

BOOK OF ABSTRACTS



Future of Rural Peoples:

Fifth
International
Symposium

Rural Economy, Healthy
People,

October 19-23, 2003

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Fifth in the World Leading Series of Symposia
Addressing Health and Life Issues for Rural People



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Institute of Agricultural Rural and Environmental Health



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Future of Rural Peoples: Rural Economy, Healthy People, Environment, Rural Communities

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Sunday, October 19

Pre-Conference Session I
- Exposure to Endotoxin and the Lung -

Salon Batoche – 09:00-14:00

High Plains Intermountain Centre for Agricultural Health and Safety, Colorado State University

Institute of Agricultural Rural and Environmental Health, University of Saskatchewan

Co-Chairs: *DA Schwartz, Duke University, North Carolina, USA*

S Reynolds, Colorado State University, USA

- 352 Dose-Response Relationships in Mixed Agricultural Aerosols:** 09:20-09:40
Implications for Exposure Limit Setting for Endotoxin, Particulate Matter, Oral
and Ammonia in Confined Animal Feeding Operations
KJ Donham, Agricultural Medicine Department of Occupational and Environmental Health, College of Public Health, University of Iowa, USA

Numerous articles have been published regarding the adverse respiratory health consequences of working in confined animal feeding operations (CAFOs). Threshold limit exposure guidelines are not currently applied to this environment, but they are essential to implementation and monitoring effective environmental controls. Four different studies have shown that levels in excess of 2.5 mg/m³ particulates, 0.23 mg/m³ respirable particulates, 100 EU/m³ endotoxin, and 7 ppm ammonia are associated with excessive cross shift decrements in pulmonary functions, and adverse respiratory symptoms. These levels are far in excess of either ACGIH, NIOSH, or OSHA exposure limits. This study will review evidence for a synergistic adverse health effect relationship between particulates and ammonia in CAFOs that explains the disparity between current exposure recommendations, and observed adverse health effects at much lower levels. An argument and procedure will be presented for pursuing exposure standards for CAFOs. Furthermore, an argument will be made for establishing limits for only particulate and ammonia concentrations in CAFOs, as there is a close correlation between endotoxin and particulate measures and there is not currently available a low cost, field expedient endotoxin assay suitable for regulatory application.

- 180 Respiratory Response to Endotoxin Predicts Systemic Response in** 09:40-10:00
Volunteers in a Swine Barn Oral
JA Dosman^{1,2} (presenter), Y Fukushima³, A Senthilselvan⁴, SP Kirychuk^{1,2}, P Pahwa^{1,2}, JA Lawson^{1,2}, Y Cormier⁵, T Hurst², EM Barber², CS Rhodes², ¹Institute of Agricultural Rural and Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada; ²University of Saskatchewan, Canada; ³Kumamoto University, Japan; ⁴University of Alberta, Canada; ⁵University of Laval, Quebec, Canada

Objective

We wished to investigate if systemic response could be predicted by FEV1 response in naïve volunteers following swine barn exposure in which endotoxin was an exposure variable.

Methods

Naïve males were tested at three exposure levels: baseline (lab); low endotoxin and dust (canola oil treated swine barn room); and high endotoxin and dust (untreated swine barn room). Subjects were classified as "more responsive" (n=9) or "less responsive" (n=11) based on FEV1 reduction following

high endotoxin exposure. Health measures included pulmonary function testing, methacholine challenge, serum samples and nasal lavage. Endotoxin, dust, hydrogen sulphide (H₂S), carbon dioxide (CO₂) and ammonia (NH₃) samples were collected from the barn.

Results

White blood cells (WBC) and blood lymphocytes at low exposure, as well as nasal lavage counts at high exposure were significantly greater in those who were more responsive compared to those who were less responsive. There was a significant increase in serum lymphocytes, serum IL6, total nasal lavage cells and nasal IL8 at high exposure among more responsive subjects compared to less responsive subjects.

Conclusions

These findings raise the possibility that the respiratory response to high level exposure predicts systemic response throughout a range of exposures, including a trend at ambient “non-exposure” levels.

254 Endotoxin in Organic Dust of Common Workplaces: Effects on Naïve Subjects and Workers

10:00-10:20

Oral

Y Cormier (presenter), *E Israel-Assayag*, *C Duchaine*, University of Laval, Quebec, Canada

Airborne endotoxins are present in many workplaces contaminated by organic dust. As expected we found high levels of endotoxins in the air of swine confinement buildings (SCB), dairy barns, and sawmills. Naïve subjects exposed for 4 hours to a SCB developed an inflammatory response in their nasal passages, lungs, and peripheral blood. The response was reproducible when the same subjects were exposed twice to the same SCB or exposed weekly to 8 different SCB chosen to represent the whole spectrum from dirty to clean. Obese subjects had a different response than lean individuals, consistent with the pro-inflammatory effect of adipose tissue. Workers had an attenuated response to chronic SCB exposure, but here again the response was modulated by obesity. The milder inflammatory response correlated with an increase in circulating soluble L-selectin (which has as an anti-inflammatory role). sL-selectin levels were significantly higher in the sera of pig farmers than in control subjects (1452 ± 62 ng/ml vs. 872 ± 25 ng/ml, $p < 0.0001$), whereas naïve subjects exposed for 4 hours to a SCB had no increase of their sL-selectin levels.

In conclusion: 1) organic dust in SCB, dairy barns and sawmills is highly contaminated by endotoxins, 2) obesity modulates the inflammatory response to endotoxin exposure, 3) shedding of L-selectin may down-regulate the inflammatory response to organic dust-contaminated environments and constitute one mechanism by which farmers adapt to their environment.

419 Distribution of Dust and Related Compounds after Oil Sprinkling in a Swine Facility: A Pilot Study

10:40-11:00

Oral

P Willson, Vaccine & Infectious Disease Organization, Saskatchewan, Canada

Background

Oil sprinkling has shown promise as a viable method for dust control in swine facilities. However, there is concern that oil sprinkling may impact the distribution of particulate matter and associated compounds.

Objective

To investigate if sprinkling canola oil to control dust in swine facilities alters the concentration and distribution of particulate matter and associated compounds (endotoxin, DNA, and viable microbes) in grower/finisher rooms.

Methods

Air sampling took place in August and December of 2001 at Prairie Swine Centre Inc., a research swine facility, near Saskatoon (Saskatchewan, Canada). The distribution studies were conducted in four identical grower/finisher rooms. Two rooms were sprinkled with oil, whereas the controls were not. Collection of total dust was achieved using an eight-stage nonviable cascade impactor. The impaction filters were weighed before and after the sampling events to obtain a dust weight at each of the eight stages (particle size range). The dust was then extracted from the filter. The extract was analyzed for endotoxin, and DNA. A six-stage viable cascade impactor was used to quantify total bacteria, enteric bacteria and fungi. Results: Oil sprinkling reduced total dust by 86%, endotoxin by 82.5% and DNA by 71.2% in the winter. However, it appears that the reduction is observed predominantly on large dust particles ($>2.1\mu\text{m}$). In addition, the proportion of endotoxin associated with smaller particles ($<3.3\mu\text{m}$) increased in the treatment rooms. The distribution of DNA does not demonstrate a consistent trend and requires further research. Finally, oil sprinkling does not markedly alter the distribution of total bacteria, enteric bacteria or fungi.

Conclusions

Although the benefit of oil sprinkling has proven to significantly reduce total dust in swine production facilities, smaller particles and endotoxin associated with them appear to remain in suspension, suggesting the impact oil sprinkling has on particle distribution requires further study.

122 PyroGene - A New Endotoxin Detection Method using Recombinant Factor C

11:00-11:20

Oral

L Chen, Cambrex Bio Science Walkersville Inc., Maryland, USA

Gram-negative bacterial endotoxin is a widespread contaminant of a variety of materials, such as water, food, pharmaceutical products, and environmental samples. Endotoxin can cause excessive inflammation when introduced into a host by inducing cytokine responses in macrophages. Current endotoxin detection utilizes a coagulation cascade found in *Limulus* Amebocyte Lysate that is activated by endotoxin binding. A new endotoxin detection method, PyroGeneTM, using the recombinant Factor C, the first component in the coagulation cascade, is described. Recombinant Factor C, a serine protease zymogen, can be activated by endotoxin. The activated form of the enzyme then reacts with a synthetic fluorogenic substrate to yield a fluorescence signal that is proportional to the endotoxin concentration. The endotoxin detection range of the PyroGene method is 0.01–10 EU/ml.

PyroGene methods, when compared to LAL tests, have no glucan reactivity and measure similar potency using purified endotoxin–Lipopolysaccharides from Gram-negative bacteria. Water samples and several environmental samples have been tested and compared. The results show that the new PyroGene method is equivalent to the LAL method for endotoxin detection.

283 Evaluation of Recombinant Factor C Endotoxin Assay using Agricultural Dusts

11:20-11:40
Oral

SJ Reynolds (presenter), *J Ragan, R Thate, J Tessari, J Nakatsu, M Tillery, L Larsson, D Lewis, L Chen*, High Plains Intermountain Center for Agricultural Health & Safety, Colorado State University, USA

Endotoxins are an important component of organic dusts that contribute to occupational lung disease in more than 700,000 North American agriculture workers. Accurate measurement of endotoxin exposure is critical to establishing appropriate occupational guidelines and controls. The goal of this study is to evaluate a novel Recombinant Factor C (rFC) endotoxin assay using organic dusts from livestock environments.

Different extraction methods including two different types of plastic centrifuge tubes (polypropylene and polystyrene), three different types of extraction media (endotoxin-free water, 0.05M KPO4/0.01% triethylamine buffer, and 0.05% tween) and centrifugation versus non-centrifugation were evaluated. Recovery of spikes and reproducibility of replicates were also determined. The rFC assay was compared to the KQCL assay for a subset of samples, and also analysed using GC/MS.

Preliminary results with bulk dust collected from a sheep farm show the average coefficient of variation to be 0.128 for duplicate wells. Extraction with Tween showed the highest endotoxin recovery, and lowest coefficient of variation. A dilution-dependent effect of the buffer was apparent, with little recovery of spikes from undiluted samples. Recovery of spikes in water and Tween was about 65%. The rFC and KQCL correlated well ($R = 0.9298$). Future work includes GC/MS studies, and application of the rFC to evaluation of aerosol sampling devices for a variety of agricultural dusts.

199 Determination of Endotoxin by GC-MS: an Update and Critical Evaluation

11:40-12:00
Oral

L Larsson, University of Lund, Sweden

Endotoxins (lipopolysaccharides, LPS) are ubiquitous in our surroundings. Recent research has suggested both a protective and inducing role of environmental endotoxin exposure in the development of allergy and asthma. These conflicting findings may partly be due to lack of standardized methods to quantify and characterize endotoxin in sample matrices that are complex chemically. More reproducible and specific methods are clearly required.

In our laboratory we have for several years used a chemical-analytical approach that involves determination of LPS-specific monomeric constituents by gas chromatography/mass spectrometry (GC/MS, GC/MSMS). The 3-hydroxy fatty acids (3-OH FAs) linked to the lipid A backbone are used as chemical markers for LPS. The present communication describes a new, integrated procedure using ion-trap GC/MS/MS to determine 3-OH FAs with 10–18-carbon chains in air-borne and settled dust samples. Recent research has demonstrated that this approach can be used to reveal a disturbed bacterial flora in agricultural and indoor environments.

Comparative analyses of samples of air-borne dust from schools in different geographical regions revealed dramatic differences in 3-OH FA patterns, and the same was observed in other studies comparing damp and reference buildings, which in addition indicated correlations with effects on health, including asthma and upper respiratory infections. There is a need for further methodological developments to improve the reproducibility in quantifying the markers in complex matrices.

The presented method constitutes a part of a more general approach to characterize organic dust microbiologically and that includes certain branched-chain fatty acids with chain lengths of 15 and 17 carbons, muramic acid, and ergosterol. The first two markers (plus the 3-OH FAs) are analysed in a single dust sample using a differential extraction procedure and ¹³C-labelled cyanobacterial analogues as internal standards, whereas ergosterol is determined in a separate sample.

379 Adaptation to Endotoxin in Chronically Exposed Swine Confinement Workers

13:00-13:20

Oral

S Von Essen (presenter), *D Romberger*, *T Mathisen*, University of Nebraska Medical Center, USA

Swine confinement workers commonly develop airway obstruction secondary to their occupation. Studies have shown that exposures to endotoxin, dust and ammonia contribute to respiratory symptoms and airway obstruction. Both naïve subjects exposed to the hog barn environment and workers have evidence of an inflammatory response in the lower respiratory tract that consists of increased numbers of neutrophils, macrophages and lymphocytes. It is of note that workers have a far less exuberant cellular inflammatory response than do the naïve subjects. Interleukin 6, a mediator of inflammation, is also present in lower amounts in workers. Less information is available about potential differences in other mediators of inflammation known to be important after hog dust exposure, including Interleukin 8. There is evidence from published studies that L-selectin may play a role in modulating the inflammatory response to the swine confinement barn environment. Repeated exposure to endotoxin causes an adaptation response to occur, suggesting that this may be the mechanism of the observations in swine confinement workers. Mechanisms of inflammation after hog barn exposure and the adaptation response to endotoxin will be discussed in detail.

396 Application of the Recombinant Factor C Assay of House Dust: Comparison with LAL, 3-hydroxy Fatty Acid, and (1-3) beta-D-glucan Assays

13:20-13:40

Oral

D Milton, Occupational and Environmental Health, Exposure, Epidemiology, and Risk Program, Department of Environmental Health, Harvard School of Public Health, Massachusetts, USA

Conditions for the rFC assay were optimized for use with a triethylamine phosphate buffer and applied to analysis of 60 house dust samples collected as part of an ongoing birth cohort study of childhood asthma. We measured 3-hydroxy fatty acids by GC-MS and (1-3) -D-glucan using a monoclonal IgM sandwich ELISA. Correlation between rFC and LAL assay of the samples was 0.92.

Both measures of endotoxin bioactivity showed moderate to strong correlations with 3-OH C10:0, C12:0 and C14:0, and weak or no correlation with C16:0, C17:0, and C18:0 3-OHFAs. The difference between the LAL estimates and the rFC estimates were not correlated with glucan content of the dust.

Multivariate analyses of LAL and of rFC responses showed that after controlling for C14:0, none of the other 3-OHFAs contributed significantly to predicting endotoxin bioactivity, except for C18:0, which was a significant (rFC) or borderline significant (LAL) and inversely related to endotoxin potency of dust samples.

Multivariate analysis of the LAL response showed that it was largely accounted for by the rFC response, but that C14:0 remained a significant independent predictor of the LAL response after controlling for rFC.

348 Identification of Novel Genes Mediating Innate Immunity

13:40-14:00

Oral

*DN Cook*¹ (presenter), *S Wang*², *Y Wang*², *GP Howles*², *GS Whitehead*², *KG Berman*², *TD Church*², *B Frank*¹, *R Gaspard*¹, *Y Yu*¹, *BJ Paigen*⁴, *J Quackenbush*¹, *DA Schwartz*³
¹Duke University Medical Center and Durham VAMC, North Carolina, USA; ²Institute for Genomic Research, Maryland, USA; ³Department of Biochemistry, George Washington University, USA; ⁴Jackson Laboratory, Maine, USA

Identification of novel genes regulating lipopolysaccharide (LPS)-induced inflammation would lead to a clearer understanding of the pathogenesis of LPS-induced toxicity and might facilitate novel interventional therapies and genetic/genomic screens for individuals at risk for diseases related to LPS-induced inflammation. We combined quantitative trait loci (QTL) analyses and microarray-based gene expression studies to identify LPS response genes in lungs of mice. C57BL/6JxDBA/2J (BXD) recombinant mice were used in these studies because the two parental strains differ markedly from one another in their biologic responses to LPS. Analysis of BXD F2 mice revealed a QTL on chromosome 2 affecting pulmonary TNF- α production, but not PMN recruitment to the lung airspace. A distinct locus affecting both TNF- α production and PMN recruitment was identified on chromosome 11.

In a parallel study, microarray analyses of BXD recombinant inbred (RI) mice identified approximately 500 genes whose expression was significantly changed by inhalation of LPS in at least one of the BXD RI strains analysed. Many of these identified genes have not been previously associated with the response to LPS. The expression pattern of some of these genes differed significantly between low and high responder BXD RI strains, suggesting a functional role for these genes in the LPS response.

A comparison of the genes identified by QTL analysis and microarray analysis revealed 28 LPS-induced genes that reside within one of the two identified QTL. Genes identified by both of these independent approaches represent particularly strong candidates for further functional studies.

223 History and Results of the Two Inter-Laboratory Round Robin Endotoxin Assay Studies on Cotton Dust

Not Presented

DTW Chun, *V Chew*, *K Bartlett*, *T Gordon*, *RR Jacobs*, *BM Larsson*,
L Larsson, *DM Lewis*, *J Liesivuori*, *O Michel*, *DK Milton*, *R Rylander*, *PS Thorne*,
EM White, USDA, ARS, Cotton Quality Research Station, South Carolina, USA

The assay of endotoxin has garnered importance in the study of respiratory dysfunctions since the determination that endotoxin is the most likely etiological agent of byssinosis. In most cases, the importance of determining which samples contained high and low levels of endotoxin was all the information needed and this ranking of samples was usually in good agreement between laboratories. However, when identical samples are assayed for endotoxin content by different laboratories, the levels differ often in orders of magnitude. Even though this permitted comparisons to be made, the differences in levels has always been a nagging concern since this meant that results reported and read in the literature must be interpreted with caution, with due consideration of the extraction methods and the laboratory conducting the analysis.

To address this concern, an inter-laboratory two-part round robin endotoxin assay study was conducted using filter membranes with the same amount and type of cotton dust that was analysed by laboratories that routinely perform endotoxin analysis. Initial results were the results each laboratory obtained using its normal method of endotoxin analysis. Later results were of filter membranes with cotton dust where the analysis were performed as before but with a common extraction protocol. The intra-laboratory results had small variations but the inter-laboratory results had very high variations. This held true for both parts of the study; but in the second part of the study, when the extraction protocol was standardized, the inter-

laboratory results showed reduced differences, which suggested that with further standardization, further reduction of differences between laboratories might be achieved so that results between laboratories would become comparable. These results stimulated a second inter-laboratory round robin study where the laboratories used a common extraction protocol and endotoxin assay kit to assay filter membranes with cotton dust containing a high and low endotoxin concentration. Again, intra-laboratory variation was small and inter-laboratory variation was reduced but not enough for inter-laboratory agreement for the same samples. But, practically all of the laboratories were able to discern between the high and low endotoxin concentration dusts.

Pre-Conference Session III

- The Changing or Complementary Role of Universities in the Rural Sector -

Starlight Room, Sheraton Cavalier Hotel

Organized by: *University of Saskatchewan International*

College of Agriculture, University of Saskatchewan

Co-Chairs: *Ernie Barber*, College of Agriculture, University of Saskatchewan, Canada

David O'Brien, University of Saskatchewan International, Canada

405 The Role of the University in Agriculture and Rural Development in Mongolia

09:00-15:30

N Altansukh, B Erdenebaatar, Mongolian State University of Agriculture,
Ulaanbaatar, Mongolia

Agriculture is fundamental to rural development and a major component of the Mongolian economy. The transition from central planning to a free market economy has brought a nationwide shift in agricultural farming systems with a dominance of small and medium scale private producers. Although the concept of sustainable development is new to Mongolia, it is a government priority that is fundamental to the well being of rural people. A rural development strategy developed by the Mongolia government is intended to ensure the sustained growth of income for rural people, the delivery of quality social services and the sustainable use of natural resources and the environment.

The Mongolian State University of Agriculture (MSUA) combines teaching and agricultural research in a manner that provides skilled manpower and technology for the advancement of the agricultural sector and rural development. MSUA is a national agricultural university including 4 leading research institutes and regional branches in different provinces. The role of the MSUA in advancing the development of rural areas has increased since Mongolia began the transition to a market economy. Faced with local natural pressures and global impacts, Mongolia's agriculture needs large-scale technological innovations and solutions to overcome the challenges.

Research and education activities of MSUA are being restructured to better address the problems facing agriculture. These activities include broader postgraduate training and end-user oriented strategies. Restructuring and capacity building of MSUA at the central and regional levels has increased to be ahead of demands of the production sector and to lead with efficient and progressive technologies.

- 406 Exploring University-Community Relations: the Case of Brandon University's Community Outreach Service** 09:00-15:30
R Annis, D Walsh, University of Brandon, Manitoba, Canada

The role of universities in community activities is changing. Instead of taking an objective position and distanced approach to community activity, university researchers are increasingly engaged with community residents to collaboratively conduct research, provide services and educate. This shift is largely a result of the university's expanding and flexible roles in contemporary society, but it is also driven by funding bodies who advocate collaborate approaches to community development, particularly in research.

This paper will examine the changing role of the university on what's being called the Research Activity Continuum, which spans from university driven research activity to community-university partnerships to community driven activity. The Brandon University Community Outreach Service will be used as an illustration of a vehicle for facilitating community-university research activity. The service will be discussed in terms of its goals, approach and delivery. Lessons learned and recommendations for others interested in such a service will also be provided.

- 407 Building University-Farmer Linkages for Poverty Reduction & Rural Development - a Case Study from Himachal Pradesh** 09:00-15:30
Prof Atul, Tej Partap, Himachal Pradesh Agricultural University, Palampur, India

As the world is entering into a regime of globalization, the farming communities in the developing countries (DCs) find themselves under immense pressure of WTO-led open market imperatives and short-term private gains at times at the public cost. The DCs are gradually realizing the need to restructure and redesign their agricultural, educational and village institutions to enable crop diversification and biodynamic farming that can achieve both the poverty reduction and rural development goals.

Himachal Pradesh is a Himalayan state of India with rich natural wealth and enterprising farming communities, 84% of whom are marginal and small with average landholding of <0.4 ha; majority of them living below poverty line. The subsistence agriculture practices generate the livelihood for only four months and for the remaining period, they have to look for alternatives to meet their food security needs. Unemployed educated, especially agricultural, graduates have added extra burden on the communities, as traditional agriculture is no longer an employment avenue for them. However, these second-generation young farmers have acquired both the scientific and traditional knowledge of farming from the university and their farming elders respectively. What they need is to be equipped with necessary business oriented knowledge and practical skills in farming, entrepreneurship development and business-platform-based production and management.

Keeping this expressed needs of the rural people in mind; a cash crop enterprise-based rural development program was launched in the Chamba region of the state. The objective was to improve the income and livelihood of the rural poor through organic production of high value cash crops such as medicinal, aromatic and natural dye plants and agro-entrepreneurship development. Various participatory rural assessment exercises, individual and institutional capacity building and targeted skill development training programs were organized at the village level. Under the concept of seeing-is-believing, the confidence building trial of an aromatic plant – Lavender was undertaken at the university farm located in rural areas. This resulted in a successful case demonstration of maize-lavender cropping system. An innovative memorandum of understanding (MOU) between the farmer and researchers mechanism developed, bridged the gap between technology generator, disseminator and the farmers. The key to this

success of this model was the multi-institutional linkages operationalized in which all the partners - the university, industrial technology institute, the buyer of Lavender oil and the grower of the crop interacted and worked at one forum called the Bio-business society. The model helped the farmers to earn a net income of more than US\$2000/ha/yr. The success of this model has generated an overwhelming tremendous response in the farming community and is being replicated in other parts of the Himalayas with other MADP crops like *Geranium*, *Mentha* and herbal tea etc. Thus, lessons learnt from the work is that agricultural university, in order to remain relevant and vibrant in the society must learn to be innovative to fit its teaching, research and outreach work with changing paradigms and imperatives. The outcome of its work is increasingly evaluated in terms of its tangible impact on poverty alleviation, livelihood improvement, and ecological sustenance of the entire system.

408 The Role of Chernivtsi National University in the Agricultural Sector

09:00-15:30

R Bepalko, IS Smaha, Chernivtsi National University, Ukraine

Printed abstract not available.

409 University's Role in Mobilizing Agrarian Community Resources: a Strategical Alternative in Broadening the Profile for Sustainable Development, Phufa District, Nan Province of Northern Thailand

09:00-15:30

S Kasetkasem, P Boonruang, Kasetsart University, Bangkok, Thailand

A challenge of Kasetsart University collaborative research activity is to broadening the profile for sustainable development strategy of Phufa Royal Center in the district of Bo Kluea, Nan Province, Northern Thailand. The search for more intellectual and integrated development capabilities has been done focusing on a critical appraisal of current agrarian and agricultural systems in targeted village communities around the Royal Center. Not surprisingly, various attempts have been made to improve the prevailing situation of the village community with more sensitive to participation of the community, partnership-community based orientation, and the conducting of research that is of relevance are much more important. In broad sense, the picture that emerges is clear to all those who deal with human ecological problems and broader views of environmental quality issues of the area. Much has been stressed on the condition and process in which rural interests are important or predominant geared toward lifelong growth and learning to gain new fresh ideas as the most precious raw materials for continued success with an inordinately high level of creative alertness as well as innovative problem solving for all concerned.

Much of the support for a strategic alternative system of farming practices has given strength and viability in the way we treat our environment and changes in the way we view our economy. This is based and a felt need for a reorientation, a need to put a human ecological face on sustainable development underpinning today's future-oriented participatory strategies. These changes and other necessary conditions for creating a positive intellectual integrated approach come with a long-term policy framework conducive to promoting adaptive research and innovative extension. Together they support needed change in agriculture paradigms so that they are consistent with agro-ecological knowledge. The effect of these various factors has contributed to moving and providing appropriate technologies and information for increasing productivity and efficiency in a way that makes agriculture compatible with activities to reduce natural environment disturbances for a broader and better environmental quality protection of the society.

410 Training for Health Renewal: Mozambique and Canada

09:00-15:30

M Dickson, D Kossick, University of Saskatchewan, Canada

The Training for Health Renewal Program (THRP) links the University of Saskatchewan, the Ministry of Health in Mozambique and communities in Mozambique and Canada in an innovative program in transforming health institutions, so they can be more responsive to community health and development initiatives, and training communities to carry out community based actions and activities to build healthy communities. Our involvement in the Universities in the Rural Sector session would be to look through our experience at these critical areas: developing a critical and positive relationship between university institutions and communities – what are the ingredients; how do universities and communities change to be able to work together; what are the points of mutuality between communities and universities at home and internationally; what is the essence of the learning relationship – who has what to offer, and who benefits; is there a qualitative difference in program objectives and delivery that benefits both the university and the community in a joint working relationship? In a participatory format and dialogue presentation we would seek to address these issues. The program was supported by CIDA and the AUCC.

411 The University Research Ethics Board and Community-Initiated Research

09:00-15:30

BM Gfellner, Brandon University, Manitoba, Canada

The Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans under the auspices of the National Council on Human Ethics in Research (NCHER) mandates ethical review of research, provides global policy and a means of vetting research in academic settings. Regional Health Authorities are establishing similar protocol for ethical issues in research but such bodies are lacking in most other areas of the public sector. This not only leads to complexities for academic researchers who venture into such domains but it reflects a basic lack of understanding of research ethics beyond academic settings.

Ethical issues in research are continuously evolving as new avenues of inquiry emerge (such as use of inter-net, availability of public and private data bases, movement into different cultural venues) and this raises challenging and controversial concerns. It is not surprising that the ethics of research beyond academic circles tend to be mired by confusion and often lack of awareness.

This presentation addresses the important role of university research ethics boards (REBs) in educating communities of the need for ethical review and what it entails to the development of a protocol for vetting community-initiated projects. The initiatives and policy developed by the REB at Brandon University will be used to illustrate how ethical issues in various types of research in rural communities are accommodated. Our experiences will be examined using examples from Outreach projects and other kinds of community research. As well, the challenges faced by REBs in dealing with community-initiated research such as time, costs, liability, and ownership will be considered.

412 Research Partnership on Community Resiliency in Rural Atlantic Canada

09:00-15:30

L Gien, Memorial University, Newfoundland, Canada

Introduction

The pressure towards building partnership to conduct research is mounting. Most major funding agencies have stipulated that one of the criteria for funding is the partnership formulated between various institutions and different sectors including universities, community agencies, and voluntary organizations.

Part of the rationale for this future trend is that current problems are too complex to be adequately addressed by a single discipline or a single institution. Furthermore, fiscal constraints necessitate

collaboration amongst disciplines and various sectors. It is, therefore, crucial that faculty members and graduate students be prepared in intersectoral skills which may involve having a greater breadth and depth of knowledge of more than one sector.

Purposes

This paper discusses the nature of partnership in research, the opportunities it presents, the strategies to overcome challenges, and its future role in research. It is based on a literature review and personal experience in a research program involving 13 interdisciplinary researchers from various sectors, several graduate students at the Master and Doctoral levels, and post-doctoral fellows. This true interdisciplinary team combines the expertise of individuals from the communities, voluntary organizations and academic disciplines of the Health Sciences, Natural Sciences, Education, Social Sciences, and the Humanities to explore the health and resiliency of Newfoundland coastal communities following the cod moratorium and termination of TAGS (a federal financial program that kept these communities afloat) and that of Cape Bretoners following the mining closure. Lastly, the implications of partnership in research will be discussed. Supported by the three-year research grant from the Social Sciences and Humanities Research Council.

310 Health Education Through Extension Leadership: a Model for Rural Community Health and Well-Being

09:00-15:30

LA Jouridine, B Tanner, V Lasley-Bibbs, Kentucky State University, USA

Introduction and Background

The Health Education through Extension Leadership (HEEL) is the product of an unprecedented partnership with the College of Medicine's School of Public Health and the University's College of Agriculture to provide a unique mechanism toward effective outreach education through established infrastructures within the land-grant system. HEEL has as its primary mission the improvement of the lives of rural Kentuckians and others by promoting healthy behaviors and lifestyles that diminish designated risk factors for illness and distress. HEEL provides the leadership in the Commonwealth toward the bridging of people, resources, ideas and actions to serve as a catalyst for change at the community level. The emphasis on chronic disease and mental wellness as a part of the first phase of HEEL was determined through the understanding that for rural communities to be economically and socially viable and thriving, families must be informed and empowered to reduce their exposure to a variety of unhealthy stimuli. The overall objective of HEEL is to mobilize health resources within the Commonwealth and enlist support in promoting our mission.

Discussion

This model utilizes the strength of the Cooperative Extension Systems' role in the land-grant system, recognizing the country extension agent as the change agent for local and community success. In this project, USDA funding has allowed for the hiring of a diverse group of Health Associates who serve as an additional resource to focus concentrated efforts on designated rural areas of the Commonwealth, which are often underserved through traditional methods of health education. The Health Associates are housed at the University and serve in a liaison role bringing resources and expertise from the Colleges of Medicine and Agriculture, and other University partners, along with state and local agencies, to the country agent and subsequently the rural populations they serve.

Conclusion

The HEEL project is a work in progress and serves as a blueprint for the way in which the University and Medical communities of a Commonwealth, State or Province, can partner to bring the mission of federal, local and state health agencies to rural communities, through the land-grant system of outreach education.

413 University:Community Partnership in Tagore's Visva-Bharati
S Joseph, Visva-Bharati, W Bengal, India

09:00-15:30

Objective

This paper will discuss the university:community partnership in Rabindranath Tagore's Visva-Bharati. The ideals of education and rural reconstruction of Visva-Bharati will be analysed from a theoretical and operational perspective across history and the lessons learnt will be discussed.

Discussion

Tagore explains the significance of Visva-Bharati: "If schools in a true sense are established in India, then its sciences of economics, agriculture, hygiene and in fact all its operative sciences, should be spread out to the surrounding rural areas, centering around the original institution. This institution will then occupy the central place of Indian life style. This institution will arrange tilling in the best way, look after the cattle and weaving in ideal manner and by adopting cooperative method will achieve financial self-sufficiency." The school was named Santiniketan and the rural reconstruction work was carried out from Sriniketan, the two campuses of Visva-Bharati University.

The experiments in Sriniketan is a good model of university:community partnership and it had contributed significantly to the development of the post-independence rural development programmes in India. However, with the institutionalization of Visva-Bharati into a university, voluntarism gave way to 'professionalism' and the partnership became less strong and effective with growing red-tapism, bureaucracy and officialdom.

Conclusion

The lessons learnt from the study of the university: community partnership of Visva-Bharati shows that taken into account the issues and problems the rural society faced during that time, the knowledge and voluntary efforts made by Visva-Bharati was an ideal model. We also learnt that professionalism without voluntarism would not sustain the health of the university as well as the community. Taken into consideration, the scope of involvement of a university in the lives of rural people, the university can take a complementary role in changing the lives of the rural people and in turn acquire knowledge from the community to complement its teaching programme.

414 Role of Univeristy in Rural Agriculture Development in Kenya
BN Mitaru, University of Nairobi, Kenya

09:00-15:30

Agriculture contributes 53% of GDP and employs 75% of the labor force in Kenya. Out of the country's population of 30 million, 80% live in rural area, where 75 % are engaged in agricultural activities. Rural agricultural systems range from subsistence to specialized market oriented.

Over and above their mandate of training manpower for agricultural development, the faculties of agriculture in Kenya contribute to rural development in policy formulation, research and technology transfer. Food security and poverty alleviation are the major thrusts for development. Farmers are involved in decision making to ensure ownership by the rural communities. Hence the University researchers in collaboration with other partners have continued to make contribution to sustainable livelihoods of rural communities by increasing agricultural productivity, post harvest value of crop and livestock products and conserving the environment.

The Universities have a considerable potential to make a bigger contribution to rural development, however this is limited by financial constraints and lack of explicit policies that promote their integration into the national agricultural research system. Through effective linkages with national

research/technology transfer institutions, the universities will improve their performance and contribution to the entire national agricultural research system. Regional and international linkages would further enhance the performance.

415 Agricultural Community Development in the Rift Valley, Ethiopia

09:00-15:30

AR Mermut, University of Saskatchewan, Canada

Agriculture is the mainstay of the Ethiopian economy: 85% of the population earns its livelihood directly from agriculture. Ethiopia's primary development goal is to eradicate poverty and promote sustainable and equitable development. Meeting the food security need of its growing population of over 60 million is paramount to the development strategy of the Ethiopian government. The deterioration of natural resources has resulted in reduced agricultural productivity, and, consequently, reduced quality of life. Most of the land is degraded and depleted in soil fertility, and people living in rural areas have not been self-sufficient in food production for more than three decades. About 52% of the Ethiopian population is food insecure. Training human resources is one of the most important steps that can be taken to rectify the rural agricultural problems. A project is conceived to promote farm-based expertise, particularly among women. This project is expected to enhance agricultural training at the Bachelor's and diploma levels at the Debub University in Awassa and enhance research and extension expertise. These can be achieved if agricultural training, research, and extension services collectively address these issues. Farmer groups with local administrators are expected to play a very important role in the extension and implementation of practices to the larger communities that could reinforce the sustainability of agro-ecosystem productivity. The ecosystem approach for agriculture considers soil, water, plants, and animals together with the target of restoring the natural ecological balance between these components. Watershed consideration could also reduce the risk of conflicts of resource management. By focusing on institutional and human resource development, the work with farmers, decision makers, academics will have long-term benefits.

416 Building Local Capacity in the Provincial Norths: Is There a Role for Post Secondary Institutions?

09:00-15:30

T Summerville, R van Adrichem, GN Wilson, University of Northern British Columbia, Canada

In order to build sustainable, healthy communities, northern regions must develop diverse connections between a variety of governmental and non-governmental institutions and actors. These regions, however, often find it difficult to build such connections for reasons of distance, geography and a lack of institutional capacity at the local level. Given these difficulties, a number of scholars have suggested that universities and colleges in the North can play a critical role in terms of building capacity and acting as a conduit between citizens and organized interests. How can universities and colleges develop the connections needed for healthy and sustainable communities in the North? To answer this question, the first part of this paper will explore the connection between regionalism and political and economic development presented by Michael Keating in his work on the new regionalism. Keating argues that regionally based and regionally focused institutions are able to accumulate specialized knowledge and skills for the purpose of regional development, which is less a matter of administration than of the promotion and stimulation of activity. As such, there is a need for specialized institutions which create connections aimed at fostering regional development, especially in the new regional context where globalization has focused the state's attention away from dealing with regional issues. This issue is particularly acute in the Canadian provincial norths which, in comparison to the territorial norths, are lacking in representative institutions and real political power.

Part two will examine the specific literature on the role of institutes of higher education in northern development, focusing in particular on the contributions of scholars such as Geoffrey Weller, Douglas Nord and Ken Coates. Their work on comparative education has highlighted the need for northern post-secondary institutions to act as engines for regional economic development through their delivery of both professional and traditional academic programs. Universities and colleges in the North, however, need to go beyond the mere delivery of programs. They need to help the communities they represent develop capacity so that the communities themselves can build functional and knowledge-based bridges and networks. Universities and colleges can assist in building capacity by developing specialized institutes that facilitate networking between institutions and governing structures at the regional and municipal levels. Currently the Political Science Program at the University of Northern British Columbia is developing a Northern Governance Institute that will act as a centre for innovation and sharing best practices concerning public policy among communities in the provincial norths. Its activities will help to create an effective and cohesive voice for communities in the provincial norths, thereby putting them into a better position to take advantage of the opportunities that exist in the new globalized economy.

417 Training Communal Farmers in Namibia: the Role of the University in Rural Development 09:00-15:30

M Undi, University of Namibia, Windhoek, Namibia

Immediately after independence, the Namibian government embarked on a land reform and resettlement program to resettle previously-disadvantaged people. The program, among other objectives, aims to redistribute land in a fair and equitable manner such that all citizens have equal access to productive land. A number of farmers have benefited from this program already. The main problems encountered so far are poor farm management skills which have led to unproductive utilization of farm resources, illegal land sales, overgrazing and poor economic performance. A critical review of the above situation shows that the main contributing factor to poor performance is lack of the appropriate farming skills. Therefore, a need to train communal and resettled farmers exists and this need has been raised in various fora across the nation. The University of Namibia (UNAM) and Women's Action for Development (WAD), a non-governmental organization, have taken up the challenge of improving the farming skills of communal and resettled farmers as part of their contribution to community development. The main objective of the training is to encourage sustainable methods of agricultural production among communal and resettled farmers in Namibia. This presentation will examine the constraints that have been encountered so far and the concerns and contributions of various stakeholders.

Monday, October 20

Official Opening - Plenary Session -

Adam Ballroom – 09:10-12:05

Co-Chairs: *J Guernsey*, Canadian Agriculture Safety Association, Saskatchewan, Canada

M MacLeod, Canadian Rural Health Research Society, Saskatchewan, Canada

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|------------|--|-------------|
| 380 | Why Local Economies Differ: the Dynamics of Rural Areas in the EU | 09:10-09:50 |
| | <i>JM Bryden</i> , Co-Director, Arkelton Centre for Rural Development Research, University of Aberdeen, Scotland, United Kingdom | Plenary |

DORA was a two-year comparative research project, led by the author. The key research question was: Why is the economic performance of some rural areas better than others with similar resource endowments, geography and policy environments? The research used a 'matched pairs' approach, with 8 pairs of successful-unsuccessful rural regions in four EU countries. It was inter-disciplinary, involving both quantitative and qualitative research over two years. It assessed ten factors that might account for differential economic performance (DEP), five of which were 'more tangible' and five of which were 'less-tangible' in nature, and the inter-relationships between these. The team used a common core methodology, which allowed for national differences as well as international comparison.

The paper draws on the international comparison between the findings of the four national studies. This identified six main themes which appeared to be universally important (if to varying degrees, and with varying 'content') in explaining DEP in the 16 case studies:

- culture and society in the shift from state to market
- infrastructure and peripherality
- governance, institutions, and investment
- entrepreneurship
- economic structures and organisation
- human resources and demography

The DORA study highlights that differences in economic performance cannot be explained by locational factors (transport costs, agglomeration economies) or other 'tangible' factors (capital, land quality) alone. Less tangible factors are just as important. Moreover, there are very important relationships between tangible and less tangible factors, which need to be taken into account by rural development policies.

The paper argues that in present and likely future political conditions in Europe, success depends largely on people 'doing it for themselves' at the local level, not just as individuals, but also collectively. This requires a re-thinking of the relationships between central government and local government; local governments must have the necessary fiscal and legislative autonomy to enable them to act. Central government (and EU) policies must facilitate this through appropriate policy and governance frameworks that support 'place-based' development.

261 Delivering Mental Health Services to Rural Aboriginal Populations

C Wieman, McMaster University, Ontario, Canada

09:50-10:30

Plenary

There is widespread consensus that Aboriginal peoples bear a disproportionate burden of both acute and chronic illnesses when compared to the non-Aboriginal population in this country and this would include conditions involving emotional distress. Factors that account for this disparity in health and mental health status for Aboriginal peoples are complex. These factors would include historical experiences, social and economic factors and political will that all directly relate to the determinants of health and have an important impact on health outcomes. The history of the Aboriginal peoples' experience in this country will be briefly reviewed in order to establish the context of its impact on their mental health status in contemporary times. Despite the discouraging realities, there are many vibrant individuals, communities and collectives within the Aboriginal population that are working toward the goal of developing proactive health interventions that will result in sustained improvements in overall health and mental health status. An example of emerging best practices in the delivery of mental health services to Aboriginal peoples will be described. Six Nations Mental Health Services is an innovative community-based mental health service located within the Six Nations of the Grand River Territory, the largest rural First Nations community in Canada. The work of this service over the past six years has afforded some insight into how the disparity in mental health status can be reduced. The basis for change includes acknowledging the harms of the past while focusing on the strengths and resiliency inherent in a self-perceived sense of indigeneity. This perspective enables Aboriginal peoples to maintain the momentum for planning and realizing a future of improved holistic wellness.

385 Rural Health Issues in the United States

J Merchant, College of Public Health, University of Iowa, USA

10:45-11:25

Plenary

Printed abstract not available.

384 Molecular Environmental Science: The Many Faces of Metals in the Environment

*IJ Pickering, Department of Geological Sciences, University of Saskatchewan, Canada,
and Canada Research Chair in Molecular Environmental Science*

11:25-12:05

Plenary

People are exposed to metals and metalloids in the environment on a daily basis. While many of these exposures are due to anthropogenic activities, others arise from natural sources. Although some metals and metalloids play essential roles in human health, all are toxic when exposure is at a higher level. For example, selenium is well-known to be an essential trace element, with roles in cancer protection, but if it is consumed at higher levels it can have adverse effects.

In addition to the dose, the chemical form of the metal or metalloid critically affects the element's toxic properties. For example, one form of arsenic – arsenite – is notorious as a poison, whereas another – arsenobetaine – is present in fish in very high amounts but is consumed by humans with no ill effects. Interactions between elements also can have some very surprising results. For example, arsenic and selenium by themselves are deadly but when administered in equal amounts the toxic effects can be cancelled out – an observation which may have significant ramifications for chronic arsenic poisoning in rural Bangladesh.

Since the element's toxicity is so critically dependent upon its chemical form, it is of great importance in predicting environmental impact to determine the form that is present. Synchrotron radiation techniques can be used to determine the chemical form directly in living systems, providing unprecedented

information. The Canadian Light Source (CLS), Canada's first synchrotron, is currently under construction at the University of Saskatchewan. Building on results obtained at facilities elsewhere, it will be discussed how the CLS will be used to contribute to understanding the behavior of these elements in the environment and how they impact human health. Many of these potential health-related impacts will be most profoundly felt in rural communities.

Rural Economy I

Kelsey/Saskatchewan – 14:00-17:00

Co-Chairs: *S Siever*, I.ARE.H, Centre for Agricultural Medicine, Saskatchewan, Canada
D Ehman, Canadian Agricultural Safety Association (CASA), Saskatchewan, Canada

383 Rural Economy and Health of Rural Australian Communities

14:00-14:20

L Fragar, Australian Centre for Agricultural Health and Safety, University of Sydney, Australia

Keynote

Socio-economic changes in agriculture impact significantly on Australian rural communities:

- Population decline in inland and remote Australia is mainly a result of long term pressures on the agricultural sector.
- Employment in primary industries is in decline in inland and remote Australia.
- There has been a significant change in the demography of inland rural communities, with loss of young people to metropolitan centre for education and employment.
- Growth in population is closely associated with growth in employment.
- Most growth is in coastal regions of Australia.

While recognizing the importance of active community participation and capacity building in rural health policy, and the imperative for maintaining adequate health services delivery to rural populations, it is suggested that unless active attention is given to sustaining the economic and employment base of rural communities such strategies will fail to deliver reduced health status differentials. Rural health policy in Australia needs to be accompanied by a “social and economic policy for improved rural health” – involving engagement of industry, resources, business development, education and training, employment and economic policy makers with health policy makers.

110 Women in Colonias along the Texas Mexico Border

14:20-14:40

C Giusti, Texas A&M University, USA

Oral

In the last 10 years the Texas-Mexico border economy has grown dramatically as shown in its positive economic indicators and the expansion of maquiladoras in the Mexican side. Just in 2000, U.S. exports to Mexico totalled over \$111 billion while U.S. imports from Mexico equalled \$136 billion. In the same year, 89 percent of all Mexican exports flowed to the United States while 73.3 percent of Mexican imports originated in the United States. Texas is the number one state exporter to Mexico, with exports totalling \$47 billion in 2000 (TDED 2002). However social indicators show that large portions of this region are not enjoying the benefits of such economic growth. The areas more critically left behind are Colonias around the Mexican border. Colonias, a Spanish term for neighborhood or community, are characterized as residential areas along the Texas-Mexico border that may lack basic water and sewer systems, electricity, paved roads, and safe and sanitary housing (Texas Office of Attorney General). Colonias are found in Texas, New Mexico, Arizona and California, but Texas has both the largest number

of Colonias and the largest colonia population. Ethnic minorities with unskilled labor force, high levels of poverty and isolation characterize colonias. One of the most common policy proposals to address the poverty problem has been the promotion of microbusinesses. Proponents maintain that self-employment provides a route out of poverty and an alternative to unemployment or discrimination in the labor market. (Fairlie 2001) Businesses run by women are specially encouraged for they are seen as positive means for promoting increases in family income and community economic development. Studies show that earnings from women's participation in economic activities out of the house have a direct impact on the well being of their families (Jones 1993, Richardson et al. 1993). This paper will concentrate in the role women are playing in colonias especially focusing in their contribution to economic activity in their communities. To what extent women are being able to open their own business, barriers they encounter, as well as policies that are needed to support their economic involvement.

- 96 The Commodification of Country Foods by Inuit in Nunavik**
(Northern Quebec): Implications of Economics
N Gombay, Department of Geography, Queen's University, Ontario, Canada

14:40-15:00
Oral

It has only been since the late 1950s that Inuit in Nunavik started to move into permanent settlements. This change obliged many Inuit to confront transformations in their community structures, in their economic base, and ultimately, in their sense of themselves as a people. Before this time, Inuit social structures had been fluid, with communities coming together and dissolving as people moved to different areas in pursuit of food. Their vernacular economy was based largely on the sharing of that food, with the obligation to provide whoever was in need with the necessities of life. With the move into communities, Inuit have been immersed in an economic system predicated on money and in a social system predicated on stability of residence and individual autonomy. As a means of gaining an income for those Inuit who continue to hunt, fish, and trap, some people have started to sell the produce from their efforts, commonly called country foods. This research reflects the findings of my doctoral work, exploring what the commodification of country foods has meant to people in one community in Nunavik. It examines the effects of selling these foods on people's sense of community and identity, and concludes that although this has caused the appearance of forms of behaviour that would heretofore have been deemed inappropriate, many Inuit have negotiated forms of commodification that both allow them to have an income from country foods, while enabling them at the same time, to maintain ideas about self and community through the continued sharing of these foods.

- 309 Food Security in the South (Developing World) – the Green and Gene Revolutions**
J Buckland, University of Winnipeg, Manitoba, Canada

15:00-15:20
Oral

Modern technology has been understood by many as a central means to achieving food security in the south or developing world. The green revolution led the way beginning in the 1960s. The biotechnology or gene revolution beginning in the 1990s has become the latest technical fix to food insecurity and the related problems of poverty and malnutrition. Yet food insecurity is not simply a technical problem so that technical solutions cannot encompass the problem in its entirety. For instance policies of the green revolution in South Asia did not address village and regional inequality in assets and power. There, the state-driven green revolution led to increased production without significant improvements in food security for a large share of the population. With the gene revolution, the market is expected to deliver food security where the state was unsuccessful. However, considering the gene revolution is dominated by a small number of northern transnational corporations empowered by intellectual property rights suggests, at best, the gene revolution will have a far weaker impact on southern food security. Considering such biotechnologies as the terminator, the consequences of the gene revolution on peasant

agriculture could be profoundly negative. What is needed is a holistic approach to farm and rural development that sees technology as one component and blends traditional and modern technology to suit the needs of small farmers.

131 Traditional Products for the Development of Rural Areas: the Case of Tuscan Extra-Virgin Olive Oil

15:40-16:00

Oral

N Marinelli (presenter), *V Alampi Sottini, S Menghini, L Casini*,
University of Florence, Italy

The paper starts illustrating the territorial relevance of the Tuscan extra-virgin olive oil filiere (olive growing areas cover 21.84% of total cultivated area with an average production of 17,700 tons per year) and describing the market for this specific product. This first step identifies our starting point to aim at the study's main objectives: on the one hand the paper points out the strengths and weaknesses of both the filiere and market in terms of food safety and sustainable rural development, and on the other it shows how the valorisation of typical products is able to translate the weak elements of the market into means of competitiveness.

The Tuscan extra-virgin olive oil filiere is characterised by a strong fragmentation of both the olive growing areas (a high number of small farms) and the final supply, which are elements that might create a difficult market position for the olive growers. On the other side, Tuscan extra-virgin olive oil holds an intrinsic value linked with its traceability in terms of materials and processes, and this quality, in the eye of the consumers, results in a high differentiation, exclusiveness and specificity of the local product. In addition to this, EU regulated controls and labelling policy further contribute to guarantee this value giving the consumers a more thorough information (DOP areas cover 74.8% of the total Tuscan olive growing area). Therefore, Tuscan extra-virgin olive oil finds its market position in a niche where no-price competition strategies work. It is important for Tuscan producers to reach such a market position, as it also represents the achievement of a policy that is able to define the same positive externalities as target for public and private decision making.

Local territory, landscape and their preservation carry out an essential role in a marketing strategy for the valorisation of both the specific oil production and the Tuscan rural economic and social environment. In conclusion, this is important to show how strategies that stress on territorial and traditional aspects particularly fit the aim of both answering the natural vocation of the area and turning it into a competitive factor.

138 Agro-Economy and Environment in a High Altitude Tropical Tribal Region in India

16:00-16:20

Oral

R Vasudeva (presenter), *RS Venkateswara*, Society for Environment and Economic Development (SEED), India

Interrelation between environment and agro-economy is studied in the humid tropical tribal area situated at a maximum altitude of 1020 meters above msl in Visakhapatnam district, Andhra Pradesh, India. The total annual rainfall is 1300-2100 mm. The remote isolated location in a rugged terrain covered with dense forest is the main constraint for development of basic infrastructure facilities, like housing, transport, health, electricity, communication systems, education etc. The total population is 6795, spread over 1662 households in 45 villages. Average number of households per village is 36.9. The villages are classified according to their altitude and the households on the basis of the size of their landholding. Primitive tribal groups are restricted to higher altitudes. Average population density of villages at an altitude decreases with increasing altitude. Literacy is very low at 26.48% and female literacy is 19.1%.

Because of the undulating terrain, plain land for agriculture is scarcely available; in 12% of the villages agricultural land is absent. Agriculture, their main livelihood, is poorly developed, and insufficient to meet their food needs. Per capita landholding is 0.2 hectares. Intensity of cropping is 91% as against the required 200-250%. It is because of lack of awareness of proper management of natural resources and agricultural technology. Shifting cultivation is carried out by 34.14% of the families, mostly at higher altitudes. Per hectare production of paddy is only 1.77 tons as against 4.65 tons at the state level. Per capita monthly income from various sources is only Rs.197.25 (around \$ 4.0). It is far below the poverty line of Rs.511 (around \$ 11.0) as per the standards of Government of India. Thus the region lives in abject poverty which is found to harbor unrest and extremist activities. Size of landholding, per-hectare productivity and per capita income are found to decrease with increasing altitude. The data are presented and discussed. Participatory developmental measures and training programs, for creation of awareness regarding modern location-specific agro-technology, are being undertaken by SEED and ORRC with support of government. The measures and the results accruing are elucidated.

**358 Introduction of Crop Agricultural Biotechnology to Andhra Pradesh:
Possible Effect on Small-Scale Farming and Rural Communities**

16:20-16:40
Oral

V Laurie, International Development Studies Program, Saint Mary's University,
Nova Scotia, Canada

Seventy percent (70%) of the people of the Indian State of Andhra Pradesh work in the agricultural sector and the majority of farms are still smallholdings operated by independent farmers. In result, any change in agricultural technology has the potential to effect a large percentage of the population. Crop agricultural biotechnology was introduced to Andhra Pradesh in March 2002, even though there were many organized protests by small-scale farmers and studies were not conducted in order to determine the potential social effects of the new technology. The paper highlights the findings of a study, using Cardoso's dependency approach, of whether the introduction of crop agricultural biotechnology in the Indian State of Andhra Pradesh will have an effect on land ownership patterns in rural communities within the state. The study found the change in agricultural technology would likely have a profound effect upon the classes that own and control land in the farming areas in the state. The main argument is that crop agricultural biotechnology will be far too expensive for the large majority of small-scale farmers due to fluctuating commodity prices and agricultural policies that favour larger producers. The small-scale farmers will be forced to sell their land and there will not necessarily be other employment opportunities for them. A case study about the introduction of crop agricultural biotechnology to India, created from data from the popular media, agricultural statistics, articles from activists opposed to the introduction of agricultural biotechnology, government policy papers, census data and other sources is featured. Given the political economy approach, the relationship of class, history and economic factors upon domestic politics in regard to the introduction of plant agricultural biotechnology are highlighted in the case study and the analysis that follows it. Comparisons are also drawn in the paper between trends that are occurring in land ownership in three (3) of the eleven (11) countries that have adopted crop agricultural biotechnology and Andhra Pradesh as a means of determining what trends might occur in Andhra Pradesh.

77 Safe and Healthy Agriculture in Canada

16:40-17:00
Poster
Discussion

D Ehmann (presented by *J Guernsey*), Canadian Agricultural Safety Association (CASA),
Saskatchewan, Canada

The importance of improving the safety and health of Canadians living and working on farms and ranches has never been so great. In fact, the success and prosperity of Canadian Agricultural operations depends on the continued safety, health and well being of operators and their families. Human safety and health risks are integral components of business risk management strategies that should be incorporated into all

agricultural operation management schemes. With the inception of the Canadian Agricultural Safety Association (CASA), much has been accomplished in the field of agricultural safety and health in Canada. CASA has been enormously successful in developing a national network for the implementation of safety and health programs that have seen some reduction in fatalities and injuries on agricultural operations. It has also been responsible for administering the Canadian Agricultural Safety Program (CASP) during the past eight years. However, devastating agricultural injuries and fatalities still occur. CASA is now looking to a new risk management based approach to structure its programming efforts. The objective for this new strategic planning effort is to effect change through leadership, partnerships, communications and education in order to reduce safety and health risk in Canadian agriculture. The intent is to have safety a recognized component of every agricultural business plan. A poster will highlight our current thinking on the future of agricultural safety and health in Canada. It will describe some of the many successful projects and provide a list of the products that have been developed through CASP. Success stories will be included from the past eight years. The activities used to deliver the safety message and the results of the evaluation of the activities will be provided. The goal for entering the poster abstract is to raise the level of awareness of the Canadian Agricultural Safety Association and to strengthen the network among farm safety organizations across North America and establish working relationships. Information from the projects will be a component of the poster and will reflect our national and provincial initiatives. The overall evaluation of the CASP program will also be incorporated into the poster.

260 Mountain Ecosystem, Rural Economy and Women – Challenges and Concerns: the Case of India

P Mukherjee, Department of Political Science, DCS, Panjab University, India

16:40-17:00

Poster

Discussion

Rural communities throughout India, particularly those in the mountains, depend on the forest for their sustenance and livelihood. However the introduction of inept and inappropriate development programs combined with the growing intrusion of market economy has led to the rapid depletion of forest resources.

The first section of the paper aims to highlight the ways in which the degradation of the environment has impacted on the lives of poor women in rural India. It aims to analyse how with the erosion of biomass based subsistence economy of the hill regions has increased the workload for women, impacting their health, their experience of family and culture, and has increased their poverty and educational deprivation. The major problems faced by women are the procurement of fuel, fodder and water and the depletion of vital resources have added on to their already existing arduous life in the mountains.

In the second section, the paper therefore argues that given the present situation there is a need to look into labour saving options for mountain women which is a complex issue linked closely to a multitude of factors- environmental and social. There is a need to look at these options as viable interventions which not only improves the quality of life for women but contributes in general to the overall development of the entire mountain system. and hence therefore include specific technologies as well as alternative activities and engagements.

In order to identify issues and consequent interventions vis a vis improved labour saving options for mountain women so that her basic requirements are available to her slightly more easily, we need to take a peep into the inner world, their every and understand their multifarious role in the region – as an agriculturist, as the primary forest user, as a home maker and other subsequent roles.

268 Life-Long Learning along the Food Chain in Sweden

P Lundqvist, Swedish University of Agricultural Sciences, Sweden

16:40-17:00

Poster
Discussion

The overall aim of the project is to create a picture of the value chain and detailed career routes in order to promote life-long learning by utilizing all the possibilities of competence development throughout the value and to draw attention to and remove such structural obstacles in the handling of the food chain that have prevented possibilities from being exploited in the past.

The development partnership intends to develop the food chain to become a platform for life-long learning where learning takes place to an equal extent by moving between workplaces along the value chain both within a company and between companies.

The various subprojects shall promote life-long learning and develop routines that combat alienation in the workplace and thereby encourage recruiting and retaining people who have been exposed to discrimination and unfair treatment in the labour market. The different subprojects include:

1. Development of methods and instruments for competence analysis and competence development along the food chain as well as the use of existing methods in the food industry.
2. Development of career routes, development and testing of:
 - (a) a co-ordinated system for careers guidance, and,
 - (b) a regional careers guidance center with respect to the food chain.
3. Development of women entrepreneurs along the food chain as well as the development of the value chain between the subcontractor and large-scale catering.
4. Compilation of new training courses and new educational methods for learning along the food chain.

The transnational co-operation is considered and the intention with this is that each subproject, as far as possible will co-operate with one or several transnational partners. The aim is that the actors in each subproject shall have close contact with a partner from abroad in order to be able to develop common solutions.

An example of the new creative process taking place in the work on the project is that for the first time the participants offer a variety of services, which are directed towards life-long learning along the food chain; they collect around the same table to develop new concepts, and educational programmes that cover the entire food chain.

343 The Role of Organic Marketing Initiatives in Sustainable Rural Development

P Midmore¹, C Foster¹, S Padel¹, M Schermer², MA Beckie³ (presenter)

¹University of Wales, United Kingdom; ²University of Innsbruck, Austria; ³University of Saskatchewan, Canada

16:40-17:00

Poster
Discussion

European rural policy has undergone significant change in recent years, resulting in a shift away from the previous emphasis on agricultural commodity-based support programs towards a broader set of regionally based social and environmental objectives. Organic agriculture has been increasingly viewed, in policy terms, as an important contributor to the refashioning of European agriculture and the development of more sustainable rural communities. The potential for organic systems to act as the basis or catalyst for the regeneration of rural landscapes and economies seems promising. Particularly interesting in this regard are the many organic marketing initiatives (OMIs) being developed throughout Europe. These OMIs are focal points linking producers and the environment, with marketers and consumers. Despite their pivotal role in the organic industry, and their broader impacts on local and regional development,

there is little information available about these organic enterprises. An extensive three-year study, funded by the European Commission, was initiated in 2001 to investigate the role that organic marketing initiatives do and could potentially play in linking consumer preferences with new goals for sustainable rural development, particularly in peripheral, economically disadvantaged regions of Europe.

This paper presents the framework of this study and some key findings from in-depth case studies of European marketing initiatives. The case studies drew upon quantitative and qualitative data from both documentary and narrative sources. The narrative research focused on in-depth, semi-structured interviews with relevant stakeholders and utilised a qualitative approach. Actor-network analysis was employed to investigate the impact on rural development. OMIs utilising a broad range of alternative marketing strategies were identified and examined. Successful enterprises build upon consumer interest in ethically, socially, and environmentally distinct products, and thereby strengthened the links between organic agriculture and sustainable rural development.

Healthy People I

Pascoe Room – 14:00-17:00

Sponsor: *Canadian Rural Health Research Society*

Co-Chairs: *Donna Rennie, I.A.R.E.H, Centre for Agricultural Medicine, Saskatchewan, Canada*

Roger Pitblado, Laurentian University, Ontario, Canada

128 Assessing Health and Quality of Life of Rural Communities: Piloting a Framework and Indicators

14:00-14:20

Oral

KD Ryan-Nicholls (presenter), D Ramsey, R Annis, Brandon University, Manitoba, Canada

Members of an interdisciplinary research team at Brandon University, Rural Development Institute received funding from SSHRC to assess the health and quality of life of rural communities. Phase 3 of the research project involves collaboration between researchers and rural Community Development Corporations, Regional Health Authorities, Community Futures Partners of Manitoba, Health Canada, the Rural Secretariat, and Statistics Canada, to build a framework and indicators to assess the health of rural populations and rural communities.

As part of an ongoing iterative process, development of the framework and indicators is challenged by the need to ensure that the framework and indicators are valid and reliable from a research perspective and credible as well as useful to the members of the rural communities that will employ them. Input derived from literature review, initial focus groups and later workshops with rural residents as well as validation focus groups were incorporated into the development of a framework and indicators for use by rural residents in measurement of their well being.

This process has culminated in the development of a workbook that is currently being piloted by two rural communities. The intent of the pilot is to demonstrate the extent of framework use and indicator utility, as well as, to identify areas that require adaptation for use by rural residents, in assessing the health, well being and quality of life of their rural communities.

The purpose of this presentation is to discuss the process of workbook testing by rural residents and rural communities. This presentation will focus on dissemination of information that was both useful and meaningful to rural residents as well as, that which required adaptation for use by rural communities.

124 Satisfaction and Quality of Life: Consumers' Experience with Rural Mental Health Services

14:20-14:40
Oral

JR Robinson, Brandon University, Manitoba, Canada

Best practice models of mental health service delivery are adapted in a variety of ways to suit the rural environment. As a result, models-in-use in rural areas differ substantially from original models. Models-in-use also differ substantially between rural Regional Health Authorities (RHA). The purpose of this research was to describe the influence of models-in-use on consumers' perception of service quality and quality of life. Semi-structured interviews were conducted with 80 consumers with severe and persistent mental illness living in nine rural RHA in Manitoba. Questions were asked about availability, accessibility, acceptability and appropriateness of services. Also, since many of the services now available in rural areas are new services, consumers were asked about the effects of new services on their life.

Quality of life (QoL) was assessed using the Wisconsin Quality of Life Index for Mental Health (QLI-MH). The QLI-MH has nine domains including occupational activities, psychological well being, symptoms, physical health, social relations/support and activities of daily living. Scores for each domain and overall QoL are compared to instrument norms and between RHA.

126 Determinants of Frailty in Rural and Urban Seniors

14:40-15:00
Oral

C MacKnight, R Latta (presenter), P Devichand, J Fisk, S Kirkland, K Rockwood,
Dalhousie University, Nova Scotia, Canada

Introduction

As the age of the population increases so to does a person's vulnerability to age-related ailments. Frailty has been described as age-related vulnerability to adverse outcomes. Frailty is conceptualized based on a 4-point scale that measures function, mobility, cognition and incontinence (0 being fit or not frail and 3 being frailest). In this report we compare characteristics of frailty in rural and urban seniors.

Methods

The Canadian Study of Health and Ageing (CSHA) is a national, representative study of persons 65 and over. This research uses data from Phase I, which were collected in 1991/2. A total of 9008 community-dwelling seniors participated, of whom 1382 rural and 7559 urban had complete data for this analysis. The association between frailty and risk factors was examined by calculating crude and adjusted odds ratios using logistic regression analysis (95% CI).

Results

For rural seniors age, number of comorbidities, ability to shop, perform housework, get to place out of walking distance all increased the likelihood of frailty. Increased years of education reduced the likelihood of frailty. For urban seniors age, number of comorbidities, ability to take care of one's appearance, ability to shop, prepare meals, perform housework, and use the telephone increased the likelihood of frailty at any level on the frail scale. Increased years of education, good living conditions and marital status reduced the likelihood of frailty.

Conclusion

A characteristic of frailty in rural seniors and not urban was the ability to get to place out of walking distance. The identification of transportation as an issue for rural people is far from novel but the finding that it increases the likelihood of frailty in rural seniors has widespread implications on intervention and provision of clinical service. The influence of more years in education reducing the likelihood of frailty in

either setting suggests that education may be an intervention to reduce the burden of frailty. Supported by the Canadian Institutes of Health Research.

- 94 The Nature of Nursing Practice in Rural and Remote Canada Study: 2003 Updates** 15:00-15:20
Poster
*R Pitblado*¹, *M Macleod*², *N Stewart*, *J Kulig*³, ¹Laurentian University, Ontario, Canada; Discussion
²University of Northern British Columbia, Canada; ³University of Lethbridge, Alberta, Canada

An increasing need for answers about how best to support, retain and recruit nurses in rural and remote areas led to a Canada-wide study which began in March 2001. This three-year study has a total of 18 researchers, more than 20 advisory committee members representing all provinces and territories, and close to 20 funding partners. The study itself consists of a survey completed, at this point in time, by 3930 nurses in rural and remote communities, an analysis of the CIHI Registered Nurses Database, the collection and interpretation of 150 nurses narratives and an analysis of relevant policy and practice documents. Already at the end of its second year, interim results have been sought by health care decision-makers, particularly those engaged in health human resources planning activities. This poster provides an overall picture of the study and showcases the initial findings and reports. As well, it briefly identifies some of the works in progress and future directions planned for the study.

- 106 The Influence of the Dual Relationship on the Rural Nurse** 15:00-15:20
Poster
K Baird-Crooks, Division of Health Studies, Medicine Hat College and University of Discussion
Calgary, Alberta, Canada

This focused ethnographic study proposes to examine how the dual relationship influences the nurse in the rural context. A dual relationship occurs when another meaningful relationship exists simultaneously with a professional relationship.

Rural nurses regularly care for people who are known to them from multiple other associations within their communities (Lee, 1998). The nurse's unique position as a health care provider situates them as a depository of information about patients who are commonly at their most vulnerable when receiving health care. Unlike the urban health care relationship, which is limited in duration and scope, the rural relationship while professional during care must frequently revert to a family/friendship/neighbor relationship following. What impact does the dual relationship have on the nurse's work-life, home-life, and social-life? How does the nurse make the transition from professional caregiver back to family member, co-worker, or friend? Whom does the nurse seek support and counsel from during stressful times within her/his home or work life? The elements that merge with and support or detract from the nurse's life and ultimately influence the decision to stay or leave rural nursing remain unclear. It is essential to uncover the blended facets of the dual relationship and the impact that these matters have on the nurse and nursing within rural communities.

This study will add substantively to understanding the influences that affect the sustainability of rural nurses and consequently rural health care. Understanding of these influences will be valuable for educators preparing nurses for practice and policy makers who will ultimately make decisions regarding rural health care provision within a diverse, specialized and often largely unrecognized segment of the country.

185 Qualitative Research Involving Holistic, Community-Based Treatment for Individuals with Fetal Alcohol Conditions

R Mitten, University of Saskatchewan, Canada

15:00-15:20

Poster

Discussion

The focus of this study is on the qualitative analysis of holistic, community-based treatment for individuals with fetal alcohol conditions. A cultural advisor at such an inner-city centre for predominantly Aboriginal youth and their families was interviewed. The global themes that emerged from an inductive analysis of the interview and accompanying field notes were: Creator, Values, Stories, Ceremonies and Herbal Medicines. A question raised by the findings is the importance of proposing inclusion of the spiritual component and traditional healing in holistic, community-based interventions, aimed at attenuating untreated secondary characteristics that impact on the educational, health and social adjustments of the target group.

130 Knowledge Translation in Rural Communities of Prince Edward Island: Research in Progress

*B Campbell*¹ (presenter), *V Timmons*^{2, 1} University of Prince Edward Island, Canada;
²University of Calgary, Alberta, Canada

15:40-16:00

Oral

Knowledge translation has become a priority for many research organizations (Canadian Institute of Population Health, 2002). This has emerged as a priority due to the fact that many decision-makers have not turned to academic research findings in developing programs or policies (Barahamson, 1996 & Mowday, 1997). This gap is found in nearly all fields in which there are both practitioners and researchers. The research, identifying effective knowledge translation strategies in rural Prince Edward Island, is built on developing and evaluating strategies through a partnership with rural communities in Prince Edward Island. One main principle identified in knowledge translation research that the most effective means of research transfer is through interactive means of engagement (St. Croix, 2001), will be the basis of this research. Prince Edward Island provides a unique environment for the exploration of the challenges associated with knowledge translation in rural, Aboriginal, Atlantic Maritime contexts. Prince Edward Island represents a society with strong traditional roots founded on agriculture, fishing and tourism which is currently undergoing the changes associated with the demise of rural life. Specifically, communities built on principles of co-operation and mutual support and sustained by strong family structures, are experiencing a declining population, the closing down of family farms, the struggle to maintain economic prosperity and issues related to accessible health care delivery, sustainability, knowledge translation, and capacity building. It is an ideal time to investigate strategies, tools, and resources to inform and empower residents to enable them to take charge of their own health care. This proposal involves transdisciplinary, participatory research to identify strategies, approaches, tools, and resources that promote effective knowledge translation in ways that may result in a transformation of the attitudes and health related behaviours of children in rural and Aboriginal communities on Prince Edward Island. Passive dissemination of information is generally ineffective in changing practice. This proposal suggests that when rural communities are engaged in unique, participatory forms of relationship building and approaches that translate research results into meaningful information and programs, positive changes in children's attitudes and behaviours will result.

133 Nursing Students Considering Rural Practice: Who Are They and How Can They be Supported?

A Bushy (presented by *B Leipert*) University of Central Florida, USA

16:00-16:20

Oral

The purpose of this international research project was to learn about nursing students who might be considering practice in a rural setting after graduation. The convenience sample included national and

international students who attended rural health conferences in the United States as well as nurse educators who were invited to have students in their schools complete the survey. Forty-three nursing students and graduates of nursing programs in the United States and Canada completed and submitted the pencil and paper survey.

This presentation will highlight demographic and qualitative findings from the surveys. Demographic data included level of education (BSN, MSN, NP), socioeconomic information, current place of residence (i.e., rural; urban), and setting of current employment (for RNs pursuing an advanced degree). Additional findings relate to students' plans to continue working in a rural setting, factors that contribute to the decision to practice in a rural setting, and challenges that some expect to encounter in rural practice. Students in the study who live and work in rural settings had real life experiences that provide practical and insightful data. For example, isolation and limited resources in rural areas contribute to feelings of inadequacy on the part of some respondents. Students with advanced education and older students noted the importance of maturity in selecting this type of practice. They also described an appreciation for the overall quality of life that is more likely to exist in less populated environments. On the other hand, they were more likely to be concerned about the ability of nurses to provide care in a health care setting with fewer resources.

The findings from this pilot study support the notion that an urban bias continues to exist in nursing education programs. Comments by the participants reinforce the need for focused rural opportunities in nursing education with faculty support for this kind of practice so graduates will be encouraged to select and remain in rural communities.

136 How Client Perceptions Influence Cancer Care Choices in Northern Aboriginal Communities

16:20-16:40
Oral

M Boone (presenter), *B Minore*, *M Katt*, *P Kinch*, *H Cromarty*, Lakehead University, Ontario, Canada

Introduction

Personal choice, or client self-reliance, is a significant factor in how any cancer patient's case is managed. For Aboriginal people in the north, however, experiences with a stretched and, hence, inflexible health care system, together with distance-linked barriers to access, make clients' perceptions and decisions more important than is generally the case.

Study design

Multiple-site study done in northern Ontario Aboriginal communities.

Method

In-depth interviews with professionals and paraprofessionals involved in community-based delivery of cancer care.

Results

Study details how perceived care options, gender, awareness of disease and treatment, reaction to system-linked problems in care delivery, as well as cultural preferences influence clients' choices and care outcomes.

Conclusion

The study underlines the interdependence between personal choice and the health care system; "bad" experiences with the system cause clients' to disengage from care, while client disengagement results in reduced care options.

- 97 Interactive Video Delivery of Mental Health Updates for Rural Primary Care Providers** 16:40-17:00
HE Miner, S Thompson (presented by *C Smith*), Lake Country Area Health Education Center, Texas, USA Poster Discussion

Objectives

1. Assess the mental health updates needs of primary care providers in rural Northeast Texas.
2. Utilize IAV to provide programming by expert practitioners to an expanded rural audience.
3. Evaluate programs effectiveness for clinical use and needs for future programs.

Discussion

For the past two years, the Mental Health Updates for Primary Care Providers has been an educational effort to attempt to address the mental health/mental illness issues in primary care practices in rural Northeast Texas. After a needs survey of targeted practitioners, a planned sequence of monthly programs was instituted. Through the East Texas Interactive Health Network, connections were established from the originating site to seven regional rural hospitals. Expert speakers experienced in delivering mental health services to rural residents presented program content. All programs were scheduled on the same day of each month, thereby facilitating work schedules for both attendees and presenters. Trained site coordinators at each location provided on-site support for program materials and interactive question and answer sessions. The Hogg Foundation for Mental Health that supports mental health research and education in Texas provided financial support for the entire series. The sessions averaged an attendance of 60 attendees from all sites, the majority being physicians. Nurses, counsellors, case managers, and pastoral care professionals made up the rest of the audiences. A few members of the public attended specific sessions, since the topics were announced in regional media. Continuing education credits were provided for physicians, nurses, and licensed professional counsellors.

Conclusion

Evaluation of the individual sessions and the entire series was very positive. Professionals responded that the series provided them with updated information about the diagnosing of mental illnesses, best practices for treatment, recommendations for follow-up in general practice, and resources. Attendees also felt the interactive programs with handouts and Q & A provided them with materials and opportunities for clarification. This type of programming could readily be replicated in other geographic areas.

- 117 Barriers to Research Participation Identified by Rural People** 16:40-17:00
L Lake Morgan (presenter), *PS Fahs*, Binghamton University, New York, USA Poster Discussion

It has been suggested that rural people are less receptive to participating in research. Proposed reasons include culture, knowledge, attitudes, and barriers. The same barriers to health care may be barriers to research participation. A random sample of 5000 households from a sampling frame of 45,000 property owners in a rural upstate NY county was selected.

This paper is a report of the findings from N=500 completed surveys. The survey was adapted from the Trauth Willingness to Participate in Research survey and included 100 questions. Comparison of demographics, knowledge about research, and perceived barriers to participation was completed and will be presented. The findings inform assumptions researchers make about barriers to research and strategies are suggested to remove such barriers. Opening the doors to inclusion of rural people in health research studies will ultimately result in improved individual and community health in rural places.

207 Socioeconomic Status and Perceptions of Selected Aspects of Health Services in Alberta

16:40-17:00

D Heng (presenter), *DJR Hunter*, *SED Shortt*, Centre for Rural and Northern Health Research, Queen's University, Ontario, Canada

Poster
Discussion

Purpose

The goal of this study was to examine the association between self-reported socioeconomic status and the perceptions of five aspects of health services in Alberta, using data from the 1996-1997 National Population Health Survey.

Design and Methods

Cross-sectional data representing an estimated 1,993,000 Albertans were analysed using descriptive, Chi-square test statistics and unadjusted odds ratios, and logistic regression techniques. Socioeconomic status was determined from derived household income adequacy, highest level of education attained and occupational status. Respondent's perceptions of five aspects of health services in the community (overall perceptions, availability, quality, difficulty of receiving, and health services received) were measured by a series of 4-point items ranging from 'excellent' to 'poor'. To account for the complex survey design of the National Population Health Survey, 500 bootstrap sampling weights and the Rao-Scott second order correction were used.

Results

The logistic regression analyses indicated that income and education did show a significant association with four of the five different aspects of perceptions of health services in the community. Other factors that were significantly associated the perceptions of selected aspects of health services were living in urban vs. rural and northern Alberta, self-perceived general health, gender, age, having a regular medical doctor.

Conclusion

Derived household income adequacy and highest level of education attained partially explained overall perceptions, perceptions of quality, perceptions of the difficulty of receiving health services and perceptions of health services received in the community. The perceptions of health services in the community may reflect true differences in the delivery of health services relating to factors such as living in rural and northern Alberta and that women and the elderly require more health services and that their perceptions may consequently be more meaningful. An alternative hypothesis is that the factors identified above may modify the expectations of these different subpopulations of health service delivery and is reflected in their rating of perceptions of different aspects of health services in the community.

222 Implications of Alternative Definitions for Rural Health Research

16:40-17:00

E Magusson (presenter), *V Mitura*, *R Bollman*, Statistics Canada, Ontario, Canada

Poster
Discussion

Rural health researchers are searching for an understanding of how "rurality" should be incorporated into studies of rural health. For example, the Canadian Rural Health Research Society organized a well-attended workshop on this exact issue in October, 2002. One outcome of the workshop was that more research is required to understand the implications of alternative ways of operationalising rurality in studies of population health and utilisation of health services. The objective of this proposal is to provide an initial assessment of the implications of alternative ways of defining "rurality" for rural health issues. Specifically, this project will take one key indicator of population health and one key indicator of the rate of utilisation of health services and determine the impact of alternative ways of measuring rurality in a model that 'explains' the level of the chosen indicator. As noted by du Plessis et al. (2001 and 2002), each

definition of rural is built on different conceptual criteria. The interpretation of our results will be in the context of the theoretical criteria used to develop each definition of rurality.

Healthy People II

Batoche Room – 14:00-17:00

Co-Chairs: *Risto Rautiainen*, University of Iowa, USA

Lesley Day, Monash University, Australia

349 Challenges for Recruitment of Injury Study Participants: Experiences from the Farm Injury Risk among Males Study

14:00-14:20

Oral

*L Day*¹ (presenter), *D Voaklander*², *M Sim*¹, *R Wolfe*¹, *J Langley*³, *J Dosman*⁴,
*L Hagel*⁴, *J Ozanne-Smith*¹, ¹Accident Research Centre, Monash University, Australia;
²University of North British Columbia, Canada; ³Injury Prevention Research Unit, New
Zealand; ⁴Institute of Agricultural Rural and Environmental Health (I.ARE.H), Centre for
Agricultural Medicine, University of Saskatchewan, Canada

Background

Strategies to minimise various sources of bias are a key component of observational epidemiological studies. In case control studies of injury issues, it is particularly important to address selection bias and non-response bias.

Purpose

We report on our strategies to minimise bias in the FIRM study, a prospective case control study of risk factors for serious farm work related injury.

Methods

The study base is adult males working on farms in the catchment regions of 14 larger regional hospitals in one Australian state. Cases are identified on presentation to the emergency departments (EDs) while age-matched controls are recruited via random telephone survey. Eligibility criteria for cases includes a maximum abbreviated injury severity score of at least 2, to minimise the potential for selection against those with less severe injuries treated outside the hospital system. Control recruitment relies on telephoning regional households until an individual from the study base, satisfying the matching criteria, is identified. This process minimises the potential for selecting against farm workers who may live off farm. We are testing a dynamic pool of individuals identified as study base members but not matched on the first call to determine its effect on the probabilities of selection.

Results

Several hospitals have indicated that the EDs are critically under-funded and under-staffed, and one hospital declined to participate for these reasons. Under new legislation, consent for hospitals to release identifying information for recruitment purposes has to be sought by hospital staff, adding an extra step to the previously piloted recruitment process. Early results indicate that 40% of people approached for the study have declined permission for the hospitals to release their contact details. The dynamic pool appears to have a small impact on the probability of selection. A recruitment support strategy including identification of potential participants by ambulance officers upon arrival to the ED, and publicity through rural networks and media has been implemented.

Conclusion

Staffing and budgetary constraints, coupled with new State legislation are likely to make recruitment through emergency departments more difficult. Creative solutions for the challenge of recruitment are needed to achieve satisfactory response rates for studies, which provide the evidence base for preventive programs.

172 Injuries in the Iowa Certified Safe Farm Study

14:20-14:40

R Rautiainen (presenter), *J Lange*, *C Hodne*, *S Schneiders*, *K Donham*
University of Iowa, USA

Oral

Objectives

The aims of this paper were to assess injury characteristics and risk factors in the Iowa Certified Safe Farm (CSF) program and evaluate its effectiveness in reducing injuries.

Methods

The CSF intervention includes a health screening, on-farm safety review, education, and incentives. The study population consisted of 152 intervention farms and 164 control farms in a nine-county area in Northwest Iowa. Injury surveillance was conducted through quarterly calls from September 1999 to August 2002. The Generalized Estimating Equations and other statistical methods were used for analysis of risk factors.

Results

A total of 318 injuries were reported during the study period. The injury rate was 42/100 person-years for all injuries and 15/100 person-years for injuries requiring professional health care. The self-reported injury costs were \$51,764 in total and \$163 per case on the average. The injury cost burden was \$68 per person per year among all study participants. No significant differences were found in the injury rates and costs of the intervention and control groups. The Generalized Estimating Equations analyses showed that raising livestock, poor general health, and exposures to noise and unusual heavy lifting were among risk factors for injury. A moderate level of stress and higher alcohol consumption were protective factors. Machinery is commonly viewed as the primary cause of agricultural injuries. However, most injuries in this study were not related to machinery but animals, falls from elevation, slips/trips/falls, struck by and struck against objects, lifting, and overexertion. Hurry (38%), fatigue (15%), and stress (14%) were listed as contributing factors.

Conclusions

The findings point out the need for developing new interventions to address a multitude of hazards in the farm work environment as well as improving farm management and organization of work.

299 Using Injury Information to Guide Prevention

14:40-15:00

R Rautiainen (presenter)¹, *C Zwerling*¹, *K Donham*², *L Burmeister*¹, *N Sprince*¹,
*S Reynolds*², *E Eskola*³, *P Saarimäki*³, ¹University of Iowa, USA; ²Colorado State
University, USA; ³Farmers Social Insurance Institution, Finland

Oral

Objectives

The objectives of this presentation were to identify priorities for prevention, based on frequency and severity of agricultural injuries and occupational diseases.

Methods

Total population based Finnish farmers worker's compensation data were analyzed with specific attention to prevention priorities. These data include several variables directly linked to prevention, such as work activity at the time of the injury/exposure, primary cause of the injury/illness, and nature of incident. Other codes, such as ICD10 health outcome, part of body, type of injury/illness, and personal demographic characteristics provided further information. A total of 10,922 injury and occupational disease cases in 1996 were analyzed. Regression methods were applied to identify significant trends and associations.

Results

Animal production claims were most frequent and most severe when compared to crop production, forest work, construction work, and other work on the farm. Working with cows and horses, as well as commuting and transportation were among work activities with numerous severe cases. PTO shafts caused only 0.1% of the injuries but they were severe. Organic dust caused a great number of costly respiratory diseases. Roofs, stairs, ladders, openings, scaffoldings and other structures caused numerous serious falls. The most costly types of injury/illness included asthma, hypersensitivity pneumonitis, brain and spinal cord injury, amputation, skin disorder, and bone fracture. Multivariable analysis showed that age, personal past claim rate, income, work activity, type of incident, and type of injury were associated with case cost.

Conclusions

Identified prevention priorities included injuries and illnesses associated with large animals, organic dusts, floors and walkways, slippery and uneven terrain, sudden movements, scaffoldings, ladders, stairs, wagons, circular saws, tractors, and repetitive motion. Machinery has been traditionally targeted for prevention, but these data suggest animals and various factors in the working environment should have greater emphasis.

103 Evaluation of the NAGCAT Using a Case Series of Injuries: Interim Results

15:00-15:20

B Marlenga (presenter), *W Pickett, RJ Brison, RL Berg, J Zentner*, National Children's Center, Wisconsin, USA

Oral

Background

A recent set of voluntary guidelines, the North American Guidelines for Children's Agricultural Task (NAGCAT), was developed to assist parents in assigning developmentally appropriate work to their children 7-16 years.

Purpose

To systematically apply NAGCAT to case descriptions of fatal and non-fatal pediatric farm injuries to:

- 1) identify the farm jobs covered by NAGCAT that are most commonly associated with childhood farm injury,
- 2) analyze the most frequent violations to NAGCAT,
- 3) determine the proportion of pediatric injuries that may have been prevented if NAGCAT were applied, and,
- 4) recommend new guidelines to cover ages, jobs, and situations not covered by NAGCAT.

Methods

Three case series of pediatric farm injuries in the United States and Canada were assembled (fatalities, hospitalizations, and general injury) using existing registries, surveillance data, coroner/medical records, case investigation reports, and national survey data for the years 1990-2000. For each case, we

systematically recorded the child demographics, a description of the injury event and circumstances surrounding it, and detailed information specific to NAGCAT.

Results

To date, 382 pediatric farm injury cases of children 7 years and older (ages covered by NAGCAT) have been identified in the United States and Canada for the years 1990-2000 (111 fatalities, 271 general injuries). There was a relevant NAGCAT guideline identified for 93/382 (35/111 fatalities, 31.5%; 58/271 general injuries, 21.4%) cases, reflecting the fact that many children were not engaged in farm work at the time of their injury. Farm work with an ATV (13/93), working with large animals (11/93), and driving a farm tractor with no implement attached (11/93) were the farm jobs most commonly associated with pediatric farm work injuries. The most frequently violated components of NAGCAT were adult responsibility (47/93) and child development (40/93). In the judgement of our expert reviewers, if NAGCAT had been applied, 50/93 of these work-related pediatric farm injuries and deaths could have been prevented.

Implications

Through this evaluation, recommendations will be developed for new guidelines to cover ages, jobs, and situations not currently covered by NAGCAT. These are aimed at refining this important parental resource.

155 Identifying Family and Community Impacts of Farm Work Injuries and Fatalities

15:40-16:00

Oral

DJ Murphy (presenter), *L Davis*, *SM Robertson*, Department of Agricultural & Biological Engineering, Penn State University, Pennsylvania, USA

Objectives

While the physical hazards of farming have been extensively studied and reported upon, the social and emotional impacts of such injuries and deaths have been little examined. Given the unique environmental, human, social and economic factors of agriculture, research into social and emotional effects of non-agricultural incidents may not necessarily be applicable to farm work injuries and fatalities. Anecdotally we know that many farmers contribute to their communities through service and leadership in agricultural, community and religious organizations. The loss of or significant injury to such individuals provides a useful perspective to investigate the ramifications of farm work injuries and fatalities on not just individuals but families and communities. This investigative study examined the type and nature of the farm work injury or fatality, forms of leadership and service that the victim contributed, community response to an incident, and the impact of the injury or fatality on the family and community.

Methods

Using a collective case study approach, this study investigated the impacts of farm work injuries and fatalities on 10 families and communities throughout Pennsylvania. Data were collected through 67 interviews with next of kin, victims and community members. Victims ranged in age from 19 through 72. Five died from their injuries; the other five experienced some level of temporary or permanent disability.

Results & Conclusions

Preliminary data analysis indicates confusion, misunderstanding and conflicting beliefs regarding the details of a farm work injury or fatality which may undermine efforts towards injury prevention. Support following an incident is welcomed and may be crucial in maintaining a farm but can also bring challenges that inadvertently tax those who are being helped. Farmers are valued for their rich, broad and comprehensive skills, abilities and perspectives. Their contributions to community service are diminished or lost through significant farm work injuries and fatalities.

- 209 Occupational Injury Surveillance for Migrant and Seasonal Farmworkers: Testing Key Assumptions** 16:00-16:20
Oral
G Earle-Richardson (presenter), *P Jenkins, J Sorensen, P Burdick, J May*, Northeast Center for Agricultural & Occupational Health, Bassett Health Care, New York, USA

Background

In response to inherent difficulties in determining occupational injury and illness rates among migrant and seasonal farmworkers, researchers developed a surveillance system in publicly funded migrant health centers. It is believed that migrant health centers draw most migrant and seasonal farmworkers in New York State to them because they offer language-appropriate medical care, transportation, and a number of other unique case management services.

Objective

To test two assumptions: 1) that regions of the state served by migrant health centers contain most of the state's farmworkers; and 2) that migrant health centers' patient population contain the majority of farmworkers in the service region. An additional goal is to identify differences between the study and non-study populations.

Methods

Estimates of total worker hours necessary for harvesting New York hand-harvested crops (by crop and county) were made from existing crop data. These estimates were then used to compare the 14 county study regions to the rest of New York counties in terms of migrant labor activity. Migrant Health Center estimates of their employed farmworker patient population was compared to an estimate of the worker population (made using crop production estimates and worker season estimates per crop).

Results

The 14-county study region encompasses 74.9 % percent of the estimated hand-labor worker hours for the state. Comparison of farm level data between this region and the rest of New York State revealed no significant differences on average workers per farm (21 vs. 24); average hours worked per week (48 vs. 50), however differences in major crop types and worker country of origin were observed. Preliminary analyses suggest widely divergent coverage rates within the different migrant health center service regions. Results of this analysis will be presented.

Conclusions

Migrant health center service regions contain most of the hand-harvest labor, although there may be differences in types of agriculture in excluded regions. Suggesting other sources of medical care within these regions must be investigated. Further research should characterize patient and non-patient populations within the study regions.

- 228 Musculoskeletal Symptoms in a Population-Based Cohort of Farmers and Rural Residents** 16:20-16:40
Oral
LA Merlino (presenter), *D Anton, JC Rosecrance*, College of Public Health, Department of Occupational & Environmental Health, University of Iowa, USA

Objective

The physically strenuous work required of farmers, and the overall ageing of rural populations in the United States, are factors that can contribute to musculoskeletal disorders. Musculoskeletal injuries represent a significant problem for quality of life and potential disability. The purpose of this study is to determine the prevalence of musculoskeletal symptoms in a population-based rural setting and examine factors associated with the prevalence of these symptoms.

Methods

Between 1994 and 1998, a sample of farm, rural and town residents (1640 residents > 18 years old) in a rural county in Iowa (Keokuk County) underwent extensive assessment and examination for personal, medical (including self-reported musculoskeletal symptoms), job history and occupational, residential, and environmental factors via surveys and direct measures. Odds ratios (OR) and 95% confidence intervals (CI) were estimated using logistic regression, adjusting for potential confounders.

Results

Prevalent pain in the hands/wrists/fingers was reported by 50.5% of the respondents, followed by 32.3% of respondents reporting back pain. Factors associated with prevalent hand/wrist/finger pain after controlling for age and body mass index (BMI) were self-rated poor mental health compared to excellent health (OR = 2.67; 95% CI = 1.60 – 4.47), never farmed (OR = 1.54; 95% CI = 1.16 – 2.06), and having a job demanding physically hard work all of the time compared to none of the time (OR = 1.83; 95% CI = 1.24 – 2.68). Factors associated with prevalent back pain after controlling for BMI included self-rated poor mental health compared to excellent mental health (OR = 2.34; 95% CI = 1.33 – 4.18), poor physical health compared to excellent physical health (OR = 1.74; 95% CI = 0.92 – 3.30; p-trend = 0.01) and lifting heavy loads all of the time compared to never (OR = 1.52; 95% CI = 0.83 – 2.76).

Conclusions

Rural farming populations have a high percentage of residents who experience musculoskeletal pain. Physically strenuous work is associated with musculoskeletal pain. Whether poor mental health is a consequence or cause of musculoskeletal pain, addressing the mental health needs of rural residents may help alleviate the problem.

266 Swedish Guidelines for Children's Agricultural Tasks

16:40-17:00

P Lundqvist (presenter), *C Alwall*, Department of Agricultural Biosystems and Technology, Swedish University of Agricultural Sciences, Sweden

Oral

Agriculture is among the most dangerous occupations. This is shown by a number of national and international studies, including "the third European survey on working conditions 2000".

In most countries, including Sweden, the minors are not included in the official statistics of work-related injuries. In Sweden there are about 3-8 fatal injuries in farm environments every year. Many injuries are occurring during actual work or when children are helping their parents with minor jobs. According to Swedish legislation minors has to be provided with appropriate education, instruction and information about health and safety related to his/her work with regard to the minors age and maturity. Today there is no help or support for parents in this situation.

We are now starting a process to establish Swedish guidelines for children's agricultural tasks to meet the demands from legislation and to support the farm families with guidelines, which may help them to handle this situation. This work is supported with a grant from the Swedish Farmers Foundation for Agricultural Research. The work will be based on the North American Guidelines for Children's Agricultural Tasks (www.nagcat.com), but will be adapted to Swedish legislation, culture and traditions. This work will also be developed in close co-operation with the National Children's Center for Rural and Agricultural Health and Safety. (<http://research.marshfieldclinic.org/children/>)

The guidelines will cover the most common types of work operations in which minors are working with on Swedish farms and the project will use a reference group with professionals in health and Safety as well as professionals in child development and farm parents. The guidelines will be available both in print

and by a home-page. Maybe this project could be enlarged to establish Nordic Guidelines for Children's Agricultural Tasks.

Environment I

- Agricultural Emerging Issues -

Adam Ballroom – 14:00-17:00

Sponsored & Organized by: *Southern Coastal Agromedicine Centre, East Carolina University, USA*
I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

Chair: *Susan Gustke, Southern Coastal Agromedicine Centre*
Judy Bernhardt, School of Nursing, East Carolina University, North Carolina, USA

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| 429 | BSE and Other Emerging Issues | 14:00-14:40 |
| | <i>A Potter, Research, Vaccine and Infectious Disease Organization, Saskatchewan, Canada</i> | Oral |

Printed abstract not available.

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| 424 | Foot and Mouth Disease: Potential impact on Public Health and Consumer Choice | 14:40-15:20 |
| | <i>R Dickens, Veterinary Risk Assessment, North Carolina Department of Agriculture, USA</i> | Oral |

Drawing largely from a survey conducted during the height of the UK Foot and Mouth outbreak in 2001 and again in spring 2003, this presentation explores how an outbreak of Foot and Mouth would affect consumer choice. The presentation also identifies four ways an outbreak of Foot and Mouth would affect the Public Health community. It also discusses a "One Medicine Approach" to preparing for and responding to a Foreign Animal Disease. Since this survey was administered once during the height of an outbreak and again two years later, results also allow us to determine whether a "drop-off" in public knowledge occurred in the interval between the two surveys.

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| 420 | West Nile Virus, Its Potential Impact on Rural Agricultural Communities | 15:40-16:20 |
| | <i>W Watson, Entomology, North Carolina State University, USA</i> | Oral |

West Nile Virus first appeared in NY during the summer of 1999 and has since spread across North America infecting birds, horses and people in 44 states, 6 provinces, and the Cayman Islands. Vectored by more than 28 species of mosquito WNV infected over 2700 humans and 14,000 horses in 2002. This year, nearly 2000 human cases have occurred in Colorado. Approximately 80% of those infected are asymptomatic, 20% experience West Nile Fever and < 1% suffer severe infections that may result in death. Sequelae to WNV infections are varied and could cause lasting hardship to families. Mosquito breeding in North Carolina and elsewhere occurs in a wide variety of agricultural and non-agricultural habitats including tires, rain barrels, flooded pastures, marshes, and animal waste lagoons. Mosquito abatement programs at the state level include surveillance programs, targeted education and mosquito management in potential high-risk areas.

Rural Communities I

- Agricultural Injury Surveillance: International Models of Best Practice -

Battleford Room – 14:00-17:00

Organised by: *Canadian Agricultural Safety Association*, Saskatchewan, Canada

Co-Chairs: *W Pickett*, Queen's University, Canadian Agriculture Injury Surveillance Program

B Rein, Agriculture Safety, U.S. Department of Agriculture

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| 421 | Agricultural Injury Surveillance: International Models of Best Practice
<i>W Pickett</i> , Queen's University, Canadian Agriculture Injury Surveillance Program,
Ontario Canada | 14:00-14:10
Oral |
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The past decade has seen the emergence of a number of model programs for the surveillance of agricultural injuries. These programs aim to provide objective data that in turn inform the development of effective injury prevention initiatives. In retrospect, how effective have these surveillance programs actually been? This workshop will provide participants with an opportunity to examine this issue critically. Various approaches to injury surveillance used in Canada, Australia and the United States will be reviewed, along with discussion of how these surveillance data are actually applied to contemporary injury control practice. The surveillance needs of the international agricultural community will be considered. Two model prevention programs from the United States and Canada will be discussed with an eye to whether surveillance data were actually used in program development. The session will conclude with a moderated discussion that surrounds the adequacy of current surveillance efforts, and whether they meet the many needs of the prevention community.

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| 393 | Canadian Agriculture Injury Surveillance Program
<i>RJ Brison</i> , Department of Emergency Medicine, Queen's University,
Ontario, Canada | 14:10-14:30
Invited |
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Printed abstract not available.

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| 375 | Surveillance of On-Farm Injuries to Youth in the United States
<i>DL Hard</i> (presenter), <i>JR Myers</i> , Division of Safety Research, National Institute for
Occupational Safety and Health (NIOSH), West Virginia, USA | 14:30-14:50
Invited |
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The National Institute for Occupational Safety and Health (NIOSH) began a national initiative in 1997 to prevent fatal and nonfatal injuries to youth on farms in the United States. A major component of this initiative is the development of a surveillance program for injuries to youth that occurred on farms. This surveillance program is an internal NIOSH activity, and has the goal of providing national and regional surveillance on injuries occurring to a variety of youth populations exposed to farm hazards. The populations at risk include: youth farm workers and the children of farm workers; children of farm operators; and, children visiting farming operations. Development of the surveillance program included the assessment of existing data sources for their utility in providing on-farm youth injury information, and the development of new data collection systems to cover populations not adequately addressed by existing data systems. Existing data systems that have been examined include the Bureau of Labor Statistics' Census of Occupational Fatal Injuries, the Consumer Product Safety Commission's National Electronic Injury Surveillance System, and the National Center for Health Statistics' Vital Statistics Mortality data system. New data collection efforts include periodic farm operator surveys conducted in cooperation with the National Agricultural Statistics Service, periodic youth farm worker surveys conducted in cooperation

with the Department of Labor through the National Agricultural Workers Survey, and the annual collection of farm-related death certificates through the cooperation of State Vital Statistics Registrars.

- 395 Australian Agriculture Injury Surveillance** 14:50-15:10
L Fragar, Australian Centre for Agricultural Health and Safety, University of
Sydney, Australia Invited

Printed abstract not available.

- 392 Certified Safe Farms** 15:40-16:00
KJ Donham, Department of Occupational & Environmental Health, College of Public
Health, University of Iowa, USA Invited

Printed abstract not available.

- 391 Farm Safe Auditing** 16:00-16:20
D Anderson, Canada Invited

Printed abstract not available.

Rural Communities II

Terrace Lounge – 14:00-17:00

Chair: *J Bidwell*, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada
A Williams, University of Saskatchewan, Canada

- 98 Environmental Alternatives for Rural Development: The Case of Oaxaca, Mexico** 14:00-14:20
RE Mitchell, Department of Rural Economy, University of Alberta, Canada Oral

This paper examines various environmental alternatives within the context of forest resource-dependent communities of the State of Oaxaca, Mexico. Two main objectives are: (1) the potential environmental and social sustainability of particular rural development routes, and (2) why certain environmental options for rural development are selected over others.

Oaxaca was selected for this study due to its having greater biodiversity and ethnic diversity than other state in Mexico. It is also one of the poorest states in the country, and has 570 municipalities, one-third of Mexico's total. The land tenure regime in Oaxaca is predominately communal, and 91% of forest production in the state comes from communities and ejidos (total productive forest land base of 680,000 hectares). Of the 283 forest-based communities in Oaxaca located in the temperate climatic zone with its dominant pine-oak stands, 137 are involved in legally authorized forest management. While positive examples of good community forest management in Oaxaca exist, many forested areas are currently threatened by illegal or poor logging practices.

The author carried out research for this study from May 15 to December 16, 2002. Field research included extensive time spent in communities of the Sierra Norte region as well as the capital city of Oaxaca. A

total of 50 semi-structured interviews were conducted, as well as assisting in forest management activities and attending community meetings.

Four principal forest-based community types in Oaxaca are discussed in the context of environmental alternatives. While many communities have chosen to focus on either sustainable or illegal logging options in Oaxaca, one community in particular has decided not to engage in commercial logging. This decision has caused significant tensions in the region, especially among neighbouring communities, but also within the community in question.

Key findings illustrate the extent to which rural communities can make appropriate environmental decisions and examines their effects on environmental and social sustainability. Increased rural involvement in environmental decision-making is called for, since rural residents are those most likely to appreciate nearby natural resources as a source of sustainable livelihoods. It is expected that this research may be applicable to rural areas of other countries.

341 Maintenance of Rural Health Status: An Examination of Social Supports and Health in Atlantic Canada

14:20-14:40
Oral

K Side (presenter), *J Keefe*, *P Fancey*, Department of Women's Studies,
Mount Saint Vincent University, Nova Scotia, Canada

This paper investigates social supports as they relate to the maintenance of health in rural communities in Atlantic Canada. The ageing of the population, intra-population shifts from rural to urban areas, and in some provinces, a pattern of out-migration, have implications for the health of rural residents and their ability to access formal and informal social supports to maintain health.

Using data from Social and Community Support, Cycle 11 of the General Social Survey (GSS), the helping relationships of rural Canadians (n=3,309) and specifically Atlantic Canadians (n=1,285), were investigated. Researchers also undertook a qualitative case study of a single rural community in Nova Scotia. Data were collected through focus groups and individual interviews with community members and key informants in 2003. Additionally, a comprehensive profile of the community was developed based on archival records, secondary data sources and community member recollections.

Findings from the GSS indicate that patterns of giving and receiving assistance vary according to the type of assistance provided and location. Preliminary data analyses from the single-community case study indicate that the wider events in the community (e.g., hospital closure and loss of employment in the primary resource sector), and outside the community (e.g., health care restructuring), were contributing factors in population change, a declining volunteer base and perceptions of community health. These events along with the population ageing affected the maintenance of health status despite proactive initiatives by community leaders to promote a healthy community.

Quantitative and qualitative analyses indicate that while there is a greater tendency to report helping behaviours in rural Atlantic Canada than in rural non-Atlantic Canada, the role these helping behaviours play in sustaining community health depend on the existence of wider supports that are both internal and external to the community.

Research results will facilitate a greater understanding by policy makers, health service providers, community planners and the voluntary sector of the complexity of issues related to ageing rural communities, and to inform future strategies for maintaining healthy rural communities. This research was funded by the Canadian Institutes for Health Research.

121 The Role of Community-Based Ecosystem Management in Sustaining Rural Communities

14:40-15:00
Oral

M Reed, Department of Geography, University of Saskatchewan, Canada

How can social learning be nurtured to support the sustainable development of communities in the new rural economy? How can national parks and biosphere reserves contribute to protecting the ecological integrity and the socio-economic viability of rural communities? The purpose of this presentation is to introduce a research alliance that has been composed to address these questions.

The alliance, composed of researchers from 7 universities and research institutes, employees of national parks, and participants in biosphere reserves, will test models of policy formulation and implementation that support sustainable development in rural places presently engaged in community-based ecosystem management. The alliance's main goal is to improve our understanding of the role of social learning in the sustainable development of rural communities in the new economy, using parks and protected areas as vehicles.

Research will be undertaken in six study sites located in prairie biosphere reserves and national parks including Elk Island, Waterton, Grasslands, Redberry Lake, Prince Albert, and Riding Mountain. The research is guided by a common conceptual framework that considers community-based ecosystem management central to rural sustainability. This framework will be presented and the questions and hypotheses that guide the research will be raised during this presentation.

334 An International Comparison of Healthy Communities: the Role of National Policy

15:00-15:20
Oral

TG Johnson, Community Policy Analysis Center, Harry S Truman School of Public Affairs, University of Missouri, USA

Healthy rural communities, provide sustained and adequate levels of public and private services to their residents. Sustained and adequate services require vital economies, leadership, and sound governance. National rural policies in developed countries differ significantly in their philosophies and effectiveness from country to country.

This paper compares and contrasts rural policy in the United States, Canada and the European Union. The focus is on the effectiveness of these alternative approaches in terms of efficiency, effectiveness and sustainability—that is, in promoting healthy communities. Canadian and European policies have traditionally focused more on explicit regional redistribution. Canadian policy has been more centralized than that of Europe. The US has focused on local capacity building. Today's globalized economy places new stresses on rural communities and tests rural policy in new ways. The author has been involved in policy analysis in Canada, United States and Europe for more than 25 years. He will report on research projects sponsored by the Organization for Economic Co-operation and Development, the USDA funded Rural Policy Research Institute, and the Commission of the European Union.

255 Intellectual Property Rights, Agriculture, and Rural Communities

15:40-16:00
Oral

A Ramanna, India Gandhi Institute of Development Research (IGIDR), India

Introduction/Objectives

The global extension of Intellectual Property Rights (IPRs) in agriculture and the simultaneous move towards evolving community/farmers rights have significant implications for the future of rural communities. This paper argues that the expansion of ownership rights in agriculture would alter the

concept of a community and lead to shifts in the relations of rural communities with firms, public sector institutions and NGOs. The paper utilizes a political economy framework to analyse the changes in the interests of actors as a result of greater IPR protection in agriculture and evaluate its implications for the future of rural communities. It evaluates the costs and benefits of greater ownership rights on rural communities and aims to suggest policy measures to ensure the development of rural economies.

Discussion

Intellectual Property Rights are government granted limited property rights over information resources. Through agreements such as TRIPs (Trade Related Intellectual Property Rights Agreement) of the WTO, IPRs are being extended worldwide to include plants, seeds, crops and agricultural genetic information. Community rights and farmers rights, promoted through mechanisms such as FAO (Food and Agricultural Organization) and the Convention on Biological Diversity (CBD), are being evolved in an attempt to protect the rights of rural communities over their resources.

Conclusion

The global expansion of IPRs would affect rural communities in two main ways: (1) Ownership rights stress the individual over the community, reversing a basic concept on which communities are constituted. A defining feature of communities is their emphasis on the collective over the individual. (2) IPRs will lead to greater dependence of rural communities on the private sector and the reduction in freely transferable materials from the public sector. Community/farmers rights will lead to greater linkages between NGOs and the rural communities. These shifts may lead to benefits for few among rural communities who can gain access to new technology or assert ownership rights over agricultural resources. The costs will be borne by those who lose access to important resources. Policy measures to maintain the useful sharing and exchange of resources and promote the links that reinforce beneficial ties within rural communities require attention.

359 Sense of Place and Well-Being in Rural Saskatchewan Communities

16:20-16:40

A Williams (presenter), R Koster, Department of Geography, University of Saskatchewan, Canada

Oral

One way to understand the complex processes surrounding how environments impact well being is to examine the mechanisms or pathways through which place and the social relations within it, shape the well being of individuals and populations. One novel approach missing from current studies examining health effects of local environments (in this case, rural) is the subjective meaning and importance people give to where they reside, that being the place-based construct named *sense of place*.

In this research we detail how *sense of place* is conceptualised by residents living in Saskatchewan rural communities (n=6) by analysing qualitative interview data collected throughout 1999 and 2002. We will explore the relationship between sense of place and health, broadly defined, and in so doing, address the themes of healthy people and rural communities, specifically addressing the socio-cultural aspects of rural life and health determinants.

Place-based research contributes to a better understanding of environment as a health determinant and may be applied to solutions directed at improving well being. The community-university partnership employed in the research relationship that produced the data was based on a community economic development model and will be outlined case by case.

123 Farmers Markets: a Rural Response to Create Healthy People with a Healthy Economy

16:40-17:00
Oral

CT Rison (presenter), *PH Powell* (presenter), *MH Perkins*, *NR Buchanan*,
Cooperative Extension Service, College of Agriculture, University of Kentucky, USA

Objectives

To increase fruit and vegetable consumption To help individuals improve their health To improve the farm economy through diversification To create more self reliant rural communities

Citizens of five counties in East Central Kentucky faced several unrelated challenges with one unanticipated outcome. Extension Agents for Family and Consumer Sciences found farmers markets to be a common solution as they worked to promote economic development and improve health.

East Central Kentucky has some of the highest rates of death from chronic diseases including heart disease, cancer, cerebral-vascular and diabetes in the United States. At the same time, risk behavior assessments for these counties include some of the nations highest numbers of overweight individuals and the lowest consumption rates of fruits and vegetables. Increasingly, research is linking chronic diseases with these behaviors.

Even though farmers have needed to diversify due to tobacco quota cuts, Kentucky has done little with fruit and vegetable production. In fact, while centrally located to a large portion of the nations population, Kentucky is making fewer direct sales of fruits and vegetables than all but one of the seven surrounding states.

Common to the five counties were farmers markets and a willingness of five long tenured Extension Agents for Family and Consumer Sciences to work with them to improve income. As the Agents developed materials, provided educational programs, conducted program evaluations and surveys the connection emerged. If consumers, across the age and economic spectrum, have access to and are taught how to use them they will increase their consumption of fresh fruits and vegetables. This will improve the economic conditions of the farmer, the health of the individuals and the rural economy. These Agents have worked tirelessly to foster the development and expansion of this connection that needs further study but could be used as a community development model.

Tuesday, October 21

- Morning Plenary Session -

Adam Ballroom – 08:30-09:40

Co-Chairs: *A Greenlee*, Midwest Center for Agricultural Research, Education, & Disease
and Injury Prevention, National Farm Medicine Center, Wisconsin, USA

M Schenker, Western Center for Agricultural Health and Safety, University of California, USA

257 Epidemiology Approaches to the Study of Rural Women's Health

08:30-09:05

D Savitz, Department of Epidemiology, School of Public Health and Safety,
University of North Carolina, USA

Plenary

In order to consider the distinctive issues affecting the health of rural women, it is essential to identify specific components of what exposures, lifestyles, and other attributes are associated with living in rural areas. Agricultural exposures are common to rural women who live on farms, for example, yet the exposure pathways are difficult to define and include multiple direct and indirect mechanisms. In the Ontario Farm Family Health Study, we examined possible reproductive health consequences of such agents, considering possible effects on subfertility, miscarriage, and preterm birth. As part of the North Carolina Breast Cancer Study, we conducted a comprehensive evaluation of pesticide use and breast cancer, which illustrate these challenges. As a reminder of the diverse implications of rural living, we found a reduced risk of breast cancer for women living on farms, likely related to greater physical activity and reproductive experiences.

Physical activity is increasingly recognized as an important determinant of a range of very important chronic diseases in women, including cardiovascular disease, diabetes, osteoporosis, colon cancer, and breast cancer, and is very likely to differ for rural as compared to urban women, especially being more likely to occur in farm work. Psychosocial factors potentially associated with rural living, including stress, social support, and depression are of health concern in their own right as well as adversely affecting other health outcomes. An additional realm of concern for rural women is in reduced access to health services, possibly discouraging early care-seeking and sustained treatment of chronic diseases (e.g., diabetes).

There are clear challenges to conducting epidemiologic studies in rural populations, mainly those resulting from the geographic dispersion and logistical challenges of assembling large studies. However, the potential for enhancing the range of experiences by inclusion of rural women and identifying opportunities for intervention to improve the health of rural populations warrants the increased efforts to do so. Advancement in spatial analysis methods should facilitate this work and perhaps the expanded use of the Internet in epidemiologic studies will reduce some of these barriers.

312 Health of Hired Farm Workers in Rural Communities

09:05-09:40

D Villarjo, California Institute for Rural Studies, USA

Plenary

Despite a recent surge in knowledge about U.S. hired farm workers, little is known about the health of this population. No national data is available on the size of the population, mortality or morbidity data, or on chronic health indicators. Most workers are Mexican immigrant or migrant males, and two-thirds live in poverty. Fewer than one in five has health insurance, either through an employer or through government programs.

This presentation reviews what is known in the following topical areas: (1) mortality and morbidity; (2) access to health care services; (3) control of infectious diseases; (4) maternal and child care; (5) occupational health; (6) violence; and (7) chronic health indicators. A recent cross-sectional survey of the health status of hired farm workers in California is also reported. It is suggested that future research seek to incorporate a minimal physical examination of all patients or subjects in order to establish baseline information for the population. Such information will be helpful in targeting interventions and measuring their effectiveness.

Rural Economy II

Kelsey/Saskatchewan – 10:00-12:00

Organized & Sponsored by: *Equine Canada, Strategic Equine Marketing;*

The Saskatchewan Horse Federation; University of Saskatchewan

Chair: *E Kendall, University of Saskatchewan, Canada*

281 Horse Production in a Rural Revitalization Strategy

10:00-10:20

V Evans, M Smith, M Acton, C Gould, E Kendall (presenter), Strategic Equine Marketing;
Saskatchewan Horse Federation; Equine Canada; University of Saskatchewan, Canada

Oral

The rural economy is traditionally driven by large volume agricultural commodities. The cost of producing these commodities has risen steadily and is now out of step with market expectations. As a result, producers are looking to diversify their operations. Horse production offers substantial promise for some rural economies to increase diversity through cross-sector organizations and initiatives. The benefits of diversification into horses include:

1. The unit cost of production is similar to cattle, while the achievable unit price for horses is greater.
2. Motivation for women to participate is high. Women lead participation in this industry through family centered activity that contributes to product value.
3. The industry provides the greatest opportunity for social and cultural exchange between rural and urban communities.
4. It provides ongoing revenue generation from a livestock commodity through riding lessons, horse training services, and horse boarding services for non-resident owners.

Results

The equine population in Saskatchewan was determined to be 94,000 animals owned or used by 24,000 women (70%), men (20%) and children (10%). Of these horses, roughly a third were breeding stock, producing 20,000 foals annually. The majority of producers surveyed appeared to be motivated to address their local market using minimum cost as the criterion, with the exception of the professional equine rancher who demonstrated significant unit returns on their animals. The survey identified that most Saskatchewan producers deemed their operations a family business. They expected to own at least as many horses in five years as they currently did. Intermediate markets for horses were recreation (60 %), sport (35%) and racing (5%). A small percentage (<5) of producers exported live horses.

Discussion

These data indicate that horse production in Saskatchewan is currently focused on the low end of the market. Support that for value-adding infrastructure development, will enhance the marketability of Saskatchewan horses. Local training and recreation facilities will increase community based commerce, allow for a continuance of traditional family enterprise while attracting urban families to the rural setting.

Value adding close to the production center is cost effective and will enhance the flow of urban money into the rural economy.

- 402 Horses in Canada...the Economic Benefit of Canada's Most Diversified Agricultural Sector** 10:20-10:40
Oral
V Evans, Strategic Equine Marketing, Saskatchewan, Canada

Unlike other livestock commodity groups, the primary economic contribution of horses is through their "live use" in a diverse range of activities over an average twenty-year active life. Live use for horses impacts multiple economic sectors – entertainment, international competitive sport, tourism, recreation, exports, pharmaceutical products, human health research, and, at the end of a horse's useful life, red meat production.

The objective of the 2003 Canadian Horse Industry Research Study, was to provide data on size, profile and impact of the horse industry on the national agricultural sector.

Results

The study revealed a snapshot of the diversity of the industry, and its significant economic contribution to the agricultural/rural sector. Farm-based owners provide a variety of products and services, including live horses "for use", PMU, boarding service to (urban-based) horse owners, riding lessons, horse training services, trail riding services for tourist operations, to name a few. With an estimated herd size of 800,000+ horses, the Canadian horse industry represents improvements on Canadian farms for horse-related activities.

The horse sector contributes more than \$1.65 billion per year for feed and care, replacement tack and equipment, horse health services and related farm maintenance. On-farm care of horses provides the equivalent of 1 full-time job for every ten horses. Racing and competitive sport with horses contributes more than \$400 million annually in additional revenues to rural economies through other horse-related services.

Discussion

The horse industry represents a unique value-added chain for agriculture, where increased participation in "non-agricultural" activities such as sport and recreation, increases sales prices for the commodity producer. Realizing the economic benefits of "diversity of opportunity" requires cooperative efforts between all industry stakeholders to develop resources, programs and strategies to develop new markets for horses and horse-related services.

- 397 Improving the Rural Economy – the Alberta Experience in Value-Adding to Equine Livestock Production** 10:40-11:00
Oral
L Burwash, Alberta Department of Agriculture, Canada

Printed abstract not available.

Healthy People III

Pascoe Room – 10:00-12:00

Co-Chairs: *JC Kulig*, University of Lethbridge, Alberta, Canada

L Chenard, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

- 351 Respiratory Symptoms, Pulmonary Function and Respirator use among Certified Safe Farm Participants** 10:00-10:20
Oral
KJ Donham (presenter), *S Schneiders*, *R Rautiainen*, *J Lang*, Agricultural Medicine,
Department of Occupational and Environmental Health, College of Public Health,
University of Iowa, USA

The Certified Safe Farm program is an intervention project designed to provide incentives for farmers to remove occupational hazards, and practice safe and healthful behaviors. The intervention includes a farm audit and safety scoring, a health screening for typical agricultural – related illnesses, taking a detailed occupational history, and individual and community education, based on individualized health and safety hazards. Farmers must obtain a score of 80% and go through the screening and education to become certified. Certification results in a \$200 payment, which is a surrogate for future incentives such as insurance premium discounts, and additional discounts on farm equipment and supplies.

Health and safety data are taken from a quarterly phone interview, an annual occupational history and questionnaire, and clinical screening data.

The results of respiratory health from all three sources above were evaluate for both the intervention (n=130), and the control (n=130) over a three-year observation period. The primary findings were as follows:

1. The intervention group had a tendency for a decrease over time in symptoms during the observation period.
2. Declines in symptoms of organic dust toxic syndrome, and sinusitis were statistically significant.
3. The use of respirators during exposure to dusty jobs was significantly higher, and increased during the study, relative to the controls.
4. Other symptoms and pulmonary functions tests were relatively comparable between the two groups.

- 321 Longitudinal Decline in Lung Function Measurements Before and After Dust Control** 10:20-10:40
Oral
P Pahwa (presenter), *HH McDuffie*, *JA Dosman*, Institute of Agricultural Rural &
Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of
Saskatchewan, Canada

Longitudinal estimates of pulmonary function decline in Canadian grain workers were determined by analyzing data collected from five regions (Atlantic, St. Lawrence, Great Lake, Central, and Mountain) of Canada over 15 years (1978-1993). Data on respiratory symptoms, smoking status, and pulmonary function were obtained approximately every 3 yr during an observational interval called "cycle".

The periods of cycles were 1978-81 (Cycle I)(n=5702), 1981-84 (Cycle II)(n=5491), 1984-87 (Cycle III)(n=3713), 1987-1990 (Cycle IV)(n=2847), and 1990-1993 (Cycle V)(n=3078) respectively. Stratified by their participation in different cycles follows: 1440 participated in all five cycles; 3004 participated in any four cycles; 3207 participated in any three cycles; 4176 participated in any two cycles and 9004 participated in any one cycle. Generalized estimating equations approach which (i) accounts for the

within-subject correlation and (ii) uses time-dependent and time independent covariates was utilized to fit a statistical model in order to predict annual declines in FEV1 (Forced Expired Volume in one second) and FVC (Forced Vital Capacity). SAS procedure GENMOD was used to fit a transitional model with autoregressive first order within subject correlation structure. The predicted annual reductions in FEV1 and FVC stratified by smoking status and years in the grain industry were computed. Declines in FEV1 and FVC were estimated before dust control (i.e based on first three cycles) and after dust control (Cycles IV and V).

Our findings suggest that in grain workers who were in the grain industry for 20 or more years both before and after dust control: the mean annual loss for FEV1 was greatest among current smoking grain workers (44.5 ml/yr and 26.3 ml/yr) followed by ex-smokers (43.5 ml/yr and 19.9 ml/yr) and non-smokers (42.5 ml/yr and 19.2 ml/yr) respectively. Similar results were obtained for FVC. Grain workers from the Atlantic region had significantly lower and grain workers from Central region had significantly higher FEV1 and FVC compared to grain workers from Mountain region. Our analysis indicates that there was an improvement in the lung function measurements of grain workers in all smoking and exposure categories. [Acknowledgements: Supported by Labour Canada].

**101 Multi-Site Randomized Controlled Trial to Evaluate Dissemination
Methods for NAGCAT**

10:40-11:00
Oral

W Pickett (presenter), *B Marlenga, RL Berg*, Canadian Agriculture Injury Surveillance
Program, Department of Emergency Medicine, Queen's University, Ontario, Canada

Background

The North American Guidelines for Childrens Agricultural Tasks (NAGCAT) were developed to assist parents in assigning developmentally appropriate and safe work for children 7 to 16 years who are working on farms across North America.

Purpose

The purpose of this research study was to compare the efficacy of the standard dissemination strategy with an enhanced, multi-phased, dissemination approach in influencing parents' (1) use/application of NAGCAT in assigning farm work to their children, (2) knowledge of the characteristics of child development at different ages, (3) knowledge of the content of NAGCAT, and (4) knowledge about the appropriateness of specific farm work for children at various developmental stages.

Methods

A multi-site randomized trial was performed. A total of 498 farms were included in the randomized trial. Participants included farm representatives from 11 western (n=115 farms) and 12 mid-western states (n=169), and Ontario, Canada (n=214 farms). 450 farms (90%) completed the full study protocol. These farms were randomized in a 1:1 ratio to experimental (multi-phased dissemination strategy) or control (standard dissemination) groups. Multi-phased dissemination activities included the provision of a video, personalized child development information, and supportive telephone calls, in addition to the provision of guidelines by first class mail. Standard dissemination activities included the provision of guidelines by first class mail only. Follow-up with all farms occurred during the fall of 2000.

Results

Baseline comparisons showed that the randomization was effective in achieving balance between the two study arms on the full range of demographic, operational, and knowledge/attitudinal characteristics. At the 15-month follow-up, 108/218 (49.5%) of farm parents in the intervention were actively using NAGCAT compared to 83/224 (37.1%) in the control group (difference: 12.5%, 95% CI: 3.4, 21.7). Parental knowledge about the content of NAGCAT also increased in the intervention group.

Implications

This is one of the first randomized controlled trials in the agricultural health and safety literature. The simple and practical dissemination strategy used in this study may actually increase the likelihood that farm parents will use NAGCAT.

204 Air-Borne Biological hazards in Livestock Farming: Standardized Measurement Procedures in Germany

11:00-11:20

Oral

MA Rieger, M Lohmeyer, M Nubling, S Neuhaus, H Diefenbach (presenter), Applied Physiology, Occupational Medicine & Infectiology, University of Wuppertal, Germany

Objectives

On the basis of EU directive 89/391/EEC (to encourage improvements in the safety and health of workers at work) and 2000/54/EC (on the protection of workers from risks related to exposure to biological agents at work), in all members of EU biological hazards at work have to be assessed and preventive measures have to be introduced. In Germany, national legislation (Biological Agents Ordinance – BioStoffV, Technical Rules on Biological Agents, TRBA) as well as recommendations of the workers compensation boards define standardized methods for the assessment of air-borne mould, bacteria and endotoxin. The paper summarizes the results of measurements in agriculture against the background of threshold values and data in sewage and waste disposal.

Methods

Mould, bacteria and endotoxin were measured with personal samplers where total inhalable dust was gathered on filters (glass fiber or polycarbonate respectively). After solution and dilution in 0,9% saline, samples were analyzed by cultivating methods (mould, bacteria) or the Limulus amoebocyte lysate test (COAMATIC® Chromo-LAL K, Chromogenix). Descriptive statistical analysis was performed by means of the software SPSS (9 and 10).

Results

Dependent on technical characteristics of livestock buildings and farming conditions (e.g. artificial ventilation, use of litter), concentration of air-borne biological hazards was far above the threshold values discussed in occupational safety and health. In sewage and waste disposal industry as well as agriculture higher exposure was correlated with emission of dust or aerosol.

Discussion and Conclusions

Whereas in the field of sewage and waste disposal a variety of technical and organizational preventive measures could be recommended, direct contact with animals and plants is characteristic for rural work. Therefore, modulations of livestock housing and farming characteristics should be evaluated in future projects with the aim of reducing exposure to biological agents.

Reference

Rieger, M.A. Biological hazards in agricultural workers, PhD equivalent Thesis, University of Wuppertal, <http://elpub.bib.uni-wuppertal.de/edocs/dokumente/fb14/habi2001/rieger/>

253 Determinant of Asthma in Swedish Farmers

11:20-11:40

Oral

A Rask-Andersen (presenter), *B Lembke, D Norback, C Janson*, Department of Medical Sciences, Occupational & Environmental Medicine, Uppsala University, Sweden

Working in agriculture represents a major occupational hazard for respiratory disease due to high exposure to dust during work. In earlier studies, we have shown that farmers have a high risk for adult

onset asthma despite a low prevalence of childhood asthma. The purpose of this study was to identify determinants of asthma in different types of farming.

Questionnaires were mailed to all farms with a field acreage larger than 10 hectares in the county of Uppsala (N=2,579) and to 710 farmers in Skåne, all members of the Farmers' Health and Safety Association. The questionnaire contained questions on sex, age, smoking, occupation, working hours, heredity for asthma and allergy, etc. There was also a number of questions on the work and production on the farm. The same validated questions on respiratory symptoms as in the European Community Respiratory Health Survey (ECRHS) were used.

Sixty percent of the farmers (2219) answered the questionnaire (1919 men and 300 women). Almost five percent of the farmers had doctor's diagnosed asthma. Male farmers with asthma were significantly older and more often ever-smokers than farmers without asthma. Farmers with asthma also had significantly more asthma and allergy in the family than farmers without asthma. There were no differences in the prevalence of asthma between different types of farming (dairy farming, cattle production, swine farming, etc.). Neither were there any differences in asthma prevalence depending on the size of the farm. In contrast, 29% of farmers that had had inhalation fever had work related wheeze compared to 12% among the farmers without inhalation fever ($p < 0.001$).

In this cross sectional study of farmer, individual factors such as age, smoking and heredity were of larger importance for the asthma prevalence than exposure during work. Probably, a more detailed history of previous exposures in different types of farming would be more useful since farmers affected by respiratory disease might have changed their production to decrease dust exposure. As inhalation fever is a marker of mould exposure in the past, these findings show that bad working conditions with mould exposure are related to respiratory symptoms in farmers.

**64 Occupational Exposure to Pubescent Canary Seed and Health I -
Study Designs**

11:40-12:00

Poster

HH McDuffie (presenter), *K Nakagawa*, *P Pahwa*, *SP Kirychuk*, *J Gomes*, *P Hucl*

Discussion

Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agriculture
Medicine, University of Saskatchewan, Canada

Saskatchewan is the major producer of canary seed. Pubescent canary seed has microscopic trichome (plant structures) which are composed primarily of silica (98% of the mineral content), which resemble fiberglass and asbestos fibers in size and shape, and are known to be skin and lung irritants. Geographical areas where the plant grows wild and contaminates wheat crops and flour for human consumption have higher levels of esophageal cancer. An international multidisciplinary team has designed studies to examine potential health effects of exposure to pubescent canary seed by integrating administrative and surveillance data with individual biological measures.

1. An ecological study comparing the geographical distribution and change in frequency of selected cancers registered by the Saskatchewan Cancer Agency (esophageal, lung) and the clustered geographical pattern of canary seed and barley production compared to wheat is in progress. Biogenic silica fibers act as tumour promoters but not as initiators in animal studies.
2. Pubescent canary seed is concentrated in selected geographical areas of Saskatchewan. We subdivided the province into rural municipalities which had canary seed production and those who did not. Grainhandlers ($n = 1354$) were then classified as exposed to pubescent canary seed if they had "ever" worked in a canary seed producing rural municipality. Longitudinal statistical analyses of

pulmonary function (1978-2003) decline will be conducted using an exposed/unexposed classification with adjustment for relevant co-factors such as cigarette smoking.

3. We examined the potential association of eight selected polymorphisms in genes and current lung function among grainhandlers (n = 96) exposed and unexposed to pubescent canary seed. Grainhandlers are male participants in a medical surveillance program initiated by Labour Canada in 1978, maintained financially by the Grain companies and delivered by professional staff.

Grainhandlers complete a questionnaire which examines respiratory symptoms and cigarette smoking habits in depth; perform spirometric maneuvers which permit assessment of pulmonary function and receive counsel concerning their respiratory health. DNA samples were collected using buccal smears and additional questions concerning types of grain handled were asked. These data will also permit estimates of the rates of decline in pulmonary function associated with selected polymorphisms.

65 Occupational Exposure to Pubescent Canary Seed and Health II - Grainhandlers, Pulmonary Function and Tumour Necrosis Factor Alpha Polymorphism

11:40-12:00

Poster
Discussion

HH McDuffie (presenter), *K Nakagawa, J Shindo, P Pahwa, N Nakada, SP Kirychuk, T Ishizaki, P Hucl*, Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agriculture Medicine, University of Saskatchewan, Canada

The rates of decline in pulmonary function among individuals are dependent on occupational (exposure to organic dusts), lifestyle (cigarette smoking) and inherent factors (certain polymorphic variants of selected genes). Currently employed grainhandlers who were participants in the Medical Surveillance Program for Grainhandlers in Saskatchewan in 2002 volunteered for testing eight polymorphisms in genes selected because of their reported relationship to lung disease or cancer. The inheritance of one of the polymorphic variants of tumour necrosis factor alpha (TNFalpha) has been investigated as a determinant of more rapid declines in pulmonary function among homozygotes (TNFalpha*2) compared to heterozygous TNFalpha*1/*2 or homozygous *1/*1.

We obtained demographic, occupational and respiratory symptom information by technician-administered questionnaires. Spirometric pulmonary function variables [forced expiratory volume in one second (FEV1), forced vital capacity (FVC), FEV1/FVC mid-maximal flow rate (MMFR)] were obtained consistent with American Thoracic Society Standards. We obtained samples of DNA using buccal smears. Genotyping was conducted using PCR-RFLP methodology.

Of the 96 male workers, the genotypes of 57 were homozygous TNFalpha*1/*1, 32 were heterozygous *1/*2 and 7 were homozygous *2/*2. Fifty-six men (58%) reported handling canary seed in the past, and 25% were current smokers. Observed mean values of FEV1 (p = .04) and FVC (p = .07) were lower for *2/*2 homozygotes (mean ± SE 3.81 ± 0.29, 4.95 ± 0.32 respectively) than for *1/*1 homozygotes (4.32 ± 0.09, 5.62 ± 0.11) or *1/*2 heterozygotes (4.41 ± 0.13, 5.61 ± 0.14). Similar lower pulmonary function values were present for *2/*2 homozygotes in comparisons of percent predicted FEV1 and FVC but there were no statistically significant differences. Reported exposure to pubescent canary seed did not influence pulmonary function. There was a statistically significant interaction among TNFalpha genotype and cigarette smoking such that those current smokers whose genotype was *2/*2 had lower FEV1 (p = .001), FVC (p = .004), MMFR (p = .01) compared to any other combination. There were similar findings for percent predicted FEV1 (p = .06) and MMFR (p = .05).

- 66 A Pilot Study of the Association between Drug Metabolizing Enzyme Genetic Polymorphisms and Lung Function Decline in Grainhandlers** 11:40-12:00
Poster
Discussion
K Nakagawa (presenter), *N Nakada*, *J Shindo*, *H McDuffie* (presenter), *P Pahwa* (presenter), *S Kirychuk*, *M Hashimoto*, *L Dwernychuk*, *T Ishizaki*, *P Hucl*,
Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agriculture
Medicine, University of Saskatchewan, Canada

The association of grain exposure with airways inflammation has been well recognized, whereas alpha 1 antitrypsin deficiency is the only certain genetic risk factor for accelerated lung function decline in grainhandlers. We investigated the association between eight genetic polymorphisms of six drug metabolizing enzymes which activate and/or inactivate environmental xenobiotics, such as tobacco smoke and/or pesticides and lung function in grainhandlers.

We obtained demographic, occupational and respiratory symptom information by questionnaires, examined spirometric pulmonary function, and collected samples of DNA using buccal smears. Genotype analysis was performed using PCR-RFLP or TaqMan PCR methods. The participants were 96 male Caucasian grainhandlers, 36.3+/-9.5 years old and, with a history of grain dust exposure for 12.5+/-8.8 years. There were 24 current smokers, 20 ex-smokers and 52 non-smokers.

We identified the following variant genotypes: cytochrome P450 (CYP) 1A1*2C, CYP1B1*3, microsomal epoxide hydrolase (mEH)-3, mEH-4, glutathione-S-transferase (GST) P1*2, GSTP1*3, GSTM1*0, and paraoxonase (PON1) Q192R. The total number of genotypes was 768 and 750 (97.6%) of them were clearly identified without any contamination. The mean values of % predicted forced vital capacity (%FVC) and % predicted forced expiratory volume in one second (%FEV1) were higher for mEH-3 homozygotes (n=38) than for heterozygotes (n=28, p=0.005 and p=0.018) and homozygotes for the most frequent allele (n=29, p=0.01 and p=0.02), respectively. There was a statistically significant interaction between PON1Q192R genotype and cigarette smoking, such that current smokers with the Q/Q genotype (n=15) had higher %FEV1 (p=0.036), %FEV1/FVC (0.001), and % predicted mid-maximal flow rate (p=0.002) compared to current smokers with Q/R (n=7) or R/R (n=2).

In this pilot study, we found two possible candidates, mEH-3 and PON1Q192R, for genetic susceptibility factors for accelerated lung function decline in grainhandlers. The effect of PON1Q192R on lung function in current smokers is the first report, to our knowledge.

Healthy People IV

- *Health of Hired Farm Workers in Rural Communities* -

Adam Ballroom – 10:00-12:00

Opening Remarks: *JL Levin*, Southwest Center for Agricultural Health, Injury Prevention & Education,
University of Texas Health Center at Tyler, USA

M Schenker, Western Center for Agricultural Health & Safety, University of California, USA

- 332 Injuries in Farmworker Families: an Elusive Concept** 10:00-10:20
Oral
S Cooper (presenter), *K Burau*, *EM Shipp*, *R Frankowski*, *D Oliphant*, *AM Sweeney*,
D DelJunco, *R Whitworth*, Texas A&M School of Rural Public Health, USA

Injury prevention efforts have been hindered by a lack of data on work patterns and risk factors for injuries to farmworkers, including both adults and children. The investigators are examining injury among farmworker families in Texas through both a cohort and case-control study. The permanent residence for

many farmworkers in the U.S. is Texas. Randomly sampled from the New Generation System (through Migrant Education) in Starr County, Texas, our cohort consisted of 267 families, who responded to a questionnaire in Spring 2000 indicating their intention to migrate. All were Hispanic, with an average family size of 4.6 people, average education of 7 years, and had lived on average in Starr County for 17 years. The mother was the primary respondent for the family, and questions were asked about the mother, father, oldest and youngest child (Year 1 only). For both years, only 62% of the participant families migrated and 96% of these completed the follow-up interviews. These families represented about 310 individuals each year who worked in the fields on average 6 days a week, 10 hours a day, for 2.7 months in the past year. During each year, 14 work-related injuries were reported. The most frequent injuries were cuts/jabs, transportation-related injuries, blisters/rashes from pesticides, and heat exhaustion/stroke. Over one-third of the injuries resulted in lost work time. Each year, 30% of mothers, 22% of fathers, 15% of oldest children and 10% of youngest children (Year 1 only) also reported chronic back pain. From this study, we identified the need for clarification and training interviewers on the definition of injury and the need to obtain information directly from the children. A subsequent study, "Injuries in Farmworker Children", is currently in progress, but initial results are indicating continuing difficulty in obtaining injury information. The investigators believe an agreed-upon definition by farmworkers of what constitutes work-related injury is elusive and complex and this health outcome should be obtained through a broader-based health approach with specialized questions covering the scope of the intended concept.

298 Respiratory and Reproductive Health Outcomes

10:20-10:40

M Schenker (presenter), *B Elvine-Kreis*, *L Beckett*, *J Bethel*, *O Kasirye*, *J Walsh*,
University of California at Davis, USA; Berkeley School of Public Health,
California, USA

Oral

Aim

To evaluate immigration-related health characteristics of female Hispanic agricultural and non-agricultural workers receiving prenatal care in a rural California community.

Methods

1121 Hispanic women receiving prenatal care in a rural California community were interviewed. Questionnaires addressed demographic, migration, occupational and reproductive health. The women represented the spectrum of Hispanic immigrants from recent arrivals to Hispanics born in the U.S.

Results

Women born in the US had more education and were less likely to have ever worked in agriculture (8%) compared to Mexican-born women (92%). US-born Latinas were more likely to be working in the service industry than were immigrants (46% vs 23%). Several risk factors for adverse occupational and reproductive health outcomes were higher among Latinas born in the US than among immigrants, including ever drinking alcohol (77% vs. 30%), smoking (42% vs. 10%), using drug (39% vs 2%), and use of alcohol and cigarettes while pregnant. Risk factor profiles were higher in the non-agriculture workers including ever smoking (28% vs. 10%); ever illegal drug use (21% vs. 2%); >1 sexual partner (59% vs. 29%); and >12 alcoholic drinks in lifetime (33% vs. 16%). Multiple logistic regression showed that agricultural work was independently associated with education (OR=1.7, 95% CI=[1.1, 2.5]) and inversely with acculturation, as indicated by language spoken (OR=2.15, 95% CI=[1.47, 3.14]). Immigration (and acculturation) were independently associated with higher risk profiles for cigarette smoking, alcohol and drug use in this population, and results showed a greater association with time since immigration.

Conclusions

Large numbers of recent Hispanic immigrants to the US live in rural areas, and health risk profiles of this population reflect immigration, acculturation and occupational influences on this population. Hispanic women who have worked in agriculture are more likely to be recent immigrants to the US, and generally have lower risk factor profiles for adverse pregnancy and other health outcomes. These results identify Hispanic women in non-agricultural occupations as a group that is at higher risk of engaging in less healthy behaviors that may affect birth outcomes, and therefore should be considered a target group for public health interventions.

314 Innovative Solutions for Improving Farmworker Health Access

11:00-11:20

A Kauffold, (presented by *S Partida*), National Center for Farmworker Health, Inc.,
Texas, USA

Oral

There are an estimated 3.5 million farmworkers and their dependents living and working in the United States. Their life of low wages, with most annual incomes below the federal poverty line, and nomadic living conditions, often prevent farmworkers from accessing health care for themselves or their families. One of the major issues in farmworker health is connecting the worker and their family to affordable health care as they migrate from one agricultural community to another. Another challenge is filling the gaps in hundreds of small rural agricultural communities where there are neither medical providers nor migrant health centers. For twenty-five years the National Center for Farmworker Health (NCFH) has provided assistance for the seasonal farmworkers across the United States. This assistance includes interaction with the Migrant Health Centers and Community Health Centers that provide primary health care for the farmworkers. The centers serve more than 600,000 farmworker patients each year, in 500-service delivery sites located in 42 states across the nation. Yet, the penetration of their services in the farmworker community represents less than 20%. This session will help the audience understand the barriers that migrant farmworkers need to overcome in order to access health care services. It will also identify local and national resources that can be used to improve farmworkers access to secondary and tertiary health care services. The audience will learn about the innovative tools the National Center for Farmworker Health has used to find financial assistance, specialty care services, medication assistance, dental and vision care for migrant farmworkers and other rural populations. This session will provide new ideas for developing and strengthening collaborations within rural communities.

401 Seasonal Labour Force in British Columbia

11:20-11:40

S Mangat, British Columbia Farm and Ranch Safety and Health Association, Canada

Oral

Since 1995 the Farm and Ranch Safety and Health Association (FARSHA) has embarked upon a farm worker health and safety training and education program in the province of British Columbia. Workers complex demographics and ethno-cultural employment statistics were taken into consideration. Started as a pilot project in 1995 it expanded to incorporate bilingual (English/Punjabi and English /French) seasonal worker safety coordinator's in 1997 and the following years. In 1995 the activities of the coordinator were limited to the Lower Mainland and were consequently expanded to the Okanagan Valley and the Vancouver Island in the following years. The initial goal of the project was to educate farm workers, labour contractors and producers of the new Regulations for Occupational Health and Safety in Agriculture (1993). It was designed to gauge knowledge around health and safety issues and to foster compliance of the regulations by outreach activities and site-specific training sessions. Training was provided in the language of the workers, predominantly Punjabi in the lower mainland and French/Punjabi in the Okanagan Valley. Topics of discussion ranged from pesticides, sun safety, machine guarding, hygiene issues, and ladder safety and injury prevention. Community service agencies and

residential sites were also targeted. Workforce characteristics in terms of age and trends will also be discussed.

Environment II

- Rural Exposures and Women's Health Outcomes -

Batoche Room – 10:00-12:00

Co-Chairs: *A Greenlee*, National Farm Medicine Center, Marshfield Clinic Research Foundation, USA
D Savitz, University of North Carolina, USA

- | | | |
|------------|--|-------------|
| 258 | Reproductive Health in Rural Populations | 10:00-10:20 |
| | <i>D Savitz</i> , Department of Epidemiology, School of Public Health, University of North Carolina, USA | Keynote |

Reproductive health is a major concern for women in general, and a public health priority throughout the world. This includes the ability to successfully conceive and carry the pregnancy to a health outcome, with adverse outcomes including infertility, miscarriage, and preterm birth. Rural women may be at increased or decreased risk relative to their urban counterparts based on several known and suspected influences on these health outcomes. Using an ongoing study of the causes of preterm birth, and based on current knowledge of the causes of preterm birth, I will illustrate special ways in which rural populations may be affected. Recent results of our research examining tobacco use, physical activity, and psychosocial stress in the Pregnancy, Infection, and Nutrition Study will be provided.

- | | | |
|------------|---|-------------|
| 125 | Risk Factors for Female Infertility in an Agricultural Region | 10:20-10:40 |
| | <i>AR Greenlee</i> (presenter), <i>TE Arbuckle</i> , <i>PH Chyou</i> , National Farm Medicine Center, Marshfield Clinic Research Foundation, Winsonsin, USA | Oral |

Background

Recent studies have suggested that agricultural occupations or exposure to pesticides may impair female fertility.

Methods

The Fertility Risk Factor Study retrospectively examined agricultural and residential exposures and risk of female infertility. Cases and controls (N=322 each) came from women who sought treatment at a large group medical clinic in Wisconsin. Women and their male partners provided information on health, occupational and lifestyle exposures in response to a telephone interview during 1997-2001.

Results

Mixing and applying herbicides two years before attempting conception was more common among infertile women (odds ratio [OR] = 27; 95% confidence interval [CI] = 1.9-380), as was the use of fungicides (OR = 3.3; 95% CI = 0.8-13). Residing on a farm, ranch or in a rural area during this time-period was protective of female fertility. Households supplied with central Wisconsin groundwater were at less risk for infertility than households using municipal sources (OR = 0.6; 95% CI = 0.4-0.9). Behavioral risk factors included alcohol consumption (OR = 1.8; 95% CI = 1.2-2.5), smoking (OR = 1.6; 95% CI = 0.9-2.9), passive smoke exposure (OR = 1.8; 95% CI = 1.2-2.5), steady weight gain in adult life (OR = 3.5; 95% CI = 2.0-6.1) and having a male partner over the age of 40 (OR = 4.5; 95% CI = 1.2-16.3). Drinking three or more glasses of milk per day was protective of female fertility (OR = 0.3; 95% CI = 0.1-0.7).

Conclusion

These results suggest that certain agricultural, residential, and lifestyle choices may modify the risk of female infertility.

141 Farm Health Surveillance in the Marshfield Epidemiologic Study Area: a Pilot Study

10:40-11:00

Oral

RT Greenlee (presenter), *B Marlenga, J Zentner, B Kieke, J Elliott*, National Farm
Medicine Center, Marshfield Clinic Research Foundation, Winsconsin, USA

Objectives

Surveillance of agricultural work-related illness and non-fatal injuries is limited and considered to be a major gap in prevention and policy making capacity. This pilot study evaluated the utility of the Marshfield Epidemiologic Study Area (MESA) and its farm residency cohort to identify and monitor potential priorities for prevention and control.

Methods

MESA is a defined geographic region that serves as a resource for conducting population-based health research. Nearly all of the 77,000 residents receive their health care from the Marshfield Clinic and affiliated hospitals, providing archived electronic medical information to characterize past and present health events. Farm residents (over 5,400) are periodically enumerated. Based on scientific literature and national research priorities, we selected 88 health conditions that may occur with greater frequency among farmers. To estimate age-specific and age-adjusted incidence and prevalence rates, we followed a fixed cohort of 1995 MESA residents through 2002. Poisson and logistic regression were used to evaluate the impact of farm residency in a multivariable setting. Additional analyses examined the occurrence of repeated diagnoses for injuries, intestinal infections, and skin cancers.

Results

Farm residents were at significantly greater risk of diagnosis with allergic alveolitis (prevalence odds ratio (POR) 11.41), crushing injuries (1.75), sacral segmental dysfunction (1.62), foreign body injuries (1.53), dislocations (1.35), and open wounds (1.21). Male, but not female, farm residents had an elevated risk of diagnosis with osteoarthritis, certain injuries, and some types of back dysfunction. Mental health and substance use diagnoses were significantly less common among farm residents (POR range 0.54-0.79). Repeated event analysis demonstrated enhanced influence of farm residency on injuries and melanoma, which suggests that farmers may be more likely to experience subsequent episodes or to require more extensive care for these conditions.

Conclusion

MESA can be a useful tool for disease surveillance in farm families. However, its utility is limited for mental health diagnoses and conditions that are less serious. For these, rates of diagnosed disease may be more strongly affected by quality of health insurance, access to specialized services, and health care utilization.

340 Biological and Environmental Monitoring Results from Agricultural Health Study /Pesticide Exp. Study

11:00-11:20

Oral

M Jones (presenter), *K Thomas, S Gordon, S Reynolds, M Nichioka, J Raymer, R Helburn,*
C Lynch, C Knott, D Sandler, M Alavanja, University of Iowa, USA

The Agricultural Health Study (AHS) is a prospective epidemiologic study of pesticide applicators and spouses in Iowa and North Carolina. Exposure to 2,4-D or chlorpyrifos was measured for a subset of

applicators and their families in the AHS Pesticide Exposure Study. Applicators were selected based on their plans to apply 2,4-D or chlorpyrifos, application methods and PPE use. Potential exposures were measured on one day of pesticide handling, mixing, loading, and application (PHMLA) using dermal patch, handwipe, and personal air samples. Dermal patches were collected by placing cellulose or gauze patches on the body. The surface area of each patch is proportionally-sized to the body area it represents. Handwipe samples were collected using a sub-sampling technique that wipes approximately 10% of the surface area of each hand. Urinary biomarker levels were measured in pre-and post-application samples from each applicator and participating spouses and children. Questionnaires associated with the PHMLA activities were collected to provide information about work practices, PPE use, and hygiene. Field monitoring was performed from 2000-2002 in Iowa and North Carolina, with 108 applicators, 47 spouses, and 12 child measurements completed.

The use of the target chemical during the observed PHMLA, and on days before and after, affected pre- and post-application urinary levels for some 2,4-D and chlorpyrifos applicators. Pre-application urinary 2,4-D concentrations ranged from <1 to 410 µg/g creatinine and <1 to 1100 µg/g creatinine from post-application urine samples. Urinary concentrations ranged from <1 to 65 µg/g creatinine for spouses and children of 2,4-D applicators. Applicator urinary concentrations of 3,5,6-trichloropyridinol, a chlorpyrifos metabolite, ranged from 1 to 29 µg/g and 2 to 79 µg/g creatinine in pre- and post-application samples, respectively. Urinary concentrations ranged from 3 to 15 µg/g creatinine for spouses and children of chlorpyrifos applicators. The amount of a target chemical measured on applicator dermal patches ranged from <1 to 34,000 µg and <1 to 3000 µg on handwipe samples. An overview of the urinary biomarker, dermal, and inhalation measurement results will be presented, along with other key relationships.

61 Women and Health in Northern Canada: a Model of Resilience

11:20-11:40

B Leipert, University of Western Ontario, Canada

Oral

The health of women who live in northern settings in Canada has not been studied in a clear and comprehensive manner. The objective of this study was to explore how women in rural, remote, suburban, and urban settings in northern British Columbia perceive and maintain their health. A feminist grounded theory method guided the study. Data were collected through semi-structured interviews with 25 women who had lived a minimum of two years in northern British Columbia and who were 20 years of age or older. Data were analyzed using the constant comparative method of grounded theory, assisted by the use of the NVIVO computer program.

The main problem for the women was revealed to be that of vulnerability to health risks, in particular, physical health and safety risks, psychosocial health risks, and risks of inadequate health care. Vulnerability to health risks resulted from marginalization within the northern context. This marginalization was characterized as including physical and social isolation, limited options of goods, services and education, limited power, and being silenced.

Women responded to health vulnerabilities by developing resilience which included strategies of becoming hardy, making the best of the north, and supplementing the north. Becoming hardy involved taking a positive attitude, following spiritual beliefs, developing fortitude, and establishing self-reliance. Women made the best of the north by participating in northern activities, making decisions about health care services, seeking education and information, seeking and receiving social support, and working on financial and work issues. Supplementing the north involved being political, and leaving the north, temporarily or permanently. The degree to which women could develop and use resilient strategies was affected by women's location within the northern context, the degree of marginalization and vulnerability they experienced, and their personal resources. As a result of developing resilience, northern women

experienced consequences of thriving, surviving, and declining in behavioral, cognitive, and emotional domains.

These study results lead to conclusions regarding women's health research, health care practice and health-related policy, and health practitioner education.

- 58 Managing Asthma within the Context of the Rural Family** 11:40-12:00
J Barrett (presenter), *E Gallien, J Dunkin, L Ryan*, Capstone College of Nursing,
Alabama, USA Oral

According to the World Health Organization, asthma is now a serious public health problem with over 100 million sufferers worldwide. It carries a high public health cost in office and emergency room visits and hospitalizations. Annually more than 10 million days are lost from school because of asthma, making it the leading reason for school absenteeism. The economic impact of children with asthma on a community or societal basis has clearly been well documented. What are not so clear are the factors, including economic, that effect the management of childrens asthma within the context of the family.

Objectives of this phenomenological study included being able to describe the day-to-day experiences of rural families with asthmatic children and discuss barriers to care. Phenomenology was used to guide this qualitative study. This approach was chosen in order to explore the dimensions, variations, and processes at work in rural families as they live day to day with a child with asthma. The cost, inconvenience to other family members, denial of normal activities, and school policies were the major problems described by caregivers. Expense of diagnostics and treatment regimens was a consistent theme among the families. Parents knew the triggers of asthma and how to prevent them. However, they were unable to pay for the special equipment and furnishings recommended. Financial assistance was not a part of the health care system available to them. This is consistent with other research that has revealed financial strain to be one of the greatest concerns of families dealing with asthma.

Adherence to asthma treatment plans will occur when interventions include assessing and securing family resources needed to manage their childs asthma. Several implications for practice emerged. Simply telling families what should be done in managing children with asthma is not sufficient. Health care professionals must offer affordable solutions and ascertain whether the recommended interventions are affordable and feasible for the families.

Rural Communities III **- Young Children on Farms: Global Perspective**

Battleford Room – 10:00-12:00

Organized by: *National Children's Center for Rural and Agricultural Health and Safety*

Chair: *B Lee*, National Farm Medicine Center, Wisconsin, USA

- 156 The Social and Economic Work Contributions of Canadian** 10:00-10:20
Farm Youth to Family Farms Oral
I Brueckner (presenter), *D Martz*, St. Peters College, Saskatchewan, Canada

The purpose of this research is to determine the nature and extent of the social and economic contributions of farm youth to family farms. This study will consider Canadian farm youth's contributions across gender, generation, farm type, and farm size. Changes in agriculture as a result of increasing farm

size, increased corporate control of agriculture, and the need for family members to work off the farm all contribute towards the need to understand how farm families are coping with change through their own work strategies. It is especially important to consider the youth's role on family farming operations as family members are increasingly relying on their own labour-power to maintain the viability of their farming operation. Current research on the division of labour based on generation is considerably lacking, and past methods of data collection have allowed the under-reporting of the contribution of youth to Canadian Agriculture. This presentation will discuss the contributions of youth to family farm operations and provide findings from the data collected over the period of 2001-2003.

95 Parents Knowledge of Child Development and Assignment of Tractor Work to Children

10:20-10:40
Oral

B Marlenga (presenter), W Pickett, RL Berg, National Children's Centre, Wisconsin, USA

Background

Childhood farm tractor injuries are an important injury control problem. Many of these injuries occur during the performance of tractor work that was assigned by parents, and some of this work is beyond the developmental capabilities of children. This has been highlighted by a recent policy statement from the American Academy of Pediatrics. Purpose Within a group of farmers who had received a new parent resource, the North American Guidelines for Children's Agricultural Tasks (NAGCAT), 1) to assess farm parents' knowledge of child development and 2) to determine whether that knowledge was associated with: a) use of NAGCAT in the assignment of tractor work, and b) compliance with two aspects of the tractor work guidelines contained in NAGCAT.

Methods

This study involved a secondary analysis of data collected during a randomized controlled trial involving 450 farms in the United States and Canada. Variables assessed included farm demographics, a measure of parental knowledge of child development, a census of the most common tractor jobs assigned to individual children (if any), whether the tractor was equipped with a rollover protection structure (ROPS), and a report of whether NAGCAT was used in making these tractor work assignments. Logistic regression models were used to examine potential associations between parental knowledge and other key variables.

Results

There was a strong relationship between parental knowledge of child development and use of NAGCAT; 92.5% of parents with perfect knowledge scores were using NAGCAT compared to only 60.7% of parents with the lowest scores. Violations of the NAGCAT recommendation for ROPS and minimum age for farm tractor operations were also associated with lower levels of parental knowledge. However, even among the most knowledgeable farm parents, there were ROPS and child age violations.

Implications

High parental knowledge acquired through education appears to have some influence on tractor work assignments. However, knowledge is not sufficient to remove many farm children from known tractor hazards. These findings will be discussed in light of the American Academy of Pediatrics policy statement on agricultural injuries.

184 Creating a Safer and Healthier Agriculture: Are We Asking the Right Questions?

10:40-11:00
Oral

MA Pucschwitz (presenter), University of Wisconsin, USA

Tremendous strides have been made in agricultural safety and health research in the past 10-15 years. Increased government funding coupled with increased interest in the subject from researchers outside of traditional agricultural fields of study has yielded a great increase in the knowledge base. A wide variety of research questions have been and continue to be addressed, involving such subjects as surveillance, education, and persuasion, among others. However, these questions are essentially based on finding answers within the agricultural system as it presently exists. This presentation will suggest that the problems are systemic and strongly tied to public policy, and discuss questions that should be raised and explored about the system itself. Such questions would involve issues of equity among various industries including agriculture, the idea and implications of a social contract between farmers and society, inherent rights, consumerism, and others.

Rural Communities IV

Terrace Lounge – 10:00-12:00

Chair: *S Burgus*, Farm Safety 4 Just Kids, Iowa, USA
S Kirkhorn, University of Minnesota, USA

69 The Effectiveness of Farm Health Fairs to Assess Rural Agricultural Health and Safety Practices

10:00-10:20
Oral

SR Kirkhorn (presenter), *LR Rydholm*, *AB Miller*, University of Minnesota, USA

A series of farm health fairs was organized in rural southern Minnesota from 1999 through 2002 in order to determine if this was an effective means to assess rural health issues, including agricultural health and safety. The effort was an inter-disciplinary collaborative approach utilizing health care professionals, University Extension, and farm service organizations. The Farm Health Fairs attracted predominantly active and retired farmers and farm family members.

Questionnaires to assess work and safety practices, specific commodity and size of operation, life style health issues, and health access issues were filled out by 67-78 per cent of participants. Medical testing, including spirometry, audiometry, cholesterol and glucose testing, body mass index, and blood pressure determination was offered at all fairs.

Results indicated that the farm health fairs were effective in attracting participants if adequate means of notification and substantial planning by stakeholders was accomplished. There was reasonable reproducibility of the participation rates, gender differences, testing results, and questionnaire responses between the two larger and more intensively organized health fairs.

Hearing loss, significant cardiovascular risk factors, and ongoing lack of proper safety practices were identified. The intervention mechanism was either an onsite review of medical test results and questionnaire responses with verbal and written recommendations given on exit or a delayed review and standardized letter indicating results and follow-up recommendations.

A six month standardized follow-up telephone interview assessed the effectiveness of the health fairs by determining work and safety practice modifications, life style changes, and medical follow-up. Work practice changes were made by 24 to 60 per cent of participants and life style changes or medical follow-

up occurred in 31 to 38 per cent. All information from questionnaires and medical testing was entered into a database and analyzed by standard means. The mechanisms and effectiveness of utilizing farm health fairs to improve rural health, provide a means of medical surveillance in agricultural communities, and determination of health and safety issues in rural communities will be discussed.

113 Building Public Policy for Alberta Rural Communities through Collaboration 10:20-10:40
M Kohlhammer (presenter, *R Hornbrook*, Alberta Rural Physician Action Plan, Canada) Oral

Objective

The rural community is being impacted negatively by many global economic, social, and environmental trends. Public policies that build community capacity, allow for the provision of service and protect the environment are required. This presentation will highlight the importance of collaboration between public organizations in developing such policies. Specifically the collaborative work of the Alberta Rural Physician Action Plan (RPAP) and the Rural Development Initiative of AAFRD in strengthening rural/remote communities and formulating supportive policies in Alberta will be shared.

Discussion

The RPAP is a comprehensive, integrated & long-term action plan for medical education, and rural physician-recruitment and retention. AAFRDs Rural Development Initiative was mandated with coordinating a cross ministry initiative that would result in a comprehensive rural development strategy for Alberta. Of importance to both groups is the development of policy for the improvement of quality living in rural/remote settings. For the past 2 years RPAP and the AAFRD have participated in dialogue across the province to identify the key issues for rural citizens, examine the resources available to rural communities, and determine feasible strategies to address the issues. These strategies can only succeed, however, within a supportive public policy framework.

119 Building on the Strengths within - Basing Project Designs on Community Goals 10:40-11:00
D Rasmussen, Agriteam Canada Consulting Ltd., Alberta, Canada Oral

Objectives

Mongolia's economic transition resulted in rising poverty and input shortages leading to natural resource degradation threatening the sustainability of rural communities. In 2002 the Asian Development Bank designed a loan to support the crop sector. Participatory techniques were used to ground the design on the goals and strategies of rural communities. Research used positive Appreciative Inquiry (AI) philosophies rather than problem-based analyses of older participatory techniques. Unexpected outcomes included institutional change and community-initiated training carried out spontaneously without project funds.

Discussion

The methods used went beyond rapid rural appraisal (RRA) and participatory rural appraisal (PRA) techniques to incorporate Appreciative Inquiry (AI) and SWOT analysis. AI facilitates the movement of an organization or community towards to a desired future based on their own positive experiences and resources. The four stages of AI are: (1) discovering periods of excellence, community strengths and resources, (2) "dreaming" the ideal state, (3) designing a consensus-based plan, and (4) community action to achieve the goals. Input was gathered from all stakeholder groups. Research activities, techniques and the selection of participants ensured small farmers, the poor and women were included in the process. Women represented 51% of all local workshop participants. Research recommendations were endorsed by a national workshop.

Conclusions

Sustainable initiatives rest on the leadership, resources and initiatives of the communities themselves. Community involvement in project planning and implementation improves projects because (1) stakeholders become a part of the process and take “ownership” of the project; (2) project designs and implementation strategies incorporate local knowledge and experience; (3) project activities are acceptable in the local culture and feasible within terms of local capacities; and (4) goals and results are established according to what the beneficiaries define as success and desirable outcomes. Community consultations and other participatory approaches can be facilitating tools, even during the design process. The key to their success is in mobilizing communities to invoke change using their own capacities and resources.

276 Increasing the Capacity of Rural Communities to use Research for Policy Change

11:00-11:20

Oral

L Langille, A Bull, Dalhousie University, Nova Scotia, Canada

In Canada, there are over 5000 rural communities and more than one-third of the population of the nation lives in these communities. Sustainability of resource-based economies, aging populations, urbanization, and globalization are just some of the challenges faced by rural communities. However, there are few concrete mechanisms whereby rural residents can provide input into the development of policies that directly affect them. When opportunities do arise, rural communities often do not have the capacity to use research to support their positions or advocate for policy change. In recent provincial and national dialogues, rural citizens in Nova Scotia and across Canada highlighted the need for more community involvement in the development of policies that affect their communities. They identified the need for information about their communities, access to tools to impact policy, and knowledge about the policy-making process.

Rural Communities Impacting Policy is a community-university alliance formed between the Coastal Communities Network of Nova Scotia and the Atlantic Health Promotion Research Centre at Dalhousie University to increase the ability of rural communities and organizations to access and use social science research to influence and develop policy. A “healthy communities” model, incorporating concepts of social, natural, human and economic capital is being used to guide the project activities. This presentation will provide an overview of the community-university research alliance, highlighting capacity-building activities, including: the development of research and policy tools, creation of a rural report, and training of students and community members in “research to policy” processes. It will also address the challenges of making the community-university partnership work effectively for the benefit of community organizations in rural Nova Scotia.

285 ICT Readiness for Rural and Remote Communities - Can it Be Assessed?

11:20-11:40

Oral

PA Jennett, University of Calgary, Alberta, Canada

Introduction/Background

There is a growing body of evidence that information and communications technology (ICT) can assist with meeting identified health and health care needs in rural and remote communities. There is also a history of inappropriate ICT investments for rural areas. One central element to informed sustained ICT rural implementation is ensuring that the various aspects of ICT ‘Readiness’ have been addressed.

Objectives

This presentation will: 1) outline an approach to identifying the factors within rural ICT 'Readiness', and 2) discuss items arising from these findings appropriate for a 'Readiness' checklist, that could be used by decision-makers.

Methods

A qualitative approach, including awareness sessions, focus groups, and key informant interviews, was used to determine the various dimensions of rural 'Readiness'. 'Readiness' factors were elicited for four target groups: 1) Public/Community, 2) Patients, 3) Care sites, and 4) Health care providers. From this process, the items for a rural and remote 'Readiness' checklist were captured.

Results

Four types of 'Readiness' were found within each of the target groups: 1) Core, 2) Engagement, 3) Structural, and 4) Non-readiness. Some factors within each type were shared across target groups, and some were group-specific. For example, dissatisfaction with the status quo was a factor within 'Core' Readiness for all four target groups. Privacy concerns were more prevalent in 'Engagement' Readiness for Public and Patient Groups, than other Groups. A draft rural and remote readiness checklist will be shared.

Conclusion

ICT 'Readiness' is a critical component of the successful and sustainable implementation and integration of ICT applications in rural communities. The development of tools, such as a 'Readiness' checklist, to assess this concept can be a useful strategy. Such devices can be used by rural decision makers to assist them in: 1) evaluating the state of ICT Readiness, as well as 2) facilitating wise ICT investments for this environment.

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| 226 University Allied Health and Nursing Student Externship in Rural Healthcare
<i>P Conatser</i> (presenter), <i>S Carmen</i> , Department of Sports & Exercise Science and Nursing,
West Texas A&M University, USA | 11:40-12:00
Poster
Discussion |
|---|-------------------------------------|

Health professionals within rural communities are being provided through a partnership between West Texas A&M University and seven rural healthcare facilities in the Texas Panhandle (26 counties covering 26,000 square miles). This model program to improve health services to rural communities is being accomplished through on-site clinical education of students.

The goal is to educate allied health and RN students in rural healthcare through clinical experiences that benefit the rural community, clients and student. Each student is positioned at different sites based on their unique abilities and desires to learn about rural healthcare. Students also obtain college credit for their practicum experience. A stipend is paid at the completion of their six-week externship through funds granted from the Burdick Foundation. The allied health students are exercise science majors with emphasis in cardiac rehabilitation, adaptive physical activity, and athletic trainers. The nursing students are BSN, RN undergraduates. The students have accomplished the following collaboratively: setting up a rural hospitals cardiac rehabilitation program, establishing a long term care facility's activity center with individualized exercise plans for clients, and individualized exercise plans for children with disabilities. Many of the students have chosen to work in rural hospitals after graduation.

Benefits of this program include: knowledge for future health care professionals in the needs of rural population and healthcare delivery, specific rural healthcare service delivery programs established at no cost to the facility, recruitment opportunities for rural healthcare facilities, and development of a healthcare delivery and education focused partnership with the University and the rural communities.

This presentation will specify key program elements and methodology to enable others to replicate this model collaborative program involving university and rural healthcare facilities in geographical areas with similar demographic characteristics.

282 Dealing with Health Information Overload: Weaving Indicators into Meaningful Stories

R Fransoo (presenter), P Martens, University of Manitoba, Canada

11:40-12:00

Poster

Discussion

While in some respects we still lack good information about the health of rural people, in other respects, we are overloaded with reports and statistics. Often, these reports seem to provide a plethora of seemingly unrelated, narrowly-defined 'indicators' of health status or health service use. This work provides several examples of how to connect various indicators to tell a more complete, compelling story about the health and health service use of rural residents.

The Manitoba Centre for Health Policy (MCHP) is about to release its second major 'Atlas' report on health status and health service use of rural residents. These reports both contain over 50 indicators meant to provide empirical results and assist regional health planners with information to help them determine current and future needs, and establish planning priorities. However, putting the results from these large reports to use can seem a daunting task, at least at first.

This presentation includes examples drawn from several RHAs, and covering several areas of health services, to illustrate how to weave various indicators together into a more complete story regarding that area's residents and how they use health services.

- Afternoon Plenary Session -

Adam Ballroom – 13:30-14:30

Chair: *D Morgan*, (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada
M MacLeod, Canadian Rural Health Research Society, Saskatchewan, Canada

386 Rural Health Care Delivery in Europe - a Rapidly Changing Scene

D Godden, Highlands and Islands Health Research Institute, University of Aberdeen,
Scotland, United Kingdom

13:30-14:00

Plenary

Provision of health services to remote and rural communities in the UK and Europe is undergoing major change. In addition to the universal challenges of transport, weather and communications to our more remote areas, we are faced with major demographic changes and the effects of European legislation. The population profile is rapidly ageing, as a consequence of increased longevity, outward migration of younger people and inward migration of seniors. Working hours for health care professionals are being restricted in accordance with the European Working Time Directive, while clinical governance regulations require that individual professionals maintain a certain caseload to guarantee competence. These conflicting requirements, together with contractual changes for health workers, make historical work patterns obsolete.

This paper will describe current research on public attitudes to altered health care provision for remote and rural areas, together with specific studies of service redesign, their implementation and clinical outcomes.

326 Cancer and Chronic Diseases in the Agricultural Health Study Cohort

14:00-14:30

A Blair (presenter), *M Alavanja*, *M Dosemeci*, *D Sandler*, *J Hoppin*, *F Kamel*,
K Thomas, *C Lynch*, *C Knott*, National Cancer Institute, National Institutes of Health,
Maryland, USA; U.S. Environmental Protection Agency; University of Iowa, USA

Plenary

Despite lower mortality from many diseases, farmers may experience elevated rates for a few cancers and other chronic diseases. The opportunity for exposure to a number of potentially hazardous substances including pesticides, fuels, engine exhausts, dusts, welding fumes, solvents, and microbes underscores the need for studies in this population to minimize their disease risks and to enhance our understanding of environmental causes of chronic diseases.

The Agricultural Health Study (AHS), sponsored by the National Cancer Institute, National Institute of Environmental Health Sciences and the U.S. Environmental Protection Agency, was established to evaluate the role of occupational, environmental, lifestyle and genetic factors on disease among rural populations. Between 1993-1997 we assembled a cohort of about 85,000 farmers and their spouses in Iowa and North Carolina. The cohort also includes about 5,000 commercial applicators in Iowa. Even though we have only 5.5 years of disease follow-up to date, the study has already provided us with a number of important research findings, e.g., the overall mortality and cancer experience of the cohort is very favorable; an excess of prostate cancer among farmers is related to use of methyl bromide and six other pesticides among individuals with a family history of prostate cancer, ovarian cancer is elevated among licensed female pesticide applicators but not among female spouses; macular degeneration is associated with use of fungicides; and respiratory wheeze is linked with use of a number of different pesticides.

The AHS is a national resource for health research on the effect of agricultural exposures. It is unique in that it is a large, actively followed, prospective cohort of pesticide applicators and their spouses with detailed information on agricultural exposures and lifestyle factors. We solicit and encourage collaboration from extramural investigators. Information on the AHS can be found in our web site at: www.aghealth.org.

Healthy People V

Pascoe Room – 14:40-17:00

Organized by: *Canadian Rural Health Research Society – CRHRS*

Chair: *R Pong*, Centre for Rural Northern Health Research, Laurentian University, Ontario, Canada

A Michalos, University of Northern British Columbia, Canada

112 Rural Youth Violence: Painting the Picture

14:40-15:00

JC Kulig (presenter), *B Hall*, *RG Kalischuk*, University of Lethbridge, Alberta, Canada

Oral

Although youth violence is increasingly acknowledged as a serious concern in many contexts, very little knowledge has been generated about this topic in rural communities. Moreover, the majority of previous studies tend to employ constructs of youth violence as determined by the investigator, rather than from youth themselves. In this provincially funded two-year two-phase study, male and female youth, ages 11 to 19, were interviewed as part of Phase I. In Phase II, the data collected from Phase I will be used to develop and administer a survey questionnaire about rural youths perspectives of violence. This paper will report on the qualitative interviews from Phase I in which the youth defined violence and its impacts on their lives and those around them.

The study was conducted in two rural, natural resource based communities. Community collaboration was achieved through local meetings, media releases, attendance at community functions and interactions with police and school personnel. Thirty tape-recorded interviews with youth were conducted in each rural community for a total of 60 interviews. In addition to the study questions, respondents created an ecomap that served to visually illustrate their family kin network and connections within their community.

The findings illustrate a range of perceptions of violence as perceived by the youth and the variance according to age, gender and communities. A discussion of the major findings will be presented along with the plans to involve the two communities in exploring the impact of the results and their ideas within the respective rural communities for dealing with and promoting anti-violence programs.

161 The Health of Rural Canadians: a Rural-Urban Comparison of Health Indicators

15:00-15:20

Oral

V Mitura (presenter), *R Bollman*, Statistics Canada, Ontario, Canada

Study Objectives:

The purpose of this study is to compare a number of key health indicators between rural and urban regions in Canada. Statistics Canada's 2000 / 2001 Canadian Community Health Survey provides a very rich database for the analysis. The large size of the survey allows for the segmentation of the population into four types of metropolitan regions (i.e., small versus large Canadian cities) and four different types of non-metropolitan regions (i.e., small cities, towns, rural census divisions, and the northern regions).

Discussion

Canadians living in rural and remote areas of Canada experience unique geographic challenges in maintaining their health and in obtaining health care. In addition to the physical geographic location of rural people in Canada, there are social, cultural and environmental differences within the population which may lead to differences in risk factors and hence differences in health outcomes. Given that health care in Canada is a provincial jurisdiction, it is also important to determine whether there are indicators of health which vary depending on the province in which health care services are offered.

Conclusions

- A lower proportion of Canadians living in non-metropolitan regions rate their health as "excellent" compared to metropolitan regions.
- In non-metropolitan regions of Canada, Nova Scotia, New Brunswick, PEI and Saskatchewan had the lowest proportion of their populations rating their health as "excellent".
- The rural population living adjacent to large cities in Canada has the lowest proportion of people reporting excellent health. These regions of Canada also have the highest proportion of the population being overweight and the highest level of physical inactivity.
- For Canadians living in Northern regions, Saskatchewan, Newfoundland and Labrador, and Manitoba had the lowest proportion of their population responding that their health was "excellent".
- Risk factors that are more prevalent in the non-metropolitan population include overweight, smoking, and chronic illnesses including arthritis / rheumatism, diabetes, and high blood pressure.
- Metropolitan and non-metropolitan regions exhibit similar proportions of people reporting very good/perfect functional health.
- There was very little difference between regions on the proportion of Canadians reporting that their health care needs were not being met.

**162 Health and Health Services Use of Rural and Northern Manitobans:
Do They Differ from Urban Rates?**

15:20-15:40
Oral

PJ Martens (presenter), *R Fransoo, E Burland, L Jebmani, C Burchill*,
University of Manitoba, Canada

Objectives

To compare health and health care use rates of three areas (North, Rural South, and Urban) to the Manitoba average.

Methods

Population-based indicators were derived from MCHP's Population Health Research Data Repository's anonymized claims for provincial health coverage. Health care use was attributed to one's area of residence. Areas consisted of Regional Health Authority (RHA) groupings: "North" (Burntwood, Churchill, Nor-Man); "Rural South" (all other RHAs except Winnipeg and Brandon); "Urban" (Winnipeg). Using SAS®, rates were direct age- and sex-adjusted to Manitoba's 1996 population, and compared using t-tests (Carriere and Roos 1997). Health indicators were: mortality (total, premature, injury, potential years of life lost); morbidity (acute myocardial infarction, stroke, diabetes prevalence, cancer incidence from CancerCare Manitoba). Health services indicators were: preventive (two- and seven-year immunization, mammography screening, cervical cancer screening, aged 65+ influenza immunization); hospital use (rates, short stay days); physician use (overall and consults); "high profile" surgery (hip replacement, cardiac catheterization, coronary artery bypass graft surgery); and "discretionary" surgery (tonsillectomy/adenoidectomy, Caesarean Section, and hysterectomy).

Results

Indicators	Difference* from Manitoba average (p<.05)		
	North	Urban	Rural South
Mortality	Higher (24%-98%)	Average, lower injury (-16%) and male PYLL (-8%)	Average, higher injury (10%)
Morbidity	Higher (31-99%), average cancer	Lower (-6% to -12%)	Lower cancer and diabetes (-2%), average AMI, higher stroke (15%)
Preventive services	Lower (-13% to -32%)	Higher (3% to 5%), except lower mammography (-4%)	Higher immunization (5%) and mammography (7%), lower Pap tests (-6%) and adult flu immunization (-4%)
Hospital & physician use	Lower physician (-7% to -13%) Higher hospital use (63% to 65%)	Higher physician (7% to 9%), lower hospital use (-10% to -20%)	Lower physician (-10% to -15%), higher hospital use (18% to 22%)
High profile surgery	Average	Average hip replacement, higher heart procedures (6% to 7%)	Average hip replacement, lower heart procedures (-8% to -9%)
Discretionary surgery	Average	Lower T/A and hysterectomy (-8% to -10%), average C-Section	Higher T/A & hysterectomy (9% to 13%), average C-Section

* % difference = [(area rate/provincial rate)x100]-100

Conclusions

Health care use somewhat reflects underlying health status, but anomalies amongst Rural South, North and Urban may show health service provision differences.

168 Impact of Telephone Triage on Medical Service Use: Implications for Rural and Remote Areas

15:40-16:00-
Oral

JC Hogenbirk (presenter), *RW Pong*, *S Lemieux*, *BTB Chan*, Laurentian University, Ontario, Canada

The Direct Health teletriage pilot project, staffed by registered nurses, was available to Northern Ontario residents, 24 hours/day, 7 days/week. Approximately 26% of Northern Ontario residents live in rural/remote areas (StatCan CSD type). Callers described their symptoms to a nurse who used clinical guidelines and nursing experience to provide nursing advice. Medical service use was estimated for callers during July 2000 to March 2001.

Questionnaires were mailed to 6,000 consenting callers (44% response rate). In addition, 28,000 records from consenting callers were matched (96% match rate) to OHIP claims. Results are presented for patient intent, nurse advice and patient action to estimate the impact of teletriage on medical service use.

Surveys suggest that 43% of patients had intended to go to the emergency department, compared to 36% who were advised to go by the nurse and the 34% of patients who went. In contrast, call record/OHIP claim data show lower rates (18, 23 and 26%, respectively). Surveys show that ~24% of the patients had intended, were advised and did visit a FP/GP at his/her office or after-hours/walk-in clinic. Call record/OHIP claim data show a much lower percentage for intent (5%), a higher percentage for advice (37%), but a similar percentage for action (22%).

Possible reasons for differences in the estimates include selection, social desirability and systematic bias and other methodological differences. Given these caveats, there is some evidence from the survey that a higher percentage of rural/remote patients had intended, were advised and did go to visit the ED compared with city/town patients.

Estimates for patient action were the most similar between methods and suggest that 26-34% of callers may visit the ED after their call and 22-24% may visit the physician at his/her office or after-hours/walk-in clinic. Additional work may help elucidate the impact and implications of teletriage on medical service use in rural/remote areas.

197 Job Strain among Nurses in Rural and Remote Areas of Canada

16:00-16:20
Oral

C D'Arcy (presenter), *D Morgan*, *N Stewart*, *J Kosteniuk*, University of Saskatchewan, Canada

There is continuing concern about the problem of recruiting and retaining health care workers in rural and remote Canada. Questions arise as to the nature and demands of the health care workplace in such areas. We use the 'psychological demands', 'skill discretion', 'and decision authority' sub-scales of the widely used Job Content Questionnaire to examine 'job strain' among rural and remote nurses. What are the levels of job strain among these nurses? How do they compare to other categories of workers? What are the organizational and individual correlates (predictors) of job strain?

The data are part of a larger national survey of nurses in rural and remote Canada. Mail questionnaires targeted a national sample of nurses working in rural areas, as well as all nurses working in remote nursing stations (outpost/nurse clinics) and the three territories. Nurses were surveyed regarding topics such as their socio-demographics, education, training, current position, work environment, job satisfaction, community characteristics, knowledge sources, and general health indicators. Approximately 68%, or 3,930 of the target sample completed questionnaires.

The 'quadrant' model of job strain uses overall mean or median scores on the psychological demands (PD) and decision latitude (DL) (skill discretion + decision authority) to classify jobs as high strain (high PD + low DL), low strain (low PD + high DL), passive (low PD + low DL), and active (high PD + high DL). High strain jobs can lead to negative health outcomes. Passive jobs can lead to chronic adaptation resulting in a reduced ability to solve problems. Active jobs, while demanding, allow for active learning and more control. Low strain and active jobs are considered more desirable and healthy.

Twenty-eight percent of rural and remote nurses report their jobs as high strain, 19.3% as low strain, 30.6% as active, and 21.6% as passive. The work environment and worker characteristics associated with each job type are assessed and the implications discussed.

206 Sources of Data for Rural Health Research – Development of an Inventory of Databases

16:20-16:40

Oral

D Heng (presenter), RW Pong, JR Pitblado, M Desmeules, C Lagace, Laurentian University, Ontario, Canada

Objectives

The purposes of this presentation are to examine the methodology of constructing database of databases and to describe the current status of inventory development and dissemination.

Background

Secondary data sources provide the raw material from which health indicators can be created and analysis can be done, and are being used more frequently than ever in health research. The availability of such databases makes them ideal for analyzing health status and health determinants of Canadians at a population level. Numerous secondary databases are available for use, but few researchers know how to locate the ideal data sources for their needs, especially for rural health research.

Discussion

The goal of this inventory is to build capacity within the field of rural health research. It represents a comprehensive review of available and relevant national data sources. Using measures of rurality that go beyond the simple rural/urban dichotomy to characterize varying levels of "ruralness", it identifies an extensive list of data sources in a common framework, assessing whether the data are collected, analyzable, and/or released at appropriate geographical levels for rural health research.

Many data sources were systematically examined. Knowledgeable individuals from different research centres, health planning agencies, and ministries of health were also canvassed for other data sources. Data sources screened during the review process were included within this inventory if they provide:

- readily available national data.
- data that can be disaggregated into rural and non-rural geographies
- data that are relevant to a variety of rural health issues
- potentially useful data to build population health models.

Conclusions

The Inventory currently consists of over 50 data sources and is designed to facilitate rural health research. The compilation of this inventory is intended to be an ongoing project that will be continuously updated as new data sources become available. The Inventory will be web-based and can be accessed by rural health researchers from around the world.

86 Breaks In Continuity of Care: the Rural Senior Transferred for Medical Care under Regionalization

HJ Biem (presenter), *HD Hadjistabripoulos*, *DG Morgan*, *HB Biem*, *R Pong*,
University of Saskatchewan, Canada

16:40-17:00

Poster

Discussion

Continuity of care is challenged when a rural senior, with multiple medical problems, is transferred to a regional hospital for acute care. From an illustrative case of an older patient with pneumonia and atrial fibrillation, we identify the potential breaks in continuity of care during patient movement through the healthcare system. Optimal continuity of care is characterized not only by contact with providers and collaboration with patients and their caregivers, but also by communication, coordination, consistency, contingency, and convenience.

For improving continuity of care, there are several systems approaches: 1) guidelines, policy and standards; 2) electronic health information systems and telecommunications technology; 3) disease management and integrated clinical pathways. The evaluation of these approaches requires measures that account for the complexity of continuity of care.

Funded by the Canadian Health Services Foundation, we are currently evaluating an integrated care pathway for anticoagulation post-discharge management for atrial fibrillation. This pathway may be a model for improving continuity of care for older patients with complex chronic medical conditions in our regionalized healthcare system.

178 Caregiving in the Heartland

PJ Jones (presenter), *WE Field*, Purdue University, Indiana, USA

16:40-17:00

Poster

Discussion

Objectives

Since 1979, the mission of Purdue University's Breaking New Ground (BNG), has been to help people impacted by disability who live or work in agricultural or rural settings. In its early years, the program focused primarily on the assistive technology needs of these individuals, primarily farmers. However, staff realized that it is not only the person with the disability who must adapt—there is usually a caregiver, frequently a family member, who also needs assistance. The program's efforts in assisting caregivers led to the development of the Caregiving in the Heartland workshop series. The proposed presentation will address the evolution, goals, and outcomes of the series.

Discussion

In 1997, BNG developed a video and manual for caregivers entitled "To Everything There is a Season," and conducted its first caregiving workshop in 1998. Then in 1999, funding was acquired from the Indiana State Department of Health to coordinate a series of workshops that have come to be called Caregiving in the Heartland. The number of workshops has steadily grown from two in 2000, to three in 2001, to four in 2002 and 2003. Workshop topics have addressed more than 20 areas, including caring for the caregiver, financial management, emergency preparedness, role changes, stress management, and humor.

Conclusions

Approximately 700 participants, exhibitors, speakers, and hosts have received instruction and encouragement from the workshops since they began in 2000. During the 2003 series, participants rated the workshops 9.03 out of 10 in meeting their expectations. The level of awareness of caregiving issues has also been raised in Indiana through the distribution of approximately 30,000 brochures plus numerous press releases and television interviews concerning the workshops. Increased collaboration among

agencies has also been a significant outcome of the workshops—more than forty organizations have participated in the planning and conducting of the sessions since 2000.

The Indiana Rural Health Association awarded the 2000 Caregiver Workshop Series the State-Level Distinguished Community Service Rural Health Award, and the workshops were part of an application that won the National Safety Council's 2001 Award for the Improvement in the Quality of Life for People with Disabilities.

230 The Need to Know Project: a Work in Progress

E Burland (presenter), S Bowen, PJ Martens, University of Manitoba, Canada

16:40-17:00

Poster

Discussion

Objectives

The Need to Know project is based on a 'knowledge transfer' model that facilitates collaborative research between the Manitoba Centre for Health Policy, Manitoba Health and the 11 rural and northern Regional Health Authorities of Manitoba, with representatives from each making up the project team. The main goals of the project form the basis of this model: (i) to create and develop knowledge directly relevant to rural and northern regional health authorities, (ii) to develop both RHA-relevant capacity for collaborative research and useful models for health information infrastructure, and (iii) to disseminate and apply health-related research so as to increase the effectiveness of health services, and ultimately the health of RHA populations.

Discussion

Efforts to accomplish these goals are well underway. The creation and development of knowledge involves conducting three RHA-relevant research projects (the first of which is nearing completion) and the refinement of the knowledge transfer process through the work of an Advisory Committee and an ongoing evaluation. The development of RHA-relevant capacity includes training for RHA team members and graduate students, to (a) increase their understanding of and/or their ability to conduct RHA policy-relevant research, and (b) improve their ability to access information. In order to facilitate the dissemination and application of health-related research, team members are informed about relevant health-related research and effective communication techniques, and receive "homework" assignments that provide an opportunity to engage in relevant activities. Moreover, ongoing team meetings, facilitated workshops, and other participatory activities provide opportunities for networking and increased partner interaction.

Conclusion

Preliminary feedback from team members has been very positive. Interacting and working collaboratively with others from across the province has been beneficial for many members. As well, the opportunity to learn, share knowledge, provide input and receive relevant training, has helped members to better understand and effectively use information. The poster will highlight some of the preliminary results from the project's first-year evaluation.

290 Needs Assessments of Elders on Fort Berthold and Cass Lake Indian Reservations

B Dahlen, College of Nursing, University of North Dakota, USA

16:40-17:00

Poster

Discussion

The purposes of this study are to expand the elder needs assessment carried out on the Standing Rock Reservation to the Fort Berthold and Cass Lake Indian Reservations and to compare the tribes in terms of sources of stress, functioning and resources. The Fort Berthold Indian Reservation is located 60 miles

from Minot, ND, and includes the New Town community. Fort Berthold is considered an open (non-isolated) reservation. It is home to the Mandan-Hidatsa-Arikara, known as the Three Affiliated Tribes. Cass Lake is located 15 miles from Bemidji, MN and is the home of the Chippewa Band of Indians.

The interviews are 2-3 hours in length and cover housing and employment conditions, transportation problems, health problems and use of medical services, functioning, and resources. The entire project will encompass two years, using data collectors who live on the reservation and will make trips to the elder homes, senior citizen centers, and pow-wows if necessary. Life histories will be conducted on a sub-sample of 10-15 elders in each tribe. The interviews will focus on the trajectory of traditional ways of doing things across the elder's lifespan: 1. Growing up as an Indian (family, community, living circumstances, gathering and preparing food, medicines, and what happened when someone was sick); 2. Changes that occurred as the individual grew older; and 3. How the individual takes care of himself/herself (preventing illness when sick, traditional medicine, caring for the sick and dying).

The study will provide information about differences between tribal elders in sources of stress and resources and how these relate to their functioning and in-depth information on customs and rituals and how they influence health and health practices. Chronic illnesses such as diabetes, heart disease, and circulatory disorders have markedly increased among American Indians during the past few years. This information will help health care providers better serve these populations.

Environment III

Kelsey/Saskatchewan – 14:40-17:00

Chair: *M Jones*, University of Iowa, USA

D Rennie, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

205 Economic Impact Assessment of Villages after Earthquake

SA Badri, Payame Noor University, Tehran, Iran

14:40-15:00

Oral

The aim of this article is study of the economic impact assessment (EIA) of rural resettlement in two villages that were damaged by earthquake at hazardous area of Tarome Olya, north-eastern Zanjan province, in 1999.

Resettlement approach was a suitable way in order to reconstruction remote and dispersal rural settlements through transferring the residents to another settlement or sites for authorities. Displacement of Balklor and Jamalabad's population to Abbar, the center of Tarome Olya, was a resettlement project that established Abbar Integrated Complex. After over 10 years, in order to answer this main question that was the rural resettlement project sustainable action? On the instant of sustainable development, the article seek to reply question what is the changes of employment structure at displaced families activities? And what is the economic impacts of the project?

The findings show that factors such as paying no attention to create employment opportunities, land and water resources restriction, unequal profitness of restrict created jobs at governmental services sector caused to tend displaced communities to continue reutilization of the low land and water resource at pervious sites as well as migration to big cities and other locations. In the meantime, changing role of rural women in household economy and their employment out of house is a new phenomenon.

**108 Pulmonary Intravascular Macrophages and Swine Barn Air Exposure:
Recruitment and Functions**

15:00-15:20
Oral

B Singh (presenter), *L Gamaga*, Department of Veterinary Biomedical, University of
Saskatchewan, Canada

Agricultural workers such as those in pig barns develop acute lung dysfunction and become susceptible to further lung dysfunction. The mechanisms of this pathophysiology remain largely unknown. We tested the hypothesis that a single exposure to pig barn air induces recruitment of PIMs which increases host susceptibility to acute lung inflammation. We exposed Sprague-Dawley rats (N=15) to the barn air for 8 hours and examined at 3, 24 and 48 hours post-exposure (n=5 each) while five rats were kept in clean air. Quantitative immunohistology showed expression of IL-8 with recruitment of neutrophils and PIMs at 3 and 48 hours post-challenge compared to the controls, respectively (p<0.05). In 2nd experiment, rats were kept in the barn or clean air (N=10 each) for 8 hours and divided into four groups (n=5 each). Control rats were given either saline (Group I) or *E. coli* lipopolysaccharide (LPS; 1.5 µg/g body weight IV; Group II). Barn-exposed rats were given either saline (Group III) or LPS (Group IV) at 48 hours post-exposure. All the rats were euthanised at 6 hours post-LPS or saline challenge. Group II & IV had more neutrophils and cells positive for TNF-alpha and IL-8 (p<0.05) compared to Group I & III. Group IV contained higher counts of neutrophils and cells reactive for TNF-alpha and IL-8 compared to Group II (p<0.05) thus implicating recruited PIMs. Immuno-electron microscopy confirmed these observations. These novel data show PIM recruitment following single exposure to the barn air and that recruited PIMs promote acute lung inflammation.

214 Air Pollution: Bangladesh Perspective

15:20-15:40
Oral

K Hossain (presented by *Md Musa Khan*), Institute for Environment & Development
Studies, Bangladesh

Bangladesh is a predominantly agro-based country where industries are few and mainly concentrated in major urban areas, particularly capital Dhaka, the port city of Chittagong and the divisional towns. Accordingly, air pollution is concentrated mainly in those cities and towns.

With the rapid urbanization and increase in the emission of black smoke by the automobiles, industrial boilers and brick burning, the situation started to deteriorate. In Dhaka, the situation is alarming, mainly due to vehicular emission. In Chittagong city, vehicular and industrial emissions almost equally contribute to the air pollution problem.

A recent monitoring of air shows that the concentration of suspended particles in ambient air is many times higher than normal. Air which the city dwellers and the road users breathe contains lead in concentrations almost ten times above the government safety standard. According to an estimate made by Bangladesh Atomic Energy Commission-BAEC, 50 tons of lead are emitted in the Dhaka air annually and the emission reaches its highest level in the dry season. Earlier reports from scientific studies say the density of lead in the air of Dhaka city in the dry season reaches 463 nanograms per cubic meter, the highest in the world. The lead concentration in the polluted air of Mexico city is 383 nanograms and in Mumbai, India, it is 360 nanograms per cubic meter.

In Bangladesh, no survey has been made on the impacts of air pollution on health. Automobile exhausts fill the air in Dhaka city with volatile organic compounds (VOCs) beyond tolerable limits, with some of the compounds causing cancer.

To implement all laws and regulations for reducing air pollution, effective cooperation of the public in general and the concerned agencies in particular was lacking. The recent decision of the government to

ban the two-stroke motor vehicles in Dhaka city to curb environment pollution in the capital has created lot of fear about shifting of the pollution sources from capital to semi-towns and rural areas of Bangladesh.

291 Sensitive Measures for Field Studies of Occupational Interstitial and Restrictive Lung Disease

15:40-16:00

Oral

M Schenker (presenter), *R Lupercio*, *P Enright*, *M Stoecklin*, *RJ Zeballos*,
University of California at Davis, USA

Objectives

To compare benefits and limitations of single breath diffusion (DLCO) and cardiopulmonary exercise testing (CPET) to spirometry in a field study of agricultural workers in Costa Rica.

Methods

Previous studies have found no effect of low-level paraquat exposure on spirometry, but paraquat is known to cause interstitial fibrosis with acute high-dose exposure. We attempted to measure DLCO and CPET in addition to spirometry in 338 farm workers (mean age = 37 +/- 10 years) in Costa Rica. All data collection was done at the plantations by trained technicians following ATS guidelines. Spirometry and DLCO testing were measured on a Collins CPLpf spirometer. CPET was performed with a MedGraphics VO2000 portable analyzer on a cycle ergometer by a trained exercise technician. For the CPET, participants were screened for cardiovascular diseases according to American College of Sports Medicine criteria. This limited the eligible participants to those 40 years of age or younger. All results were graded for acceptability according to previously published criteria.

Results

Spirometry testing was successfully completed in 96% of workers, with 4% unable to give acceptable results. DLCO was completed in 305 subjects; of these, 293 tests met acceptability criteria (96%). Reasons for failure to complete diffusion testing included inability to hold breath for 10 seconds, lack of gas mixture while in the field, and loss to follow-up with rescheduling of tests. 129 subjects were excluded from CPET because of age (33%), prior cardiac disease (4%), or back and knee problems (1%). Challenges in PFT testing included unpredictable power surges, extremes in ambient conditions, especially temperatures, high humidity and maintaining a supply of diffusion gas.

Conclusions

DLCO and CPET are feasible in field studies and offer more sensitive measures of interstitial and restrictive lung disease, but there are more limitations to their use than for spirometry. Some of these limitations are greater in rural field locations of developing countries, where conditions and supplies are less controllable.

146 Airborne Biological Hazards in Different Pig Fattening Systems

16:20-17:00

H Diefenbach (presenter), *MA Rieger*, *M Lohmeyer*, University of Wuppertal, Germany

Poster

Discussion

Due to occupational health regulations based on prevalence of diseases, biological hazards of employees in different economic fields, including agriculture, get more and more interesting. As standardized measurements are defined for the assessment of endotoxin, bacteria and moulds in Germany, acquisition of comparative data is possible, and exposure with relation to the individual's work may be assessed. The aim of the research is to assess four different housing systems for pig fattening regarding the emission of airborne germs and dust. The subject of this paper is integrated in a interdisciplinary research about

Occupational Safety and Health, Environmental Protection and Animal Welfare in pig fattening supported by the Bundesanstalt für Landwirtschaft und Ernährung (Federal Agency for Agriculture and Food).

The project focuses on two different conventional housing systems with fully slatted floor without bedding material and forced ventilation versus two systems common in organic farming in Germany, in detail: ecological deep litter pigsty with natural ventilation and a pigsty corresponding the European regulation 1999/1804 on organic livestock production with natural ventilation, exercise place and bedding material.

The air samples as well as material samples are taken and analysed on endotoxins, different bacteria and different moulds (fungi) according to German regulations. In addition the occupational dust mass concentration as inhalable, thoracic, alveolics (referring to the DIN EN 481) are determined. First results indicated the role of bedding material as a promoter for airborne biological agents. Additionally the type of livestock building seemed to influence the height of airborne germ concentration. As the Project measurements are to be continued until September 2003, final results will be presented. In principle it is to remark that the height of the values found in livestock farming are much higher than in other economic fields e.g. the waste and sewage disposal. They are far above discussed threshold values.

The results indicate that a modulation of the housing system (floor, bedding material, ventilation...) can be considered as a technical or organizational preventive measures with regard to occupational exposure to biological hazards. This possibility has to be considered in the actual political discussion encouraging ecological livestock farming in Germany.

181 Longitudinal Analysis of Pulmonary Dysfunction in the Initial Years of Employment in the Grain Industry

16:20-17:00

Poster

S Olfert (presenter), *P Pahwa, JA Dosman*, Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Discussion

A longitudinal study of 299 newly hired male grain industry workers was conducted between 1980 and 1985. The objectives were to determine the effects of employment in the grain industry on pulmonary function and respiratory symptoms; and to determine if completers experience similar changes in pulmonary function and respiratory symptoms as drop outs.

Pre-employment physical examination, pulmonary function tests and allergy skin prick tests were conducted on subjects at the Division of Respiratory Medicine, Department of Medicine, Royal University Hospital, University of Saskatchewan. Using Hedeker's approach for handling missing data, completers were compared with drop outs in both grain industry workers and controls. SPSS was used to conduct independent samples t-tests and chi-squared analyses to examine demographic characteristics, pulmonary function test values, respiratory symptoms and other irritations.

There were no significant differences between completers and drop outs when controls and grain workers were analyzed together. When controls and grain workers were analyzed separately, however, a higher proportion of non-smokers was found among control subjects that completed the study (89.5%, $p < 0.05$). As well, among ever-smoking controls, subjects that dropped out of the study smoked 6.00 pack-years, while those that completed the study smoked 0.82 pack-years ($p < 0.001$). No other statistical differences were found between completers and drop outs among controls; and no differences were found between completers and drop outs among grain industry workers. Generalized estimating equations was used to fit transitional models to determine the effects of grain dust exposure on pulmonary function. Height, study and previous FEV1 were significant predictors of FEV1, while height, study, exposure weeks, previous FVC, smoking group and an interaction between exposure weeks and previous FVC were significant

predictors of FVC. Work status was kept in the model for both FEV1 and FVC, while exposure weeks was kept in the model for FEV1 as it was thought to be biologically significant.

Results from these models, using subjects exposed to grain dust in the initial years of employment in the grain industry, will be compared with results from Labour Canada's Grain Dust Medical Surveillance Program, which used subjects with long term employment in the grain industry.

322 Respiratory Profiles in Grain Handlers of Saskatchewan

16:40-17:00

*P Gupta*¹, *P Pahwa*² (presenter), ¹Department of Physiology, University College of Medical Sciences, Delhi, India; ²Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Poster
Discussion

The research reports are available, highlighting the vast spectrum of prevalence of respiratory symptoms and decreased pulmonary function in farmers occupationally exposed to grain dust. Viewing these, the present study was planned to assess more exploratively the presence of clinical respiratory symptoms and any decrease in lung function in those who are acutely exposed to high level of grain dust while shoveling the grains. Fifteen grain handlers volunteered to participate in this study.

The American Thoracic Society (ATS) standard respiratory questionnaire used by the Agricultural Rural and Environmental Health, University of Saskatchewan, was executed to each subject to record information on occupational exposure, nature and duration of previous exposure to livestock, medical health, respiratory symptoms, allergies, smoking habits along with height and weight. Pulmonary functions were measured before starting and after the work, by technical staff, included Forced Vital Capacity [FVC], Forced Expiratory Volume in 1st second [FEV₁] and FVC/FEV₁ ratio by using a mobile pulmonary unit, observing the American Thoracic Society's guidelines. The dust mass concentration [mg/m³] measured by using personal samplers [Dupont Air Sampler; Canada Safety Supply; Saskatoon, SK, Canada], was carried by study subjects. The cassette was attached at the shoulder near the subjects breathing zone. The filters were desiccated before and after sampling. Geometric means for total dust and endotoxin levels were 2.43 mg/m³ and 175.74 EU/m³ respectively. The lung function of grain workers depict a decline trend though not significant from pre to post shift in FVC (5.26-5.14) and FEV₁ (4.12-4.09). The FEV₁/FVC ratio (78.57-79.78) appears to be more in post shift records may be attributed to lower values FVC with slight decline in FEV₁ results. Workers reported to have many clinical symptoms of work related.

To conclude we may state that acute grain dust exposure is injurious to the respiratory health of grain workers.

338 Gender, Environmental Tobacco Smoke and Pulmonary Function in Children

14:40-17:00

*Y Chen*¹, *L Lockinger*², *D Rennie*², (presenter), *JA Dosman*², ¹Epidemiology & Community Medicine, Faculty of Medicine, University of Ottawa, Canada; ²Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Poster
Discussion

We examined the gender-related effect of household exposure to environmental tobacco smoke (ETS) on pulmonary function among 862 subjects aged 6 to 17 years living in the town of Humboldt, Saskatchewan in 1993. Pulmonary function tests included forced vital capacity (FVC), forced expiratory volume in one second (FEV₁), maximum mid-expiratory flow rate (FEF₂₅₋₇₅), and flow rates at 75%, 50% and 25% of vital capacity (V_{max75}, V_{max50}, V_{max25}). Each pulmonary function test variable was regressed on age, height, weight, and their quadratic and cubic polynomials with the terms significant at the alpha level of

0.10 being retained. Residuals for the pulmonary function test variables, which are the differences between the observed and predicted values were calculated. Estimations of ETS exposure were parental smoking status, number of household smokers, total daily cigarette consumption and number of cigarettes smoked daily at home by household members.

Maternal smoking status was significantly related to residual FEF25-75, Vmax75, Vmax50 and Vmax25. Number of household smokers and daily cigarette consumption by household members had significant effects on FEV1, FEF25-75, Vmax75, Vmax50 and Vmax25. Gender-specific analysis showed that ETS exposure had larger effects on pulmonary function in girls than in boys. Interaction of gender and number of cigarettes smoked daily at home was significantly related to FEF25-75, Vmax75, Vmax50 and Vmax25 among the non-smoking subjects. We concluded that ETS exposure had a larger effect on pulmonary function in girls than in boys.

Environment IV

- Pesticide and Health Risks -

Adam Ballroom – 14:40-17:00

Organized by: *Pacific Northwest Agricultural Safety & Health Center, University of Washington;*
National Cancer Institute, Maryland

Chair: *R Fenske, University of Washington, USA*

- 229 Cancer Incidence among Pesticide Applicators Exposed to Atrazine in the Agricultural Health Study** 14:40-15:00
Oral
JA Rusiecki (presenter), *A Deroos, Won Jin Lee, M Dosemeci, J Lubin, A Blair, JA Hoppin, MCR Alavanja*, Occupational & Environmental Epidemiology Branch, DCEG, National Cancer Institute, NIH, DHHS, Maryland, USA

Previous studies have documented the human carcinogenic potential of atrazine. Increased risks for non-Hodgkin's lymphoma, leukemia, multiple myeloma, colon, ovarian, testicular, prostate, and brain cancers have been found, however studies were limited by small numbers and lack of in-depth exposure measurements.

We evaluated risk of cancer incidence for multiple cancer sites among pesticide applicators with and without exposure to atrazine in the Agricultural Health Study, the largest-to-date prospective cohort study of farmers in the U.S., based in Iowa and North Carolina. A total of 53,929 applicators were included in our analysis. Of these, 37,138 (69%) were classified as having been ever exposed to atrazine. We calculated standardized incidence ratios (SIRs) for each cancer site. We also carried out poisson regression analyses among atrazine exposed applicators to calculate relative risks (RR) for various cancers with quartiles of exposure, controlling for potential confounders. Exposure to atrazine, assessed via questionnaire, was measured as: (1) cumulative frequency of use (years of use x days/year) (2) weighted cumulative frequency of use (years of use x days/year x intensity index). During the study period (1993-2001), 1,680 incident cancers occurred.

We found elevated SIRs for prostate and ovarian cancers among both atrazine exposed and non-exposed applicators, however, estimates did not differ significantly between the two groups. Adjusted poisson regression analyses revealed a suggestion of association between atrazine exposure and multiple myeloma, rectum, lung, and bladder cancers. However, most of the individual estimates were not statistically significant because of small case numbers, and the results need to be interpreted with caution.

There was no increased risk for other cancers for which there were previous reports of associations: non-Hodgkin's lymphoma, leukemia, colon, ovarian, testicular, and brain cancers.

Presently, the Agricultural Health Study provides sufficient power to explore associations between atrazine exposure and prostate cancer (n=450). We found no evidence of elevated risk for prostate cancer with atrazine exposure. Based on the excellent exposure data available in this prospective cohort, however, these associations are worth further investigation as the number of exposed cases accumulates.

177 Pesticide Exposures of Rose Greenhouse Workers

15:00-15:20

WT Sanderson, University of Iowa, USA

Oral

Under the U.S. Environmental Protection Agency's (EPA) Worker Protection Standard (WPS), workers are excluded from entering pesticide-treated areas during restricted entry intervals (REIs). The EPA granted cut-rose producers an exception to these restrictions, allowing workers early entry to harvest roses. A study was conducted to evaluate the pesticide exposures of these workers to determine if early contact with pesticide-treated roses posed a health risk and to evaluate the effectiveness of work practices and use of protective clothing to reduce their pesticide exposures.

Forty-eight workers from 12 greenhouses were surveyed over two consecutive days immediately after pesticides were applied to the roses. The workers' exposures to five pesticides—acephate, chlorpyrifos, diazinon, dimethoate, and piperalin—were measured by having them wear air samplers, clothing dosimeter patches, and dosimeter gloves and socks over both survey days. To estimate the absorbed doses of these five pesticides, the workers also provided all urine voids over 48-hours post initial exposure for measurement of urine metabolites.

The air samples indicated that inhalation exposures averaged between 2 to 3 $\mu\text{g}/\text{m}^3$, decreasing steadily for some pesticides while remaining relatively constant for other pesticides over the two-day sampling period. The results of the patch and dosimeter glove samples were quite variable depending on the work practices and protective clothing employed by the workers. The results of the study indicated that use of protective clothing significantly reduced workers' exposures while working under the REIs but that use of protective clothing should be continued after the REIs had expired. The results of the study may be useful for guiding policies concerning work under the REIs and use of protective clothing. The methods employed in this study may be used for evaluating the pesticide exposures of workers in other settings.

280 Cancer Incidence among Pesticide Applicators Exposed to Chlorpyrifos in Agricultural Health Study

15:20-15:40

Oral

Won Jin Lee (presenter), K Khawaja, JA Hoppin, A Blair, JH Lubin, M Dosemeci, DP Sandler, MCR Alavanja, Occupational & Environmental Epidemiology Branch, DCEG, National Cancer Institute, NIH, DHHS, Maryland, USA

Objectives

To evaluate the incidence of cancer among pesticide applicators with exposure to chlorpyrifos in the Agricultural Health Study, a prospective cohort study of licensed pesticide applicators in Iowa and North Carolina

Methods

A total of 54,391 pesticide applicators are included in this analysis; 22,181 applicators (41%) reported use of chlorpyrifos. Detailed pesticide exposure and other information were obtained from a self-administered questionnaire completed at the time of enrollment (1993-7). Standardized incidence ratios analysis were

calculated separately for those exposed and not exposed to chlorpyrifos, based on age-, race- and calendar period- specific Iowa and North Carolina cancer incidence rates. Poisson regression was used to evaluate the exposure-response relationships between chlorpyrifos and cancer incidence controlled for the effects of potential confounding factors.

Results

A total of 1,687 incident malignant neoplasms were diagnosed during the study period, 1993-2000. There was a moderate deficit of malignant neoplasms combined among both chlorpyrifos-exposed and non-exposed applicators. However, in Poisson regression analysis among chlorpyrifos- exposed applicators, we found a significant increasing trend for incidence of lung cancers associated with lifetime exposure-days (p for trend=0.010) and intensity-weighted exposure-days (P for trend=0.003) to chlorpyrifos controlled for cigarette smoking. In the highest chlorpyrifos exposure category, the lung cancer incidence was significantly increased among applicators in both exposure indices (RR=3.17, 95% CI=1.37-7.37; RR=2.20, 95% CI=1.25-3.85, respectively). The results were consistent in Iowa and North Carolina, when analyzed separately.

Conclusions

Our findings suggest an association between chlorpyrifos exposure and increased incidence of lung cancer among applicators from the Agricultural Health Study.

307 Post-Application Methamidophos Residues on Indoor and Outdoor Surfaces and Childrens' Hands

15:40-16:00

Oral

S Weppner, K Elgethun, L Chensheng, V Hebert, R Fenske (presenter),
Environmental Health and Assessment Program, University of Washington, USA

This study characterized children's opportunities for exposure following aerial application of the OP insecticide, methamidophos, on nearby potato fields. In this study, biological, environmental, and child activity data were collected during and following an agricultural spray event. This presentation focuses on methamidophos surface deposition and hand residue data only.

Hand wipe samples were collected prior to, the day of, and the day following the spray. Playground equipment wipes were collected the evening prior to the spray and twice during the day of the spray. Wipes samples were collected from clean balls and apples prior to and following pesticide spray application in order to measure surface contamination of toys, foods and non-flat surfaces due to pesticide drift. Surface wipes were collected from kitchen tables and counters. Silica gel chromatography plates were placed throughout the community to measure methamidophos deposition.

Methamidophos residues on playground equipment were significantly higher than pre-spray concentrations at both 6 hours and 11 hours after aerial application began ($p=0.04$ and $p=0.04$ respectively, Wilcoxon signed rank test). Hand wipe concentrations on the day of and day following the spray were significantly higher than baseline samples ($p=0.008$ and $p=0.031$ respectively, Mann-Whitney tests). Three of the six post-spray toy wipe samples had measurable concentrations of methamidophos ranging from 0 to 0.37 ng/cm² with a median concentration of 0.14 ng/cm². No detectable residues were found on any apple or indoor residential surfaces.

For the purposes of this study, pesticide drift has been defined as any measurable off-target movement from the application site. Methamidophos residues found on silica gel deposition plates throughout the community, playground equipment, toys, and children's hands confirmed that drift occurred following aerial application. The lack of methamidophos on indoor surfaces suggests an outdoor source for children's dermal exposure. The lack of pesticide residues found on apples suggests that pesticide

ingestion via food contaminated by drift is not a likely exposure pathway in this study. The increase in methamidophos residues on playground equipment following the spray suggests greater opportunity for children to come in contact with pesticides when playing outdoors within 12 hours of an application.

- 67 Host Factors, Occupation and Testicular Cancer in Saskatchewan, Canada 1979-2000** 16:00-17:00
Poster
HH McDuffie (presenter), *J Quail*, Institute of Agricultural Rural and Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada Discussion

The incidence rates of testicular cancer are increasing in Saskatchewan, in Canada and in other developed countries. Cryptorchidism is the most consistently associated risk factor but accounts for a minority (5-17%) of cases. Other extensively investigated putative risk factors include personal medical history (Down's syndrome, testicular trauma or asymmetry, inguinal hernia, mumps orchitis, sexually transmitted diseases, infertility and prior cancer); agricultural exposures, paternal occupation as a farmer, family history of cancer and exposure to endocrine disrupting chemicals in utero.

In phase one of a planned triphasic study to investigate the hypothesis that exposure to selected pesticides which have estrogenic or other hormonal effects interact with selected host factors to increase risk of testicular cancer, we conducted a review of the medical records of all cases (n = 517) of testicular cancer diagnosed in Saskatchewan (1979-2000) and registered by the Saskatchewan Cancer Agency. In this information gathering phase, farming as an occupation was used as a surrogate for occupational exposure to pesticides.

Descriptive statistical analyses stratified by farmer, non-farmer and unknown occupation were conducted to compare demographics, tumour characteristics, post-diagnostic survival, lifestyle attributes including rural/urban residence and cigarette smoking, personal medical history and family history of cancer. Chi square and t-tests were used to assess the significance of the frequency distributions and of comparisons of mean values for continuous variables respectively.

Known medical risk factors were infrequent: Comparing farmer to nonfarmer: Cryptorchidism (2% vs 5%); testicular trauma (6% vs 5%); inguinal hernia (15% vs 12%); positive family history of testicular cancer (0% vs 5%). Sixteen percent of the cases were known to be farmers. Although the mean and median ages at diagnosis were older among farmers (median 39 years) compared to non-farmers (32 years), the frequency of stage one diagnoses (62% vs 66% respectively) and the mean and median tumor size at diagnosis were similar in the two groups. Fewer farmers (21%) than nonfarmers (27%) received only surgical treatment for their malignancy. These data indicate that rural residence or farming as an occupation were not barriers to early diagnosis or treatment.

- 70 Multiple Myeloma: Cigarette Smoking, Pesticide Exposure and Family History of Cancer** 16:00-17:00
Poster
P Pahlwa (presenter), *HH McDuffie*, *JA Dosman*, *Ja Spinelli*, *S Fincham*, *JR McLaughlin*, *D Robson*, Institute of Agricultural Rural and Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan; Saskatchewan Cancer Agency; Samuel Lunenfeld Research Institute; BC Cancer Agency, Canada Discussion

A positive family history of cancer may be a surrogate for inherited susceptibility and/or shared environmental influences. Known risk factors for Multiple Myeloma (MM) include occupational exposure to specific pesticides as well as selected medical conditions, a positive family history of cancer and smoking cigarettes.

Using mailed structured questionnaires, we conducted a case-control population-based study of incident cases (n = 347) of Multiple Myeloma (ICD-9 203) and controls (n = 1506) among males resident in six Canadian provinces. We conducted conditional logistic regression analyses and report odds ratios (ORadj) and 95% Confidence intervals (95% CI) adjusted for matching variables. We demonstrated statistically significant elevations in adjusted odds ratios for selected variables related to family history of cancer among first degree relatives (siblings [ORadj (95% CI) 1.58 (1.17, 2.13)], sisters [1.64 (1.13, 2.37)], female family members [1.40 (1.11, 1.94)]). Pesticide exposure was defined as exposure to any combination of herbicides, insecticides, fumigants, fungicides, algicides or slimicides for 10 hours per year or more. Smoking history included smoking status (non-, ex-or current smoker), and packyears.

We constructed four mutually exclusive categories combining the variables family history of cancer (yes, no) and pesticide exposure equal or greater than 10 hours per year (yes, no). Similar mutually exclusive categories were formed for family history of cancer and smoking status (nonsmoker; exsmoker and current smoker). Elevated risks of MM were found for those with a combination of a positive family history of cancer and exposure to pesticides [ORadj (95% CI) 1.73 (1.17, 2.57)] while neither variable was significant independently. In contrast, a positive family history of cancer increased risk both with [1.83 (1.24, 2.68)] and without [1.80 (1.12, 2.91)] cigarette smoking. Cigarette smoking without a positive family history also increased risk [1.51 (1.04, 2.18)] of MM. This pattern suggests a lack of synergism between the lifestyle factor, cigarette smoking and the inherent factor, positive family history of cancer. (Supported by Health Canada, British Columbia Health Research Foundation and Institute of Agricultural Rural and Environmental Health).

**83 Comparison of Male Breast Cancers in Farmers and Non-Farmers:
a Review of Cases at the Saskatchewan Cancer Agency**

16:00-17:00

KE Kvinlaug (presenter), *HH McDuffie*, *P Pahwa*, Institute of Agricultural Rural and Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Poster
Discussion

The objectives were: 1) To compare whether farmers, due to their implied exposures to pesticides, develop male breast cancer at an earlier age resulting in a more severe form of the disease and shorter survival compared to non-farmers. 2) To characterize all cases (n = 127) of male breast cancer registered at the Saskatchewan Cancer Agency, a population-based registry, between 1932 and December 31st, 2000.

The cases were grouped according to occupation (farmer, non-farmer, or unknown). Comparisons between farmers (n=41) and non-farmers (n=54) were made using the independent samples t-test and Chi-squared test. Cox proportional hazard models and Kaplan-Meier survival analysis were used to compare survival within occupational groupings and among other variables.

The mean age (standard deviation) at diagnosis for farmers was 68.5 (13.5) and for non-farmers 63.0 (11.2) (p=0.04). There were no statistically significant differences between farmers and nonfarmers for postdiagnostic years of life (median 4.5 vs 5.0 years), maximum tumor dimension [mean (SD) 2.5 (1.6) cm vs 2.3 (1.4) cm], lymph node involvement at diagnosis (55% vs 56%), or relapse occurrence. Farmers (24%) had more higher staged (stages III and IV) breast cancers than non-farmers (6%) and fewer diagnoses of other cancers compared to non-farmers (p=0.03)

Survival analysis revealed no statistically significant difference in survival between farmers and non-farmers. Cases who were older at diagnosis, died of male breast cancer, had a higher staged cancer, had a larger tumor, had a relapse, or had a cancer prior to breast cancer all had statistically significant shorter

survival times compared to reference cases (p less than 0.01). Multivariate analysis indicated age at diagnosis, maximum tumor dimension, lymph node status at diagnosis, and relapse occurrence were the most significant independent predictors of length of survival ($p=0.01$ or less).

These data did not support the hypothesis that farmers are more likely to be diagnosed at a younger age or with a more severe form of the disease due to their agricultural chemical exposure in comparison to non-farmers.

200 Assessing Cancer and Chronic Disease Risk in Farmers: Results from a Large Study in Central New York

P Jenkins (presenter), *G Earle-Richardson, J May, A Green*, Bassett Research Institute, Bassett Healthcare, New York, USA

16:00-17:00

Poster
Discussion

Background

The agricultural workplace presents a variety of health and safety hazards, ranging from machinery and large animals to poor ventilation and chemical exposures. To date, the effect of many of these exposures on chronic diseases such as cancer have not been established. Objective: To determine if farmers in Central New York are at increased risk for certain types of cancer.

Methods

Health survey data from a large rural population in Central New York were collected from two studies (1989, 1999). Among the health endpoints assessed were the presence of diabetes, heart disease and cancer. These surveys also obtained socioeconomic and behavioral data, such as occupation, disease screening, and smoking status. Data from the first study were utilized to identify subjects who were cancer free in 1989. These subjects were classified as either farmers or non-farmers and assessed for cancer status 10 years later according to subjects' 1999 survey responses. The presence of other risk factors for cancer, such as smoking and age were also assessed. To rule out possible biases due to differences in screening behavior, incidence for prostate and colorectal cancer only included subjects reporting to have been screened for these cancers.

Results

Prostate and colorectal screening rates were moderately (but significantly) lower among farmers. Smoking prevalence was also significantly lower among farmers (13.2%), than non-farmers (22.2%, $p=.0002$). Age-adjusted rates of leukemia were significantly higher among the farmers ($OR=5.6$, $p=.0407$, 95% $CI=1.1, 29.2$). Higher age-adjusted rates of prostate cancer and melanoma, which approached but did not reach, statistical significance, were seen among farmers. No meaningful differences were seen for a range of other cancers (bladder, head and neck, basal cell, lung, Hodgkin's Disease, non-Hodgkin's Lymphoma, ovarian, pancreatic, stomach, or colorectal).

Conclusion

A number of other studies looking at farming occupation as an exposure have found a similar, marginal effect for prostate cancer, and a somewhat greater effect for leukemia. These findings are instructive in narrowing the field for future, more targeted research on leukemia, prostate cancer and melanoma with more fully specified agricultural exposures.

273 Poison Center Surveillance of Bystander Pesticide Exposures

P Bryden (presenter), R McKnight (presenter), S Westneat, University of Kentucky, USA

16:00-17:00

Poster
Discussion

Introduction

The extent to which bystanders are exposed to pesticide applications is unknown. Systematic monitoring around spray areas is not routine. Quantifying exposures is extremely difficult. Airborne levels are determined by pesticide particle concentration and the percentage of toxic substance in those particles. Persons who are inadvertently exposed to pesticides often do not know the chemical or quantity involved. Persons living near areas of frequent field spraying have the potential for multiple unintentional pesticide exposures. Concerns about health consequences from these exposures may prompt calls to poison control centers for information.

Methods

We examined poison control data to explore bystander pesticide exposures in an agriculturally intensive region of the United States: the Mississippi River Delta region. Our goal was to determine if Poison Control Centers can provide surveillance of environmental pesticide exposures to bystanders. We searched American Association of Poison Control Centers' 2001 electronic medical records for exposure reports involving persons from 129 counties in Kentucky, Tennessee, Louisiana, and Arkansas, that implicated at least one of 54 generic classifications of fumigants, insecticides, fungicides, herbicides, or rodenticides. We abstracted 980 pesticide-related records. Narrative sections were read to identify bystander status of the exposed person.

Results

Forty-six bystander exposures were identified from 32 events. Reported bystander ages ranged from 2 to 81 (median: 45 ; 16 females, 13 males). All pertinent information for bystander classification came from narrative sections of the record. 28% identified aircraft crop dusters as the pesticide source. The most implicated substance was malathion (30.4%). 19.6% did not know the exposure substance. 73.9% of cases were symptomatic. 65.2% of the exposed persons were seen in, or referred to a health care facility. No hospitalizations or deaths were reported.

Conclusions

Reliance on poison control data may underestimate the true number of bystander environmental pesticide exposures that occur. However, the information from poison center records does provide valuable information for areas of concern. Further investigation into particular geographical area practices or frequently implicated pesticides can be initiated. Sentinel events can be identified.

71 Hodgkin's Disease: Cigarette Smoking, Pesticide Exposure and Family History of Cancer

P Pahwa (presenter), HH McDuffie, JA Dosman, JJ Spinelli, S Fincham, JR McLaughlin, D Robson, Institute of Agricultural Rural and Environmental Health (I.ARE.H), Centre for Agricultural Medicine. University of Saskatchewan, Canada; BC Cancer Agency; Samuel Lunenfeld Research Institute, Ontario, Canada

16:00-17:00

Poster
Discussion

Known and suspected risk factors for Hodgkins disease (HD) include occupational exposure to farming, farm animals and specific pesticides as well as selected medical conditions including viral infections, personal attributes such as a positive family history of cancer and smoking cigarettes. A positive family history of cancer can be used as an index of inherited susceptibility and/or of shared environmental influences. Using mailed structured questionnaires, we conducted a case-control population-based study of incident cases (n = 316) of Hodgkins Disease (ICD-9 201) and controls (n = 1506) among males

resident in six Canadian provinces. We conducted conditional logistic regression analyses and report odds ratios (ORadj) and 95% confidence intervals (95% CI) adjusted for age and province of residence.

In earlier reports, we demonstrated statistically significant elevations in adjusted odds ratios for selected variables related to family history of cancer among first degree relatives. Risks were significantly elevated for mothers, fathers and siblings, specifically sisters. Pesticide exposure was defined as exposure to any combination of herbicides, insecticides, fumigants, fungicides, algicides or slimicides for 10 hours per year or more. Smoking history information included smoking status (non-ex-or current smoker), and among exsmokers and current smokers, packyears, number of cigarettes smoked per day and number of years smoked.

We constructed four mutually exclusive categories combining the variables family history of cancer (yes; no) and pesticide exposure equal or greater than 10 hours per year (yes; no). Similar mutually exclusive categories were formed for family history of cancer and smoking status (nonsmoker; exsmoker or current smoker). The results indicated that family history of cancer without pesticide exposure [(ORadj (95% CI)) 2.34 (1.67, 3.28)] was important. A positive family history of cancer both with [(2.33 (1.56, 3.46)] and without [(1.79 (1.08, 1.95)] a personal history of cigarette smoking increased risk of HD. We conclude that a positive family history of cancer in first degree relatives is a more important risk factor for HD than exposure to pesticides as defined above and cigarette smoking status. (Supported by Health Canada, the BC Health Research Board and the I.ARE.H).

277 Adenocarcinoma of the Stomach and Esophagus with Agricultural Pesticide Use in Nebraska

16:00-17:00

Poster

Discussion

Won Jin Lee (presenter), *EF Heineman, R Markin, DD Weisenburger, W Lijinsky, MH Ward*, DCEG, National Cancer Institute, NIH, DHHS, Maryland, USA

Obectives

To evaluate the risk of adenocarcinoma of the stomach and esophagus associated with farming and agricultural pesticide use, including the use of nitrosable pesticides

Methods

We conducted a population-based case-control study in eastern Nebraska. Telephone interviews were conducted with white men and women diagnosed with adenocarcinoma of the stomach (n=176), esophagus (n=143) between 1988 and 1993 and controls (n=502) randomly selected from the same geographical area. Unconditional logistic regression was used to calculate adjusted odd ratios (ORs) for farming, chemical classes of insecticides and herbicides and for pesticides classified as nitrosable (able to form N-nitroso compounds [NOC] upon reaction with nitrite). Non-farmers were used as the reference category for all analyses.

Results

Farming history was associated with a non-significantly decreased risk of stomach (OR=0.9; 95% CI=0.6-1.3) and esophageal cancer (OR=0.7; 95% CI=0.5-1.2). There was no association between stomach and esophagus cancer risk with ever-use of insecticides (stomach OR=0.9; 95% CI=0.6-1.4, esophagus OR=0.7; 95% CI=0.4-1.1) or herbicides (stomach OR=0.8; 95% CI=0.5-1.4, esophagus OR=0.7; 95% CI=0.4-1.2). Individual pesticides, including individual nitrosable pesticides, did not show any significant association with stomach and esophageal cancers. Overall, the total number and total years of nitrosable pesticides use also were not significantly associated with either cancer. The patterns in the ORs were somewhat different among self- and proxy-respondents. Among self-respondents, use of 4 or more nitrosable pesticides was inversely associated with stomach cancer (OR=0.4, 95% CI=0.1-1.8) whereas there was an 1.8 fold elevated risk (95% CI=0.6-5.2) associated with esophageal cancer.

Conclusions

We found no significant associations between specific agricultural pesticide exposures and the risk of adenocarcinoma of stomach or esophagus among Nebraska farmers. However, the elevated ORs for esophageal cancer and nitrosable pesticide use among self-respondents are suggestive and deserve further evaluation.

147 Incidence of Hematologic Malignancies in Farmers

JJ Mazza (presenter), *BC Lee*, *SR Kirkhorn* (presenter), *DJ Reding*,
Marshfield Clinic Research Foundation, Wisconsin, USA

16:00-17:00

Poster
Discussion

Objectives

Over the past 30 years an extensive body of literature has been compiled linking certain occupational environments with an increasing trend in the incidence of certain cancers, in particular, hematologic malignancies, i.e., leukemia, lymphoma, and myeloma. Therefore, an extensive literature review was conducted to assess whether there is sufficient data to validate this purported association.

Discussion

The most convincing publications have been in the realms of the petrochemical industry and agricultural environments. Farmers, because of their frequent exposure to and use of pesticides, herbicides, and organic compounds, as well as the contamination of soil, water and air, have been a prime source for epidemiologic studies in countries throughout the world. Although the data would suggest a cause and effect relationship between exposure and incidence, major difficulties in methodologies to support this relationship have left doubt and skepticism in the minds of some investigators.

Numerous studies of the occupational environment of the agriculture industry have shown conflicting data of the relative risk and odds ratio to support a cause and effect relationship between hematologic malignancies and the environment. A major impediment that has persisted in all studies relevant to an exposure/cause and effect relationship is the inability to apply methods to accurately measure the “dose” and duration of the exposure. Additionally, exposure in the suspected environment is virtually always to a multitude of factors, many of which have been incriminated as suspicious for causing cancer. Genetic predisposition is also an important factor that must be considered when assessing probability and incidence of these diseases in this population.

Conclusions

Challenges to conducting future studies that support or refute an association between agricultural work and hematologic malignancies present a daunting task. Critical issues that must be addressed include: accurate measures of dose and duration of exposure, inclusion of confounding environmental factors, and identification of predisposing genetic factors.

Rural Communities V

- *Young Agricultural Workers: Policy, Training and Injuries*

Battleford Room – 14:40-17:00

Organized by: *Great Lakes Center for Agricultural Safety & Health, Ohio State University*

Chair: *T Bean, Ohio State University, USA*

- 213 Proposed Revisions in U.S. Regulations Affecting Hired Youth in Agriculture** 14:40-15:00
MW Peters (presenter), *BC Lee, DJ Murphy*, National Farm Medicine Center, Oral
Wisconsin, USA

Objectives

The U.S. labor laws regulating work assignments for youth employed in agriculture have not been updated since 1970. In May 2002 the National Institute for Occupational Safety and Health (NIOSH) submitted a report to the U.S. Department of Labor (DOL) recommending specific changes in the hazardous occupation orders in agriculture (HOOAs) that restrict work tasks for hired youth age 14 and 15. The recommendations were consistent with DOL's commitment to facilitate meaningful employment and training opportunities while protecting youth from significant work hazards. The DOL requested "stakeholder input" on proposed revisions to the HOOAs from child safety advocates, cooperative extension educators, and agricultural businesses. Comments to the DOL were intended to: 1)offer guidance in prioritizing revisions to the HOOAs; 2)anticipate the impact of changes to the HOOAs on injuries among young workers; and 3)provide comment on how current regulations are not protecting young workers.

Discussion

This paper will discuss the regulatory revisions from the perspectives of the National Farm Medicine Center and Penn State University. The top priority should be requirement of roll over protective structures (ROPS) and seat belts on tractors operated by hired youth. Regulations should also require that youth have a valid operator's license to drive tractors on well-traveled roadways. A new regulation focusing on "extra riders" or passengers was proposed, because many serious and fatal injuries occur from falls associated with riding on non-passenger areas of tractors or machines (e.g. drawbar or hay wagon). There is agreement that terminology should be clarified and updated throughout the regulations. Disagreement persists among stakeholders regarding legal exemptions based on student status and/or training certifications. While some believe these exemptions are warranted, others contest there is insufficient evaluation to demonstrate the student or training programs are effective in reducing injuries among young workers.

Conclusion

A challenge in revising these regulations is posed by the agricultural industry that annually employs about 666,500 young workers. Further concern is raised that, ultimately, these regulations would affect family farms where many young people are conducting agricultural work for their parents.

- 140 The Epidemiology of Tractor-Related Injuries among Agricultural Households with Children** 15:20-15:40
KR Ferguson (presenter), *SG Gerberich, BH Alexander*, University of Minnesota, USA Oral

Tractors are a leading source of agricultural fatalities and are also associated with the most severe of nonfatal agricultural injuries. To date, most evidence is based solely on case reports or hospital records, although only a fraction of those who sustain an agricultural injury are hospitalized. This study utilized

data from the Regional Rural Injury Study – II (RRIS-II), a population based study, to determine the occurrence of and potential risk factors for tractor-related injuries among agricultural households with children in a five-state region of the United States (U.S.)

This surveillance methodology utilized a computer assisted telephone interview to follow 3,765 agricultural households, identified using the U.S. Department of Agriculture's National Agricultural Statistics Service Master List Frame, throughout 1999. Demographic, exposure, and injury data were collected for all members of the households. Personal risk and injury event rates, adjusted for within-household correlation, non-response, and unknown eligibility, were calculated using generalized linear models. Odds ratios and confidence intervals were calculated using logistic regression; selection of confounders was based on directed acyclic graphs.

The annualized tractor-related injury rate was 9.6 events per 1,000 persons, and was higher among males (16.2) than females (2.5). Rates were also increased among adult males (29.6) and females (4.2). One-third of cases reported an activity of mounting/dismounting at the time of injury; general repairs, driving, and adjusting machinery were also common. Treatment was frequently received in doctors' offices (31%), chiropractic clinics (26%), or hospitals (22%). More than one-fourth of all treated injuries resulted in costs not covered by health insurance. Compared with participants 35-44 years of age, decreased risks (ORs; 95% CIs) were identified for ages 0-4 (0.1; 0.04, 0.5), 5-9 (0.1; 0.02, 0.2), 10-14 (0.1; 0.05, 0.3), 15-19 (0.2; 0.1, 0.3), and 20-24 (0.3; 0.1, 0.9). Increased risks were observed for males compared with females (7.2; 4.3, 12.3) and prior versus no prior agricultural injury (2.0; 1.4, 2.9).

The results of this study serve as the basis for an analytical case-control study to further evaluate specific risk factors for tractor-related injuries and help facilitate the development of appropriate prevention and control efforts.

232 A Case-Control Study of Injuries among Central Ohio Farm Youth

15:40-16:00

JM Crawford (presenter), *JR Wilkins*, *K Koechlin*, *L Shotts*, *M Elliott*, *TL Bean*,
Ohio State University, USA

Oral

In 1999, a longitudinal study of injury risk among farm youth was undertaken in central Ohio. Youth were recruited through OSU Extension (4-H Youth Development), were asked to complete a Self-Administered Questionnaire (SAQ), and were administered developmental tests (IQ, strength, hearing, balance, neurobehavioral status, and anthropometry). In addition, they were asked to prospectively record daily agricultural work activities and all unintentional injuries for a period of 13 weeks. A total of 407 youth provided (nearly) complete data. Among the items on the SAQ were details of injuries occurring during the lifetime of the youth which required medical treatment. The present study compared youth reporting being injured in the 2 years prior to enrollment in the study (n=121) to those reporting no injuries or injuries that occurred more than 5 years prior to enrollment (n=214). A logistic regression model found elevated risk of injury associated with youth frequently engaging in high-risk behavior (OR=1.96, 95% CI 0.96-3.99), sometimes engaging in high-risk behavior (OR=2.06, 95% CI 1.08-3.92), high parental rating of youth physical skills (OR=1.83, 95% CI 1.05-3.20), low youth perceived risk of ever using alcohol, tobacco and other drugs (OR=1.90, 95% CI 1.06-3.41), low adult perceived risk of cleaning/bedding animal stalls by hand (OR=1.82, 95% CI 1.05-3.18), being in the 3rd or 4th quartile of national age- and sex-specific Body Mass Index norms (OR=2.07, 95% CI 1.12-3.82), strongest tertile of shoulder strength (OR=2.27, 95% CI 1.18-4.37), being in the 3rd or 4th tertile of postural sway length [having less balance] (OR=1.95, 95% CI 1.07-3.54), and authoritarian parenting style (OR=1.89, 95% CI 1.07-3.33). The adjusted OR for the continuous age variable was 0.83 (95% CI 0.71-0.97). These results suggest that youth developmental factors, youth and adult attitudes about risk, and parenting style may influence risk of medically-attended injury.

219 Farm Youth Can Be Reliable Reporters of Their Daily Injury Experiences

16:00-16:20

JR Wilkins (presenter), *JM Crawford, KM Koechlin, L Shotts, M Elliott, TL Bean*,
Ohio State University, USA

Oral

A longitudinal study of children and adolescents 8-18 years of age exposed to agricultural hazards was conducted to empirically develop multivariable risk prediction models of agriculture-related injury, and to derive work guidelines that parents and other caregivers could use to judge the age- and developmental-appropriateness of farm chore assignments. Putative risk indicators of interest include (but are not limited to) the following youth-based factors: chronological age, neurobehavioral competence, anthropometric and strength characteristics, and selected behavioral factors. The role of caregiver-based factors such as parenting practices and risk perception is also being explored.

Longitudinal data on all unintentional injury events were obtained through a modified form of Participant Event Monitoring (PEM), where youth were expected to report their injury experiences (and work exposures) in a semi-structured daily diary over a 13-week period. The data collection methodology permits estimation of severity-specific injury rates, the focus of this presentation. One aspect of data quality assessment concerned the validity of the youth self-reports of injuries. For all unintentional injuries combined (U.S. data, from WISQARS), and for injuries classified as agriculture-related (national and/or state or regional data from 15 previous studies), plots of both types of rates as a function of severity were unambiguously log-linear, consistent with the well-known iceberg/pyramid model of injury severity. Superimposing both types of severity-specific rates estimated from the present study also demonstrated clear, unambiguous log-linearity. Further, the slopes of all 4 trendlines were remarkably similar, differing, by type, by no more than approximately 15%. Rates for all unintentional injuries combined derived from the present study were 2-3 times higher than the national rates at each severity, suggesting our methodology significantly reduces under-reporting of unintentional injuries.

The agriculture-related rates estimated from the present study were 6-40 times higher at each severity compared to predicted values based on the combined results of all previous (and relevant) national, regional, and/or state-based studies. It therefore appears that the modified form of PEM we have developed can be implemented with 8-18 year olds to yield reliable daily data on unintentional injuries.

247 Pesticide Safety Training in Migrant Farmworker Mothers and Children from Starr County, TX

16:20-16:40

EM Shipp (presenter), *SP Cooper, K Burau, R Frnkowski*, Texas A&M University, USA

Oral

Established by EPA, the Worker Protection Standard (WPS) mandates that farmworkers receive basic pesticide safety training covering the use of protective equipment and employee rights to information/resources. Although WPS has been in full effect since 1995, little is known about pesticide training among migrant farmworker women and children. Two projects examine this issue. A 2-year cohort study, "Injury and Illness Surveillance in Migrant Farmworker Families" includes 267 migrant farmworker families randomly sampled from the New Generation System (database for transferring their childrens school records while migrating) who permanently reside along the Texas-Mexico border (Starr County, TX).

Data were collected in Starr County during in-home interviews. Of 102 mothers who participated in migrant farm work during summer 2001, 57 (55.8%) reported having ever received training/instruction in the safe use of pesticides while 43 (42%) reported having received training within the previous 5 years. Of trained mothers, 88-91% reported that their training covered key WPS areas: 1) entry into a recently treated field; 2) pesticide related injuries/illnesses; and 3) where to go and who to contact for emergency care following exposure. Of 77 mothers who worked outside Texas, 68-83% reported employer-provided

decontamination supplies (e.g., soap, wash water, towels, and toilet facilities). However a strikingly smaller proportion (12-28%) of 25 mothers who worked within Texas reported access to the same resources indicating discrepancies in compliance with WPS across the U.S.

The second project, "A Study of Work Injuries in Farmworker Children" is a 5-year prospective case-control study initiated in 2001. The study population includes farmworker children with a usual residence in Alto Bonito, TX located in Starr County. Although data collection is not complete, preliminary data suggest that farmworker children are not receiving sufficient education or supplies necessary to minimize their exposure to pesticides. Increased enforcement, education, or an alternate delivery of pesticide training for both farmworker mothers and children is recommended.

- 102 Fatal Farm Injuries among Canadian Children: There is No "Golden Hour" for Young Farm Children** 11:00-11:20
Oral
R Brison (presenter), *B Marlenga*, *W Pickett*, *RL Berg*, Department of Emergency Medicine, Queen's University, Ontario, Canada

Background

Victims of serious injury who receive rapid provision of trauma care are predicted to have a more favorable prognosis. Hence, the hour following the occurrence of an injury is referred to as the "Golden Hour" by some emergency health services professionals. The provision of timely prehospital care continues to be a challenge in rural settings. Before investing resources to optimize pre-hospital care, it would be helpful to assess the relationship between injury outcome and the provision of optimal trauma care in the farm population. Our study examines this relationship for fatal injuries in children 0-6 years.

Purpose

- 1) Describe the anatomical site and nature of fatal injuries sustained by farm children.
- 2) Examine the proportions of victims who died at the scene or were declared dead upon arrival to an emergency department.
- 3) Evaluate each case individually to determine whether Level 1 pre-hospital and hospital trauma care would have resulted in survival to hospital discharge.

Methods

As part of a larger study to evaluate the North American Guidelines for Children's Agricultural Tasks, a retrospective review was conducted of Canadian pediatric deaths that occurred on farms or were related to agricultural production for the period 1990 through 2000. For each case we systematically recorded the child demographics and a detailed description of the circumstances surrounding the injury event. Three trauma physicians are independently reviewing each case and evaluating survivability.

Results

A total of 115 children aged 0-6 were killed in farm-related injury events. Anatomic injuries most responsible for death were major head injury (51%), and asphyxia by drowning (23%). Twenty-one percent of these children were pronounced dead at the scene and 42% were pronounced dead upon arrival to medical care. Preliminary results of the survivability coding suggest that over 95% of the cases would not have survived even if Level 1 trauma care had been provided.

Implications

The rapid provision of Level 1 trauma care would be unlikely to impact upon survival rates in these young injury victims. Primary prevention must focus on keeping young children away from the farm worksite.

Rural Communities VI

Terrace Lounge – 14:40-17:00

Co-Chairs: *N Delmaire*, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada
R Bollman, Statistics Canada, Ontario, Canada

149 Aging Well in Rural Places: Development of a Community Based Social Marketing Strategy

14:40-15:00

Oral

LL Langille (presenter), *RF Lyons*, Dalhousie University, Nova Scotia, Canada

A research team led by the Atlantic Health Promotion Research Centre designed a project to develop and pilot test a community-based social marketing strategy to address depression in seniors in rural Atlantic Canada. Project objectives included examining and synthesizing formal and informal strategies in Canada and elsewhere, selecting a pilot site community (including one French-speaking community) in each Atlantic Province, gathering information from community members regarding needs, barriers, and resources related to depression and seniors, developing social marketing messages and formats in each community, and pilot testing the draft social marketing messages and formats.

Research questions were designed to explore perceptions of depression among rural seniors, their informal supporters (friends, family) and key informants in rural communities. Eighty-five people participated in the focus groups and interviews. Types of information gathered included: terms that seniors use to describe depression; perceptions related to why seniors get depressed; signs and symptoms of depression; what seniors and their informal supporters do (or not do) to deal with depression; barriers to seeking help for depression; levels of knowledge regarding the existence of community resources, and suggestions for the content and format of social marketing messages that would most effectively mobilize seniors to seek help for depression.

The research team used the literature review and research findings as a basis for conceptualizing the draft messages and formats. Fifteen pilot test sessions were held and feedback was received from 106 seniors, informal supporters of seniors, and other interested parties. Seniors were highly represented both in the seniors' pilot test sessions and in the informal supporters' pilot test sessions. Eleven community-specific messages in various formats were pilot-tested, as well as four generic messages: an educational brochure, a 30-second cable TV ad, a 30-second TV ad and a 30-second Radio ad.

Project outcomes included a regional partnership model, a literature review and synthesis, an evaluation framework, community asset-mapping and capacity building, and 15 community-based social marketing messages.

192 Creating and Sustaining Dementia Special Care Units in Rural Nursing Homes

15:00-15:20

Oral

A Cammer (presenter), *D Morgan* (presenter), *N Stewart*, *C D'Arcy*,
University of Saskatchewan, Canada

The majority of dementia special care units (SCUs) are located in larger nursing homes in urban centres. Little is known about the challenges of creating and sustaining SCUs in rural settings. As part of a larger study comparing rural nursing homes with and without SCUs, semi-structured telephone interviews were conducted with the current Directors of Care of all 8 rural nursing homes in Saskatchewan of 100 beds or less that had a SCU. If the current Director was not present when the unit opened, we also interviewed

previous Directors. The 11 interviews were tape-recorded, transcribed verbatim, and analyzed using thematic analysis.

The Directors identified problems in providing quality care to increasing numbers of residents with dementia in integrated (non-SCU) facilities. Challenges included agitation resulting from excess stimulation, safety issues such as wandering and conflict between residents with dementia and cognitively intact residents, and the stress and time demands that these behaviors caused for staff. Often, a crisis situation (e.g., resident injury) moved the SCU from idea to actuality.

The analysis revealed several characteristics common to SCUs that were rated as most supportive on quantitative measures of the physical and social environments. Most critical was a strong leader committed to an alternative, psycho-social model of care who possessed a clear vision of the philosophy and desired outcomes for the unit. Leaders who had positive relationships with staff and who could role-model appropriate dementia-care strategies were more likely to have the trust, respect, and confidence of the staff, which facilitated the paradigm shift necessary to approach resident care differently. Leadership and vision provided the foundation for a comprehensive SCU program that produced positive outcomes for residents, staff, and families. Early, visible signs of success contributed to staff commitment, enthusiasm, and ownership. Leaders with clear goals were able to provide the constant monitoring needed to prevent erosion of the program. Other important elements included empowerment of nursing aides, staff training emphasizing the philosophy of care vs. purely technical skills, clear admission/discharge criteria, and job descriptions consistent with program goals.

217 Integrated Primary Care: Blue Skies or a Storm Front in the Canadian Health Care System?

15:20-15:40

Oral

P Hasselback, R Wedel (presented by *L Halma*), Chinook Health Region, Department of Community Health Sciences, School of Health Sciences, University of Calgary, Alberta, Canada

Introduction

Primary health care renewal is often touted as the cure to existing health care woes despite clear evidence to support this claim. In 1999 physicians from the Associate Medical Centre in Taber partnered with Chinook Health Region (CHR) staff to develop and evaluate an integrated primary care (IPC) system for the municipal district of Taber, Alberta. Local and collaborative decision-making, multidisciplinary teams, an integrated information system and an alternative payment plan for physicians are core elements of the new system.

Objectives

The IPC system in Taber was implemented to: 1) improve patient outcomes; 2) increase patient and provider satisfaction; and 3) increase appropriate utilization of services. Methods: The Taber IPC system was developed in response to local care needs. Evaluation of the model occurred simultaneously with its development. A multi-methods approach was used to measure the impact of IPC. Pre-post population health surveys, provider satisfaction surveys, trend analysis of service/administrative databases and face-to-face interviews were used to answer the question 'does IPC result in improved primary health care?'

Results

IPC has reduced service duplication and increased collaboration among health care providers especially in the areas of well-baby and chronic disease management. Most parameters of antenatal and postnatal patient satisfaction remained unchanged however, some improvement was noted.

A greater percentage of respondents reported being happy with the postnatal care they and their baby received after integration than before integration (92.5% versus 88.5%). Post integration patients were significantly more likely to disagree that their wishes were not taken into account during birth than pre integration patients were ($p=.023$). Practitioner satisfaction with communication effectiveness ($p=0.028$), communication flow ($p=0.015$), current work situation ($p=0.016$), autonomy ($p=0.009$) and ability to impact patient health/behaviours increased significantly ($p=0.008$) after integration. Physicians are providing more services to Taber residents since moving to an alternative payment plan. However, the associated increase in workload may be preventing physicians from experiencing an improved quality of life.

Conclusion

While the data suggests that the most objectives have been met there have been some unexpected outcomes. IPC is not yet a stable warm front in the Canadian health care system.

265 Volunteerism and Restructuring of Long-Term Care for Vulnerable Populations in Ontario, Canada

15:40-16:00

Oral

D Cloutier-Fisher (presenter), *MW Skinner*, University of Victoria, British Columbia, Canada

The restructuring of public sector programs such as health and welfare services in Canada has been extensive in the 1980s and 1990s fuelled by recessions stemming from the 1970s and the awareness that population aging is promoting the need for more complex and wide-ranging forms of care than those that are usually provided through the acute care system under the biomedical model. As government downsizes and rationalizes services and programs, informal service providers such as families, friends and neighbours, and voluntary sector providers such as charitable and non-profit organizations are being forced to bear an increasing share of the responsibility for caring for older populations with complex health needs. Rural communities tend to be more disadvantaged by their smaller size, and other factors that make it difficult for them to bounce back from major restructuring initiatives.

Objective

The objective of this paper is to better understand the impacts of health sector reforms, especially long-term care sector restructuring on the informal and voluntary sectors in rural communities in Ontario, Canada.

Discussion

This research employs a mix of quantitative and qualitative methods to shed light on the changing nature of long-term care service delivery, which we argue is manifest in the establishment of the Community Care Access Centre (CCAC). Data from the National Survey of Giving, Volunteering and Participating (2000) is used to complement and contextualize primary data from in-depth, key-informant interviews conducted in 1998 in the Town of Minto. These data sources become the platform for analysis.

Conclusions

The results presented in this paper indicate that while CCACs have consolidated the longstanding need for better access and coordination of long-term care services, their creation has posed some critical challenges for informal and voluntary sector providers and ultimately resulted in a further erosion of choices for rural service recipients. Vulnerable, elderly and disabled persons living in small rural communities continue to be disadvantaged by the large-scale restructuring of their services.

292 Delivering Population Health-Based Services: Perceptions of Rural Public Health Nurses

16:00-16:20
Oral

B Rushowick, Sunrise Health Region, Saskatchewan, Canada

This qualitative study used the perceptions and experiences of public health nurses to discover what information, and practices could be included in a continuing education model for public health nurses in rural Saskatchewan. The problem at the heart of this study: how major changes in public health over the last two decades require new skills and knowledge to meet the challenges and how the continuing education needs and competency requirements for practicing public health nurses are being influenced by these changes. The literature review included the history of the development of the population health approach, identified some of the major changes in health and public health and what impact they are having on public health nursing, the development of population health-based services and identified the competencies and best practices required to implement and use the approach in public health nursing. Participants were chosen utilizing a process of purposeful sampling and were drawn from the East Central Health District service area of east central Saskatchewan. The participants described a number of skills and practices that could be grouped under the general heading of building or developing leadership capacity.

A consistent theme came through related to the need to develop and/or update skills in a number of broad areas of public health nursing. Participants offered a number of suggestions for the creation of a flexible continuing education program, based on current and future competencies and best practices, that could provide public health nurses in practice in rural Saskatchewan with the skills necessary to deliver population health-based services and do so in a manner designed to meet the needs of the small, widely dispersed public health nursing workforce in rural Saskatchewan.

264 Problems and Resources of American Indian Elder Diabetics

16:40-17:00
Oral

BA Ide (presenter), B Dahlen (presenter), M Gagert, University of North Dakota, USA

The purpose of this project was to complete a needs assessment of elders on the Standing Rock Indian Reservation. Standing Rock Reservation is a vast area encompassing about 1500 square miles and parts of two states, North and South Dakota. The estimated population of elders is about 400 aged 50 and over (the tribal designation). Diabetes is a major problem, with one of three adults over the age of 45 diagnosed with it. Prior to this, a needs assessment had never been conducted.

The information obtained from this needs assessment has been and will be used by tribal leaders in applications for other grants for programs to help meet these needs. Interviews have been completed with 187 elders identified through the Tribal Health Program and the community health representatives (CHRs) who serve the elders. The questionnaire addresses housing, transportation, and employment conditions, use of medical services, functioning, support, health needs/problems, and resources. Nearly 60% see their health as fair/poor.

The sample was high in self-assessment of emotional status, trusting, mobility, cognitive functioning, elf-efficacy, and family and social support. It was low in assessment of economic and physical status. The main family concerns were unemployment, someone bothered by stress, anxiety, or depression, and someone with a drinking problem. There was a high prevalence of chronic health problems, with 58.7% saying they had diabetes. The diabetics were significantly lower than non-diabetics in health status and physical, economic, emotional, and cognitive functioning.

Access to health care is abysmal, and the foregoing is further complicated by geographic and environmental issues such as weather and road conditions, the closure of satellite clinics, and the lack of

providers to staff satellite clinics. Provision of adequate health care is both extremely challenging and extremely urgent. Suggestions for program development include increases in the numbers and training of CHRs, improvements in transportation and staffing levels, and the institution of telemedicine and a fly-in service.

211 The Sources and Predictors of Information Use by Nurses in Rural and Remote Canada

16:40-17:00

Poster

C D'Arcy (presenter), *J Kosteniuk, N Stewart, B Smith*, University of Saskatchewan, Canada

Discussion

Health care professionals, including nurses, are encouraged to engage in evidence-based practice. The tide of evidence based literature has brought with it numerous assumptions regarding hierarchies of evidence, the objectivity of scientific knowledge, as well as the proper roles of researchers as producers and practitioners as users of that knowledge. Given the current push to encourage nurses to use research information in everyday practice, the questions become: how do rural and remote nurses use central and peripheral information sources in daily practice? What are the significant correlates of peripheral information use?

This study is based on data from a 2002-2003 survey of nurses in rural and remote Canada. The mail questionnaires targeted a national sample of nurses working in rural areas, as well as all nurses working in remote nursing stations (outpost/nurse clinics) and the three territories. We surveyed nurses regarding topics such as their socio-demographics, education, training, current position, work environment, job satisfaction, knowledge sources, and general health indicators. Approximately 68%, or 3,930 of the target sample completed questionnaires.

Nursing information can be categorized as that which is centrally produced closest the individual nurse's particular work context and that which is peripherally produced away from the specific work context. This study indicates that a greater proportion of rural and remote nurses use any single central source than use any peripheral source. Ninety percent use central sources such as nursing colleagues, 80% in-service, and 72% newsletters, compared with 65% using peripheral sources such as journal subscriptions, 61% continuing education programs, 56% the internet, and 40% the library. We evaluate the nature of the evidence provided by central sources and review the paradigm of practitioner as both knowledge producer and user (Larsen et al., 2002). We also assess the socio-demographic, professional, organization, community characteristics, and beliefs that best predict the use of any single peripheral information source, and the predictors that are significantly associated with using the greatest number of peripheral sources. We note the implications of these findings for implementing successful research dissemination strategies.

262 The Delivery of Needs: Evaluating Distance Education for Rural Ontario Nurse Practitioners

16:40-17:00

Poster

K Tilleczek (presenter), *N Russell, S Caty, R Pong, E Ruckholm*, Laurentian University, Ontario, Canada

Discussion

Distance education provides nurse practitioners (NPs) working in rural, northern, and remote areas with ready access to flexible continuing education opportunities considered vital to maintaining and upgrading professional skills and knowledge. It is also considered important for recruitment and retention by reducing professional isolation and allowing rural nurses to keep up with new developments in their field. The Nurse Practitioner Needs Assessment Study, conducted by the Centre for Rural and Northern Health Research (CRaNHR) in 2000-2002, suggested that NPs in rural and northern Ontario had specific content

and delivery needs to enhance their daily practice. Following these recommendations, The Council of Ontario University Programs in Nursing (COUPN) has now implemented a rural continuing education program which CRaNHR is evaluating.

Objective

The objective of this presentation is to present selected results of the evaluation of the continuing education implementation project. Specifically, we will trace the original delivery needs, modes of implementation and evaluation of the project in terms of the modes of delivery.

Methods

A multi-method, action research model was adopted permitting ongoing discussions and collaboration with the COUPN implementation team, CRaNHR researchers, and NPs in rural and northern Ontario communities. A combination of three sources of data permitted the use of data triangulation: 1) Demographic and intake data taken from registration forms; 2) Learning assessment data collected electronically 3) Focus group data conducted via teleconferencing

Results

Themes around the opportunities, challenges, adaptations and supports (human and technical) will be presented. Findings relating to the transference of learning to daily practice, computer and technological issues, and delivery and design issues will be discussed. Results offer insights into modalities of distance learning that are most effective to enhance the daily practice of rural and northern NPs. We will discuss the findings as they relate to a system of distributed rural/remote distance education for health professionals.

267 The Canada Health Act's Principle of Accessibility: What Does it Mean for Older Rural Adults?

16:40-17:00

Poster

DE Allan (presenter), Centre on Ageing, University of Victoria, British Columbia, Canada

Discussion

The purpose of the Canada Health Act is to guarantee Canadians access to medically necessary services based on the five principles of universality, accessibility, portability, public administration, and comprehensiveness. Under a system such as this, need becomes the defining factor in terms of receipt of health services for Canadian residents. Yet, Canada's large rural areas, characterized by sparse populations, fewer services and greater distances present a major challenge to these principles. Many studies show that since Medicare, service utilization is indeed based on need and not income. However, we do not have the research to know if this is true in rural areas. Given the rural characteristics listed above it is conceivable that income does influence service utilization.

The purpose of this paper is to determine the extent to which this is true. Specifically, the paper examines the relationship between income and health service utilization of older adults in rural and urban areas of British Columbia using data from the Canadian Community Health Survey. Multivariate regression analyses reveal that income is not related to number of nights spent in a hospital for both rural and urban residents. In other words, the principle of accessibility holds true for medically necessary services requiring hospitalization. However, for services not requiring hospitalization the pattern is not as clear.

Findings suggest that higher income is related to greater number of specialist visits in both urban and rural areas and number of general practitioner visits in urban areas only. Given these results, it appears that income does influence the utilization of some health services and that the principle of accessibility holds a similar meaning for urban and rural older adults in British Columbia. The implications of these results for both policy and research are discussed.

Wednesday, October 22

- Morning Plenary Session -

Adam Ballroom – 08:30-09:30

Sponsored by: *Great Plains Center for Agricultural Health, University of Iowa, USA*

Rural Voices – for Early Childhood Education and Care, Manitoba, Canada

Co-Chairs: *C Gott, J Wilson*

Rural Voices – for Early Childhood Education and Care, Manitoba, Canada

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| 398 | Agricultural Hazards – Transitioning Knowledge into Prevention
<i>E Hallman</i> , Director, Agricultural Health and Safety Program, Cornell University,
New York State Agricultural Safety Specialist, USA | 08:30-09:00
Plenary |
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Printed abstract not available.

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| 388 | Current Political Climate and Prospects for Development of a National
Childcare Strategy in Canada
<i>J Godfrey</i> , National Liberal Caucus Social Policy Committee, MP Don Valley West -
Toronto, Ontario, Canada | 09:00-09:30
Plenary |
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Printed abstract not available.

Rural Economy III

Kelsey/Saskatchewan – 10:40-12:20

- Workplace Assessment Methods in Agriculture -

Co-Chairs: *R Rautiainen*, Great Plains Center for Agricultural Health, University of Iowa, USA

M Madsen, Institute for Rural & Environmental Health, University of Iowa, USA

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| 129 | Research Priorities for Improving Agricultural Fire Safety
<i>D Torvi</i> , Department of Mechanical Engineering, University of Saskatchewan, Canada | 10:40-11:00
Oral |
|------------|--|---------------------|

Providing fire protection in agricultural facilities presents unique challenges, as these buildings are often situated in remote locations and not continually monitored. Many of the materials that are stored in these buildings are highly flammable, and if ignited, burn very quickly and release toxic combustion products. While the number of human deaths and injuries resulting from fires in these buildings are small, there can be large economic losses, because of the large quantities of animals, crops and equipment present. For example, in Saskatchewan from 1997 to 2001, fires in agricultural buildings accounted for only 10% of the total number of fires, but 23% of the total fire losses. Fire safety is also increasing in importance with other developments, such as increases in the size of livestock facilities.

To address the problem of agricultural fires, a literature search was recently conducted to identify research, standards, and industry practices aimed at improving fire safety in agricultural buildings. Fire science and agricultural engineering publications were examined, along with information from Canadian and American universities and government agencies. This review, which will be published this fall, found

that there are very few standards aimed specifically at agricultural buildings, and there is little research being conducted into the behaviour of fire in these facilities.

This presentation will identify some of the specific challenges that must be overcome when providing fire protection in agricultural buildings, along with fire safety resources that are currently available to building owners, designers, engineers and fire departments. Previous research and current industry practices will be discussed. A number of research priorities will then be identified, including increasing the use of currently available fire protection systems, developing improved methods for the design of fire protection systems in agricultural buildings, and increasing the available information on the fire behaviour of agricultural materials. Research is also needed to improve fire detection in agricultural buildings and to assist fire departments that respond to fires. Specific ways in which research results can be used by building owners to improve fire safety will also be discussed.

- 169 Using Fault Tree Analysis to Identify Contributing Factors to Engulfment** 11:00-11:20
in Flowing Grain in on-Farm Grain Bins Oral
DM Kingman (presenter), *WE Field*, Illinois State University, USA

Since 1978, there has been a continuous effort at Purdue University to identify fatalities that occur in farm grain bins as a result of engulfment in flowing grain. Findings reported by Purdue researchers indicated that since 1980, an annual rate of 8 individuals have become engulfed and died in farm grains in the U.S. and Canada and that all these deaths were significant because they were believed to be preventable.

During a recent effort to develop intervention strategies and recommendations for a ASAE farm grain bin safety standard, a systems approach was used to identify the contributing factors to engulfment. As part of the systems approach, contributing factors to engulfment in grain were identified by applying Fault Tree Analysis (FTA), reviewing agricultural safety literature related to engulfment and the prevention of out-of-condition grain, reviewing and summarizing fatal engulfment cases from Purdue University's database of engulfments, conducting investigations of engulfment incidents, and convening an expert panel to review and prioritize the list of contributing factors.

FTA has been utilized as a post-incident tool to identify contributing factors in well-known incidents such as the Three-mile Island nuclear power plant mishap, Space-Shuttle Discovery explosion, and the titanic sinking. In addition, FTA has been used to identify the potential factors that could lead to failure in the nuclear power industry, intercontinental missile guidance systems, and airliners such as Boeing's 757.

FTA diagrams provided a spatial perspective of the circumstances that occurred prior to engulfment incidents, a perspective never before presented in other hazard analyses. The FTA also demonstrated relationships and interrelationships of the contributing factors and offered insights for researchers and the expert panel regarding the engulfment problem.

- 278 Evaluation of the Certified Safe Farms on-Farm Safety Review Process** 11:20-11:40
R Rautianen (presenter), *L Graft*, *J Lange*, *M Madsen*, *S Schneiders*, *K Donham*, Oral
Great Plains Center for Agricultural Health, University of Iowa, USA

Objectives

The objectives of this paper were to characterize hazards and safety improvements observed during the Iowa Certified Safe Farm (CSF) study, and evaluate the feasibility of the on-farm safety review process.

Methods

CSF aims to reduce farm injuries, illnesses, and associated costs. It consists of a health screening, education, on-farm safety review, and incentives. The feasibility of this program was studied on 152 intervention farms and 164 control farms in Northwest Iowa. The on-farm safety reviews were conducted using a checklist for farm safety items, and a safety score of 85% was required to become certified. The checklists were sent to farms beforehand, and the reviews were conducted by three trained consultants.

Results

About 82% of the farms passed their initial farm reviews. The mean farm review scores improved from 90% in 1998 to 95% in 2002. Hazards related to machinery, buildings, and the outdoor working environment varied greatly between farms. A total of 1292 safety improvements were reported with a total estimated value of \$69,000. The most common improvements included SMV signs, decals, shields, lockout/tagout, labeling of chemicals, and equipment lighting/markings. Higher safety review scores were significantly associated with lower total costs from farm-related health outcomes.

Conclusions

The on-farm safety reviews were effective in identifying hazards and prompting safety improvements. The safety scores were associated with total farm injury and illness costs, suggesting that this process can be effectively used in prevention programs aiming to reduce farm injury and illness costs.

301 Site-Specific Management of Tractor Safety and Engineering Control Strategies Based on Stability

11:40-12:00

Oral

J Liu, High Plains Intermountain Center for Agricultural Health & Safety, Department of Civil Engineering, Colorado State University, USA

Tractor related injury and death is continuously major concern of occupational health and safety in agricultural industry. The hazardous rate is ranked 2nd behind mining/quarrying. This paper will present a tractor stability monitoring system designed for engineering control deployment strategies, and the site-specific stability mapping and related technology for tractor operators.

A site-specific driving safety management and stability mapping system as tractor safety and stability information will be developed utilizing MSTs, Differential Global Positioning System (DGPS), Geographic Information System (GIS), and Video Mapping System (VMS). A monitoring system of dynamic ROPS deflection and timing of tractor overturn will be developed by using LVDT (Linear Variable Differential Transformer) and MSTs, and applied to validate effectiveness of the protective structure deployment for engineering control strategies. Radio-controlled tractors and normal tractors equipped with the stability monitoring system and field data acquisition will be used to conduct field tests.

The application of the stability monitoring system for the deployment of engineering control strategies, tractor stability mapping with management of agricultural machinery will be explored in various typical fields, including longitudinal and lateral overturns. The tractor stability maps can help operators and/or farmers determine precise requirements for driving safety management and inputs for each traffic routine of the field.

Healthy People VI

- *What Were You Thinking? Making Connections Conference, Part I* -

Batoche Room – 10:40-12:20

Organized by: *Saskatchewan Farm Stress Unit, Canada*

Co-Chairs: *K Imhoff, L Sabiston, Saskatchewan Farm Stress Line*

376 Suicides among Canadian Farm Operators

W Pickett, Queen's University, Ontario, Canada

10:40-11:20

Invited

Farmers and their families experience high levels of emotional stress due to the nature of their occupation. During times of economic crisis, stress levels on farms can be especially intense. There is a consequent belief that these stress levels have historically lead to high rates of completed suicide among farmers. In order to test this hypothesis, Dr. Pickett and colleagues at Queen's University and Health Canada conducted an historical study of suicide mortality among Canadian farm operators. The study covered the time period 1971-1987 and 1457 cases of farm operator suicide. Suicide rates among male farm operators were compared between age groups and then over time. They were also compared with suicide rates experienced within the general population of Canadian men. Risk factors for suicide were also explored. Results showed that male farmers experienced suicide rates that were in fact quite similar or even less than the general male population. Risk factors for farm suicide also mirrored those that exist for the general population; isolation, older age and lower educational status were important determinants. Dr. Pickett will describe these results and provide some perspective on their meaning for agrarian society.

335 Depression among Farmers: Links to Stress, Health, and Safety

CJ Hodne (presenter), KJ Donham, R Rautiainen, University of Iowa, USA

11:20-11:40

Oral

This research explores the relationship of depression among farmers to their: (1) socioeconomic status; (2) attitudes toward their health and safety, measured by the Farm Safety and Health Beliefs Scale; (3) safety conditions on their farms; (4) rates of farm injuries and health status, as measured by self-reports and clinic-based assessments; (5) subjective stress; and (6) social support.

Participants were Iowa farmers (n = 248) who participated in the experimental and control groups of the Certified Safe Farm (CSF) Program. CSF, an intervention by Iowa's Center for Agricultural Safety and Health and the AgriSafe Clinic of Spencer, Iowa, is designed to reduce farm injuries and illnesses through health screenings, farm safety reviews, and education.

Self-reported depression was measured by the CES-D scale and depression subscale of the Hopkins Symptoms Checklist. Among the socioeconomic indicators compared with depression were: size and type of farm operation, debt-to-asset ratio, net and gross income, and off-farm job. Depression was compared to farm safety behaviors, indicated by the scores of their farm safety reviews and their rates of farm injuries.

Farmers' depression was linked to various measures of subjective stress including the Perceived Stress Scale and stress regarding finances, farm policies, and family issues. The associations between farmers' depression and stress, attitudes and behaviors regarding their health and safety, and health and injury status suggest the benefits of incorporating interventions for depression (e.g., education, screening, treatment) into clinical practice and education programs regarding farmers' health and safety. The importance of such interventions is emphasized in light of the ongoing socioeconomic difficulties (e.g., low farm prices, concentration in agriculture).

210 Mental Health of Rural Adolescents

11:40-12:00

AR Peden (presenter), DB Reed, University of Kentucky, USA

Oral

Objective

Provide a preliminary picture of the mental health of teens who live in rural America. Many of these teens live on family owned farms. The recent economic downturn in agriculture is reminiscent of the Midwest in the 80's when farm foreclosures reached all time highs. Loss of the farm means more than just loss of income: for many families it meant loss of heritage, history, and future dreams. Depression and suicide rates in adults increased. Today, farmers face a similar situation, except this time it is natural disasters, global markets, and crop eradication by government intervention. In the past, many studies of the ramifications of farm failure were conducted with adults, but little attention was paid to children. This study examines the effects of the current farm crisis on adolescents who live in rural communities.

Method

A convenience sample of 303 high school students in Kentucky and Iowa completed a 9-page survey that included demographic information, family farm history, indicators of stress, and risky behaviors. Students also completed the Center for Epidemiologic Studies – Depression Scale (CES-D) which is a measure of depressive symptoms. Surveys were distributed during class time at 5 high schools. All students were members of Future Farmers of America or enrolled in an agriculture class.

Results

The prevalence of high depressive symptoms in this sample was 35%. Nine percent had considered suicide in the last year and 20% had a friend who had attempted or completed suicide in the last year. The majority of these students (68%) lives with both parents and report that their parents' stress level (44%) is greater than 2 years ago. Students engaged in risky behaviors with 80% operating 4-wheelers; 58% gun hunting; 66% swimming alone; and 49% camping or hiking alone. The majority of these students reported positive family and school relationships. Conclusions: These findings may assist in identifying rural teens who are at higher risk for depression and suicide.

300 Farmwomen's Contradictory Roles in the Contemporary Economy: Implications for Health

12:00-12:20

W Kubik, RJ Moore, University of Regina, Saskatchewan, Canada

Oral

Farming on the Canadian Prairies is entering a new era. As such, the roles of contemporary farmwomen are rapidly changing and becoming more complex in order to survive the economic realities of the new millennium. Indeed, Statistics Canada has dubbed farmwomen agricultural superwomen. The increase in stress that farmwomen have experienced has direct links to their physical health and psychological well-being. Often this stress is a result of the expectations they experience from family, community, and the woman, herself, as the pressures to be a traditional farm wife, mother, and resident clash with the realities of day-to-day life on the farm.

A multi-stage study employing quantitative and qualitative research methods was conducted in partnership with the Saskatchewan Women in Agriculture Network (SWAN) and the Farm Stress Line, in 2001. 717 farmwomen, in 20 Rural Saskatchewan Municipalities, returned a 20 page, objective questionnaire that examined, among a number of variables: (1) Health Status, (2) Social Support, (3) Well-being, (4) Stress, and (5) Gender Roles. Subsequently, 20 qualitative interviews were conducted to explore further the findings of the Survey.

Stress was omnipresent in the lives of the farmwomen. They not only had to cope with stress resulting from their own lives but also took on responsibility for the well-being of their families, many times

sacrificing their own psychological health in the process. Over half of the farmwomen reported having trouble relaxing and experienced feelings of anxiety and depression, as well as frustration and anger. The women felt pressured to fulfil the expected traditional role of farmwomen within the context of the current reality of being a contemporary woman on the farm today.

The results document overwork and accompanying high levels of stress, a lack of access to medical and counselling services, and a perceived lack of understanding by policy makers and professionals. Integrated health and educational service centres, the increased use of nurse practitioners, and the establishment of mobile health services are recommended policy initiatives.

Environment V

- Environment in the Kyoto Age -

Battleford Room – 09:00-16:00

Organized and Sponsored by: *Saskatchewan AgriVision Corporation Inc., Canada*

372 The Role of Manure as a Nutrient in Sustainable Crop Production

09:30-09:50

J Schoenau, Department of Soil Science, University of Saskatchewan, Canada

Oral

Animal manures contain plant nutrients that, when land-applied to deficient soils at agronomically appropriate rates, promote better plant nutrition and improved crop yield and quality. The organic component of the manure also contributes to improved physical properties, water relations, and microbial activity in the soil. These benefits have been documented in field trials in Western Canada which examine the effect of manure rate, placement and timing of application on crops and soils so as to provide guidelines for economic and environmentally sustainable manure application. Crop recovery of manure nutrients is optimized when manure is applied at the appropriate rate according to manure and soil test and placed in the soil so as to allow maximum root access. Over-application leads to reduced yield and increases nutrient loading and risk of loss from the soil. Injection of liquid manures is an effective practice for improving crop recovery of nutrients and reducing odors. Challenges to effective manure use include low nutrient content relative to mass, limiting the economic hauling distance to only a few kilometers from the site of production. As well, manures are variable in their nutrient content and do not always contain the appropriate balances of nutrients in relation to plant requirements, which can lead to over or under - application of one nutrient relative to the other. Animal feeding and manure processing strategies that improve manure nutrient uniformity and balances such as N:P ratio, along with the use of commercial fertilizer supplements to achieve the desired balance of nutrients following application, can be effective in promoting better utilization of manure nutrients.

369 Manure and Odour Management – Operating a Large Enterprise

09:50-10:10

F Possberg, Big Sky Farms, Saskatchewan, Canada

Oral

Few enterprises garner as much passion and controversy as large hog operations. Nuclear energy, casinos and daylight saving time debates can amuse the coffee shops at times. But if you want a real 'down and dirty' debate in rural Saskatchewan, propose a large hog barn. Jobs, feed grain markets and cheap fertilizer are often argued as benefits of hogs units. Smell, pollution and factory farming rate highest as negatives.

I grew up on a mixed farm that had up to 50 hogs at a time. The hog barn was 500 square feet, straw bedded, hand cleaned, hand feed and water supplied by pail. In 1975, I built my first 'factory' hog unit.

The barn had automated ventilation, feed, watering, and liquid manure systems. Neighbours were aghast by the sheer size of the operation. Upon inspection by one neighbour, he concluded that it was too big, too many animals and couldn't be handled by a young fellow such as myself. That huge unit was 5600 square feet housing 600 animals. Today, our units are up to 176,000 square feet and house 15,000 hogs. Computer systems control most of the major functions, however, the skill and caring of committed and trained staff are still the secret recipe to success.

Realities around economics of scale have favored larger and larger sized operations. A significant part of the general public dislike and mistrust our industry to produce livestock in large volumes. Why is this so?

1. Livestock poop - more livestock creates greater volumes of manure.
2. Manure in water is unhealthy and disgusting.
3. Livestock operations have allowed manure to get into water systems.
4. Livestock stink - I am told even hogs stink. You can live by a few animals, but no one should have to live by a bunch.
5. Large operations are run as a business and are motivated by profit.

These issues have created serious environmental problems around the globe. North Carolina went from 20th largest hog Production State to number 2 in 10 years. Most of its production is close to the ocean in a hurricane zone. Netherlands has a large portion of land below sea level, yet has more hogs than all of Canada. Quebec has a fraction of the land base of Saskatchewan but has more than 3 times the hogs. Saskatchewan has done an excellent job developing an environmentally sustainable industry. We have been blessed with a lot of natural advantages:

1. Saskatchewan has 46% of all the cultivated land in Canada.
2. Saskatchewan has a very low hog density now.
3. Glacial till soils are very impermeable.
4. Excess precipitation events are few and far between.
5. Flood areas are few.
6. Human density is low.
7. Saskatchewan was very early in regulating intensive livestock operations.
8. Saskatchewan producers have been quick to incorporate new and progressive practices.
9. The University of Saskatchewan, PAMI, Prairie Swine Centre and Provincial agencies have been leaders in manure management.

Saskatchewan has not had environmental wrecks. Our planning, climate, soils and topography have given us an enviable record. In the short term, we will separate hogs from people to reduce odour problems. Long term, we will continue to develop ways to reduce odour. We are one of the few places in the world that can develop large scale, internationally competitive industries. In my mind, the benefits of large-scale livestock enterprises far out weight the negatives. Let's grow Saskatchewan!

368 Clear Green Environmental Inc.

B Voss, Clear-Green Biotechnologies Inc., Saskatchewan, Canada

10:10-10:30

Oral

Clear-Green Environmental has been working to develop technology and project sites to implement commercial manure utilization systems. In the summer of 2003, Clear-Green announced the construction of an anaerobic digestion plant that is in partnership with SaskPower and Cudworth Pork Investors Group. Phase 1 involves the production of biogas and processing of hog manure on site for a 1200 sow farrow to finish operation. Fertilizer production from the facility is also being implemented.

The presentation will provide a general overview of the history, challenges and milestones associated with implementing this project. In particular, discussion around the business model and financing that was assembled, including the attraction of chartered lending institutions and private-sector venture capital. An overview of how Clear-Green has collaborated with a variety of proven technology suppliers and developed some of its own “made in Canada” innovation will be a key component of the presentation. All of this will be tied to the focus of manure and odor management for Western Canadian Agriculture.

Clear-Green is a privately held corporation with headquarters in Saskatoon, Saskatchewan. It has been commercially operating since April of 2002 following three years of research and development by the management team. Ben Voss is the CEO of Clear-Green and has been profiled in a variety of conferences across Canada speaking on the topic of biogas, greenhouse gas credits, sustainable development, and the economic and commercial viability of new manure treatment technology.

366 Animal Health, Zoonotic Disease and Food Safety

11:15-11:45

AA Potter, Vaccine Infectious Disease Organization, University of Saskatchewan, Canada

Oral

Infectious diseases of animals continue to be a leading cause of economic losses to livestock producers. Over the past two decades, microbes transmitted from animals to humans via contaminated food and water have also become a major problem, costing the industry several billion dollars in losses each year. Recent estimates suggest that direct or indirect animal to human transmission of pathogens accounts for up to 50% of human infectious disease in developed countries. There are over 40 viruses, bacteria and parasites that have been implicated in food borne illness. Six bacterial species account for a significant portion of economic losses, including *Campylobacter jejuni*, *Escherichia coli* O157, and non-typhoid *Salmonella*.

Epidemiological modeling has predicted, as expected, that the most significant reduction in risk to humans can be achieved by reducing pathogen levels in food-producing animals. Control at this level is also the only means of reducing environmental contamination. A number of control methods are under development, including modifications in animal management practices and the application of biological technologies. The latter includes vaccination, a tool, which we are using as a strategy to reduce levels of EHEC in cattle and *Salmonella* plus *C. jejuni* in poultry. The development of such vaccines requires a different approach than conventional products, from both laboratory and regulatory perspectives. This will be highlighted using *E. coli* O157 and *C. jejuni* as examples. Advances in vaccine formulation and delivery have also made it possible to produce vaccines, which induce superior immunity, both qualitatively and quantitatively, than conventional formulations. These will ultimately result in a decrease in tissue damage and residues in the animal. This area will be discussed, using infectious disease vaccines as well as those for food and water safety as examples.

370 Animal Management

11:45-12:15

N Ketilson, Sask Pork, Saskatchewan, Canada

Oral

In today's international consumer driven marketplace, producers are increasingly asked to provide evidence of food safety through documented production methods. Traceability, transparency, medication use, feed ingredients and rearing practices are all becoming facets of production in which consumers have an interest. Pork producers have responded with industry lead standards, such as the nationally recognized Canadian Quality Assurance Program (CQA®), CSA Environmental Standards and others. Through industry lead initiatives, many of the consumer “wants” for information can also become management tools for producers, we believe it can be a “win- win situation”.

382 Agriculture and Health on the Mongolian Steppes

13:15-13:45

His Excellency Dr G Bastukh, Ambassador of Mongolia to Canada

Keynote

The traditions and culture of Mongolia's agriculture date back over two thousand years. The lifestyle of the steppe nomads is intertwined with livestock and wildlife. Despite urbanization, the traditions of the steppes live on. Today, half of the 2.4 million Mongolians are involved in the raising and care of livestock.

There are approximately 27 million head of livestock in Mongolia producing important exports for the economy including meat, cashmere and wool. The country also produces a considerable amount of grain, fodder and vegetables. Mongolia was a net exporter of food prior to the 1991, however, the transition from central planning to a free market economy led to Mongolia becoming a net importer. Economic reforms resulted in increased poverty and a shift towards the consumption of cheaper and less nutritious food. Nutritional diseases such as anemia, goiter and rickets are still common in rural Mongolia.

The current imports include fruits, 70 % of consumed flour, and 80% of some vegetables. Imported items have had an impact on the well being and incidence of disease in Mongolia due to improper storage, shipping and inadequate inspection. The Ministry of Food and Agriculture is responsible for inspection and enforcing food regulations. Although the latest regulations match international standards and emphasis is placed on the veterinary and sanitary control of products for export, the weakening of the veterinary service over the last 10-12 years has increased concern with livestock. There have been 30 animal-to-man diseases recorded in Mongolia. In the year of 2000, there were 532,435 cases requiring hospitalization among the adult population including 26.5% food related diseases. This figure demonstrates the outstanding problems and shortcomings surrounding food security in the country.

The Government has introduced a national program on food security, safety and nutrition. The establishment of a modern system for providing sanitary conditions for food production including the control of livestock diseases is central to this program. A further objective is the provision of reliable quality drinking water throughout Mongolia. An integrated approach to agriculture production, trade, food security and safety will aid in the improvement of the health of rural people.

367 Endotoxin and the Lung

13:45-14:45

E Barber¹, S Kirychuk², ¹College of Agriculture, University of Saskatchewan, Canada;

Oral

*²Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for
Agricultural Medicine, University of Saskatchewan, Canada*

It is now well established that persons who work inside intensive swine buildings, and probably most other intensive livestock buildings, are subjected to high levels of work airspace contamination, especially dust, endotoxin and manure gases such as ammonia. Endotoxin, a component of gram negative bacteria, is ubiquitous in our surroundings, and has recently been linked with respiratory effects in workers and the general population. Exposure to endotoxin is linked to both asthma and to chronic obstructive pulmonary disease (COPD).

Newly developed intensive production facilities with full-time employees are, if anything, more highly contaminated with endotoxin than were the smaller family operated facilities in which family members had 2-3 hours/day exposure and on which the bulk of our knowledge of respiratory effects has been derived to date. The effect of 8 hour/day or 12 hour/day continuous occupational exposure is not known. There is evidence that exposure to high concentrations of endotoxin in the occupational/work settings such as in intensive animal production (i.e., 3,000 EU/m³) and lower concentrations such as in homes (i.e., 100 EU/m³) can result in deleterious respiratory outcomes, and recent observations appear to indicate that a percentage of

the population may respond more strongly to endotoxin exposure, while another segment of the population would have very little response to high endotoxin levels.

In the livestock industry, the three common approaches to protecting the health of workers have all been investigated. Administrative controls, personal respiratory protection (i.e., masks) and engineering interventions are methods to reduce worker exposure to airspace contaminants such as endotoxin. Limiting the amount of time spent in contaminated airspace is an example of an administrative control method. In Canada, the use of personal respiratory protection while working in livestock buildings is still not common, even though research indicates that masks are effective in reducing respiratory effects in workers. Engineering controls such as air filtration, scrubbing, air ionization, and oil sprinkling have been effective means of reducing the concentration of dust in the airspace.

Despite the impressive reduction in dust and endotoxin by certain control methods, the goal of a clean workspace in which workers can work without personal respiratory protection and without adverse respiratory effects has yet to be realized.

371 Social and Economic Issues of GMOs: the Collision of Technological Change and Social Innovation

15:30-16:00

Oral

PWB Phillips, Department of Agricultural Economics, University of Saskatchewan,
Canada

Technological change and social innovation have collided in the 21st century. A cascade of events has overwhelmed the ability of many market, government and social institutions to manage technologies that offer potential to enhance social welfare. Technological change in the global agri-food system has accelerated since the 1970s, with private capital now increasingly driving advanced scientific research in search of more finely engineering products and processes.

Biotechnology, and the resulting diffusion of genetically modified organisms, have acted as a lightning rod for those concerned about new technology, but GMOs represent only one example of how accelerating technological change is challenging our regulatory and market institutions, and generating significant social debate. This debate has become especially difficult as it is occurring against the backdrop of increasingly integrated societies and trade. Rapid communication through the Internet has both “democratized” the debate but also has created a new opportunity for well-organized pan-national special interests (both private and social) to drive and at times capture the debate. Neither national nor international regulatory institutions are able to engage effectively in this kind of a debate.

Meanwhile, the accumulation of 50 years of internationalization of input and output markets in the agri-food sector has made it next to impossible for any country to internally control the range of products in their markets. As such, even small, localized and relatively insignificant health or environmental safety concerns are often amplified, creating potential to disrupt the functioning of widespread markets.

This talk will examine the trends, using biotechnology as an example, in order to identify the institutional gaps that are becoming increasingly evident. Institutions at three levels—industry, governments and social groups—will be considered.

Rural Communities VII

- Early Childhood Education and Care -

Terrace Lounge – 10:40-12:20

Organized and Sponsored by: *Rural Voices – for Early Childhood Education and Care,*
Manitoba, Canada

Moderator: *J Wilson, Rural Voices, Manitoba, Canada*

377 Early Childhood Education and Care: Part of the Future of Rural Communities – a Round Table Presentation

11:20-11:40
Round Table

*M Friendly*¹, *J Beach*², *J Godfrey*³, *C Gott*⁴, ¹Childcare Resource and Research Unit, University of Toronto, Ontario, Canada; ²Child Care Policy Consultant and Researcher, British Columbia, Canada; ³Chair, National Liberal Caucus Social Policy Committee, Member of Parliament-Don Valley West Toronto, Ontario, Canada; ⁴Rural Voices for Early Childhood Education and Care, Manitoba, Canada

J Wilson
Moderator

An effective national strategy for early childhood education and child care (ECEC) is key for Canada – as for other countries - in the 21st century. Today there is broad recognition that children's early experiences are critically important for development over the life span. ECEC is important in human development as a foundation for life-long learning and ensuring that children are healthy, safe and secure. At the same time, ECEC programs support parents from across the socio-economic spectrum who work in all sorts of settings and strengthens social cohesion in all types of communities.

Although ECEC is as important an issue for rural communities as it is for those in urban and suburban areas, rural communities tend to be under-served, especially in countries like Canada that have relatively undeveloped ECEC policies and programs. While no region of Canada provides young children and families with accessible, high quality ECEC programs, providing these in rural communities presents special challenges. However, current international and Canadian knowledge provides useful insight into the nature of successful rural ECEC policy and programs. International policy analysis identifies policy lessons from countries where rural communities have reasonable access to high quality ECEC programs and Canadian examples describe some of the pitfalls and opportunities in establishing them.

Poster Presentations

- Listed by Themes A, B, C, D -

Centre Room, Sheraton Cavalier Hotel – 10:00-14:00

Authors in Attendance

127 Community Partners for Healthy Farming: Intervention Research

J Ehlers, T Palermo, Centers of Disease Control and Prevention (CDC/NIOSH), Ohio, USA

A
Poster

Agriculture is among the most hazardous industries (unintentional death rate = 22.5 vs. 3.8 per 100,000 workers) and is dynamic in terms of farm size, ownership, commodity, range of hazards, labor regulations, working children, and owner autonomy. Although many intervention strategies have been tried, knowledge to guide operators, workers, public decision makers, and extension educators about what works best is limited. The purpose of the Community Partners for Healthy Farming Intervention Research (CPHF-IR) program is to implement and evaluate existing or new interventions for reduction of

agriculturally-related injuries, hazards, and illnesses. Objectives include the development of active partnerships between experienced researchers, communities, workers, managers, agricultural organizations, agribusinesses, and other stakeholders. These partners have provided their unique resources for accessing the target population, planning, implementation, dissemination, and evaluation; they have produced useful engineering controls, educational and motivational tools, and helped build infrastructure for promoting agricultural health as essential to sustainable agriculture. The current six projects (funded 2000-2003) target: improved ergonomics for handling grapes (CA) and for small scale berry growers (WI, IA, MI, MN); engineering controls (KY, VA, SC) and training (IN) related to tractors; private-sector financial incentives for safety (IA and NE); and reducing eye injuries in Latino farmworkers (IL, MI, FL). Preliminary outcomes include: increased respect by partners for other partners' roles in prevention; identifying psychosocial differences between growers of various commodities; the feasibility of Latino lay health advisors as active partners in research, and the value of process evaluation of a partnership to enhance sustainability of interventions. Stakeholders have initiated requests to be research participants and contributed resources. Products of most projects are being made available electronically. Products and models have expanded further geographically than originally anticipated and even into other sectors, e.g., for primary prevention among healthcare workers and adolescents, and introducing public health in social studies and language classes. NIOSH is utilizing the model created for the Simple (ergonomic) Solutions in Agriculture, a document related to earlier CPHF-IR projects, for a comparable document for construction in both English and Spanish.

**186 Barriers to Implementing Holistic, Community-Based Treatment for
Individuals with Fetal Alcohol Conditions**

A
Poster

R Mitten, University of Saskatchewan, Canada

The LL.M. thesis contends that holistic, community-based treatment is preferable to carceral options for offenders with fetal alcohol conditions, provides support for this contention, and includes an analysis of ways of acquiring non-carceral treatment options. Potential avenues of both policy reform and ways of legally mandating treatment will be examined, including:

- Charter of Rights and Freedoms, s. 15, including an analysis from Eldridge, Law, and Auton, based on the duty to accommodate disabilities;
- Constitution Act, 1982, s. 35 and its recognition and affirmation of such relevant treaty rights as the medicine chest, school house clause, and alcohol ban; and,
- International treaties such as Article 12(1) of the International Covenant on Economic, Social and Cultural Rights, Article 24 of the Convention on the Rights of the Child, and the Draft Declaration on the Rights of Indigenous Peoples.

A remedy mandating a positive state obligation to provide community-based treatment would likely require favourable cost-benefit analyses, as well as evidence of effectiveness of the treatment (the latter to be studied in the interdisciplinary Ph.D. program using qualitative research techniques). The research topic is at the interface of health and justice, and indeed is multidisciplinary in nature as fetal alcohol affects every aspect of the individuals' lives.

The thesis is being cited in the annual review of the SKCA for the upcoming edition of the Sask. Law Review, as a potential solution to the conundrum of *R. v. L.E.K.*, 2001 SKCA 48, where a youth court judge's order requiring community-based, holistic treatment for an offender with fetal alcohol syndrome was over-turned by the Court of Appeal as being unconstitutional and outside the judge's jurisdiction.

203 Rural Canada in an OECD Context

R Bollman, Agriculture Division, Statistics Canada, Ontario, Canada

A
Poster

Rural development, or more generally territorially-focused development, is receiving increased attention among OECD countries. An analysis of rural Canada in comparison to the predominantly rural regions of other OECD countries will provide a useful benchmark for evaluating the problematique of Canada's rural populations and a useful benchmark for understanding both the structure and performance of Canada's predominantly rural regions. The objective of this paper will be to situate rural Canada within the socio-economic context of predominantly rural regions in other OECD countries. Rural development is first, and last, measured by demographics. International comparative data from the OECD Territorial Database will be extracted on demographics. Rural development is focused on employment, largely employment to export new goods and/or services from rural areas which are experiencing labour shedding as resource sectors ship more and more commodities with less and less labour. Patterns of employment growth will be compared across OECD predominantly rural regions, with a particular emphasis on nature of the resource sector(s) in each predominantly rural region. In addition to employment, income will be another "outcome" measure in the comparative analysis. Some solace will be observed from the fact that Canada tends to be in the middle of OECD countries in terms of the degree of rurality and most other rural socio-economic characteristics. However, Canada has a significant population in regions that are 100 percent rural, according to the OECD classification. These areas have a settlement pattern that have no "OECD urban communities" and an urban core population is often viewed as important to anchor regional development.

227 Agroforestry in North-West India for Rural Economy

CM Shukla, National Bank for Agriculture & Rural Development, Chandigarh, India

A
Poster

Among other things, the Indian forestry policy directs the people's participation be encouraged in agroforestry by producing raw material on the private lands in collaboration with farmers for agrobased industries and improving rural economy. Tree planting on lands other than forest by farmers and industries also addresses some of the major environmental concerns of soil protection, sequestering green house gases, biodiversity conservation etc., thereby safeguarding ecological security of mankind. This is one of the strategies built on a sound economic base for healthy rural economy. Bankable projects for plantation of Poplar tree species for agroforestry in north-western India are under implementation. The results are encouraging. While the farmers income has been augmented, the demand of match industry is met by producing raw material for processing without violating the moratorium on forest harvests. Banks provide long-term loans to farmers by estimation of average unit cost per hectare plantation. The loans are provided to farmers by the state land development bank through primary agricultural rural development banks under a federal structure. Farmers provide to the bank, mortgage of land as security against loan. The loans disbursed by the bank are fully refinanced by the apex refinancing agency (90 percent) and the state and central governments remaining (10 percent). The extension staff of the forest department or the concerned industry provides the plant saplings, plantation techniques and technical assistance. Thus, the banks, forest department and the concerned industry provide the financial and technical assistance in a coordinated manner. The entire produce is purchase by the concerned industry. The project serves bio-diversity conservation goals and the farmer gets additional income. Tree farming projects with a sizeable financial support have made considerable impact on rural economy, especially with regard to assured supply of raw material, conservation of already scarce forest resources, employment generation and improvement of rural economy and environment. The project is an attempt towards locating ways and means for the best possible utilization of wastelands, afforestation for life-support system and improving rural economy, while providing employment and good returns to farmers thereby reducing their poverty.

269 The Welfare of Man in Future Dairy Production

P Lundqvist, Department of Agricultural Biosystems & Technology, Swedish University of Agricultural Sciences, Alnarp, Sweden

A
Poster

The working conditions for people is a key issue for the future of dairy production. We can start by asking why it is so hard to attract young people to a future within agriculture and dairy production. If we can change the issues about money, professional pride, belief in the future, leadership, possibilities for personal development and life-long learning, and improve the working conditions, then we will attract attention from the younger generation. To reach this goal joint efforts are necessary. We need the support from politicians, authorities, universities, organizations and others. On the farm level we need to modernize leadership and management and we need to offer personal development, life-long learning as well as improved physical working conditions. Even the technical developments, such as automatic milking systems, may help us to reach our goal and enhance the welfare of men and women as well as cows!

313 New Structures, New Hope: Governance Reform in BC Land Use Planning Processes

K Gerwing, University of British Columbia, Canada

A
Poster

For First Nations who have been continuously fighting to assert their Aboriginal title and rights against the forces European colonialism, the current state of resource management in BC could be seen as a great opportunity to rethink, restructure, and reorganise. Some bands have had more success than others in asserting their positions on resource management issues in their traditional territory. Advances in treaty negotiations and court litigations have seen a slight shift in power relations between the provincial and First Nations governments. Western structures of law and governance have been interrupted by voices from the Indigenous domain. But these shifts have not been paralleled with advances on the institutional front. The gap between western and Indigenous understandings of fundamental concepts such as equity, democracy, devolution, and choice must be bridged if cycles of dependency and poverty are to be halted in Canadian society. The nature of this project is learning by doing – it is about action and reflection on action. This paper reports on a workshop that has the objectives to design a community-based governance reform project, engage partner organisations and partner communities, and establish criteria to measure progress. Based on those findings, it explores the opportunities and constraints of transactive planning in working with First Nations communities who are interested in reforming their institutional involvement with regional land use planning processes.

337 Communication Channels and Noise-Induced Hearing Loss in the Agriculture Industry

*V Sublet*¹ (presenter), *M Lum*², ¹Oak Ridge Institute for Science & Education, Florida, USA; ²National Institute for Occupational Safety & Health (NIOSH)

A
Poster

Approximately 3 million workers in the United States (U.S.) are exposed to hazardous noise on the job. Although noise-induced hearing loss is 100 percent preventable, this disease is one of the most prevalent occupational diseases in the U.S. and the second highest self-reported workplace injury and illness. The loss of hearing prevents communication with others, impacts self-esteem, and decreases the person's interaction with their environment. Because workers in a significant number of industries are at high risk of developing noise-induced hearing loss, a study was conducted for the National Institute for Occupational Safety and Health, which focused on the agriculture industry. The objective of the research was to identify the most effective resources that motivate farmers to become more aware and more proactive regarding this disease. The ultimate goal was to reduce or prevent noise exposure and the

resulting loss of hearing. Qualitative research methods were used to conduct the study. Focus groups and individual interviews were carried out with experts in the farming industry to obtain information about their perceptions, opinions, beliefs, and attitudes. They were queried about the most effective communication channels and the kind of messages that get the attention of farmers. Other issues explored were the most significant occupational diseases in the agriculture industry, noise-induced hearing loss as an occupational health hazard in farming, and where noise is a problem in the farm environment. This presentation will discuss the methods used to identify the target audience, insights provided by this qualitative research such as the channels and message content preferred by respondents, and the suggested format.

354 Agroforestry and Afforestation – a Viable Option for Saskatchewan Landowners

A
Poster

D Weedon, L White, Saskatchewan Forest Centre, Canada

Saskatchewan landowners are examining afforestation and agroforestry as crop diversification options on agriculture lands in Saskatchewan.

Climate change concerns and Government programs such as the Green Cover and Forest 2020 have spurred an increasing interest in the conversion of marginal agriculture lands to tree cover. The amount of non-treed agricultural land in the forest fringe of Saskatchewan that is capable of growing tree crops has been estimated and provides an economic and cultural development possibility for many rural inhabitants.

Many individuals and rural communities within the province are considering trees as a means to increase or promote economic and co-operative development in their jurisdictions as a system rather than a side industry. Agronomics of afforestation and agroforestry, marketing and economic information is being developed to assist landowners and communities to making informed decisions.

356 Economic Impact of a Free Health Clinic for the Working Non-Insured

A
Poster

RG Carrington, Nursing Division, Mississippi University for Women, Mississippi, USA

The objective of this study was to identify if there was a difference in health care utilization of working, non-insured residents in two rural North Mississippi counties; Lee County with a free clinic and Alcorn County without a free clinic.

The study used a non-experimental, retrospective, comparative research design with convenience sampling. Data was gathered from both Lee County and Alcorn County emergency departments. Alcorn County had 3,804 non-insured residents access the local Emergency Department for an overall cost of \$462,174.00 in 1991/1992; and in 1992/1993, 12,962 non-insured residents went to the Emergency Department for a cost of \$4,568,817.65. A Free Clinic was established in Lee County in 1992/1993. In 1992/1993 Lee County had 3,066 non-insured residents access the free clinic for a cost of \$93,000.00. The actual value of service was \$400,000.00. The introduction of a free clinic in Lee County increased non-insured residents' utilization of the health care system by 11.75%, but reduced the number of non-insured emergency department visits by 10.75%.

In conclusion, access to free health clinics for the non-insured will increase their utilization of health care and reduce the financial burden of the emergency departments.

404 A Preliminary Study of the Impact of Disability in Farm Households on the Farm Business in Ireland

A
Poster

*J McNamara*¹ (presenter), *DJ Ruane*², *L Connolly*¹, *K Reidy*³, *A Good*⁴,
¹Agriculture & Food Development Authority, Co Kilkenny, Ireland; ²The National University of Ireland; ³Waterford Institute of Technology, Ireland; ⁴National Disability Authority, Dublin, Ireland

The research of reported disability is from a representative sample of farm households (1048) participating in the Irish National Farm Survey of 119.5k households in Autumn 2001. Causation and impact of disability on the farm business, time commitment of family members to support the disabled person(s) and an assessment of available services was obtained.

The results show that 19.5% of farm households reported one or more persons with disability. Persons with disability were: the farm operator (39.5%); spouse (10.2%); child(ren) (20.8%); parent(s) (23.1%) and others (6.4%). Types of disability identified were categorised as: physical (from injury) 14.3%, physical (from birth) 6.8%, physical health-related 43.8%, sensory impairment 6.7%, learning/intellectual disability 12.9%, mental health 7.0%, other 8.5%. In 40.9% of households reporting disability a family member attends to the needs of the disabled person. Services and supports needed were specified by 45% of respondents. Disability in affected households had a "major" or "some" impact on the farm business in 22.4% and 52.9% of cases respectively. Family farm income per hectare for farms with the farm operator and "all other household members" reporting disability were €434 and €494 respectively compared to €458 for non-disability farms. When the farm operator reported disability the level of off-farm employment for the farm operator and spouse was 13.7% and 23.5% respectively compared to 34.6% and 35.9% for non-disability farms. The findings suggest that further study of the supports required by farm household members is warranted.

59 The Impact of Rural Life Upon Adolescent Mental Health

B
Poster

BL Murray, College of Nursing, University of Saskatchewan, Canada

Suicide is a significant health problem in every country in the world, and is among the ten leading causes of death. Suicide has been systematically and scientifically studied. However in spite of this, suicide is almost impossible to predict in any given individual and our attempts at preventing suicide have been characterized as still being in their infancy. Youth suicide has been on the rise in rural Saskatchewan and presents a particular challenge for rural health care providers working in the area of community mental health, school health, trauma response and emergency/outpatient care, as well as those involved in follow-up care of the youth and their families.

Current research in the area of youth suicide identifies the magnitude of the problem and also provides correlation between youth suicide and the contextual issues within families. However the literature provides limited exploration of the effects of loss, farm stress, abuse, family conflict, school and peer issues, and the changing structure of families on adolescent development and the increased vulnerability of adolescents growing up in rural Saskatchewan. Another limitation of current research is that it fails to provide clear and practical models for the assessment and intervention of youth suicide particularly in rural areas.

The presentation will discuss the challenges of youth self-harm and suicidal behavior in rural communities as well as a proposed assessment and intervention model that is being utilized with suicidal youth and their families. The presentation will also discuss the qualitative research methodology used to test the efficacy of the model being described and the related findings.

73 Psychosocial Risk Factors for Musculoskeletal Symptoms Prevalence among Mexican Seasonal Farm Workers in Quebec

B
Poster

H Duarte-Tagles (presenter), *C Infante-Rivard*, Department of Epidemiology, Biostatistics & Occupational Health, Faculty of Medicine, University of McGill, Quebec, Canada

Due to their working and living conditions, migrant agricultural workers are at relatively higher risk of developing health problems among farming populations. Psychosocial stressors experienced by these workers may be additional risk factors that account for the prevalence of musculoskeletal symptoms (MSS) not explained by physical workload. According to the Job Demand-Control (JDC) Model, the combination of high psychological demands, low decision latitude, and low social support at work is likely to produce job strain, which is a condition associated with the risk of adverse MSS. This could be the case for the Mexican Temporary Agricultural Workers (MTAW) of Quebec. Through the MTAW Program signed between the governments of Canada and Mexico, every year arrives to Canadian farms the workforce supply that local farmers need, especially for the harvest season. According to their occupational status, there are two types of MTAW: those coming for the first time to a particular farm (named *Seleccionados*, MTAW-S), and those returning workers to the same farm (named *Nominales*, MTAW-N). As part of a study aiming to measure risk factors associated with the prevalence of MSS in the population of MTAW of Quebec, a repeated survey was conducted along two consecutive working seasons in a broccoli farm.

The objectives of the study were to measure the prevalence and nature of MSS among MTAW, as well as to determine the level of job strain experienced by MTAW-S and MTAW-N. In order to measure MSS and the associated risk factors, a Combined Instrument (CI) was developed in Spanish and then administered to participants by interviewers. The CI included a modified version of the Body Diagram to measure MSS, whereas for psychosocial factors a modified version of the Job Content Questionnaire of the JDC Model was used.

Preliminary results from the first part of the survey indicate that there was no significant difference in the number of reported psychosocial factors between MTAW-S and MTAW-N, but at least half of the workers had a certain degree of job strain. MTAW-S had a higher prevalence of MSS, and “back problems” was the most common symptom reported by MTAW.

92 Effect of Age on Machine-Related Farm Injuries

B
Poster

L Hagel, Institute of Agricultural Rural & Environmental Health (I.ARE.H),
Centre for Agricultural Medicine, University of Saskatchewan, Canada

Background

Machinery-related injuries are the leading cause of fatal and hospitalized injuries on Canadian farms. In Saskatchewan, the proportion of all farm injuries related to farm machinery exceeds that reported for all Canada. This project examined the relationship between age and various factors associated with farm machine-related injuries in Saskatchewan.

Methods

A retrospective review of hospital discharge data from the administrative data set of Saskatchewan Health was conducted using external cause of injury codes to identify cases of farm machinery injury that occurred in Saskatchewan during the period April 1, 1990 to March 31, 1997. Log linear estimates of association of various factors in four age groups were derived.

Results

There were 1,107 hospitalizations attributed to farm machinery related injuries. Among the injured cohort, age was a predictor of the rate of injury. Significant association for nature of injury, mechanism of injury, and type of machine varied by age group. Interpretation: These data provide insights for a case-control study of farm machinery related injuries with the objective of determining personal, environmental and machine related factors that are responsible for this serious public health issue.

109 On-Site Investigations of Auger-Related Farm Injuries

B

*MW Ingram*¹, *TG Crowe*² (presenter), *J Wasserman*² (presenter), *LM Hagel*¹ (presenter),

Poster

¹Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada; ²Prairie Agricultural Machinery Industries (PAMI), Saskatchewan, Canada

Previous reports have indicated that injuries involving augers (screw conveyors) are a serious problem in agriculture, but to date on-site engineering inspections linking injuries to mechanical and procedural aspects have not been available. This paper details four events involving injuries as the result of being entangled in auger flighting. In each report the circumstances surrounding the injury event are outlined and the machinery involved is evaluated in terms of its compliance with current safety standards. In three of the four instances the machinery did not conform to current guarding standards or to safety sign standards. In these three cases, injuries were preventable with improved guarding according to ASAE standards. In the other case, the machine complied with ASAE standards, but the injury could have been prevented with improved guarding of the auger flighting.

116 Rural Partnership Building

B

S Burgus, Farm Safety 4 Just Kids, Iowa, USA

Poster

Objectives

To increase knowledge of organizations and individuals that work toward similar missions. To determine the merits of forming mutual partnerships that decrease farm-related injuries and health risks.

Discussion

Turf battles can stifle the implementation of effective programs. Egos, budget restraints, and logistics often interfere in the process of developing resources, implementing unique approaches, and evaluating the impact of activities and programs. With so many organizations and individuals working toward similar missions it is imperative that these same groups move beyond their own self interests and focus on the mission of prevention.

Farm Safety 4 Just Kids is an intervention oriented organization. Since its conception in 1987 as a result of the death of an eleven year old boy in Iowa, FS4JK has focused its efforts on awareness and education that help prevent this type of tragedy. The FS4JK Chapter network grew out of this need to provide awareness and educational programs on a community level. The network has become instrumental in the implementation of thousands of educational programs. The chapters are encouraged to seek out diverse individuals and organizations to complement each other. Partnerships develop for a variety of reasons. The basis of a partnership formation might include funding, program implementation, resource development, community awareness, and evaluation. After initial formation, overlap among the motives almost always takes place.

This presentation will discuss ways to identify partnerships that benefit both organizations. Attendees will be asked to participate in identifying the strengths they have to offer others as well as determining the needs that can be fulfilled by other individuals or organizations.

Conclusions

Limited resources demand the need to build on the strengths of an organization and seek partnerships where a need is identified. Partnerships that are developed out of a need develop a stronger product or program than those developed in isolation. By identifying and utilizing the strengths of each other, both entities benefit.

137 Stress, Social Support, and Self-Esteem in Rural and Urban Postpartum Women

B
Poster

K Marcinkiw, D Rennie (presenter), *D Mpofu, HH McDuffie*, Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Studies of the relationships among postpartum women's health status, stress, social support, and self-esteem are limited, particularly in the area of rural postpartum women's health. In 2001, a prospective cohort study was conducted in Saskatoon, Canada to determine the relationship between postpartum length of hospital stay and maternal and infant health outcomes with 150 early (less than 48 hours postpartum) and late discharge (greater than 48 hours) postpartum women. A secondary analysis was undertaken to assess the relationships among stress, social support, and self-esteem and to determine predictors of stress at four months' postpartum between rural and urban postpartum women who participated in the study at birth and at four months' postpartum. The sample used in this secondary analysis (n=101) consisted of 63 urban and 38 rural participants. The Prenatal Psychosocial Profile instrument was used to measure levels of social support and self-esteem in the immediate postpartum period and stressors/hassles at birth and four months' postpartum, using rating subscales. Results indicated that at four months' postpartum, both rural and urban groups experienced higher stress due to money worries and overload compared to the first interview ($p<0.05$). Rural and urban groups experienced moderate to high satisfaction with social support in the immediate postpartum, although the rural group had lower satisfaction scores with the scale items "goes out of his/her way to do special or thoughtful things" and "tolerates my ups and downs and unusual behaviours" ($p<0.05$). Self-esteem scores did not differ between groups. The best predictors of maternal stress at four months' postpartum were determined to be younger age, aboriginal ethnicity, lower income, and single status ($p<0.05$). The knowledge gained from this study indicates the need to target young, single, lower income, aboriginal postpartum women in both rural and urban populations for psychosocial support in the postpartum period.

165 HIV/Aids Risk Perception and Safer Sex Behavior among Commercial Sex Workers in Tarkwa and Prestea

B
Poster

J Kwadwo Larbi Opere, District Health Management Team, School of Public Health Legon, Atibie, Ghana

The AIDS menace is on the increase. Since the late 1980s, there has been an increase in scientific literature which links female prostitution to high prevalence of sexually transmitted diseases, including AIDS. The sex worker is both at risk of becoming infected with HIV and of spreading it to others. Knowledge of HIV/AIDS risk perception and safer sex practices of the Commercial Sex Workers is an essential part of gauging the effectiveness of the current approaches to the control of HIV/AIDS. Unfortunately, this has not adequately been assessed in Tarkwa and Prestea (mining towns in Ghana),

hence the importance of the study. The emphasis of the study was on the female home-based Commercial Sex Workers (Seaters), because they were more accessible than the roamers.

The study had a descriptive, cross-sectional design, using quantitative survey method supported by in-depth interviews. The general objective of the study was to examine the level of awareness, knowledge and risk perception of HIV/AIDS among the Commercial Sex Workers in Tarkwa and Prestea, and to determine the extent to which they practice safer sex through the use of condoms. Convenient sampling procedure was used, to select seventy-two Commercial Sex Workers in Tarkwa and Prestea. Survey interviews using structured questionnaires and in-depth interviews, were the data collection methods.

The study revealed that the awareness of HIV/AIDS among the Commercial Sex Workers at Tarkwa and Prestea is very high, but knowledge of the basic facts about the disease is very low. The majority of the Sex Workers perceive themselves at low risk of HIV/AIDS because they claim they use condoms. Logically this implies that the prevalence of HIV/AIDS among the Commercial Sex Workers should be low. Recent studies, however, indicate relatively higher prevalence of HIV/AIDS, among this group. Financial incentives for unprotected sex could be one of the underpinning factors for this observation.

224 Public Private Partnership (PPP) for ESP: an Innovative Approach for Delivery of Primary Care Focus

B
Poster

MD Azam Ali, TA to Ministry of Health & Family Welfare, Nicare (Northern Ireland)
Health & Social Services/British Council, Dhaka, Bangladesh

Though Health for All is universally agreed struggle to achieve this, remove the prevailing rural-urban and other form of inequities and to create provisions for essential services for the majority of Rural population particularly to the poor to date continued to be difficult and remains as the major challenge for most health sector.

In the above context this presentation will share a new vision called “Public Private Partnership (PPP) for Essential Health Care Services” developed with community solidarity, resource pooling, and targeting to poor approach in Bangladesh. With three distinct elements; a) Community-based Health Scheme b) Funding and Commissioning Partnership and c) Health Providers Partnership, PPP is working towards developing sustainable continuum care provision with community empowerment and participation.

Together with available public sector resources, community funds are being mobilized and placed under decentralized management and community control. Service charges introduced to protect the limited public resource being wastage and air marked only for the poor. Community Health Schemes (CHS) in PPP are developed one for about 8,000 populations, mobilizing the entire community including the disadvantaged. With representatives from 7-10 stakeholder groups a Community Health Committee is formed and registered as a legitimate CBO. Community agrees to pay for ESP services and protect the limited public sector resources only for the poor. In addition to this there are resource pooling such as members subscription, contribution from the Union Parishad and donation collection from rich and middle class. Through a participatory process 41 CHSs have developed their recent annual operation plans (2002-2003) projecting average community contribution of .1-.2 million Taka which is about 40-50% of the estimated total running cost of a CHS. Empirical evidence shows positive developments on providers and commissioning partnerships, addressing social issues attached to demand such as reaching the poor and building community solidarity.

PPP, this new intervention for partnership and empowering community has drawn significant interest among the Govt. policy planners, NGOs and professional associations and considered to be a new form of primary care delivery for the country.

225 Pathways and Barriers to Mental Health Care for Rural Children and Youth

B
Poster

K Tilleczek (presenter), *K Boydell, R Pong, T Volpe, E Wilson*, Centre for Rural and Northern Health Research, Laurentian University, Ontario, Canada; Hospital for Sick Children, Ontario, Canada

The overall goal of the presentation is to highlight issues of access to mental health care for children and youth living in rural Ontario. The study has investigated the issue from the perspectives of families and service providers. Specifically, the goal has been to understand the facilitators, barriers and pathways to care.

The study used an action research approach designed to have decision-makers participate in all phases of research and dissemination. Sixty participants (30 family members and 30 service providers) were recruited from rural/remote catchments of the two study sites. In the first phase of the study, a advisory committee was established to help with recruitment and guidance of the project. Key informant consultations were held with community members from each site. In the second phase, parents and services providers were interviewed in-depth regarding their views and experiences of children's mental health. Interviews were transcribed verbatim and analysis has been completed with the help of ethnograph software. Analysis has focused upon the positive and negative aspects of the rural mental health system. Strategies used by families and service providers and the pathways that families take through the system are main themes. This presentation will also discuss child/youth differences in data from a developmental framework.

The findings have implications for strategic planning activities for rural agencies and organizations. Given the relatively small body of knowledge on children's mental health in rural areas, the project also adds value as evidence to inform the organization and delivery of mental health services.

248 Atopy among Fraser Valley 4-H Youth

B
Poster

H Dimich-Ward (presenter), *C Trask, J Chung, Y Chow*, University of British Columbia, Canada

Background

A number of recent studies have suggested that there is a 'protective farm factor' that reduces the risk for allergic sensitization. The 'hygiene hypothesis' suggests that early exposure to endotoxin from livestock increases tolerance to inhaled aeroallergens.

Objectives

The purpose of the study was to determine whether exposure to livestock was associated with a lower prevalence of atopy.

Methods

Members of the Fraser Valley region of the British Columbia 4-H program were invited to participate by completing a self-administered questionnaire with the assistance of a parent. Skin prick testing using 18 inhalant allergens was conducted at fairs and at 4-H meetings. Atopy was defined as a positive skin prick test (a wheal diameter > 3 mm from control). Analyses incorporated chi-square and logistic regression.

Results

The participation rate of the 327 subjects was 64% among those with club consent. Analysis by frequency of contact with livestock/poultry showed no significant differences in the prevalence of atopy whether of farm, indoor or outdoor common allergens. Similarly, no significant differences in atopy were shown according to current or past (prior to age 2) area of residence with livestock or not. Rather, trends were

higher for groups exposed to livestock. Youth spending >7 hrs/wk in a barn had a significantly higher prevalence of atopy to common allergens. However, analysis according to farm size showed trends of lower atopy among youth living on larger farms. The prevalence of atopy to common indoor allergens was found to be significantly lower among youth living on farms >50 acres; with an odds ratio (adjusted for age, sex and parental history of hayfever, eczema or asthma) of 0.4 (95% CI, 0.2-0.95) when compared to youth living on 2-50 acres.

Conclusion

In general, exposure to livestock was not found to be protective for atopy. Limitations of this cross-sectional study may include selection effects, misclassification of exposure status and small sample size. However, the association of larger farm size with reduced atopy suggests that some aspect(s) of the environment of larger farms other than livestock exposure may be important.

279 How are they Faring in the Field: First Report of a Five Year Study of Farmers over 50

B
Poster

DB Reed (presenter), *MK Rayens*, *D Daniel*, College of Nursing, Farm Safety 4 Just Kids, University of Kentucky, USA

Objectives

This NIOSH-funded study aims to provide health and work profiles of senior farmers in Kentucky and South Carolina.

Methods

Using both mailed and telephone surveys, data were collected from a sample of 1327 farmers on agricultural work, attachment to land and work, physical and psychosocial indicators of health, injuries, and work organization. Data were analyzed using descriptive and bivariate analyses.

Results

Findings from the first wave of surveys (completed March, 2003) will be presented. Overall, the sample composition is 75% male, 80% White, and 90% married. The mean age was 64 years and 76% had a high school education or greater. The respondents reported a mean of 156 acres in their farmsteads and worked 14 hours on the farm in the last week. There was a significant association between time spent on farm tasks and each of gender and age: males were significantly more likely to spend as much or more time now as in the previous year, and those 65 or older were less likely to do so. Males performed significantly more farm tasks than females, both in the last 5 years and the previous year; this relationship also was found when comparing younger farmers to older ones. Males and females did not differ on the number of health conditions, but older farmers had significantly more than younger ones. There were no age or gender differences in the number of injuries in the past year or in the respondents' depressive symptoms scores: the rate of injury was 25.7 per 100 respondents and the average CES-D score was 7 out of a possible total of 60.

Significance

The results of these findings will be used to develop age appropriate programs for work organization of senior farmers and guidance for families of senior farmers. Of special consideration is the difference and adjustments in gendered work patterns.

Conclusions

The findings demonstrate gender and age differences in work habits and health status among these senior farmers.

288 Effectiveness of Sun Safety Intervention Approaches for Agricultural Workers

B
Poster

D Jepsen (presenter), *J Smith* (presenter), *J Smith*, *B Jackson-Smoot*, Ohio State University, USA

Objectives

1. Encourage sun safety practices among agricultural workers.
2. Evaluate impact of sun safety intervention programs.
3. Evaluate the Dermascan skin analyzer as an effective tool in intervention programs.
4. Evaluate design and preferences for sun safe hats among agricultural workers.

Discussion

Skin cancer is the most common form of cancer in the United States accounting for more than 800,000 new cases each year. The principle cause is excessive and long-term exposure to the sun. Farmers, by nature of their occupation, are at high risk for developing skin cancer. This project was a cooperative effort with Ohio State University Extension and the OSU School of Public Health. Utilizing state mandated pesticide certification training programs as the venue, 451 agricultural workers participated in the project. Two different educational approaches were used to increase skin cancer awareness among the workers. Participants of the intervention program received information on skin cancer and sun safe practices. A Dermascan skin analyzer was incorporated into one educational approach. A control group was also included in the study's design. Participants received a free sun safe hat and tube of Soy Smooth, a soybean-based sunscreen.

Conclusion

Participants completed an initial questionnaire during the time of pesticide certification training. This information provided baseline data on sun exposure and sun safe practices. A mail survey was administered 10 months after initial contact with a 78(%) response rate. The follow-up questionnaire determined changes in sun safe practices, adoption of the sun safe hat, and peer perceptions and influences on participants' behavior change. At this writing, follow-up data are being analyzed. Data collected during training sessions suggest a need for skin cancer prevention programs for agricultural workers. Seventy five percent of participants spend greater than 6 hours in the sun on a regular basis, with over 50(%) of that time between noon and 4pm. The most frequent style of head protection is the ball cap, which does not meet the requirements of a sun-safe hat. The cooperative nature of this project provided a more comprehensive approach to learning about sun safe behaviors of agricultural workers and evaluating intervention approaches.

289 Investing in Adolescents for Achieving Demographic Goals

B
Poster

Faisal Abdullah Memon, *Bux Mallah Hussain*, Sindh Rural Support Program and Social Sciences Research Collective, Hyberabad, Sindh, Pakistan

Why adolescents in developing countries are increasingly gaining the interest of researchers, policy makers and programmers? One aspect of this issue is the large number of adolescent's population makes necessary their involvement for human development sustainability. The strongest demand expressed today, by young people themselves is that for participation. They want to be considered as full and equal citizens. Adolescents need to be consulted and involved in all aspects of social interchange. In Pakistan, out of 135.6 millions, more than 22.5 millions are adolescents, which is a major proportion of the whole population. This proportion is important than that other population, because high percentage of Pakistani are already either in their adolescence years or will be entering it in the next five years, and are also dependent of coming generation and can play a role as guardians or trainers for this coming generation. Adolescence is a sensitive period of life, in which changes are occurring as a younger passes from

childhood to adolescent, and then adolescent to youth. It is a period of transition, and can learn or take positive or negative results quickly. Due to lack of decision making power and incomplete capacity building they are especially ill equipped to handle the reproductive health & other social and psychological problem they face.

This paper will analyze research on Adolescents presenting major issues such as:

- a) Level of education, which was beneficial in particular life.
- b) Age at marriage-whether marriage at young age was more advantages or at an old age.
- c) Gender differences and female mobility.
- d) Health and Nutrition problem.
- e) Skills enhancement.
- f) Sexual exploitation may be wide spread social problem in Pakistan (i.e., problem of child and Adolescents sexual abuse; threat of HIV/AIDS, Infant Mortality, Abortion).

297 Future Search: a Guided Process for Community Survival

L Moll Smith, MAIS, Lake Country Area Health Education Center (AHEC), Texas, USA

B
Poster

Lake Country Area Health Education Center has cooperated with the Texas Department of Health over the past two years to promote, organize, facilitate and report on a series of "Future Searches" held in Northeast Texas. The Future Search event is a guided three-day process in which a multi-disciplinary group of participants reviews its community's or areas health current outcomes, assesses needs, charts progress and envisions change. A Future Search ends with participants forming workgroups or committees to achieve the mission statement and goals agreed upon by the body of participants. This session will outline the systems processes which form the basis of Future Search activities, examine the step-by-step process by which a Future Search is conducted, compare and contrast measurable outcomes among four rural Northeast Texas Communities performing Future Searches. Tracking of results will be displaying, along with comments about the efficacy of the process from participants and helpful hints from facilitators. A resource guide for communities interested in replicating the Future Search process will also be made available.

304 Health Service Utilization and Quality in Rural Saskatchewan (with Urban Comparisons)

C D'Arcy (presenter), J Kosteniuk, P Smith, R Nilson, University of Saskatchewan, Canada

B
Poster

Saskatchewan's rural population is estimated to range from 36% to over 50% of the provincial population depending upon how rural is defined. Five issues have been identified in order to sustain rural residents' health: (1) health service access, (2) health service use, (3) quality of health services, (4) early screening for risk factors, and (5) access to health information. This analysis of the Saskatchewan Population Health and Dynamics Survey (SPHDS) provides information pertinent to these topics. The SPHDS is a large (N=7,000+) omnibus provincial cross-sectional health survey conducted in 1999-2000.

The sampling strategy was designed to provide data for regional health authorities. We surveyed residents regarding health-related topics such as preventive practices and procedures, sources of health information, health services utilization and perceived quality, health insurance, and health centre or hospital access. The final sample includes 44% rural dwellers, including 1,632 women and 1,493 men ages 18 and older. Rural residents report that they are on average 23 minutes away from the nearest hospital or health centre, the time for urban residents is 8 minutes.

In the three years prior to the interview, approximately 30% of rural residents did not have a routine general check-up by a family doctor, 25% is the comparable figure for urban residents. There are a myriad of similarities and differences in the health of rural and urban residents in Saskatchewan. We report on the frequency of use of 14 different health services by rural residents during the 12-month period prior to the interview; if the health service has been utilized, we report the quality ratings with respect to ease of access, promptness, and satisfaction. Where appropriate, urban residence, age, and gender comparisons are offered. We describe rural residents use of formal preventive procedures, such as general check-ups, dental and eye exams, PSA testing and breast screening, as well as informal practices such as skin examinations.

This report also details the types of health insurance held by respondents, respondents preferences for health information sources, and their distance to hospital or health centre access. The implications of these findings are discussed.

316 Farm Life Following a Disabling Farm Injury: the Spouse's Experience

B

*R Kaminski*¹ (presenter), *KM Semchuk*², ¹Nursing Education Program of Saskatchewan, SIAST Kelsey Campus, Saskatchewan, Canada; ²College of Nursing, University of Saskatchewan, Canada

Poster

A disabling farm injury affects both the farmer and the farmer's spouse. In Canada, injuries rank third as a leading cause of death and second as a leading cause of medical spending. There have been studies of agriculture-related injury and death, including research on the prevalence, incidence, and causes of farm injuries. There is a lack of empirical data on the impact of agricultural injuries on farm families. This paper outlines the methodology for a proposed qualitative study that will explore the lived experiences of spouses (wives or husbands) of Saskatchewan farmers who have experienced a disabling farm injury. The spouses will be recruited through contacts with the Saskatchewan Abilities Council and the Institute of Agricultural Rural and Environmental Health. Study participants will take photographs that depict their lived experiences following the injury. Using the photographs to facilitate recall and discussion, participants will be interviewed about their experiences. The interviews will be audio-taped, transcribed verbatim, coded and analyzed using methods of grounded theory analysis to identify common patterns and themes in the data. This paper presents some common themes that have emerged from the preliminary analyses.

324 Needles in the Hay: U.S. Press Clips on Farm Injuries (SEP02-AUG03)

B

MD Madsen, College of Public Health, Institute for Rural & Environmental Health, Department of Occupational & Environmental Health, University of Iowa, USA

Poster

Many safety leaders, agencies, and organizations subscribe independently to services whose readers scan thousands of newspapers and periodical publications for accounts of farm fatalities and injuries. Often these reports are logged as a gauge of a state's agricultural incident toll for the year. Timely surveillance and comparative information, for the region and nation, are being missed and virtually lost over time. Such press clipping information could be more systematically captured, catalogued, and made available for awareness and inquiry. That is the objective. The importance of doing so has been repeated in various forums.

Subscription services have provided press clippings from over 16,000 publications across the U.S. to the Great Plains Center for Agricultural Health since September 2002 under a feasibility pilot project grant. Each new report of a farm injury is a straw in the accumulating stack, and a needle for prevention. For example, in the month of March 2003, there were twenty-two press clippings on farm fatalities alone. By

September 2003, there will be a year's accumulation of several hundred incidents, both fatal and non-fatal from across the nation. It is the review of experience, these incident data and how they stack-up, that provide the bases for recommendations and conclusions about the future of the system and the information harvestable from it.

325 Periodontal Conditions of a Group of School Children in Rural Mexico

B

FJ Otero-Cagide (presenter), *JN Hoove*, *A Yaschine*, *B Avila-Curiel*, *B Juarez*, University of Saskatchewan, Canada; University of Oaxaca, Mexico; Metropolitan University of Mexico

Poster

Periodontal status and basic oral hygiene measures were investigated in a group of 218 children (105 male; 113 female), 12 to 15 years of age, attending two randomly selected schools in a remote rural area of the State of Oaxaca in southern Mexico.

The Periodontal Screening and Recording procedure (PSR) was used to assess the periodontal status of such a population. The clinical examinations were performed by two examiners who were instructed and calibrated in the use of PSR. The recording was based on the full mouth scoring excluding permanent second molars, using only the highest score per sextant for further evaluation. Information about basic oral hygiene measures was obtained using a questionnaire.

Analysis of the data showed that only 3.4% of the children were periodontally healthy (code 0), 26.6% displayed bleeding on probing (code 1), and 36.8% presented with calculus or other plaque retentive factors (code 2). Nearly one third of the population, 37.7%, presented pocket depths of 3.5 to 5.5 mm (code 3). Deep pocketing of 6 mm or more (code 4) was observed in 0.5% of the examined children. Despite the poverty and relative inaccessibility to regular preventive oral health, toothbrushes were used by 203 children (92.2%) and 68 (31%) reported to clean their teeth three times per day, 82 (37%) twice per day, while 56 (26%) cleaned only once per day.

The findings suggest that the periodontal treatment needs of this population should mainly consist of preventive plaque control and calculus removal, treatment that could be well within the mean of dental therapists. Also, PSR can be used as a suitable method for screening large populations in a community setting. Supported by a grant from WHO (D2/180/9), Geneva, Switzerland.

328 Health Promotion Behaviors of Rural Women with Heart Failure

B

C Pierce, Binghamton University, New York, USA

Poster

The purpose of this research was to predict the influence of socio-ecological factors including social support, perceived health status, barriers to health promotion behaviors, and selected demographic variables on the health promotion behaviors of rural women with Heart Failure. A correlation and descriptive study was performed with a convenience sample of 45 women 65 years of age and older who live in upstate New York, USA.

A history of diabetes and the New York Heart classification were shown to be most predictive of health promotion behaviors in this population. Social support, barriers to health promotion behaviors, and perceived health were not useful in predicting health promotion behaviors in this population. Demographic variables were reviewed to gain insight into the performance of these variables. Inferences for health care providers caring for older women with Heart Failure who are living in rural areas are suggested.

329 Adolescent Mental Health in a Rural County: Risk Behaviors, Depression, and Suicide

B
Poster

AM Stromquist (presenter), *KM Kelly*, *LF Burmeister*, *C Zwerling*, *JA Merchant*,
University of Iowa, USA

Objectives

To report national (U.S.) data on depression and suicide in youth. To determine the prevalence of depressive symptoms and suicide ideation in adolescents participating in the Keokuk County Rural Health Study and to identify risk factors associated with each, comparing boys and girls.

Methods

Adolescents in Round 2 of the Keokuk County Rural Health Study were interviewed in person by a trained interviewer. Most questions were taken from CDC's Youth Risk Behavior Survey and included items about risk behaviors and suicide ideation. The CES-D (depression scale) was used to identify those with depressive symptoms. Logistic regression analyses were conducted to determine risk factors and behaviors most strongly associated with depressive symptoms and suicide ideation.

Results

Preliminary results are reported here. Data collection is ongoing and results will be updated in time for the conference. 25% of the girls (17/69) and 18% of the boys (16/88) had high levels of depressive symptoms. Four girls and 3 boys had considered suicide. Differences in risk behaviors were found between those with depressive symptoms and those without, as well as between girls and boys. Of girls with depressive symptoms, 47% had tried cigarette smoking (vs. 25%), 35% had carried a weapon in the past 30 days (vs. 6%), 53% had property stolen or deliberately damaged at school (vs. 12%), and 35% had been in at least 1 physical fight in the past year (vs. 4%). Of boys with depressive symptoms, 81% felt like they were being "pushed around in life" (vs. 36%), 31% felt they had little control over things that happened to them (vs. 4%), 44% had lost something of sentimental value in the past year (vs. 14%) and 50% felt there is little they can do to change the important things in their lives (vs. 11%).

Conclusions

Depression and suicide are major public health problems for adolescents. Certain risk behaviors and risk factors are associated with depression, suicide ideation, and suicide attempts, and these appear to be different for boys and girls. Suggestions for prevention and intervention will be discussed.

333 Policy and Contextual Factors in Health Care Service Delivery in Rural and First Nations Communities

B
Poster

S Vilches, *J Ball*, Early Childhood Development & Indigenous Peoples School of
Child & Youth Care, British Columbia, Canada

Rural and remote communities, including First Nations communities, face challenges in accessing health services even while population health is assessed at increased risk (Romanow Report). A number of policies and programs exist which attempt to ameliorate the disadvantages faced by rural and remote communities. Using child care in rural BC First Nations as a case study, the nexus of services available to young children will be examined to illustrate challenges at the micro level of the family and individual as well as the intermediate level of community/region and the macro level of policy.

A review of policies and programs reveal a multitude of intersecting and contradictory funding and program formulas that affect both rural mainstream and rural First Nations communities and families in unplanned and unintended ways. This has both negative and positive implications for the ability of community administrators to develop capacity in child care and attendant health and social services. In

particular, conflicting and uncoordinated policies sustain lack of coordination between off-reserve and on-reserve services in geographically co-located communities to the detriment of both communities and the individuals who travel between them.

Regional factors such as the availability of skilled personnel; facilities; and infrastructure such as roads and telecommunications systems are generally understood to influence the provision of services. These factors will be compared to contextual factors that service providers identified and that were observed as barriers or catalysts to service development.

Conditions at the individual level also influence the ability of individuals to uptake services. Some of these are family-level factors such as the need to care for others, while others are economic, such as the remotely located worksites. Other factors, which also influence uptake of services, are poverty, lack of personal vehicles, and cultural differences.

The interaction of policy, regional and family-level factors create unique challenges for meeting the health care needs of children and families, particularly in First Nations communities. Some possibilities for shifting this from both the individual (agentic) and structural vantage points will be explored, particularly as expressed through a capacity development initiative in BC.

336 An Agricultural Health and Safety Training Program for Nurses

B

J Bidwell (presenter), *L Lockinger*, *HH McDuffie*, *JA Dosman*, Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Poster

This project created a system and a program for training registered nurses in agricultural health and safety. Its goal was to increase the ability of rural nurses to provide occupational health services and information to farm and rural residents. The program involves seven days of training over a two-year period. In the initial year, participants receive three days of introduction to agricultural health and safety; and two days of audiometric technician training, to enable them to provide hearing screening, education and referrals. In the second year, participants receive two days of spirometric technician training, to enable them to provide respiratory screening, education and referrals. Participants receive and have ongoing access to agricultural health and safety health resources produced by I.ARE.H. Participants in the pilot training program in 2003 were eight public health and primary care nurses employed by Saskatchewan Regional Health Authorities and one Occupational Health and Safety Inspector employed by Saskatchewan Labour. The project was undertaken with funding assistance from Health Canada, through a Rural and Remote Innovations Initiative grant; and from Agriculture and Agri-Food Canada through a Canadian Agriculture Safety Program grant.

355 The Association of Birth Related Factors with End-Stage Renal Disease in Saskatchewan: Differences between Aboriginal and Non-Aboriginal People

B

RF Dyck (presenter), *H Klomp*, *L Tan*, Departments of Medicine and Community Health & Epidemiology, University of Saskatchewan, Canada

Poster

The purpose of this study was to determine possible links between birth related factors and the subsequent development of end stage renal disease (ESRD) in Saskatchewan aboriginal (AB) and non-aboriginal (non-AB) people. A 1:3 age, sex, and ethnicity matched case-control study compared cases with ESRD diagnosed from 1981 to 1998, with randomly selected controls without ESRD. Maternal age and parity, gestational age, and birth weight (high birth weight [HBW] ≥ 4000 grams; low birth weight [LBW] ≤ 2500 grams) were compared between cases and controls.

Birth registration data was available for 334 cases and 828 controls born after 1949. Of those, 277 cases with birth weights had 601 matched controls with birth weights (48 AB and 229 non-AB cases; 112 AB and 489 non-AB controls). Although LBW rates were higher for both AB and non-AB cases than their respective controls (10.4% versus 5.3% and 6.6% versus 4.3% respectively), overall differences were not statistically significant. Non-AB women with ESRD, however, had significantly increased rates of LBW compared to controls (Odds ratio [OR] 3.66; 95% confidence intervals [CI] 1.05, 12.73). In contrast, there was a tendency for increased HBW rates in AB cases compared to controls (14.6% versus 11.6% respectively); in particular, 3/5 female AB diabetic ESRD (DESRD) cases were over 3750 g compared to 1/14 controls ($p < 0.05$). Using multivariate analysis, only maternal age ≥ 30 years remained an independent predictor for ESRD after adjusting for other birth registration variables. This relationship was stronger for non-AB cases with non-DESRD (OR 2.45; 95% CI 1.03, 5.8). Cases whose mothers were ≥ 30 years had lower mean birth weights than controls (3236 g versus 3434 g; $p = 0.005$). This finding was also strongest in non-AB cases and cases with non-DESRD.

Maternal age ≥ 30 years was the sole birth related independent predictor of ESRD in our study. This was related in part to lower birth weights among non-DESRD cases. Although numbers were small, AB DESRD cases were more likely than controls to have higher birth weights. These findings imply that different prenatal factors including ethnicity may be operational in the pathogenesis of DESRD versus non-DESRD.

364 Survey on Relation of Some Effective Factors and Gender-Similarity of Children of 15-49 year Old Women of Isfahan Province (Iran)

B
Poster

M Valiani, Isfahan University of Medical Sciences, Iran

Objectives

Being able to choose their children's gender, has been always one of human being's wishes. Since in many cases, parents tend to have children of both genders. This study aims to effective factors on having children of same sex.

Methods

This study was a historical cohort that covered 3057 instances in 45 clusters; each includes 67 families in Isfahan province. Entrance instances were women with 15-49 years old who had at least two children (not twins), without abortion or ectopic pregnancy or molar pregnancy between them and had not diagnostic difficulty in child sex. Data collected with observation and consulting by questionnaire. Independent variables were birth interval, marriage age of parent, number of delivery, breast feeding duration, aliveness birth, contraceptive methods, mother nutrition methods, gender of sibling, age, education and occupation of parents. Depended variable was gender-similarity of children. Result analysed with ANOVA, Stepwise multivariate and logistic regression, and chi-square.

Results

Data showed time between first and second child births ($P = 0.015$), third and forth child births ($P < 0.001$), Marriage age of father and mother ($P = 0.02$, $P = 0.03$) number of pregnancies ($P = 0.008$), breast feeding ($P < 0.001$), aliveness of born instance ($P < 0.001$), contraception duration ($P = 0.04$), consanguinity of couple ($P < 0.001$), methods of determining the sixth child gender ($P = 0.002$), father's level of education ($p = 0.002$), fathers and mothers occupation ($P < 0.001$), $P = 0.04$), age of mother ($P = 0.01$) and father's age ($P = 0.05$) had significant relation with having children of same gender in sequential births. Data showed probability of third boy after two girls is more than 50% and probability of fourth girl after three boys is less than 50% ($P < 0.05$). Also probability of fifth boy after four girls had significant relation with methods of family planning. Conclusions: A direct relation was found between gender similarity of first and second children with death of child, IUFD, abortion and consanguinity, whereas number of

pregnancies, milking duration and mother age had reverse relation with it. Researcher recommend “consulting with parents” about time between child birth and effective factors on gender which they tend to have.

365 Serum Androgen Levels and Correlation with Embryo Quality

A Kazemi, Isfahan University of Medical Sciences, Iran

B
Poster

Objective

The peripheral hormonal pattern has important role on oocyte maturation. High level of androgens in this period affect on it.

Material & Methods

Our study included 260 women who were undergoing in-vitro fertilization (IVF). In this study plasma testosterone and andrestandion concentration were assayed and embryo quality on day 2 were scored.

Results

Findings showed that there were statistically significant coloration with testosterone and and restandion levels and embryo quality ($p=0.006$ & $p=0.00$).

Discussion

Results of this study show that concentration of androgens (testosterone and andrestandion) in the circulation during the follicularphase of menstrual cycle negatively affect embryo development and fertility.

374 Case-Control Study of Farm Machinery Injury – Prairie Region of Canada – Preliminary Results

K Belton, Alberta Centre for Injury Control & Research, Department of Public Health Sciences, University of Alberta, Canada

B
Poster

Objectives

On Canadian farms, work-related fatalities among the adult farming population, occur at a rate of 14.8 per 100,000 per year (1990-96), a rate 2.7 times greater than that for workers in all industries in Canada. 36% of fatal farm injury events occurred in the provinces of Alberta, Saskatchewan and Manitoba and injury events involving farm machinery accounted for 70% of these fatal farm work related injuries. The study objectives are: 1) to identify and assess the relevant contribution of individual, environmental and machinery-related (design, operation and maintenance) risk factors for farm machinery injuries among adult farmers; 2) to assess through direct observation, characteristics of machine design, maintenance and operation among case machines and control machines; and, 3) to,characterize farm machinery exposure.

Methods

Using a case-control design, matching on age, sex and postal code, telephone and mail questionnaire-based measurements of individual characteristics, characteristics of the environment where the individual works, and machinery operation and maintenance practices on a group of similarly exposed cases and control subjects; and on-site evaluations in order to determine factors associated with the design, operation and maintenance of the relevant machine are being conducted.

Results to Date

Of the cases of farm machinery injury collected so far 94% were males. Almost half of all injuries occurred in the later days of the traditional work-week, Friday (24.6%) and Thursday (21.7%). Almost

90% of all injuries happened in daylight. Approximately 51% of all injured persons reported only one injury, 29.9% reported 2 injuries and 19.4% reported three injuries. Similarly, 61.2% of those injured reported injury to one body part only, 23.9% and 14.9% indicated injury to two and three body parts were injured respectively. Lacerations amputations and fractures were the most common first injuries reported, 38.8% 20.9% and 20.9% respectively. Lacerations, amputations and fractures were also the most common injuries reported when multiple injuries were cited. The body part most frequently injured is the hand (43.3%), leg (17.9%), and head (13.4%). Amputations most commonly occurred to the hand (85.7%). Fractures most frequently involved an appendage, with legs 57.1% and arms 21.4% as the body part involved. Almost 65% of all injuries occurred while performing crop production activities and the tasks of seeding (20.0%) and harvesting (24.4%) were the most common tasks being performed at the time of injury. Eighty percent of all injuries recorded were motor vehicle collisions (35.8%), entanglements in machinery (16.4%), being pinned or struck by a machine (14.9%) and operator falls from machinery (13.4%).

Conclusions

These preliminary results show the potential significance of this study for: 1) development of best safety practice models for farm machinery users; 2) development of safer farm machinery design opportunities for farm machinery manufacturers; 3) identification of behavioural factors amenable to change through targeted injury abatement strategies developed by health and safety professionals in consultation with manufacturers and end users; and 4) development of public policy initiatives.

403 Making Progress with Occupational Safety on Irish Farms

A Finnigan¹, J McNamara² (presenter), J Phelan¹, ¹The National University of Ireland,
²Agriculture & Food Development Authority, Co Kilkenny, Ireland

B
Poster

Three National surveys of farm accidents conducted since 1991 sought to examine the incidence of farm accidents and also farmers' attitudes and activities towards safety on their farms. These were conducted at five yearly intervals during 1991, 1996 and 2001. The surveys were conducted as an 'add-on' to the Irish National Farm Survey (NFS) by trained recorders in an interview setting. The sample, which was randomly selected, was large and representative of the national farming population. In 2001 the survey yielded 1127 utilisable questionnaires, which was representative of approximately 116k farm households .

The results of the most recent survey show showed that during the five-year period from January 1997 to December 2001 an accident had occurred on 9.7% of the respondents' farms. In three- quarters of the accidents the farmer was the injured person. The estimated average number of accidents, nationally, for the 5-year period prior to each survey year, indicated a decline in accident levels from 5000 in 1991 to 2000 and 1782 in year's 1996 and 2001, respectively. Accidents associated with livestock, trips and falls, and other farmyard accidents have increased since 1996. However, there has been a reduction in the number of accidents associated with machinery from 35% to 19% of all accidents.

Although the majority of farmers described themselves as 'concerned' about farm safety, the results illustrated that in the majority of cases this concern was not reflected in farmers' action towards safety on the farm. The results highlight the necessity for developing strategies to assist farm families to become effective managers of farm safety, to improve the safety record of the sector further.

236 Biotransformation of Benzene by Poplar Cell Suspensions

ME Wismer (presenter), JD Knight, JJ Germida, University of Saskatchewan, Canada

C
Poster

Phytoremediation, the use of plants and their associated microorganisms for the treatment of contaminated soils, provides an ecologically and economically viable method for the remediation of petroleum-polluted sites. Several studies have indicated that plants can transform and mineralize hazardous organics; however, relatively little is known about the mechanisms involved. This study assessed the use of plant cell suspensions as a tool to elucidate plant mechanisms involved in the transformation and/or degradation of contaminants. Benzene was chosen as the model compound. Poplar cells (*Populus trichocarpa* x *P. deltoides* clone [H11-11]) suspended in Murashige and Skoog medium were incubated in a closed test system at 25°C in a dark shaker (100 rpm) for 5 days. Suspensions were inoculated with 50 or 125 ppm benzene, and then re-incubated. Aliquots were taken at 24-hour intervals for 1 week, filtered with a 0.45 µm filter, extracted with carbon disulfide, and analyzed on a gas chromatograph-mass spectrometer. Preliminary results indicated that poplar cells degraded benzene, validating cell suspension as an effective method to investigate plant cell mechanisms of contaminant degradation.

303 Brain Function in Factory Workers – Evoked Potential Responses

OM Tandon, University College of Medical Sciences, Delhi, India

C
Poster

Rubber factory workers are exposed to many chemicals and their interactive products during manufacture of various commonly used rubber products like tyres and tubes. Human brain is highly evolved structure and is most liable to get damaged from the environmental toxins and chemicals. Hence an investigation of brainstem auditory (BAEP), visual (VEP) and Somatosensory (SEP) and P3 evoked potential was carried out in rubber factory workers in order to assess subclinical impairments in sensory, and cognitive functions of the brain. Forty male workers in the age group of 18-55 yrs. participated in this study. Twenty healthy male subjects of similar age served as controls.

The results obtained indicate that 47% workers had abnormalities in the brainstem auditory pathways as evidenced by prolongation of peak and interpeak latencies of BAEPs whereas 51% of workers showed abnormal latency of wave P1 of VEP. In case of SEPs; the exposed workers showed trend of prolongation of various waves like N1, P1, N2, P2 and N3, P3. The study thus suggests subclinical impairment of sensory functions auditory, visual and somatosensory pathways as a result of exposure to rubber factory environment. In some workers P3 component of the event related evoked potential was substantially delayed indicating deranged cognition. These neurotoxic effects could be due to polycyclic aromatic hydrocarbons, which are widely dispersed in nature and are formed during combustion of organic material as well as during various processes of manufacture in rubber factory. They may be inducing dysfunction by themselves or through liberation of other chemicals during manufacturing process.

305 Assessment of the Environmental Impacts of Oil and Gas Industry Emissions in Central Alberta, Canada

M Irvine (presenter), K Rosel, G Bortolotti, J Smits, C Waldner, M Wickstrom, University of Saskatchewan, Canada

C
Poster

The size of the environmental footprint of the oil and gas industry in western Canada is enormous, yet the potential impact of the industry and chemical emissions associated with it on local environments remains largely unknown. Therefore, when a study was initiated to investigate the health, productivity, and immune competence of domestic livestock chronically exposed to emissions from oil and gas batteries and associated field facilities in the western provinces of Canada, an opportunity arose to conduct a

parallel study of a representative wildlife species, in order to gain some insight into the potential impact of the industry on environmental health. To this end, wild European starlings (*Sturnus vulgaris*) were attracted to nesting locations surrounding oil and gas emission sites and sites without nearby facilities through strategic placement of artificial nest boxes in the breeding seasons of 2001 and 2002. Spanning these two field seasons, immune function, reproductive performance (clutch size, egg mass, egg volume, and hatchability), nestling condition and survival were examined in approximately 120 nests over a large geographical area in central Alberta. Furthermore, hepatic ethoxyresorufin-O-deethylase (EROD) activity (a measure of cytochrome P450IA1 detoxification activity) provided a biomarker of exposure to certain contaminants including polycyclic aromatic hydrocarbons (PAHs) present in oil and gas emissions. In this way the European starling is a bioindicator species in the use of biomarkers of both exposure and effect. This species act as effective sentinels of potential effects of oil and gas field emissions on environmental health as they are abundant around livestock and other agricultural facilities, and are omnivorous, eating a wide variety of plant and insect material, therefore being exposed to environmental contaminants by ingestion of gleaned invertebrate prey, as well as through inhalation of gaseous emissions.

Studies such as this one of wildlife populations may increase our insight into potential toxicological mechanisms operating in cattle and humans, and may lead to the identification of specific biological indicators of flare emission exposure that could be used in future research.

84 Empowering Rural People: a case Study from Ghana

D Tsetse, Science & Technology Policy Research Institute, Council for Scientific & Industrial Research (STEPRI, CSIR), Accra, Ghana

D
Poster

Agriculture mainly undertaken by rural people is the main stay of the economy of Ghana. Yet there is an increase in level of poverty and unemployment among rural farmers in the country. The government of Ghana in an attempt to improve the life of rural people has introduce programmes such as the National Poverty Reduction Strategy, Social Investment Funds and the Presidents Special Initiative on cassava. Even though these programmes are in the right direction, empowerment of rural farmers, an important element is lacking. Empowering rural farmers by equipping them with better farming and management skills will make them confident and prepared to face the future.

This paper presents a case study carried out in Kutukrom, a farming community in the Brong-Ahafo Region of Ghana. The farmers in the community are mainly commercial tomatoes farmers. During harvest seasons, people from urban centres come to buy tomatoes at prices they want to pay for and not the market price of produce. This has made the farmers in Kutukrom not getting profit on their produce and sometimes loosing capital they have invested in farming. The farmers formed an association and members are not allowed to sell produce below the market price. This helped the farmers to negotiate and get better prices for their produce. The farmers were also taught basic and better tomatoes farming methods to improve their yield. The farmers established a development fund from which members could barrow money for themselves and their wives to undertake other incoming generation activities.

114 The Multi-State Study of Migrant and Seasonal Farm Worker Occupational Health in the Northeast

J Sorensen (presenter), *G Earle-Richardson*, *PL Jenkins*, *JJ May*, Northeast Center for Agricultural & Occupational Health, Bassett Healthcare, New York, USA

D
Poster

Objectives

Little is known about migrant and seasonal farmworker occupational health in the Northeast. Traditional health surveillance methods have proved problematic. For these reasons, we have designed a multi-state

migrant surveillance system, which would assess migrant and seasonal farmworker occupational injury and illness in the Northeast using point-of-care medical information.

Methods

Data was collected in seven states in the Northeast using a network of federally-funded migrant health centers. Data collection included the following steps: 1) a computer generated list of all farmworker visits made to a health center 2) a review of all charts or a random sample of charts by NEC researchers and 3) anonymous abstraction of injury, demographic and medical care information. An injury or illness was included if the provider wrote, "while working", "work-related" or mentioned a harvesting activity. Data was also collected from emergency rooms in one study region with the help of an occupational health nurse, who asked hospitals to keep a log of occupational injuries.

Results

NEC researchers documented approximately 1,500 occupational injuries and illnesses over three years. Musculo-skeletal strain and exposure to natural and chemical irritants proved to be the most frequent events. Contributing factors included bending, lifting and inappropriate protective clothing. Most injured farmworkers were Hispanic, male and in their mid to late 30's. In the study region where emergency room data was collected, we found a large number of farmworkers sought healthcare at emergency rooms. Severity ratings illustrated that more than 60% of emergency room visits were made for medical problems easily treated at migrant health centers.

Conclusions

Sprain and strain, as well as, skin exposures to irritants and chemicals seem likely targets for interventions. Materials and training that are translated into Spanish may be preferable tools for these interventions. Emergency rooms seem to be a popular choice of healthcare for this population and should be included in future surveillance projects.

139 Symptom Management: Rural Cancer Patients and their Spouses

NM Parker, T Sullivan, College of Nursing, Montana State University-Bozeman,
Montana, USA

D
Poster

Managing symptoms and the demands associated with the treatments of cancer is a major component of life for patients and their family caregivers. The ability to respond to these demands has not been well-documented. Little is known about how rural cancer patients and their spouses deal with distressing symptoms over time at home, far from health care facilities, following the completion of treatment regimens such as surgery, radiation and /or chemotherapy.

The specific aims of this qualitative study are to: (a) examine the most difficult symptoms reported by older rural cancer patients and their spouses at three points in time during 6 months following cancer-related treatments; and (b) determine how older rural cancer patients and their spouses manage the most difficult reported symptoms over time following cancer-related treatments.

The study is being conducted over a 12 - month period (ending in August, 2003). Study participants are four patients (and their spouses) living in rural areas who have completed radiation treatments at a Radiation/Oncology Clinic. Because cancer occurs more frequently in persons 65 years or over, the patients will be at least 65 years of age. Using a symptom checklist and a semi-structured interview guide, participants are being interviewed separately at three points in time over the course of 6 months following radiation treatments—on the last day of treatment in person, and at 3 months and 6 months following the completion of treatments over the telephone. Descriptive statistics will be used to analyze the quantitative demographic data. Question analysis, which is similar to content analysis, will be done with each of the

questions in the semi-structured interviews. Determining what symptoms are identified by patients and their spouses as the most difficult is a necessary first step in exploring strategies they use in dealing with them.

Results from this study will help lay the groundwork for future work related to older patients' and their spouses' experience with cancer in rural areas. (This study is currently underway. Analysis will be completed by August, 2003. Results and conclusions of the study will be presented at the symposium.)

142 An Enabling Policy Model for Rural Women

PM Petrucka, Faculty of Nursing, University of Alberta, Canada

D
Poster

Objectives

The presentation will explore the policy process in relation to rural women in Saskatchewan and Manitoba as these pertain to health renewal policy. As informed by the current research project, consideration will be given to 3 key aspects of health policy – rural health policy as an insular process; health policy and rural recipient perspectives; and gender incorporation into the rural health policy process.

Discussion

Health policy has continued to done primarily on the economic, fiscal, and political level, seldom considering the community, groups, and individuals impacted by such directions. Failure to move towards a more enabling model will simply perpetuate ineffectual and unpalatable health policy decisions, and potentially further disenfranchise select sectors of the populations, such as rural women. Hence, in considering health policy and its impacts in the rural setting, it is imperative to recognize that the rural context is unique and the perspective of rural women is a critical component. As health reform has been operationalized in these two provinces, it has become apparent that the impacts and implications for rural women have been underemphasized and underestimated. It is imperative that rural women be given voice to their policy concerns, and a means to become involved in ongoing and future health policy changes.

Conclusions

The emergent policy model for rural women is seen as a dynamic and enabling model which is inclusive throughout the policy process. This four phase model highlights the key points of potential involvement of policy makers and implementers in order to fully engage and empower rural women in the policy process.

151 Health Screenings for Rural Volunteer Firefighters and Emergency Squad Personnel

S Ackerman, D Gaetano (presenter), *A Clark* (presenter), *J May, T Ohhensee, W Whiteman*, New York Center for Agricultural Medicine and Health, USA

D
Poster

Nurses and staff from the New York Center for Agricultural Medicine and Health's HealthWorks Occupational Health Program provide rural volunteer fire and emergency medical squad (EMS) personnel with medical surveillance examinations and firefighter classification. This evaluation includes vital signs, vision testing, an electrocardiogram (EKG), spirometry (PFT), respiratory fit testing including self-contained breathing apparatus (SCBA), and physical examinations. Since 1998, volunteers desiring A or B classifications have been offered lipid measurements and American College of Cardiology Framingham coronary heart disease (CHD) risk profiling. We reviewed the findings in all Otsego County firefighters since 1998.

1,396 persons were evaluated including 1,121 (80%) men and 275 (20%) women. 801 (57%) were firefighters, 208 (15%) were EMS personnel, 385 (28%) were both and 2 were auxiliary members. The mean age of the group was 39.7 years. 486 (35%) had abnormal findings. These included 192 (14%) abnormal PFT's, 238 (17%) abnormal blood pressures, 152 (11%) abnormal EKG's and 69 (5%) abnormal physical exams. There were 287 firefighters evaluated for CHD risk. 49 (17%) of these had CHD risk scores indicative of substantially increased risk of coronary artery disease. Of these, 46 (94%), completed surveys asking about follow-up medical care. 37 (76%) were subsequently seen by their primary health care provider or a cardiologist.

These medical visits led to 1 firefighter having coronary artery bypass surgery, 2 (5%) receiving coronary angioplasties, 12 (32%) being started on antihypertensives and 9 (24%) starting lipid lowering medications. 12 (32%) had no change in medical regimen. In summary, medical treatment regimens were initiated or changed in 68% of these referrals. These volunteers come from an aging rural population at risk for CHD. The motivation to maintain their firefighter classification appears to provide substantial impetus for effectively addressing identified risk factors. CHD risk profiling can be a particularly effective intervention in this population.

167 The Community Collaboration Project

R Annis, P Lachance, Rural Development Institute, Brandon University, Manitoba, Canada

D
Poster

The Community Collaboration Project (CCP) serves as an example of a successful partnership between rural and northern communities, with the support of the Rural Development Institute (RDI) of Brandon University and Federal and Provincial agencies that provide services and programs to communities. The CCP vision is that of communities exploring and implementing processes to assist them in working towards becoming resilient, healthy and sustainable.

Since inception, a steering committee comprised of several intersectoral collaborators has overseen the project, including Health Canada, Environment Canada, Rural Secretariat (Agriculture & Agri-Food Canada), Western Economic Diversification Canada, Community Futures Partners of Manitoba Inc., Manitoba Intergovernmental Affairs, Manitoba Community Connections, Manitoba Aboriginal and Northern Affairs, Community Information Management Network and Rural Development Institute. Four pilot CCP regional round tables (RRTs) have been initiated. Each RRT has, as anticipated, unfolded differently.

The regions have guided the process within their own timelines according to the needs of the communities involved. Northern Vision RRT, established in October 1999, is comprised of four communities in northern Manitoba who wish to strengthen their region by coordinating and implementing culturally sensitive goals that are identified through action oriented partnerships. Southwest RRT, established in April 2000, is comprised of seven communities in southwestern Manitoba, a predominantly agricultural region populated by small rural communities. The region is dealing with issues of rural depopulation, the industrialization of agriculture and isolation from major services. Bayline RRT, established in November 2001, is comprised of six communities in northern Manitoba along a the rail line running from The Pas to Churchill which is the primary mode of transportation between the member communities. Hudson Bay Neighbours RRT, established in January 2002, is comprised of three communities in northern Manitoba and seven communities in Nunavut. As this RRT crosses political and jurisdictional boundaries, it provides unique opportunities and challenges.

171 Project Implementation in Developing Countries

D Chuluunbaatar, University College of the Caribou, British Columbia, Canada

D
Poster

There are many developing country projects and programs funded by developed countries. Some of them fail to meet local needs with fewer results and impacts than they could have. Often people explain it by a lack of adequate funding. But it is possible that a better implementation strategy can produce sustainable results with significant impacts from low budget projects. Implementation strategy of projects is a key to successful results.

The objective of my presentation is to show how an appropriate implementation strategy for projects in the developing world such as Mongolia can lead to maximum impact for commercial producers, policy makers and other beneficiaries. The presentation will be based on the experiences from implementation of the "Introduction of Minimum Tillage Technology in Mongolia" project.

This project was funded by CIDA INC and executed by Agriteam-Canada Company. We used a consumer or beneficiary based approach and developed activities based on their needs. Throughout the duration of the project we focused on the following objectives and activities: build local capacity to manage and adapt minimum tillage systems; demonstrate minimum tillage systems on commercial farms; strength local institutions and create linkages; and improve supply of farm inputs through commercial linkages.

Although, this project was carried out with small funding, over the 2.5 years of the project duration, a number of significant results were achieved at the output and outcome level and the first impact level results were beginning to be seen. One of the factors that made the project successful was the strategic development of objectives and activities that were based on building linkages, using local resources and allowing control by local partners in ways that many projects don't do. Consequently, projects do not necessarily have to be big to be effective, small projects can be as effective and sustainable as big projects if managed with a proper implementation strategy.

191 Driving Risk and Rural Life: Everyday vs. Reconstructed Realities

JP Rothe, L Elgert (presenter), Alberta Centre for Injury Control & Research, University of Alberta, Canada

D
Poster

Objectives

Evidence throughout North America shows that injuries and fatalities due to traffic collisions are of a higher proportion and greater severity in rural areas than in urban areas. Thus, rural drivers have become a featured topic in the traffic safety debate. Congruent with the increasing emphasis on the social environment as a determinant of health, this study was designed to seek greater insight into rural drivers' socio-cultural characteristics, as they relate to rationalizations and behaviors associated with traffic safety.

Methods

A cohort of 212 individuals from rural areas in north, central and south Alberta was recruited to participate in focus group interviews. A rigorous literature review was used to define rural in an Albertan context. Questions asked related to social roles and meanings, religion, civic society, justice, driving, safety, risks and attribution, and law enforcement.

Results

The results of the study are interpreted according to a framework that speaks of rural people's everyday constructed reality, based on lifestyle, social involvement, and livelihood, in opposition to reconstructed reality based on law making, enforcement, traffic safety policies and administration procedures in rural

areas. Traffic laws and enforcement of them are seldom viewed in terms of safety. Rather they are interpreted and obeyed according to family learning, needs and priorities, work priorities and schedules, personal beliefs and philosophies based on living in rural communities.

Conclusion

This paper concludes with a recommendation that risk-taking by drivers in the rural areas needs to be personified in everyday relevance rather than generalized constructs.

193 Role of the University of Saskatchewan's Residential Campuses in Developing Rural Saskatchewan

D
Poster

K Hobin, B Hobin (presenter), Agriculture, Food and Horticulture Program, Extension Division, University of Saskatchewan, Canada

The University of Saskatchewan is known as the People's University. It has had a long history of reaching out to the rural communities of this province. The presence of the University of Saskatchewan is now being felt through two rural-based residential campuses, Emma Lake Kenderdine Campus and the Bruno Ursuline Campus. The former is a seasonal campus open during the summer months on the fringe of the boreal forest north of Prince Albert. The latter is a former Ursuline convent and academy situated in the heartland of the province about an hour drive from Saskatoon.

Both campuses function as a conference, continuing education, and training centre. Various groups, organizations, government and university departments book the campuses for their meetings, retreats, conferences, and educational events. However, the impact of these two campuses goes beyond providing venues for groups and organizations to hold their meetings. The local communities of Emma Lake and Bruno receive direct benefit from the presence of these two facilities. First and foremost is the economic benefit the campuses provide to area residences through employment opportunities at the facilities. Secondly, the communities benefit economically from campus visitors who spend their money at local merchants. And thirdly, whenever possible, the two campuses buy locally when purchasing goods and services.

There are other benefits the campuses provide to the area besides those that are economic. The local citizens often have the opportunity to participate in some of the events that are held at the two campuses. This provides them with the chance to experience a variety of educational, training and cultural activities. In addition, the local residents can interact with those attending campus functions who have come from other parts of Saskatchewan, Canada and the World. Without the presence of these University of Saskatchewan campuses none of the above benefits would accrue to these communities. Both the Emma Lake Kenderdine Campus and the Bruno Ursuline Campus do indeed play a significant role in the development of rural Saskatchewan.

294 First Aid Farm Quest: an Interactive CD Focusing on First Aid and Injury Prevention for Farm Youth

D
Poster

AK Carruth, K Gilmore, School of Nursing, Southeastern Louisiana University, USA

Farmers are among the highest risk groups for occupational injury and illness. Because youth work side-by-side with adults, they may be called upon to activate EMS and provide lifesaving skills until help arrives. Needs survey of 657 farm women in southeast Louisiana revealed that only 21% attended first aid classes in the previous year. Focus group interviews confirmed that women believe there is a need for first aid training of all family members but few opportunities to attend training sessions. To address the expressed need for training and the concern for unintentional injuries among farm youth and friends, an

interactive CD titled "First Aid Farm Quest" was developed by a partnership of rural university health professionals, communication/graphic artists, agricultural extension professionals, and farm women and children. Development of the CD not only seeks to demonstrate first aid skills but also to introduce hazards that potentially lead to injury or harm. First aid skills are reinforced with multimedia computer-based games. Injury prevention messages are integrated throughout the program. Raising awareness and reinforcing safe behaviors and situations is the focus of the last module titled "Safety Countdown". Evaluation of the effectiveness of the CD is ongoing. The poster session will outline the development of modules with computer demonstrations available.

295 First Aid for Rural Medical Emergencies (F.A.R.M.E.): the Development of an Instructor's Manual

D
Poster

AK Carruth, K Gilmore, School of Nursing, Southeastern Louisiana University, USA

Farm family members are exposed to a variety of hazards. Contributing to the risk of hazard exposure is the fact that farmers work long hours under severe time constraints. Women and children are also at risk for injury and illness because they come into contact with hazards on the farm homestead, regardless of whether they are engaged in farm work. When children go with parents to perform farm-related chores or work, they are exposed to the similar risks as their parents. Taken together, risk of injury and illness is significant for all members of the family. A needs survey of 657 farm women in Southeast Louisiana revealed that only 21% attended first aid classes in the previous year. Focus group interviews confirmed that women believe there is a need for first aid training of all family members but few opportunities to attend training sessions.

To address the expressed need for training and the concern for unintentional injuries, an instructor's manual titled First Aid for Rural Medical Emergencies has been developed. The manual is used by individuals, certified as first aid instructors, who want to tailor their instruction to the agricultural community. A companion instructor's CD using pictures and video/audio clips is also available. The poster session will outline the development of modules.

296 Texas Toolbox for Community Health Improvement

D
Poster

L Moll Smith, MAIS, Lake Country Area Health Education Center (AHEC), Texas, USA

Lake Country AHEC received grant funding from The Robert Wood Johnson Foundation to design and disseminate a program to recruit and retain physicians and other healthcare providers to rural and underserved communities across Texas. After 18 months of research and testing, a three-pronged program was developed, including a toolbox of information, an annotated outline and a regional recruitment and retention specialist.

The Texas Toolbox for Community Health Development was designed as a boxed set of resources to provide a starting point for rural communities to begin shaping a healthier future for themselves. It is organized in 18 self-study components, covering topics from Assessing community needs and developing community networks, to considering economic development demands, health professional recruitment tools, emerging technologies and Internet resources. Sets of the complete toolbox were distributed across Texas and seven other southern states in the U.S., as well as to federal agencies in Washington, D.C. The resulting annotated outline has been reprinted numerous times and has been widely distributed. Both these tools formed the foundation for a grant extension, which financed the hiring and training of a regional recruiter who assists rural communities in listing their clinical sites on a statewide recruitment database and matches health professional candidates with job openings.

This session will provide an overview of the project by displaying the Toolbox and outline, highlight lessons learned from implementation of the regional recruiter position and describe changes being made to the original materials. User survey results will also be reviewed, and the possible future of the project will be discussed.

319 A Study on Determining Factors Affecting Usage of Mahigiran Extension Magazine by Fishermen in Khoze

D
Poster

S Mohammadzadeh (presenter), *SY Hedjazi*, Agricultural Extension & Education
Department, Faculty of Agriculture, University of Tehran, Iran

The objective of this research is to determine factors affecting use of Mahigiran extension magazine. This research has been done in the general framework of survey research. The population of the research included the literate fishermen of Khozestan province, from which 130 fishermen were sampled by using multistage random sampling procedure. Data was collected through a questionnaire and were analyzed by SPSS9.

Results of the research indicated that there is a positive significant relationship between the use of the Mahigiran magazine and educational level, habit of study, visit of extension agent, attendance at extension meeting, achievement motive, technical leadership, job satisfaction, learning motive, right and trust content, social prestige motive, accessibility to magazine, reflecting fishermen healthy problems and amusement motive. It also showed that dependent variable has negative significant relationship with age, job experience and social leadership. Using stepwise regression, educational level, achievement motive, habit of study and job experience variables were entered the regression equation, respectively. Also by using factor analysis variable were summarised in nine factors: individual and personality characteristics, content (environmental economical and technical information) and credibility of the magazine, healthy information seeking and learning motive, physical characteristics of the magazine, localism, accessibility and extension characteristics of the fishermen, social interaction motive and diversion motive.

342 Nighttime Impaired Driving in Rural Alberta

D
Poster

K Belton, D Voaklander (presenter), *G Jhangri, S MacDonald*, Alberta Centre for Injury
Control & Research, Department of Public Health Sciences, University of Alberta, Canada

Problem Definition

In 1998, approximately 193 persons died in alcohol-related crashes in Alberta (Mayhew et al, 2000). In addition, of the 3,345 drivers in Alberta who were involved in crashes in which someone was seriously injured 24.2 % were alcohol related crashed (Mayhew et al, 2002). In Canada, the prevalence of impaired drivers on the road at night dropped by 44% between 1981 and 1993 (from 5.4% in 1981 – 3% in 1993). Alberta's only Night – time Driver Survey took place in 1974. This survey found that in the Prairie Region, Alberta, Saskatchewan and Manitoba, that 20.7% of nighttime drivers had a BAC .02 and that 5.6% of nighttime drivers had a BAC .08. The primary objective of this study is to quantify the nature and extent of impaired drivers on Alberta's rural roads during nighttime. This study also seeks to describe driver demographics, driving habits such as seatbelt use, and information about the trip such as origin of trip among rural Alberta's nighttime drivers.

Method

Surveys were administered to vehicles that were randomly sampled at 32 rural locations in Alberta between the hours of 10:00PM and 4:00AM between August 22 and September 1, 2001. Drivers who agreed to participate were asked a series of short questions. The interview concluded with the driver providing a breath sample into a device (i.e., Intoxilyzer 400D) that measured the driver's BAC level.

Findings

Of the 1,431 drivers randomly selected to take part in the survey 3.1% had a BAC that was over the legal limit of 80 mg%. An additional 1.3% of drivers had a high enough limit (50 to 79 mg%) to have their licenses temporarily suspended. A total of 13.5% of drivers tested had detectable amounts of alcohol in their system.

Conclusions

Drivers are recognising their impairment but are not being discouraged from driving. While some progress has been made in the area of impaired driving clearly there is much more work to be done.

346 Social Adaptations of Pre-1960 Farm and Ranch Families in Southern Saskatchewan

D
Poster

L Dale-Burnett, Canadian Plains Research Centre (CPRC), University of Regina,
Saskatchewan, Canada

One challenge facing farmers and ranchers in the semiarid prairies was and continues to be the unpredictability of the whole enterprise. Not only do elements of the physical environment such as temperature and precipitation vary dramatically from year to year, economic factors such as grain and livestock prices fluctuate as well. When such an uncertain enterprise was undertaken in a place where the margins for economic and environmental error were narrow, it is understandable that farmers and ranchers adopted the general strategy of stabilizing as many factors as possible.

In oral history interviews, farmers and ranchers described a variety of behaviours that helped them survive and sometimes even flourish within a rapidly changing socio-natural environment. Though technological adaptations like disease-resistant crop varieties, and economic activities such as producer's co-operatives were important, this presentation focuses on social strategies used by farmers and ranchers. In particular, the role of the family is examined.

In general, family members represented a flexible pool of labour, often with a high degree of commitment to the family farm enterprise. One area of farming that typically fell within the responsibility of farm women and children was household production. They grew gardens, kept small livestock, prepared and preserved food for home consumption and sold their excess production. This did not necessarily bring in large amounts of money, but it provided an alternative, often when there was little income from other sources.

423 Same Sex Couples' Rights and Entitlements

10:00-14:00

N Bennett (presenter) *T Funk*, University of Saskatchewan, Canada

This original research project was carried out at the University of Saskatchewan during February of 1999. The authors wanted to investigate the issue of same sex couple's rights to legal recognition in Canadian law. The research project was based on the premise that the size of community lived in the majority of life, religious affiliation, and sex of the respondent would influence university student's thoughts on legal rights of gay and lesbian couples. The research began by questioning if Canadian society was prepared to accept same sex couples as legal family entities. The purpose of the research was to examine the opinions expressed by University of Saskatchewan students concerning same sex couple's legal rights.

A self-administered multiple-choice questionnaire was developed and distributed to 400 Arts and Science students in years one to four inclusive, at the University of Saskatchewan. It was the intention of the researchers to have a random selection method employed, but due to unforeseen problems, the selection

became non-random. The dependent variable was defined as the attitude expressed by the students regarding acceptance or denial of gay and lesbian rights. The independent variables consisted of religious doctrine; size of community lived in majority of life; and gender. The responses to questions were measured by having available answers on the questionnaire allocated numerical values that represented each choice of answer. These values were then sorted by SPSS program in a regression model that examined the effects of independent variables on the dependent variable. The findings were based on utilization of regression models that encompassed Pearson's *r* statistical test for significance and the Gamma measure of association values.

The research findings indicated that the effects of community size lived in for majority of life does not have any significant effect on attitudes toward same sex couple's rights. Female attitudes toward same sex couple's rights are more accepting when respondents have lived the majority of life in smaller communities or in larger cities. Males from medium sized communities and small cities did register higher on acceptance of same sex rights as compared to female counterparts from the same community size category. Respondents that claim to have religious affiliation, regardless of community size, have significantly higher rates of disapproval of same sex couple's rights.

If the research had incorporated qualitative data collection methods there may have been provision of deeper insights into the practices, beliefs, social attitudes and positions on social issues that face university students. The data from the limited number of respondents can not be seen as an accurate representation of the entire student body. Self-administered questionnaires can not provide in-depth qualitative data.

Rural Economy IV

- Injury Session -

Kelsey/Saskatchewan – 14:00-16:00

Chair: *L Hagel*, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan
W Sanderson, University of Iowa, USA

240 Task Specific Injury Rates for Youth Exposed to Agricultural Hazards

14:00-14:20

KM Koechlin (presenter), *JR Wilkins*, *JM Crawford*, *LF Shotts*, *M Elliott*, *TL Bean*

Oral

School of Public Health and College of Food, Agricultural & Environmental Sciences,
Ohio State University, USA

The objective of this work is to determine injury rates for specific farm tasks in which youth commonly engage. Rates are based on data from the NIOSH-funded investigation entitled, "Empirical Derivation of Work Guidelines for Youth in Agriculture" (J.R. Wilkins III, PI). Youth ages 8 to 18 and a parent or guardian were recruited through 4-H clubs in Central Ohio over three years (1999-2001). For up to 13 weeks each, youth provided longitudinal data on the amount of time (in minutes) spent daily on each of 52 farm-related activities through use of a semi-structured daily diary. Youth also recorded multiple characteristics of all injuries experienced, including which activities they were doing when the injuries occurred. This allows for the calculation of task-specific injury rates with exposure time denominators rather than overall person-time denominators (which underestimate injury risk). Task-specific injury rates per 100 hours of actual exposure time varied from less than one to more than 10 injury events. Task-specific rates with respect to age, sex, and other youth-based factors have been analyzed and will be presented.

221 Evaluating Time-Dependent Errors in Daily Injury Self-Reports from Youth in a Longitudinal Study

14:20-14:40
Oral

JR Wilkins (presenter), *M Strickland*, *JM Crawford*, *KM Koechlin*, *L Shotts*, *M Elliott*,
TL Bean, School of Public Health and College of Food, Agricultural & Environmental
Sciences, Ohio State University, USA

A longitudinal study of youth 8-18 years of age exposed to agricultural hazards was conducted to empirically develop multivariable risk prediction models of agriculture-related injury and to derive work guidelines that parents and other caregivers could use to judge the developmental-appropriateness of chore assignments. Putative risk indicators include a wide range of youth- and caregiver-based factors.

Longitudinal data on all unintentional injury events were obtained through a modified form of Participant Event Monitoring (PEM), where youth were expected to report their injury experiences in a semi-structured daily diary over a 13-week period. One aspect of data quality assessment concerned the validity of the youth self-reports of injuries, with a focus on the question: Does the quality of the self-reported injury data deteriorate over time due to participation fatigue, a common problem in panel studies.

Results of analyses presented are based on the (daily) data reported by all Year-2 participants, who numbered 150 and returned 1,618 weeks (11,326 days) of data. These 150 youth reported 1,274 unintentional injuries (over all severities), producing 11,466 injury instrument item responses to be examined for time trends in the rate of occurrence of "Discernible" Recording Errors (9 injury instrument items per injury X 1,274 injuries = 11,466 opportunities for a Discernible Recording Error (DRE)). Discernible recording errors are emphasized because there will likely be recording (i.e., transcription) errors that are not detectable by visual inspection only. Each of the 11,466 responses was examined and coded to one of the following categories: no DRE, DRE present (item non-response), DRE present (item partial response), DRE present (illogical/nonsensical response), DRE present (other).

Overall, 5.2% of the 11,466 responses contained some type of DRE. The weekly mean injury DRE rate declined slightly over time, indicating modest progressive improvement in data quality (for both girls and boys). Girls committed proportionately fewer DREs than boys, but like the time trends, these differences were not statistically significant. The effect of age, youth IQ, and introduction of an instructional videotape on the DRE rates will also be discussed.

246 Keokuk County Farm Machinery and Associated Injuries

14:40-15:00
Oral

MD Madsen (presenter), *WT Sanderson*, *RH Rautiainen*, *AM Stromquist*, *C Taylor*,
JA Merchant, College of Public Health, Institute for Rural & Environmental Health,
Department of Occupational & Environmental Health, University of Iowa, USA

Keokuk County, population 11,624, encompasses nearly 580 square miles of southeastern Iowa. Over 95% of its 370,688 acres is land in over 1000 farms averaging 351 acres. Keokuk County has 4573 households and is entirely rural with no town over 2,500 in population. It is typical of Iowa agriculture with corn, soybeans, oats, and hay as primary crops and livestock including mainly hogs, cattle, and sheep.

The Keokuk County Rural Health Study (KCRHS) is a 20-year population-based prospective study involving 2,256 men, women, and children from 1004 households in Keokuk county. Its repeated rounds on a four year cycle include assessment of injury exposures and outcomes. In each round personal interviews and medical evaluations are performed with all members of the participating households. In each round there is an environmental assessment of every house and every farm. The KCRHS was

designed to measure rural and agricultural adverse health outcomes and their respective risk factors. Included are risk factors for injury associated with agricultural machinery.

This presentation reports information collected during the first survey round (June 1994 through February 1998). It provides descriptive information such as age and use, make and model, presence of ROPS and cab for 665 farm tractors (average 3.1 per farm, range 1 to 7 tractors/farm). Use and user information such as ridership and operation by youth has also been captured for tractors and other prominent farm machinery in operation on these farms, e.g., augers, balers, and skid-steers. Parallel data record the detail of death and injury experience among 341 participating farm households in the county. A previously unreported portion of 469 injury experiences are related to farm machinery. For example, 44 farm households responded someone from their household had been involved in a tractor overturn during the previous year. Conclusions based on these data describe the association between injury experience, use and other parameters of farm machinery, such as the presence of guarding.

249 Analysis of Power Take-Off Related Injuries and Fatalities Involving Children and Adolescents

15:00-15:20
Oral

S Beer (presenter), *WE Field*, Agricultural Safety and Health, Purdue University-West
Lafayette, Indiana, USA

Objective

The objective of this paper is to summarize approximately 40 power take-off (PTO)-related injury and fatality cases involving children and adolescents up to and including the age of 17 between 1980 and 2002 in order to explore trends and causative factors that would contribute to a better understanding of these injuries and allow for the development of more effective engineering, educational, and regulatory intervention strategies.

Methods

The methodology used for this research is to: 1) develop estimates of the scope, severity, and trends associated with PTO-related injuries involving children and adolescents based upon the data contained in the Purdue University PTO-Related Injury Database and 2) utilize the findings to develop recommendations for more effective intervention strategies to reduce the frequency and severity of PTO-related injuries involving children and adolescents. Results The paper will report results of the analyzed data presenting trends and causative factors of PTO-related injuries involving children and adolescents. Comparisons will be made of the frequency and trends of these incidents over the past 20 years. Information such as distribution of age, gender, time of day, and location will be reported on. Common injuries as well as causal factors of the injuries will also be reported on. Identification of specific causative factors will help in designing more effective educational resource by targeting specific machines, situations and behaviors that contribute to PTO-related injuries to children and adolescents.

Conclusion

The researchers recognize that the frequency of these events is small, but it is clear that the severity and permanent impact of these incidents, especially on children, is substantial. The findings of this research can be used to enhance engineering standards published by ASAE and reinforce the need to strengthen the Hazardous Work Order for Agriculture prohibiting children from operating or working with PTO operated equipment. This research can also provide the basics for further investigations into the impact PTO-related injuries have on children and adolescents.

201 Impact of Ergonomically Improved Apple Harvest Bag in New York Orchards, 2002

15:20-15:40
Oral

G Earle-Richardson (presenter), *P Jenkins, S Fulmer, C Mason, C Bresee, P Burdick, J May*, Northeast Center for Agricultural & Occupational Health, Bassett Healthcare, New York, USA

Background

Northeast Center research on occupational injury among migrant and seasonal farmworkers indicates that back, neck and shoulder strain is common among apple harvest workers. Objectives: design, develop and test an ergonomically improved apple harvest bag in operating apple orchards, using laboratory, field and worker interview methods.

Methods

Farm advisory teams evaluated intervention ideas for their potential for: strain reduction, worker acceptance, harvesting efficiency, and cost. A removable hip belt, and an elasticized, padded shoulder strap were selected. Feedback from farmworker focus groups led to revisions prior to formal testing. Laboratory tests quantified (in pounds) the effect of the removable hip belt on the weight load on the trunk, and measured difference in muscle activity of the lower back (erector spine). In randomized orchard field tests, researchers observed body posture, work task, and equipment usage over four days in two orchards (14 workers during eight, 90-minute intervals). Workers were interviewed in each condition.

Results

Laboratory testing of the hip belt intervention found substantial reductions in load and muscle activity in the lower back. Most dramatic were reductions while severe forward flexion (40 lb. reduction) with full bag, and moderate forward flexion (35 lb. reduction) with full bag. Field observations indicate that workers spend 22 percent of their time in moderate forward flexion, suggesting this reduction might be significant in terms of overall daily load. A smaller load reduction (6 lbs) observed for neutral trunk posture, full bag, may also be important, since this posture was found to comprise 50 percent of the observed work time. Qualitative assessment by workers was positive overall. One unexpected result was enthusiasm for the hip belt itself, as back support, irrespective of being attached or detached from the apple bag. Survey data will be presented.

Conclusions

Reductions in load were measured with the use of the removable hip belt, however further revision is needed. This study provides important groundwork for further research into the relationship to intervention and strain injury.

182 Development of Guidelines for Play Areas on Farms

15:40-16:00
Poster
Discussion

NM Esser, BC Lee (presenter), *SW Heiberger*, National Farm Medicine Center, Marshfield Clinic Research Foundation, Wisconsin, USA

Objectives

Although safety guidelines exist for public playgrounds and residential play areas, no comparable information is available regarding children's outdoor play on farms (or related agricultural sites). This project strived to develop a guidance document for constructing new, or modifying current, play areas on farms applicable for children ages 2 to 10 years.

Methods

A 10-member primary advisory team of specialists in injury prevention, child development, and public playground safety was formed. Document content was generated via one in-person meeting, several

teleconference calls and multiple emails. Feedback sessions with farm parents were convened in WI, IA and NY. Content revisions were made and primary advisors approved a significantly changed document. Thirteen secondary reviewers were invited to critique content for accuracy, completeness, and regional applications following collation of all feedback. Customized illustrations were commissioned to visually depict key information. The final document version was approved by primary advisors prior to printing and dissemination.

Results

The project team worked through many complex issues that were practical for farms but contradicted public playground recommendations (e.g., use of trees for hanging tire swings). In feedback sessions, farm parents indicated they were eager to learn more, but wanted information practical for their situations, such as play options with available farm materials that can be modified as children grow. Secondary reviewers identified gaps in the content, especially related to environmental hazards on farms. An illustrated guidance document was published in April 2003 with information on elements of safe and unsafe play areas on farms, environmental factors unique to outdoor farm play, low cost and “nature-made” play ideas for a farm, and worksheets for designing play areas. (<http://research.marshfieldclinic.org/children>).

Conclusion

A dynamic, multidisciplinary project team developed this guidance document that merges principles of farm safety, residential play areas and public playgrounds. Farm parents were instrumental in highlighting strengths and weaknesses of the initial draft. The next steps for “Creating Safe Play Areas on Farms” will be to test strategies to influence rural community leaders to promote, and farm owners to adopt, these guidelines for creating safe play areas on farms.

220 Work-Related Time-Activity Patterns among Children and Adolescents Exposed to Agricultural Hazards

15:40-16:00

Poster

Discussion

JR Wilkins (presenter), *JM Crawford*, *KM Koechlin*, *L Shotts*, *M Elliott*, *TL Bean*,
School of Public Health and College of Food, Agricultural & Environmental Sciences,
Ohio State University, USA

An Ohio-based longitudinal study of children and adolescents 8-18 years of age exposed to agricultural hazards was conducted to empirically (i) develop multivariable risk prediction models of agriculture-related injury and (ii) derive work guidelines that parents and other caregivers could use to judge the age- and developmental-appropriateness of farm chore assignments. Putative risk indicators of interest include (but are not limited to) the following youth-based factors: chronological age, neurobehavioral competence, anthropometric and strength characteristics, and selected psychosocial/behavioral factors. The role of caregiver-based factors such as parenting practices and risk perception is also being explored.

Longitudinal data on work-related exposures have been obtained through a modified form of Participant Event Monitoring (PEM), where youth were expected to report the frequency and duration of each of 52 agriculture-related jobs/chores/tasks in a semi-structured daily diary over a 13-week period. After 3 years of data collection, 407 youth (169 boys, 238 girls) reported on 4098 weeks (28,686 days) of work-related time-activity data (in addition to the frequency and duration of engaging in sports/exercise). Daily data on paid work (on or off farm), sleep patterns, and occurrence of unintentional injuries were also obtained.

Statistical analyses focused first on describing the frequency and duration patterns for each of the 52 farm jobs/chores/tasks (which fell into the following categories: animal feeding/handling, cleaning, handpicking, farmstead repair/maintenance, handling silage/hay/straw/feed/seed, operating mobile farm machinery, operating/driving farm vehicles, operating/using stationary farm equipment, farm

equipment/machinery repair/maintenance). In addition to investigating variation in both frequency and duration of job/chore/task by age, sex, and season/time of the year, we attempted to identify (i) high frequency/low duration, and low frequency/high duration, chores, and (ii) how often the daily reports suggested risk not only of unintentional acute traumatic injury, but also of potential chronic biomechanical overloading.

- 241 Using Composite Measurement Scales to Model Injury Risks among Youth Exposed to Agricultural Hazards** 15:40-16:00
Poster
Discussion
KM Koechlin (presenter), *JR Wilkins, JM Crawford, L Shotts, M Elliott, TL Bean*,
School of Public Health and College of Food, Agricultural & Environmental Sciences,
Ohio State University, USA

The objective of this work is to develop user-friendly Composite Measurement Scales (CMS) that parents and other caregivers can use to assess the magnitude of injury risk among youth who perform agricultural tasks. CMS models will be based on data from the NIOSH-funded investigation entitled, "Empirical Derivation of Work Guidelines for Youth in Agriculture" (J.R. Wilkins III, PI).

Youth ages 8 to 18 and a parent or guardian were recruited through 4-H clubs in Central Ohio over three years (1999-2001). Variables available for CMS modelling include (but are not limited to) farm chore history, risk perception of youth and "parent partners," handedness, demographics, place of residence (on a farm or not), vision problems, anthropometry, standing steadiness, neurobehavioral competence, hearing ability, intellectual attainment, and muscular strength. Also available for up to 13 weeks per youth are longitudinal data on the amount of time spent daily on each of 52 farm-related activities and multiple characteristics of all injuries experienced. Poisson regression modelling with variables readily knowable by a parent or guardian such as youth age, gender, height, weight, etc. is being used to develop each task-specific CMS. Regression coefficients from the fitted models are scaled and rounded to integers for ease of use. For each variable in the model, an integer score is obtained based on the youth's characteristics, and a total score determined by summing the individual scores.

The magnitude of the total score reflects that individual youth's injury risk for the specific task. Over the 3-year study period, 407 youth and their "parent partners" provided usable data (4,098 youth weeks, 2,788 injury events). Empirically-derived CMS models for at least five specific tasks will be presented along with conclusions and recommendations.

Healthy People VII

- *New Advances in Educational and Behavioral Applications to Farm Health and Injury Control* -

Adam Ballroom – 14:00-16:00

- 311 Applications of Narrative Psychology and Injury Epidemiology to Prevent Occupational Injuries** 14:00-14:40
Keynote
HP Cole, Preventive Medicine and Environmental Health, Educational and Counselling
Psychology, University of Kentucky, USA

For nearly 20 years seven different agencies have funded research by Professor Cole and his colleagues that combines rate- and case-based injury epidemiology with principles of narrative psychology to construct interactive stories and simulation exercises that teach and assess critical hazard recognition and

injury prevention skills. Approximately a half million copies of 70 simulation exercises were designed for mining industry workers, evaluated, and used throughout the US with many additional copies used in other countries. Interactive narrative injury prevention educational materials also were developed for hazardous waste work, construction, environmental protection, agriculture, and health care workers as well as for high school students. Theories and design principles that underlie this work are described along with methods by which their effectiveness was evaluated.

As part of the United States NIOSH Community Partners for Healthy Farming initiative a quasi-experimental trials community education project was implemented to promote use of roll over protective structures (ROPS) on tractors. During overturns ROPS prevent crush injuries to tractor operators. Pre- and post-intervention telephone surveys were administered to large random samples of farmers in intervention and control counties. In cooperation with community members in the intervention counties a program of interactive narrative community education materials and activities was developed, implemented, and evaluated. Three years and six months later equipment dealers in the two intervention counties had retrofitted 81 tractors with ROPS compared to a total of 4 retrofits in the combined intervention and control counties in the year prior to the intervention.

A repeated measures ANOVA found significant differences in the expected direction between the intervention and control counties with respect to increases in farmers favorable attitudes toward ROPS, increased contemplation of installing ROPS, and increased frequency of obtaining ROPS-protected tractors. The previous work and the tractor safety study design, intervention methods, materials, and results are generalized to other community and workplace safety education interventions. The Kentucky ROPS program materials may be examined by accessing the NASD web site <http://www.cdc.gov/nasd/> and then typing "Kentucky" in the search box.

- 202 Communicating Research Results to Migrant and Seasonal Farm Workers: Media Development Program** 14:40-15:00
Oral
G Earle-Richardson (presenter), *L Hawkes, S McKinnon, J May*, Northeast Center for Agricultural and Occupational Health, Bassett Healthcare, New York, USA

Background

The Northeast Center is committed to disseminating the results of its health and safety research widely, particularly to all parts of the agricultural workforce. While numerous safety training materials exist in Spanish, Spanish-speaking agricultural workers have been largely left out of the dialogue surrounding research findings and setting the research agenda.

Objective

To develop and pilot test a simple, linguistically, and culturally appropriate communication format that can be used with a wide range of studies for effective dissemination of results to low-literacy, Spanish-speaking audiences. A successful communication tool for this purpose is easy for the farmworker to: 1) comprehend; 2) integrate (a. have personal relevance, b. be actionable); 3) retain.

Methods

Researchers developed the format by working through each of the following steps, first creating prototypes based on prior knowledge, then conducting focus groups to evaluate them and solicit further feedback: 1. defining the farmworker audience factors affecting design 2. selecting key results to share 3. developing a format prototype and alternative formats for comparison 4. finalizing the test materials, and defining key features to be used with other topics in the future modules 5. stand alone versus mediated – (how does the format work best?)

Results

Focus groups and format development will be completed by June 2003. To date, focus group participants have been principally Mexican males, ranging in age from early 20's to early 40's. Focus groups have yielded the following information: attitudes about the information: ·high level of interest ·want results to be accompanied by information that be acted on ·value a quantity of information; materials appearing to have "more" preferred. ·information must also be shared with the employer also understanding of the information: ·able to explain the information communicated by a chart ·can explain the connection between research and prevention ·stronger self-definition by "legally documented" or not than any other set of definitions ·would like results grouped by crop or region

Conclusions

A final product will be presented, and research conclusions discussed.

- 231 The Certified Safe Farm: a Novel Incentive-Based Farm Health Intervention** 15:00-15:20
KJ Donham (presenter), *S Schneiders*, *R Rautiainen*, *J Lang*, Great Plains Center for Oral
Agricultural Health, University of Iowa, USA

The Certified Safe Farm program is an intervention project designed to provide incentives for farmers to remove occupational hazards, and practice safe and healthful behaviors. The intervention includes a farm audit (with a performance standard to become certified), a health screening for typical agricultural – related illnesses, eliciting a detailed occupational history, and individual and community education, based on individualized health and safety hazards. Farmers must obtain a score of 80% and go through the screening and education to become certified. Certification results in a \$200 payment which is a surrogate for future incentives such as insurance premium discounts, and additional discounts on farm equipment and supplies. Health and safety data are taken from a quarterly phone interview, an annual occupational history and questionnaire, and clinical screening data.

The results of respiratory health from all three sources above were evaluate for both the intervention (n=150), and the control (n=150) over a three-year observation period. The primary findings were as follows:

1. The intervention group demonstrated a trend tendency for decreasing respiratory symptoms over time.
2. Declines in symptoms of organic dust toxic syndrome, and sinusitis were statistically significant.
3. The use of respirators during exposure to dusty jobs was significantly higher, and increased during the study, relative to the controls.
4. Other symptoms and pulmonary functions tests were relatively comparable between the two groups.

- 107 Effectiveness of a Web-Based Agricultural Respiratory Disease Module for Rural Practitioners** 15:20-15:40
S Kirkhorn (presenter), *N Young*, Immanuel St Joseph's-Mayo Health System, Rural Oral
Family Practice Residency Department, University of Minnesota, USA

A pilot project was undertaken with NIOSH funding through the Midwest Agricultural Research Center to determine if the technological advances and increasing use of computers in education, medical practice, and personal use at home would make web-based education in agricultural health a viable option. The goal was to determine if a web-based method could be utilized to develop a core curriculum in agricultural health which could be modified to make the content regionally specific for use by the NIOSH Agricultural Health and Safety Centers. A web-based module in agricultural respiratory disease was placed on a template utilized by higher education facilities allowing for analysis of pre- and post-test results, demographics, and course evaluation. Prior surveys of rural providers and health educators

indicated that agricultural respiratory disease ranked highly as a topic of interest and concern. Content, including case studies, graphics, and learning objectives, was developed and reviewed by experts in the topic, and made available to a total of 540 Family Practice residents and faculty, nursing students, practicing rural physicians, physician assistants, and nurse practitioners in Iowa, Minnesota, North Carolina, Wisconsin. Of those contacted by e-mail, written notices, and faculty involvement, 162 (30 per cent) requested access codes and only 27 (17 per cent) of those completed the pre- or post-test.

The results indicated that it was difficult to recruit the desired number of participants, even if free continuing medical education was offered. Practitioners, Family Practice residents, and Nurse Practitioner students rated the program highly while residents and rural practitioners indicated that time was a limiting factor and did not routinely complete the pre- and post-test. Technological issues, including access speed and band width, were also limiting factors in rural areas.

A conclusion of the project is that such content is best suited for degree programs or "mini-courses" offering required credit. The presentation will further discuss advantages and disadvantages of using web-based methods to deliver educational content, assess baseline knowledge, and make recommendations for potential modifications to improve utilization and provide an internationally based core curriculum in agricultural health and safety.

**284 Effectiveness of Electronic-Based Educational Strategies for Teaching
Agricultural Safety to Youth**

15:40-16:00
Oral

R Tormoehlen (presenter), *R Ortega, W Field, K Machtmes*, Purdue University - West
Lafayette, Indiana, USA

This paper will report on an effort to evaluate the effectiveness of interactive CD-ROM multimedia and interactive multimedia World Wide Web (WWW) programs to teach critical agricultural safety and health topics to youth in community based settings. The project involved the development of the subject matter competencies, creation of the CD-ROM and web-based curriculum, comparative evaluation of the educational methodologies employed (CD-ROM-based instruction, web-based instruction, and traditional instructor-led instruction), and analysis of the data collected on the Computer Assisted Instruction/Multimedia farm tractor and agricultural machinery certification program developed by the Department of 4-H Youth at Purdue University. The selected instructional strategies were evaluated for their effectiveness in developing beliefs, skills and behaviors related specifically to the safe operation of agricultural tractors and machinery.

To accomplish the stated goal the following broad objectives were established:

1. Develop the competencies needed to ensure the proper subject matter content is being presented to youth involved in a farm tractor and machinery safety program.
2. Develop a community-based educational curriculum, based on the subject matter competencies identified in objective #1, to be implemented via the two proposed instructional strategies (computer-based CD-ROM multimedia version and computer-based World Wide Web (WWW) multimedia version).
3. Evaluate the effectiveness of these community-based curricula/teaching strategies at improving attitudes, behaviors, knowledge and safety practices of youth concerning safety and health issues related to tractor and machinery operation.
4. Disseminate, as widely as possible, the final product and strategies for incorporation into existing youth safety programs.

Over 160 agricultural science students in six different high schools geographically dispersed throughout the state of Indiana were used to evaluate the effectiveness of the different educational methodologies. Data indicates that the knowledge gained by high-school aged youth was approximately 30% for each of the educational methodologies employed. Youth in all three educational methodologies exhibited a positive change in attitudes and behaviors related to safe agricultural safety practices. A complete analysis of the data will be presented in the final paper.

Environment VI

Pascoe Room – 14:00-16:00

Chair: *J Lawson*, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan

308 In the Wake of the Flood: Rural Land-Use Lessons in the Central Appalachians

14:00-14:20
Oral

P Miller, Extension Service, West Virginia University, USA

Record floods in July 2001 and May 2002 devastated several counties in southern West Virginia. Despite the many tragic consequences of these disasters, several flood recovery programs offer opportunities for reviving communities that have long wrestled with unemployment, poverty, and limited opportunities for economic development.

Coal mining and logging historically have dominated the local economy in this rugged, geographically isolated terrain, and residential settlement is concentrated in steep, narrow valleys with minimal floodplains. In recent decades, many mining companies have drastically reduced their workforce or left the area altogether, leaving limited resources for maintaining infrastructure, housing, and community services in former company towns.

In McDowell County, an Extension Service Disaster Education (EDEN) program for private water wells and septic systems has become inseparable from a web of other land use and economic development issues. To best target funds for infrastructure repair and development, an innovative rural facilities plan is closely linked with an understanding of the nature, distribution, and causes of flooding. Geographic Information Systems mapping provides an essential tool for prioritizing areas of greatest infrastructure needs and minimal geologic hazards.

Flood mitigation programs expand opportunities for tourism and recreational development in the valleys and rebuilding of communities in areas outside the floodplains and closer to transportation corridors. Construction is underway on a regional recreational trail system, and funding and planning have commenced for a Coal Heritage highway. However, the benefits of mitigation programs must be balanced with a new set of environmental concerns for development on ridgetops and valley fills: exacerbating already severe runoff; geomorphic and hydrologic stability of valley fills; restricting and contaminating recharge of high quality groundwater used for drinking water and targeted for bottled water and aquaculture enterprises. Several housing coalitions are working to utilize “green” building and landscaping practices for new low-income housing communities, to demonstrate environmentally sound development as an essential part of county revitalization.

These programs illustrate the importance of examining human activities as integral parts of the environmental balance, in making sustainable land use decisions for rural Appalachian communities.

344 Factors Influencing Farmers' Transition to an Alternative Farming Practice

14:20-14:40

MA Beckie, University of Saskatchewan, Canada

Oral

Zero tillage and organic farming practices began to be adopted in Saskatchewan during the late 1960s and early 1970s in response to problems associated with conventional approaches to agricultural production. Although the rates of adoption were initially low, the number of farmers making the transition to these alternative farming practices began to steadily climb during the 1990s. Recent surveys indicate that the amount of land under zero tillage and organic management in Saskatchewan now far exceeds that of any other Canadian province.

As part of a study investigating zero tillage and organic farming as theoretical and practical responses to sustainable agriculture, I conducted interviews farmers from 33 organic and 33 zero tillage farming enterprises situated throughout the seven provincial soil climatic zones. The farmers were asked to identify and describe factors or concerns that had influenced their adoption of an alternative farming practice. Their responses were grouped into five broad categories.

These findings suggest that zero tillage is being adopted because of specific environmental, economic, and labour advantages, whereas organic farming is adopted for a combination of environmental, health, economic, philosophical and labour-related factors. Environmental concerns were identified as the primary reasons influencing the transition to both zero tillage and organic farming, but the nature of these and other concerns differed for the two groups of farmers interviewed. Discussion of these differences is linked to practical as well as theoretical issues.

250 Soil Crusting and Early Crop Development As Affected by Repeated Manure Application

14:40-15:00

Oral

MT Japp, Department of Soil Science, College of Agriculture, University of Saskatchewan, Canada

The numbers of large hog barns and cattle feedlots in Saskatchewan are increasing. Currently, over 60,000Mg of manure is produced every day in Saskatchewan. The distribution of manure by soil application must be properly managed to prevent negative environmental effects. Previous research has focused on soil fertility and physical and chemical soil properties that are affected by manure. Sometimes the effect is positive, and in other cases, negative. There is no research available that quantifies the effect of these changes on early crop development.

Research will be carried out at Dixon, Saskatchewan in 2003 to quantify the effect of soil crusting, bulk density, aggregate mean weight diameter, sodicity and salinity on crop emergence and the early root development of the crop. These soil properties are important indicators of the quality of the soil and growth potential for the crop. Agricultural producers need this knowledge to understand how to maintain the sustainability of their farm in the future, while meeting their current production needs.

A laboratory experiment will examine soil crusting and surface sealing under simulated rainfall conditions. Manure management can alter the infiltration rate of a soil, which in turn affects runoff. This experiment will help producers understand the effect of manure on the potential for soil loss due to erosion.

208 A Typology of Property Regimes for Environmental Protection

15:00-15:20

S Bell, M Reed, Department of Geography, University of Saskatchewan, Canada

Oral

Ecosystem management in and near Grasslands National Park is being pursued using a variety of property regimes. While this research is part of a larger project examining the relationships among environmental protection, property regimes, and community health, our current focus is to provide a typology of property regimes that contribute to environmental stewardship in and around Grasslands National Park. Our typology will include both private and public property regimes while considering the implications of these regimes for community cohesion, health, and sustainability.

Property regimes associated with environmental stewardship have important implications for the sustainability and health of rural communities, particularly those communities traditionally associated with primary activities such as farming and ranching. By examining how property rights and community cohesion relate to stewardship, we can eventually make inferences about the social and environmental transitions related to sustainability in southern Saskatchewan.

286 Permaculture and Sustainability: Ethical Issues

15:20-15:40

K Krug, Centre for the Environment, Brock University, Ontario, Canada

Oral

Bill Mollison, the founder of the permaculture movement, defines it as a design system that aims to use the "inherent qualities of plants and animals combined with the natural characteristics of landscapes and structures to produce a life-supporting system for city and country, using the smallest practical area." This paper discusses permaculture as an approach to agriculture that has the potential to lead toward sustainability. It is one small piece of a broader study funded by the Social Science and Humanities Research Council of Canada (SSHRC); a study that aims to identify means to build sustainable rural-urban agriculture by fostering linkages between food and agriculture activities in both rural and urban centres.

A series of permaculture-type approaches to food production and farm or garden construction in Ontario were examined, and the farmer-gardeners were interviewed. In this paper I briefly describe the kinds of alternative agriculture projects that were examined, then focus on ethical issues. Interviewees were asked a series of questions designed to clarify the values that motivated them, the obstacles encountered and the supports they found in the process of seeking to live and work in different ways. I report on their answers to these value questions and also discuss the implicit values that emerge from their answers to additional questions.

What motivates someone to live and farm/garden in a radically different way? How viable are these alternative approaches? What are the implications for sustainability of living in such a manner? Is it possible to imagine a future for rural communities in which rural people use their values and commitments, along with their wealth of practical knowledge, to forge a future that is both satisfying and sustainable? These are the central questions that will be explored in this paper.

I will argue that permaculture has the potential to link rural and urban dwellers, that it can use traditional and non-traditional knowledge to create new ways of living, and that it is capable of fostering communities that provide meaningful work, healthy food and comfortable homes while limiting environmental damage.

72 Indigenous Communities & Environmental Threats of Kalabagh Dam

AL Palijo, Sindh Research Council, IWHa, Hyderabad, Sindh, Pakistan

15:40-16:00

Poster
Discussion

We the South Asians live in the worst governed region in the world, our today begins the struggle of survival for 115 million poverty-ridden destitutes, and tomorrow threatens the future of 395 million illiterate adults with nuclear arms, climatic changes, land degradation, scarcity of water and mismanagement of natural resources. This paper will point to the ways in which even the internationally funded projects have often become threats for people of local communities. The paper aims to present a differentiated account of how protection of environment and implementation of equity should co-exist.. Focusing particularly on the case study of proposed Kalabagh Hydropower Dam, I will explore the ways in which our environmentalists have often had to work rather harder than the Western environmentalists to represent their activities as relevantly virtuous in order to defend the integrity of their work against hostile critics.

- This paper will discuss the following environmental threats due to the proposed dam:
- Migration of rural communities due to low productivity and resource depletion.
- Siltation of the basin causing reduction in depth and duration of flooding.
- Threatened, indigenous culture, mangroves, fish stocking and water birds due to man-made shortage of water.

In spite of rejection of Kalabagh Dam Project by the environmentalists and by the three out of four provinces of Pakistan the Govt is still planning to construct this mega threat. The dam will not only store 6.7 MAF water of Indus but additional 12.8 MAF will be diverted to left and right bank canals for the irrigation in Punjab and will ultimately cause: shortage for out flow to sea, reduction in silt volume and area of Indus delta, erosion and degradation of lands, elimination of 0.6 million acres of riverine forests, destruction of mangroves and disaster of lower Indus ecology. This paper will explain how the mega projects have been offering prospects of development for particular areas at the cost of ecological and environmental disaster and inundation and displacement in smaller provinces and at the cost of deforestation, destruction & desertification of green and fertile lands and rich cultures.

**215 The Replacement of Fossil Fuel in Rural Societies; a Model for Villages
Natural Environment Protection**

F Barimani, Department of Geography, Membership of Sistan and Baluchestan,
University Zahedan, Sistan, Iran

15:40-16:00

Poster
Discussion

In The light of the fact that Iran is situated in the dry belt of the world , consequently, this country has a dry and warm climate which one of its impacts is the shortage of the fauna and flora in the vast expanse of Iran. On the contrary, this country enjoys the advantage of fossil resources such as coal, oil and gas. Unfortunately, these abundant resources are not used as fuel in the Iranian rural societies or their consumption is not mostly prevalent in these areas.

Now, in the light of the increasing rural population, since the second half of the twentieth century, and the unmethodical consumption of flora fuel, this rare resource is severely on the verge of destruction so that 300,000 square meters of the forest area is limited and about 1,000,000 hectares of the country's pastures are changed into deserts and sandiness, and are practically unusable and inaccessible. Meanwhile, as a result, about 1.5 million tons of the country's soils which is equivalent to 400,000 hectares of the fertile lands are annually eroded, and a considerable part of the above mentioned consequences are due to the consumption of flora fuel by the country's rural societies that their population is ever increasing.

Now, in the light of the above said, the presentation of the replacement model for fossil oil instead of flora one for the rural societies by the provision of necessary cultural and service structures are proposed, and it is believed that this model can be useful in protecting the country's natural environment especially the rural ones and largely helps its stable development. The analytical and detailed arguments are discussed in the main body of the article.

Rural Communities IX

- What were you Thinking? Making Connections Conference, Part II - "Stress and Mental Health"

Batoche Room – 13:00-16:00

Organized by: *Saskatchewan Farm Stress Unit, Canada*

Co-Chairs: *K Imhoff and L Sabiston, Saskatchewan Farm Stress Line*

152 Rural Based Canadian Telephone Crisis Services

13:20-14:00

K Imhoff (presenter), *J Smith, E Crouse, S Klein-Swormink*, Saskatchewan Farm Stress Line, Saskatchewan, Canada

Oral

A Comparative Review of Services, Best Practices and Future Challenges. From the middle of the 1980's the headlines in the Canadian Agricultural newspapers spoke extensively of the Farm Income crisis. Stories profiling farm families who lost their farm business, their homes and their livelihood appeared in the news papers, on the radio and on television. Organizations emerged out of this crisis dedicated to supporting farm families facing foreclosure actions in every Canadian province.

Studies of farm families in crisis by Walker and Walker (1986 & 1987) addressed the unique stressors faced by farm families. These studies supported anecdotal observations by many organizations and human service agencies that assisted farm families during the crisis of the 1980s.

Some believed that a toll free telephone service dedicated to the needs of farm people, where staff understood implicitly the culture of agriculture and the business of farming would assist farm families to constructively address the challenges they were facing. This thinking lead to the development of toll free telephone services presently in four Canadian provinces: Saskatchewan (1992), Manitoba (1994) Ontario (2000) and Nova Scotia (2001)

Objective

This paper will describe how each service evolved from a single concept, highlighting the conditions that lead to their development. It will also compare and contrast these four programs, with an emphasis on their unique characteristics, operational principles, best practices and adaptability to social conditions in which they operate.

Discussion

Each program will be described, focusing, services provided (including adjunct services), out reach activities, promotion, administrative structures, staff recruiting and training, financing and of course issues most typically presented by users of the services.

Conclusion

The paper will conclude with challenges faced and lessons learned in establishing and maintaining farm and rural toll free help line

79 Behavioral Health Access for Farm and Ranch Families

14:00-14:20

MR Rosmann, Agriwellness Inc., Iowa, USA

Oral

Leaders in seven U.S. states (i.e., Iowa, Kansas, Minnesota, Nebraska, North Dakota, South Dakota and Wisconsin) have pooled their expertise and resources to form a program called "Sowing the Seeds of Hope", which responds to the needs of farm and ranch families for mental health and other support in times of crisis. The program is establishing an integrated regional network of behavioural health care supports for the rural agricultural population.

The program provides services to individuals and families who do not have health insurance or adequate behavioural health coverage and others who are unable to pay for necessary care. The central aim of each state project is the formation of a coalition of individuals (both paid staff members and volunteers), agencies and organizations to maximize information about access and cost of services, options for additional funding and continuation of the state projects. Core service areas include: outreach, training and education of traditional and non-traditional behavioural health care providers, education of the community on agricultural health issues, information clearinghouses, crisis hotlines, direct services through vouchers and contacts with approved providers, educational retreats and support group activities for farm couples and families. Recently the Sowing the Seeds of Hope program was selected for inclusion in "Rural Health People 2010," a companion document to "Healthy People 2010," as a model program, from among over 300 nominations.

**196 Prevalence and Correlates of Depression in Rural Saskatchewan
(with Urban Comparisons)**

14:40-15:00

Oral

*C D'Arcy (presenter), J Kosteniuk, P Smith, R Nilson, Applied Research Psychiatry,
University of Saskatchewan, Canada*

Rural Canada covers over 90 percent of the landmass of the country and encompasses about one-quarter to about a third of the Canadian population depending on the definition of rural used (Pitblado et al., 1999). As many as 10 million Canadians live in rural areas. Approximately 50% of the population of the prairie province of Saskatchewan live in 'rural' areas.

There is paucity of data on the health status in general and mental health status in particular of rural Canadians and of variations in health status among rural Canadians in different parts of the country (Rural Research Summit Report, 1999).

This analysis of the Saskatchewan Population Health and Dynamics Survey (SPHDS) attempts to remedy this deficit. The SPHDS is a large (N=7,000+) omnibus provincial cross-sectional health survey conducted in 1999-2000. The sampling strategy was designed to provide data for regional health authorities. The survey questionnaire includes a standard psychiatric diagnostic inventory module for depression. The Composite International Diagnostic Interview – Short Form (CIDI-SF) module allows for the generation of data on the occurrence within the past 12 months of a specific psychiatric diagnosis – Major Depressive Episode.

Surprisingly, we found very little difference in the prevalence of depression between rural and urban residents of the province; however rural residents generally reported lower levels of depression. Among rural women 12.7% reported experiencing depression during the last year in comparison to 14.1% of urban women. Among rural and urban men the rates of depression were 8.0% and 9.0% respectively. These differences are not statistically significant. More detailed analysis of prevalence patterns show that rural men 50+ have higher rates of depression in comparison to urban men, specifically 7.1% in comparison to 5.2%. The analysis also showed differences in the significance of the relationships between

depression and its correlates for rural versus urban populations. The reasons for these similarities and differences are discussed.

330 The Relationship between Partner Abuse and Depressive Symptoms in a Rural Cohort 15:00-15:20
Oral

AM Stromquist (presenter), *KM Kelly*, *LF Burmeister*, *C Zwerling*, *JA Merchant*,
Keokuk County Rural Health Study, Department of Occupational and Environmental
Health, College of Public Health, University of Iowa, USA

Objectives

To examine the relationship between spouse abuse and other risk factors and depressive symptoms in a rural cohort. To compare two measures of spouse abuse and their relative association with depressive symptoms. To identify differences between men and women and among different age groups in the risk factors associated with depressive symptoms.

Methods

Subjects were interviewed in person by a trained interviewer. 562 men and 632 women who were living with a partner at the time of the interview are included in this analysis. Straus and Gelles' Conflict Tactics Scale and Yllo's Controlling Behavior Questions were used to measure spouse abuse. The CES-D was used to identify those with depressive symptoms. Numerous other variables were explored for their association with depressive symptoms. Stepwise multiple logistic regression analyses were conducted to determine risk factors and behaviors most strongly associated with depressive symptoms. Comparisons were made between men and women and among three age groups.

Results

21.8% of all women and 14.4% of all men reported depressive symptoms. Risk factors for depressive symptoms included poor health, for men OR 4.7, CI 2.5, 8.8, women OR 4.4, CI 2.5, 7.9; four or more stressful events, for men OR 4.4, CI 2.0, 9.4, women OR 2.6, CI 1.4, 4.8; spouse abuse measured by Yllo's Controlling Behavior Questions, for men OR 2.9, CI 1.7, 4.8, and women OR 1.8, CI 1.2, 2.7. Spouse abuse measured by the Conflict Tactics Scale was associated with depressive symptoms in the 65+ female age group only, OR 3.5, CI 1.4, 8.8. Other associated factors will be reported as will differences between men and women in each age group and among age groups within gender. These include alcohol abuse, smoking, marital status, antisocial personality, and income.

Conclusions

Rural women and men are at risk for spouse abuse and depression. Spouse abuse measured by the Controlling Behavior Questions appears to be more closely associated with depressive symptoms than spouse abuse measured by the Conflict Tactics Scale. Possible reasons for this will be discussed.

270 Development of the Farm Stressors Scale: Links to Farmers' Injuries and Health 15:20-15:40
Oral

C Hodne (presenter), *KJ Donham*, Institute for Rural & Environmental Health Sciences
Research Center, University of Iowa, USA

The new 39-item Farm Stressors Scale measures common farm stressors including those reflecting the changing socio-economic context of family farming. The scale was developed among Iowa farmers (n = 248) involved in the Certified Safe Farm (CSF) program. CSF is designed to reduce farm injuries and illnesses through AgriSafe Clinic-based health screenings, farm safety reviews, and education.

Participants rated their stress in the previous year regarding 75 original items by using a 4-point Likert-type scale.

A principal components factor analysis revealed six factors: Farm Policies, Finances, Family, Farm Work, Job, and Loss/Victimization. Strong evidence of convergent validity was displayed through: (1) moderate to strong correlations between most of the factors and subjective measures of stress (e.g., the Perceived Stress Scale, current stress level); and (2) strong correlations of the Finances factors with debt-to-asset ratio, problematic financial conditions, and financial adjustments. Self-reported symptoms of depression are most strongly correlated with Finances, Family, and Farm Policies. Average scores on the six stressors factors are also compared to: (1) self-reported injuries; (2) self-reported illnesses; (3) health status indicators from health screenings; and (4) farm safety review scores.

The new Farm Stressors Scale offers the potential for the development of more precise interventions to reduce farm stress and resulting health and safety problems. The relationships among particular stressors and injuries, safety behaviors, and illnesses have implications for farm safety education, health and mental health interventions, and self-help activities.

Rural Communities X

Terrace Lounge – 14:00-16:00

Chair: *L Bharadwaj*

I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

418 Knee Osteoarthritis and Farm Work

14:00-14:20

A Thelin (presenter), *S Holmberg*, *N Thelin*, Epidemiology, Injuries,
Gatugard, Wederslot, Sweden

Oral

Objectives

Occupational workload is discussed as a contributing cause in the development of knee osteoarthritis, in addition to well-known risk factors such as age, female gender, overweight and previous knee injuries. Farm work increases the risk of developing hip osteoarthritis, but it is uncertain if farming is influencing the occurrence of knee osteoarthritis. The aim of this population-based case control study was to investigate the importance of some specific occupations for the risk of knee osteoarthritis.

Methods

A mailed questionnaire enquiring about previous occupations was answered by 778 subjects having X-ray verified osteoarthritis in the femorotibial joint, and 695 matched controls. The reply frequency was 89%. Mean age of the participants was 63 years, 43% were male and 57% female. The relationship between knee osteoarthritis and occupation was analyzed using multiple logistic regression, with adjustment for a number of variables.

Results

Men who had worked 11-30 years with building and construction, had a 3.7 times (95% CI, 1.2-11.3) increased risk of knee osteoarthritis. Farm work was not related to any increased risk for men. However, women who had worked 11-30 years in farming, tended to have an increased risk (Odds ratio 2.1, 95% CI, 1.0-4.5). Forestry, letter-carrying (postal), cleaning and health care work was not related to knee osteoarthritis. Overweight, heredity and previous knee injuries were strong risk factors, whereas smoking showed a negative relation to knee osteoarthritis.

Conclusion

Work in building and construction occupations, but not in farming was associated with an increased risk of knee osteoarthritis among males.

91 Agriculture Curriculum and Knowledge Development in Nursing Schools in the Southeast USA

14:20-14:40

Oral

DB Reed, College of Nursing, Farm Safety 4 Just Kids, University of Kentucky, USA

Objectives

This NIOSH funded study (2001-2006) intends to (1) increase the agricultural health knowledge of nurse educators, researchers, and students, (2) determine how nurse educators use agricultural curriculum, (3) provide formats to educate nurse educators and researchers about agricultural illness/injury prevention, and (4) provide opportunities for agri-health nursing research.

Background

A 1989 national report on the state of agricultural health noted the need for 8,000 nurses with training in agricultural health. Only a handful of nurses currently possess this expertise. In the Southern United States alone, nurses serve the needs of 516,437 farm families and their labor forces.

Methods

Biennial surveys of 185 Colleges of Nursing in the Southern Nursing Research Society area, multiple educational methods (web listserve, continuing education, visiting faculty), student and faculty scholarships, and consultative service for agricultural nursing research. Results: In a little over a year, 96 persons joined the list serve, a one day continuing education course was established, and the first survey of Southern Colleges of Nursing was completed (N=113). Survey results revealed that 28% of the schools had no mention of agricultural health in any course and only 13 schools had any history of agricultural health research. Lectures and projects were the primary instructional methods used by the schools that offered any agricultural health instruction.

Significance

The efforts of this project will help equip nurses to meet the clinical and health research needs of the agricultural community. Multiple venues for education and scholarship will enhance the ability of nurse scholars to become national leaders in the area of agri-health.

Conclusions

A focused effort on agri-nursing should yield more nurses who are equipped to meet the unique health needs of agricultural clients.

160 Enhancing Education of Rural Practitioners Through Collaboration

14:40-15:00

E Thomlinson (presenter), *M McDonagh*, *D Edge*, *M Reimer*, *M Kohlhammer* (presenter),
Faculty of Nursing, University of Calgary, Alberta, Canada

Oral

Objective

The recruitment and retention of health professionals has been, and will continue to be, a major concern for persons living in rural and remote Canada. The projected shortages of professionals could have a devastating impact on rural and remote health care delivery. This presentation will highlight ways in which the Alberta Rural Physician Action Plan (RPAP) and the Rural and Remote Health Research Group (RRHRG) in the Faculty of Nursing at the University of Calgary have begun collaborating for the education of practitioners in rural Alberta.

Discussion

The RPAP is a comprehensive, integrated & long-term action plan for medical education, and rural physician recruitment and retention. The RRHRG and RPAP share the common goal of preparing and retaining health professionals in rural Alberta. Of importance to both groups is the conduct of research for the improvement of health outcomes in rural/remote settings. For the past 2-3 years RPAP and the RRHRG have examined the resources and clinical placements available to students in rural practicums. The Southern Alberta Nursing and Health Research Resource Unit (SANHRRU) has provided technical and analysis services through the development of a toolkit for RPAP initiated research studies. RPAP was instrumental in pulling together community members, government, professionals, and educators for the development of a provincial rural health week increasing the awareness of rural practice and recognizing the many professionals who make a positive difference within this practice.

Conclusions

This partnership has the potential to enhance the preparation of health professionals and to promote rural health practice in other jurisdictions. The presenters will discuss current activities and future goals for this collaboration.

287 The Dynamics of Distance: Employing GIS to Address Service Delivery

15:00-15:20

K Kelly (presenter), N Hanlon, S Emmons, S Carroll, D Voaklander,
University of Northern British Columbia, Canada

Oral

Background

Distance is a seemingly straightforward concept that is nevertheless an important and dynamic feature of health service provision. The term implies a physical separation of patients and their caregivers, measured in spatial, temporal or economic terms. When applied to the provision of welfare services, however, the complexity of the concept becomes more evident.

Objective

Our objective is to develop a web-based Distance Analytical Interface (DAI) that allows users to calculate the road network distance, in kilometres, and the estimated travel time, in minutes, between any two postal code reference points in the province of British Columbia. The DAI will enable researchers and decision makers to incorporate reliable and accurate measures of distance to look at a range of research and management issues, including: location-allocation modelling; area indexes of physical accessibility; facility or program impact assessment; and service area definition and analysis.

Methods

Our work will proceed simultaneously in two separate, but integrated, stages. One stage is the development and fine tuning of the database "engine" that translates geo-referenced road network data into tabular data and graphical output. The second stage is the development of a web-based interface, or the "steering" mechanism, that we refer to as the Distance Analytical Interface (DAI). The DAI will communicate with the spatially referenced data stored on a GIS server at UNBC to perform analyses on origin and destination scenarios that the user specifies.

Results

Pilot work has established that these distances can be calculated for a variety of datasets relevant to health in British Columbia. A template will be presented that will display the web-based interface (DAI). Typical user specified scenarios will be presented as examples of how the DAI works.

357 Investigation of the Impact of Community Learning Networks on Rural Community Economic Development

15:20-15:40
Oral

K Rempel, R Annis, Rural Development Institute, Brandon University, Manitoba, Canada

This presentation highlights the efforts to date on the Rural Development Institute's investigation of the impact of community-learning networks on rural community development. The research was initiated in early 2003, but follows RDI's efforts in the area of community learning organizations over the past two years. The objective of the research is to determine the extent to which a community-learning network has resulted in increased opportunities for community economic development. The project is part of a larger SSHRC research project, "CED in the New Economy".

The investigation focuses on the specific case of the Network of Community Enterprise Development Centres (NCEDC), an association of six rural Manitoba communities. Since 2000, the primary activity of the NCEDC has been the establishment of community learning networks; that is, community-based learning organizations that are supported or facilitated by information technology. The NCEDC and its member communities consider community-learning networks as a key strategy for rural community economic development.

Society has accepted the claim of importance on the contribution that adult learning makes to community development. Information technology has fueled the urgency felt by many rural communities to organize community-learning networks as a strategy to help develop economic options. The real or perceived potential of community learning networks is now a focal point for many rural communities seeking ways to participate in the new knowledge-based, global economy. To date, there have been very few investigations on the impact of community learning organizations.

The research is supported by a philosophical foundation of community theory; transformation theory of adult learning; and, a framework of a number of community economic development indicators including changes in entrepreneurial activities, local production and local consumption of goods and services, participation in community decision-making, mobility of work force and creation of new jobs. The theoretical and practical understanding resulting from the research will assist rural communities gauge their efforts to participate in the new, knowledge-based, global economy.

235 Claiming What We Know: What Researchers Can Learn from the Community About "Knowledge Translation"

15:40-16:00
Oral

S Bowen (presenter), PJ Martens, Department of Community Health Sciences, University of Manitoba, Canada

Objectives

This session will: 1) outline, in practical terms, key concepts and terminology related to knowledge translation (KT); 2) explore links and commonalities between KT concepts and approaches, experiences and expertise found outside the research arena; 3) provide concrete examples of attitudes, beliefs and approaches that promote successful KT initiatives, 4) Identify areas of community expertise related to KT.

Discussion

There is increasing recognition of the need to make health research findings accessible to potential users and to "transfer" research findings to practice and policy settings. However, even among those involved in KT activities there appears some confusion about what is meant by "knowledge translation", "knowledge transfer" and other related terms. This confusion, (along with an increasing number of academic articles on the topic) may suggest that KT is a new – and complex – concept, best understood

by researchers. This may obscure the “common-sense” principles on which effective KT activities are based. The roots of many of these principles are found in other disciplines (and many life experiences). Principles of KT can be demystified to make them easily understandable to a lay audience – and researchers have much to learn from rural communities about these principles. This presentation will use the Manitoba Need to Know project as an example of a KT initiative focusing on rural/northern health issues, which has benefited from this community knowledge.

Conclusions

Several factors have been identified as critical to effective KT. From an evaluation of The Need to Know project. The finding of the NTK project is that the most crucial principles are those common to public relations, psychology, community development, adult education, and simple “good manners”. Theory building around KT is not the exclusive domain of researchers. It is essential that community research partners participate in discussions of KT principles and model development, not only to ensure that their expertise is included, but also to assist researchers in developing expertise in this area.

Thursday, October 23

- Morning Plenary Session -

Adam Ballroom – 08:00-08:30

Chair: *N Koencke*, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

- 389 Understanding the New Rural Economy: Implications for Rural Revitalization** 08:00-08:30
Plenary
B Reimer, Department of Sociology and Anthropology, Concordia University, Quebec, Canada

Printed abstract not available.

Rural Economy V

Adam Ballroom – 08:30-12:00

Co-Chairs: *S Halliday*, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada
L Sullivan, British Columbia Centre of Excellence for Women's Health, Canada

- 135 Assessing Community Capacity in Biosphere Reserves: Clayoquot Sound, BC and Redberry Lake, SK** 08:30-08:50
Oral
S Mendis, M Reed, Department of Geography, University of Saskatchewan, Canada

Rural communities across Canada are facing issues that threaten their way of life and livelihood. Some examples include de-population, low commodity prices, changing or loss of job opportunities, and losses in social services. In the past few decades, the need for the integration of social, economic and environmental concerns in research and assessments to inform policy and decisions followed the recognition that rural resource-based communities face such stresses. Many approaches to community assessment have been attempted, such as community stability and community resiliency; however, they are often insufficient as they do not encompass broader, intangible aspects of a community, such as the ability to work together.

Community capacity is an emerging approach to community assessment that attempts to fill this gap. It address the question of what characteristics enable communities to adapt and respond to changes while meeting the diverse needs of residents in pursuit of common goals. A framework for community capacity is presented here; it is based on capital stocks of resources and the mobilizing forces that activate their use. These include the following components: ecological, economic/ physical, human, and social capital, as well as cultural values and sense of community.

Biosphere Reserves are designated areas that are models for sustainability in that they attempt to balance conservation, sustainable development and encouraging research, education and training. Two Biosphere Reserves in rural Canada were the focus of this study: Clayoquot Sound, BC and Redberry Lake, SK. Since community capacity is a recent concept in the context of resource management, methods of assessment remain unestablished. A 'bottom-up', self-assessment approach was taken, where focus groups were conducted to assess community capacity. These were supplemented by semi-structured interviews of key informants to provide historical context. Preliminary findings reveal that elements of

community capacity perform different roles in the different social and geographic contexts. For instance, ironically it is the financial capital, so sought after in both areas, that is both a contributor and barrier to the creation of capacity.

189 Craft Production and Tourism in Rural Manitoba

08:50-09:10

D Eberts (presenter), *D Ramsey*, Department of Geography, Brandon University,
Manitoba, Canada

Oral

This paper reports on research into the craft sector of South-West Manitoba. In places dependent on primary sector activities such as agriculture, traditional craft or artisanal forms of production appear to be regaining prominence. Importantly, they may play a number of roles within the household (hobby, income supplement, primary income) and community economies (cultural identity/heritage, employment, development). The research presented here intends to describe the characteristics of craft production, including its spatial distribution and relationships, and explain how and why it has become an important component of the new rural economy in the context of the so-called 'farm crisis'. Emphasis is placed on the relationship between craft production and the tourism sector, as there are many complementarities and interdependencies between these two sets of activities.

378 Occupational Health in Agriculture of Ukraine

09:10-09:50

Y Kundiyeu, Institute for Occupational Health, Kiev, Ukraine

Oral

Modern stage agrarian reform in Ukraine has been facing a decline in agricultural output, which necessarily entails further deterioration in the economic, social and health status of the rural population. It manifests itself by negative medical and demographic developments. There is the increased aging of the rural population.

Health risk factors among agricultural machine operators include noise, vibration, unfavorable microclimatic conditions, dust and chemicals. As a rule, these factors produce a combined impact. Their intensity and duration of exposure correspond to the yearly cycle of agricultural operations. Heavy manual labor poses a risk of developing locomotor problems. There is a high incidence of lumbar radiculitis among agricultural workers. Milkmaids tend to have hand diseases because of manual milking.

High level of traumatism among agricultural workers is the most acute problem. In the past five years in Ukraine, death toll from injuries in agricultural sector approached 3,236 or almost one-third of injury-induced deaths in all sectors in aggregate. The rural death toll from injuries, poisonings, and accidents among the productive age group exceeds the urban one by far. Most injuries occur among agricultural machine operators, stock farmers and repairmen. The main causes of injuries are working conditions, which do not comply with safety requirements and hygienic standards. Operation of faulty or obsolete machinery, poor work organization, lack of skill and alcohol abuse all combine to produce the conditions in which most tractor drivers, repairmen, and stock farmers work. In Ukraine only in agrarian sector over 400,000 people work in conditions dangerous to health.

Socio-economic hardship is often reflected by alcohol abuse. Rural death toll from alcohol intoxication among productive age people exceeds the urban one.

For the last decade health services in rural area was substantially deteriorated. Although health risk factors for rural workers are inherent in most operations they carry out, their effect on health is comparable with that in industry, the occupational diseases induced by those factors are too often not

discovered. Such a situation prevails because occupational health services are remote from workers and have not yet become an integral part of primary health care.

Among common diseases, the most problem is tuberculosis. The incidence of tuberculosis in rural communities stands at 2,459 cases per 100,000 while the urban population indicated a substantially lower rate, 2,177 cases. Similarly, the steady yearly rise in the incidence of sexually transmitted diseases and AIDS among rural residents is alarming. The same causes apply in the case of tuberculosis – the lack of rural health care has to be recognized as a key contributor: instead of investing in preventive measures, specialized rural health care services are actually being reduced due to the lack of funding from national programs. Additional difficulties appeared after Chernobyl accident.

Positive trends in the economics of Ukraine in the last years and also broadening international collaboration provide hope on improving the situation.

- 306 Residents at Risk?: Gender Implications of Rural Life, Service Delivery Reform, and Health Tradeoffs** 09:30-09:50
Oral
LM Sullivan (presenter), *L Greaves*, *B Reimer*, British Columbia Centre for Women's Excellence, Canada

Since May 2000, the pace and nature of health reform in British Columbia (BC) has led to changes in the regional health authorities, hospital and bed closures, and increased privatization. Concurrently, pressures of economic restructuring and instability in both mining and forestry sectors internationally have increased the vulnerability of some resource-dependent towns. The combination of health reform and economic restructuring are challenging the social and physical health of British Columbian women and men.

The BC Centre of Excellence for Women's Health conducted a major research project (funded by the Canadian Institutes for Health Research) in the fall of 2002 with the objective of creating a more robust and gendered rural health research agenda in Canada. One aspect of this study included conducting four focus groups (two with women and two with men) in Mackenzie and Tumbler Ridge, British Columbia that identified issues women and men living in these towns had with regard to health. Analysis of the focus group transcripts revealed that while women and men living in Mackenzie and Tumbler Ridge are making tradeoffs with respect to their health as a result of their rural location, these tradeoffs differ.

The purposes of this presentation are two fold. First, to highlight the health issues raised by women and men in Mackenzie and Tumbler Ridge that specifically relate to their rural location; and second, to discuss the gendered nature of the 'temporality' associated with decisions rural residents make when evaluating whether or not to remain living in rural towns. We will show that the decisions being made by residents are influenced by tradeoffs necessary to maintain health, and that these decisions differ for women and men. Finally, we will argue that the combination of health reform strategies by the provincial government and regional health authorities, and economic restructuring pressures influencing resource towns, are requiring women and men in rural areas to make tradeoffs that may place their health at risk.

- 118 The Ethical Challenges of Farming, or Farming for Ethics** 09:50-10:10
HS James, Jr, Department of Agricultural Economics, University of Missouri, USA Oral

Academic researchers have described a variety of ethical challenges that exist in agriculture, such as concerns for animal welfare and the genetic modification of crop plants. Although these ethical

challenges are important, they have been articulated from a perspective "outside" of agriculture by academic researchers and philosophers. No attempt has been made to learn what, if any, ethical challenges farmers face from their unique perspective.

The purpose of this paper is to present the results of personal interviews with farmers designed to learn what they perceive to be the most important ethical challenges in agriculture.

A principal source of the ethical challenges farmers face stems from the conflicting tensions pulling on them. Government programs, technological innovations, economies of scale, corporate interests, and society's desire for cheap food conspire to erode "traditional" farming values, including the importance of hard work, integrity, and the moral motive of contributing to society by helping to meet their basic needs. There is no question in the minds of farmers that a "crisis" exists within agriculture today because many of them increasingly feel the economic pressure to "cheat the system." Thus, the nature of the ethical challenges facing farmers can be characterized as the incentive to do things they know to be wrong, rather than an uncertainty as to what the right thing is. Examples from actual farmer experiences will be used to illustrate the scope and scale of these ethical dilemmas farmers.

216 Regional Planning and the Development of Rural Sustainable Economy

10:10-10:30

I Ebrahimsadeh, Department of Geography, Membership of Sistan and Baluchestan
University Zahedan, Sistan, Iran

Oral

The regional planning and rural development are necessary processes in the countries economic and social development systems, it is because the rural regions in addition to their importance and place in economic production systems, have accommodated the major part of the population volume especially in the underdeveloped countries. If due attention is not paid and in the absence of rural economic and social development planning, result in numerous demographic problems which are formed with increasing growth are followed by unmethodical rural migrations to the urban areas. These will impose basic problems on the cities which in turn, cause the under-development of the rural regions.

In this research, the Sooran rural region a suburban area of the Saravan Township was chosen as a less developed rural region- a case-. The total economic income of the region has been Rls 27290 million (about 3411250 \$), which actually each household's income is Rls 9.6 million (about 1200 \$), and in the light of the household's dimension (5.9 person), every individual's income is about Rls 1.6 million (about 200 \$) per year. In the meantime, in the light of the fact that nearly one person per household is officially employed - the father - he affords the expenses of 5.6 persons, actually ; 17.3 percent of the total population are employed and 82.2 percent are practically unemployed.

Now, in the light of displacement and merger of some rural points, their new type of economic activities and special - land usage were indicated and proposed. In the meantime, for the other stable villages, in order to increase their productivity and economic optimization the situation of redistribution, and selection of optimization of the prevalent economic activities and the lands special application model was also suggested.

238 Development Implications of Farmers Marketing Problems on Production of Food Crops

10:30-10:50

R Ampadu Ameyaw (presenter), *S Fialor*, S&T Policy Research Institute, Accra, Ghana

Oral

This study aims at improving the welfare of smallholder food (Maize and Cassava) farmers and marketers by strategically identifying (through farm level surveys) and assessing viable ways of enhancing existing

60 Microcredit for Rural Community Development

O Okeowo, Conscience Resources, Lagos, Nigeria

11:10-12:00

Poster
Discussion

Microcredit is the process of providing credits such as business (entrepreneurships training, awareness programmes, introduction of rural businesses to urban and international partners, etc.) and financial services(credits,small and soft loans) to the less privileged and poor people/families and the core poor families for their self reliance and self employment, most especially their women.

In most cases benefits such as business services (introduction to new business partners and profitable business, free training services on business activities and enlightenment on government activities and subsidies) they can benefit from. The financial assistance provided is mostly by introducing and recommending families and communities to Financial and Micro-financial institutions, Banks, Donor organizations, Cooperative societies, Credit and thrift society, etc. This is done after effective integrations and assessment of individuals, families and communities.

Ensuring Impact

This is the process of measuring how the Microcredit activities affect families and the people of most communities. If the beneficiaries can be self reliant, self employed or good income employment, be able to receive loans and pay back loans, good means of livelihoods, be able to feed three times daily, be able to afford their children`s school expenses, provision of good education systems, increase their savings, improve in business activities, able to afford good shelter, be able to wear good cloths, be able to encourage good hygiene, this will also make the project reach wider range of communities for development.

The Learning Objective

- Meeting the need of most community members.
- Knowing new and other ways of assisting member.
- Provide networking and partnership with most similar interested groups.
- Establishment of business partnership between urban and rural businesses.

93 Causes of Death by Social Classes and Place of Living in Romania

L Fat (presenter), D Tudor, Institute of Public Health, Cluj Napoca, Romania

11:10-12:00

Poster
Discussion

Introduction

The special literature shows the existence of the mortality differences between social classes in all the European countries. In this study we tried to analyse, for the first time in Romania, the relations between different social classes, specific causes of death, place of living, and to evaluate the contribution of these causes in mortality of the different social classes.

Methods

Details from death records and occupations were extracted from the death certificates and working documents of 2387 persons who died in two regions of Romania. Deaths were classified by cause according to the International Classification of Diseases 9th Revision: cancer, ischaemic heart disease, other cardiovascular diseases, cerebrovascular diseases, accidents, gastrointestinal diseases, respiratory diseases, and other diseases. Occupational classes were defined according to the British Classification of the Social Classes in 6 different categories: I - professional, II - managers/intermediate, III(N) - non-manual skilled, III(M) - manual skilled, IV - partly skilled, V - partly unskilled. The data were collected

in the Microsoft Excel program and were statistically analysed using the SPSS 10 program. We used descriptive statistical methods and Anova and Chi Square tests.

Results

There were 49.8% deaths in rural and 50.2% in urban areas, with an equal distribution of the men's deaths, and more women's deaths in urban. The ischaemic heart diseases were situated on the first place (18.8%), followed by other cardiovascular diseases (17%), other diseases (15.8%), respiratory diseases (16%) and cancers (14%). On the last places were the gastrointestinal (1.7%) and cerebrovascular diseases (6%). In rural areas on the first places were the deaths of the social classes IV, V and III(M), the most frequently causes of death being the respiratory diseases, other cardiovascular diseases and ischaemic heart disease. In the urban areas the first causes of deaths were ischaemic heart disease, cancers and other diseases.

Conclusions

There were statistically significant differences between the frequencies of cancers and other cardiovascular diseases in rural and urban according to sex ($p < 0.05$) and the frequencies of cancers, ischaemic heart diseases, other cardiovascular diseases and other diseases in connection with occupation and place of living ($p < 0.05$).

259 Life on the Edge: Impact of Globalization on Local Knowledge and Rural Commons of Punjab
SK Shukla, Department of Political Science, DCS, Panjab University, Chandigarh, India

11:10-12:00
Poster
Discussion

Living on the edge, the lives of rural commons, impacted by globalisation, seem to be in a state of jeopardy. This issue needs to be addressed with a deep concern. In the recent years, the forces of globalisation have become conspicuous and alarming for those who survive in fragile environments thereby affecting future of the rural peoples. The globalisation process, which is market driven, promotes selectivity and narrow specialization in the choice of production activities, encourages indiscriminate resource-use intensification with little concern for environmental and socio economic consequences.

An equally important implication is the total disregard and erosion of resource use systems and production practices based on local knowledge handed down through generations to have sustainable environment and livelihood security in the fragile ecosystems. In other words, it tends to wipe off not only the existing culture but tends to convert rural "common into commodities" as the only target of the global forces is profit maximization. This has a long term implication with the possibility of being detrimental to the life and the life style of the rural people.

Given this larger reality within which local communities are placed, the paper aims to analyse as to what are the options and strategies for adaptation to the newly created global market or to what extent the local communities will be able to negotiate or bargain? What are the roles of the different agencies in this regard? We also need to see as to how the commercial demand for resources affect the dynamics of internal cooperation, which in itself is a critical issue in the case of community management of rural peoples? There is a need to probe into these issues by making an empirical analysis based on surveys in rural Punjab.

The results and conclusions drawn from the study can be employed by policy makers, non-government organisations and other government agencies in order to secure the future of the rural commons.

Healthy People VIII

Battleford Room – 08:30-12:00

Co-Chairs: *D Voaklander*, University of Northern British Columbia, Canada
H McDuffie, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

- 75 Factors Influencing Health and Safety Behavioral Intentions in Agriculture** 08:30-08:50
PD Elkind, Department of Sociology, Eastern Washington University, USA Oral

Persons living and working on farms are generally aware of the health related hazards of agriculture. However, knowledge of these hazards and appropriate safety precautions alone does not appear to prevent illness or injuries. This paper argues against a direct relationship between knowledge, attitudes and safe healthy behaviors. Rather, a combination of factors influences farmers intentions to behave including: risk perceptions, locus of control; and chronic stress.

To demonstrate the combination of factors influencing behavioral intentions a triangulation methodology using results of several empirical research projects superimposed upon an extensive literature review is employed. Analyses include data collected from four-thousand respondents via questionnaires, couple and key informant interviews, quasi-experimental instruments, focus group results and evaluations. Questions about risk perceptions, safety and health related attitudes, behavioral intentions, behaviors, cultural values, demographics, situational characteristics and organization structures were analyzed. Using Ajzens "Theory of Planned Behavior" framework, superimposed upon a literature review, this multi-layered research process yields a wealth of data to support the argument.

Queried about the cause of injuries the general agreement of farmers is that stressors due to the structure of farming economics, government policy changes, and environment conditions outside their control cause chronic stress resulting in an attention deficit. The injuries often happen when persons are not paying attention. Farmers thus believe a large portion of the farm related illness and injury is due to external pressures and lack of safety provision from external sources, outside their locus of control.

The results suggest information alone will not effect behavior. Only when chronic stressors from occupational and structural processes are alleviated and coping mechanisms introduced, the political economy of farming improves, and farm populations perceive they are in control of their work environment, will meaningful reduction in agricultural injuries and agricultural related disease be possible.

- 82 Using History and Accomplishments to Plan for the Future: a Summary of 15 Years in Agricultural Safety & Health and Action Steps for Future Directions** 08:50-09:10
RE Petrea, University of Illinois at Urbana-Champaign, USA Oral

Objective

The passage of time and perceived changes within agriculture, and agricultural safety and health, since Agriculture at Risk: A Report to the Nation (Ag. At Risk) call for a new process to serve similar purposes. Such a process, and resulting document, would summarize the investments and key activities in U.S agricultural safety a health from 1987-2002. The document would state the progress made and identify gaps that remain. Further, the document would look to the future and anticipate changes to come and provide recommendations for agricultural safety and health policy.

Discussion

The identified three-year, national project seeks to meet this need. The project contains three interrelated primary activities, a conference, a consensus building process, and a document editing and review strategy to involve interested entities and organizations. The presentation will provide background information and an overview of the three-year project. Included will be a short summary of the paper presentations and discussion at the 2001 conference and identification of work-group topics and work-group consensus outcomes derived in 2002. Of primary importance is the presentation of the specific recommendations and accompanying strategies for implementing those recommendations contained in the project document.

Conclusion

The primary outcome of this project is a consensus document containing specific recommendations and accompanying strategies for future programs and policy related to agricultural safety and health. The document and its processes represent direct input from farmers, farmworkers, and their families as well as participants ranging from federal and state agency personnel, university researchers and programming personnel, agricultural industry representatives, as well as health professionals from all levels.

134 Continuous Development and Evaluation of Occupational Health Services for Farmers in Finland

09:10-09:30

Oral

K Taattola (presenter), *K Husman*, *B Kinnunen*, *M Peurala*, *M Holopainen*, Department of R&D in OHS, Finnish Institute of Occupational Health, Kuopio, Finland

The planning and development of farmers occupational health services (FOHS) have been conducted since 1979 by the Finnish Institute of Occupational Health in collaboration with the Social Insurance Institution (SII) and the Farmers Social Insurance Institution (FSII). In 1985, the National Board of Health issued an ordinance initiating FOHS in municipal health care centres. Thereafter, FOHS have been continually evaluated and developed. In addition, farmers health hazards at work and their work related diseases, mortality and accidents have been studied in 1979, 1982, 1986 and 1992. The functional adequacy and productivity of FOHS was studied in 1989, 1995 and 2000. In 1999, A National Centre for Agricultural Health was founded to aid the continuous development of GOHP in FOHS. A recommendation for applying Good Occupational Health Practice-ordinance in FOHS was issued in 2000. Experiences, needs and expectations of farmers in relation to FOHS was studied in 1992 and 2001.

The results of the survey of the year 2000 and the statistics of the SII and FSII show that functional adequacy of FOHS had improved from the level observed in 1996. The amount of farm visits and consultations of the local agricultural advisors increased. Coverage of FOHS increased in some regions. The main limitations for GOHP in FOHS are still the lack of resources and training of OH -personnel and inactivity of the farmers. The coverage of FOHS should be higher than 50 percent reached so far.

According to the study of the year 2001 most of the farmers were interested in health examinations, referral to rehabilitation and maintenance of work ability. They prefer active customership and want to be invited to health examinations.

It is essential for the functional adequacy of FOHS that OH-personnel have sufficient resources and up-to-date training. Also, continuous development and marketing of the services is important. Two very important issues to improve FOHS are the participation of the agricultural advisor in the checking of working conditions at farms and the active involvement of the local FOHS boards. The transition-period to EU has been stressful to most farmers, and thus activities maintaining work ability are especially important.

**115 Longitudinal Agricultural Health and Safety Curriculum Evaluation
Utilizing Experimental Design and Multiple Outcome Measures**

09:30-09:50
Oral

V Buchan, R Seiz, High Plains Intermountain Center for Agricultural Health & Safety,
Colorado State University, USA

Knowledge about environmental and occupational hazards is a critical need of all individuals. When youth live, visit or work on a farm they have the additional challenge of being exposed to an environment that has been shown to be one of the most dangerous occupational environments in the country. Efforts to prevent or reduce injury and disease have been hampered by inadequate research on the effectiveness of educational programs designed to improve farm and ranch safety for youth.

A CD based health and safety curriculum developed under the auspices of HI-CAHS at Colorado State University, addresses health and safety concerns identified with regional agricultural production. The curriculum is delivered in agricultural education classes with both teacher- and student-led discussion and learner exploration via computer. The technology driven approach was based upon the developmental stage of the 15-17 year old students and a needs assessment of agricultural educators in the two participating states. The varied teaching-learning approaches recognize that health and safety education needs to respond to multiple learning styles and complex interactions between learning and developmental processes. The curriculum has been implemented in rural high schools of Colorado and Wyoming.

A five year longitudinal study utilizing quantitative and qualitative methodologies with random assignment to treatment and control groups is in progress. Instruments measuring acquisition and retention of prevention knowledge, changes in agricultural injury and disease incidence, and in attitudes towards safe practices have been developed. Teacher training on the curriculum and research methods has taken place in both states.

Thirty schools in Colorado and 29 in Wyoming are involved with a total initial student N (treatment and control) of 500. Research procedures, instrumentation and results of Stage I of this project (which include student demographics, community context profiles, baseline injury data, and knowledge acquisition and retention) will be presented along with a profile of agriculture in the regions represented.

174 Factors That Impact on the Health and Well-Being of Male Farmers

09:50-10:10
Oral

H Lindner, School of Health & Environment, La Trobe University Bendigo, Australia

Objectives

To examine the factors impacting on the health of male farmers. The research encompassed farmers overall health and well-being including workplace safety, physical health, and emotional health. A particular focus of the research was the examination of farmers' attitudes and beliefs regarding health and how these impact on health behaviors.

Methods

There were two phases of data collection. The first consisted of 36 semi-structured face-to-face interviews with male farmers, 20 of which were dairy farmers and 16 dryland farmers. Questions included, whether they had experienced a recent workplace injury, physical health problem or a period of emotional stress, and if so how they had dealt with these problems. Respondents were also asked questions regarding, their perceptions of risks on the farm, how they gained health information, and the best ways to deliver health messages to male farmers. The second phase consisted of 15 interviews with the wives/partners of some of the men originally interviewed. The purpose of these interviews was to examine how farm women's

perspective on farmer health and safety issues differ from those of male farmers, and to explore the role they play in the management and promotion of health within the farming family, (particularly in relation to their partners). The resulting qualitative data were analysed for major themes, categories and sub-categories

Results

A theoretical framework detailing the relationship between the factors impacting on the health of male farmers has been produced as well as recommendations for practical strategies of delivering health and safety information and services to male farmers.

Conclusions

Those involved in the design and delivery of health and safety information and programs for male farmers need to be aware of a number of factors. These include: male farmers attitudes, beliefs and perceptions regarding health and safety issues, the benefits of directing information at farming couples or families rather than individual farmers, and the relationship between the physical and emotional health of farmers and the occurrence of farm accidents.

- 120 Farm Health Fair Callback Findings: a Complementary Ethnographic Study** 10:10-10:30
L Rydholm, SR Kirkhorn, Health Ministry/Occupational Health, Immanuel St. Joseph's Mayo Oral
Health System, Minnesota, USA

A pilot study was undertaken to evaluate the effectiveness of Southern MN regional farm health fairs held in 1999 and 2001. Evaluation, took the form of standardized telephone surveys conducted six months following each of the fairs. Participants had received work practice and lifestyle recommendations based on their medical test and history fair findings. The purpose of the callbacks was to assess learning (adherence to individualized advice and MD follow-up). There was an open-ended component to the definitive interviews. Quotes regarding rationales for post-fair behaviors will be shared.

There were 237 active farmers within the 363 participants who were revisited. The majority claimed work safety changes of one type or another as a result of the fair. Feedback suggested that gifts of masks, earplugs, repellant sun block and awarded door prizes were influential. The use of them had resulted in new work behaviors more often than not. Bandanas and cotton balls repeatedly emerged as a frugal substitute for earplug and mask gift resources that had worn out. Most agreed that access to resources and cost were the primary barriers to usage. Other identified barriers will be shared.

Comments pertaining to lifestyle practices suggested that accountability to gratis health fair caregivers helped promote lifestyle changes. Respondents sought affirmation from the interview stranger for all changes they had made. When changes had not occurred they were sincerely apologetic. Many were gifted at using humor to reframe and justify their behaviors. A few were unsure how to fold new self-care patterns into their stressed interpersonal family scenarios. A surprising number had turned to treadmills in search of stress relief. A turn to low cost herbal remedies, (especially garlic) recurred as a repeated response to high cholesterol reports. The spiritually despondent folks (who expressed little concern for their self-care) were most appreciative of the callbacks. They talked the longest. For them the callback itself was reportedly therapeutic.

Quoted rationales behind access delays, serious symptom disregard and outcomes will be shared.

166 Rural Safety Issues in a Culturally Diverse Population: the Amish and Other Old Order Anabaptists

10:30-10:50
Oral

PJ Jones (presenter), *WE Field*, Agricultural Safety & Health Program, Breaking New Ground Resource Center, Purdue University - West Lafayette, Indiana, USA

The Amish and other Old Order Anabaptists are a rapidly expanding agricultural minority with a long-standing presence in the North American farming community. However, few consolidated efforts have been identified that document the nature and extent of farm-work-related injuries among these groups or address best-practice injury prevention strategies. This presentation will identify important cultural issues that should be considered in understanding and attempting to reduce farm injuries in this population, summarize statistics concerning farm-related fatalities among Old Order Anabaptists, and discuss methods which have been effectively used to address farm injuries within these communities.

Discussion

Purdue University's Agricultural Safety and Health Program has been actively involved in working with Old Order groups since around 1996. The program is now coordinating a NIOSH-funded, multi-state surveillance project to assess the extent of injuries within this population and develop appropriate interventions. The primary collaborator on the project is the Young Center for Anabaptist and Pietist Studies at Elizabethtown College. The project is also utilizing an advisory committee composed of Extension personnel and nurses working with Old Order groups.

Conclusions

Preliminary data from Purdue's initial research reveal a high percentage of farm fatalities involving children. (The authors' preliminary findings can be found in: Jones, P.J., and W.E. Field. Farm Safety Issues in Old Order Anabaptist Communities: Unique Aspects and Innovative Intervention Strategies. *Journal of Agricultural Safety and Health*, 8(1): 67-81.) Approximately 63% of the identified fatality cases were children fifteen years and under, and 80% were male. Runover incidents (often by a horse-drawn vehicle) were the primary cause of the fatal injuries while animal-related behavior was the most frequent secondary cause, reflecting agricultural practices that remain highly dependent upon the use of horses and mules.

The authors believe evidence suggests that certain Old Order Anabaptist choices concerning farm safety issues may be directly related to their socio-religious beliefs, and that, therefore, effective intervention strategies must also be sensitive to socio-religious beliefs. Some examples of these strategies currently being used include the Weeds in Our Garden farm safety coloring book and local safety committees composed of Amish and non-Amish community leaders.

243 Living with Stroke in a Rural Community

10:50-11:10
Oral

S Jones (presenter), *R Lyons*, Yarmouth Stroke Project, Atlantic Health Promotion Research Centre, Carleton University, Nova Scotia, Canada

Stroke is the leading cause of disability and the third leading cause of death in Canada. The rate of stroke in rural areas is at least twice as high as the rate in urban areas, due to the difference in the age composition and to differences in health practices.

An individual who has had a stroke finds his or her life changed, forever. Persons with stroke benefit from flexible rehabilitation and social support programs, yet these are seldom available in rural areas. The stress of caring for someone with stroke, without many community supports to help, adds to the difficulties for families.

The Yarmouth Stroke Project of the Atlantic Health Promotion Research Centre, Dalhousie University, was created to develop and evaluate new models for supporting rural residents in southwest Nova Scotia who have a chronic illness or who care for someone with such an illness. Support for the project comes from the Canadian Institutes for Health Research and the Heart and Stroke Foundation.

As part of the project we interviewed 70 individuals with stroke and 40 people caring for those with stroke to understand how they lived with chronic illness, looked at community assets to serve those with stroke, and systematically reviewed best practices in stroke care and rehabilitation. In a collaboration between researchers and members of the community a number of interventions to improve services were identified. These are now being planned and implemented, using the same collaborative process.

In this paper we will identify the major themes of the needs we discovered and the areas of strength we found and discuss how these findings inform the collaborative development of services for those with stroke and their care givers.

272 An Evaluation of the New South Wales Hearing Conservation Program

11:10-12:00

*D Voaklander*¹ (presenter), *RC Franklin*², *J Depczynski*², *K Challinor*², *L Fragar*²,

Oral

¹University of Northern British Columbia, Canada; ²Australian Centre for Agricultural Health & Safety and New South Wales Health, Australia

Background

The NSW Hearing Conservation Program has been offered to farmers since the late 1980s. The program was designed to contact the target population during "downtime" at agricultural exhibitions and field days. The program consisted of hearing testing, advise on the prevention of hearing loss, and referral to further hearing related services.

Objective

The primary objective of the evaluation was to measure the impact the program has had on participants.

Methods

A random sample of participants was selected from the pool of individuals accessing the program between 1995 and 2001. A mail survey was used to gather information on current hearing safety practices. These surveys were linked to participants baseline characteristics.

Results

Surveys were sent to a random sample of 1000 farmers. The response rate after elimination of duplicates and those returned unopened was 64%(n=565). Of these 441 were still actively farming. Sixty-seven percent reported that they had started using or maintained their use of hearing protection since program contact. The net gain in personal hearing protection (PHP) use was 13% for non-cabined tractors, 21% for chainsaws, 21% for workshop activities, and 7% for firearms use. Younger age, female gender, not having a family history of hearing loss, not having tinnitus and having severe baseline hearing loss were characteristics correlated with an increase in PHP use.

Conclusion

These results indicate that this program has had an impact on the hearing conservation behaviour of farmers. Farmers who participated in the evaluation were highly satisfied with the program and recommended that it continue.

Environment VII

Pascoe Room – 08:30-12:00

Co-Chairs: *B Lester*, Colorado State University, USA

V Kaur Grover, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

157 Improved Irrigation for Sustainable Food Production in Ghana: Challenges and Constraints

08:30-08:50

Oral

N Obirih-Opareh, Science & Technology Policy Research Institute (STEPRI), Council for Scientific & Industrial Research (CSIR), Accra, Ghana

Like in many sub-Saharan African countries, there has been a lack of significant changes in the structure of Ghana's agriculture production. Despite the fact that Ghana has many water bodies and the largest man-made lake in the world, food production in the country has been rain-fed, with disastrous consequences, particularly during drought and poor rains. Food crop farming in most parts of the three northern regions considered as the breadbasket of the country, is tied up to the three to four months rainy seasons, after which the people are idle except the few days for harvesting. The perennial fluctuations in food availability and almost 'hunger seasons' due to, among others, erratic rainfall and poor capability in harnessing the country's vast water resources for irrigation-led agricultural development is a worry to the people and many development analysts. As President Kufour (2002) put it, "...It is unacceptable that in the twenty first century there should be a 'hunger season' seemingly because we are unable to harvest the water resources of the country for food production".

The main objective of this paper is to deepen our understanding on irrigation agriculture in Ghana. It assesses the challenges and constraints of irrigation agriculture for food security, wealth creation and poverty reduction in Ghana. It looks at the type of irrigation methods, crops/and improved seed varieties best suited to the areas to boost food security, and their impact on the environment and the health of the people. It draws lessons from other countries both developed and developing on the challenges and constraints of irrigation agriculture. It concludes by showing that though irrigation is an expensive venture, if properly handled, it could help to reduce over dependence on rain-fed agriculture with its uncertainties, boost food security, enhances wealth creation and reduces poverty among the population.

143 Preliminary Study of Ambient Air Quality in the Vicinity of Large Swine Production Facilities

08:50-09:10

Oral

B Lester, Environmental Health, Colorado State University, USA

The industrialization of livestock production has led to concern over public health impacts from air emissions. Hazardous emissions from Concentrated Animal Feeding Operations (CAFOs) include gases, bioaerosols, odors, and other semivolatile organic compounds. While research has established that these emissions are occupational hazards, there is less known about adverse effects on surrounding communities. Fourteen Iowa CAFOs were selected on the basis of overall size (study limited to CAFOs with three or more barns) and the downwind ambient air monitored at the nearest property line. Along with meteorological conditions, analytes measured included odor, hydrogen sulfide (H₂S), inhalable particulate, volatile organic compounds, and bioaerosols including endotoxin, fungi, mesophilic bacteria, and gram-negative bacteria. Downwind monitoring distances ranged from 23 to 418 meters. Meteorologic conditions varied widely in temperature (range: 12-33 degrees C), relative humidity (range: 37-97 percent) and wind speeds during sampling (range: 1-8 m/s). The maximum 1 hour time-weighted average H₂S concentration was 68 ppb, however, most sites ranged between 6-14 ppb. Endotoxin ranged from 4-3371 EU/m³ and one-third of the sites exceeded 200 EU/m³. Inhalable particulate ranged from below

detection to $576 \mu\text{g}/\text{m}^3$ with most sites showing levels between $75\text{-}300 \mu\text{g}/\text{m}^3$. Odor levels generally correlated with H_2S . Airborne gram-negative enteric bacteria averaged $1.1 \times 10^3 \text{ CFU}/\text{m}^3$ while mesophilic bacteria averaged $2.0 \times 10^3 \text{ CFU}/\text{m}^3$. The mean concentration of culturable fungi was $5.2 \times 10^3 \text{ CFU}/\text{m}^3$. This study demonstrated that off-site concentrations of gases, particulates, and bioaerosols occurring downwind from CAFOs achieved levels that raise significant public health concerns.

144 Differential Effect of the Duration of Follow-Up on the Predicted Lung Function Measurements

09:10-09:30

Oral

S Ghosh (presenter), *P Pahwa*, *HH McDuffie*, *JA Dosman*, Institute for Agricultural Rural and Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

The Grain Dust Medical Surveillance Program was conducted by Labour Canada from 1978-1993. Data on pulmonary function tests, respiratory symptoms and smoking status were obtained approximately every 3 years during an observational interval called a "Cycle". According to the number of available follow-up tests per grain worker, the subjects were divided into five groups: Group1(n=1440) participated from Cycle1 through Cycle5, Group2(n=1048) participated from Cycle1 through Cycle4, Group3(n=1419) participated from Cycle1 through Cycle3, Group4(n=1236) participated in Cycle1 and Cycle2 and Group5(n=3354) participated only in Cycle1.

The analysis was conducted primarily to determine whether these five groups of grain workers, based on the number of follow-ups, were different from one another on the basis of their lung function measurements and to determine the significant predictors of lung function. The SAS procedure PROC MIXED was used to fit random effect model with intercept and age as random effects. The SAS procedure UNIVARIATE was used to determine mean baseline values of age, FEV1(Forced Expiratory Volume in 1 second) and FVC(Forced Vital Capacity).

Our findings suggest that for: Group1, grain workers were younger (mean \pm S.D.)(Age 30.2 ± 9.4) and had better lung function (FEV1 4.1 ± 0.7 , FVC 5.2 ± 0.9), than Group2 (age 36.7 ± 11.2 , FEV1 4.1 ± 0.8 , FVC 5.1 ± 0.9), Group3 (age 38.2 ± 14.1 , FEV1 3.9 ± 0.8 , FVC 5.1 ± 0.9) and Group4 (age 39.7 ± 14.9 , FEV1 3.7 ± 0.9 , FVC 4.8 ± 1.01). However, Group5 (age 34.6 ± 14.2 , FEV1 4.0 ± 0.9 , FVC 5.1 ± 1.0) the subjects were younger compared to Group 2 to 4 and had better lung function. Random Effects model were fitted for FEV1/ FVC (covariates in the models were age, height, weight, exposure to grain dust, smoking status, survey and geographical region) for each of the groups to determine significant predictors of the lung function. Based on these models annual longitudinal decline were predicted for smoking status and years in the industry in FEV1. Grain workers in Group1 (mean \pm S.D.) (-0.03 ± 0.04) had the lowest decline for each of smoking status and years in the industry of grain workers as compared to Group2(-0.05 ± 0.07), Group3(-0.06 ± 0.19) and Group4(-0.07 ± 0.15). Similar results were observed for FVC. These analyses suggest that the grain workers who had participated in all the 5 Cycles had better lung function as compared to subjects who participated in other groups.

187 A Framework to Assess the Capacity of Rural (Resource-Based) Communities to Adapt to Climate Change

09:30-09:50

Oral

S Mendis (presenter), *S Mills*, *J Yantz* (presenter), Department of Geography, University of Saskatchewan, Canada

Recent developments in climate change research include the movement from predictive models of biophysical impacts to more integrative planning frameworks that examine how communities can mitigate or respond to biophysical changes. The sustainability and persistence of rural communities in particular

may be tenuous due to high reliance on natural resources, lower economic diversity and reduced access to economic, social, and human capital. By examining recent studies of community resilience, vulnerability and adaptive capacity in the context of environmental change we propose an overarching framework to assess community response in rural communities. Our framework is founded on the building blocks of community capacity which we see as integral to the assessment of adaptive capacity. Of the building blocks, economic, human and social capital, we identify factors that are likely to impact a community's capacity to adapt to climate change. These include: economic wealth and diversity; infrastructure; technology; knowledge, skills and education; health; community cooperation, equity, institutions and institutional linkages. We propose indicators and measures of these factors that can be used by rural (resource-based) communities as part of an integrated adaptive management strategy to assess and prepare for climate change impacts.

163 The Application of Integrated Pest Management Strategies to Achieve Sustainable Development and Improvement
C Reavis, Georgia Southern University, USA

09:50-10:10
Oral

Non-traditional agricultural export (NTAE) crops are an important rural economic development strategy in Guatemala. An abundance of family labor on small farms and diversified microclimates have provided the region with an economic advantage in the production of selected high quality NTAE crops for counter-seasonal supply to developed countries. However, viability of NTAE exports depends on the regions capacity to address increasingly important non-economic constraints to interregional trade; more specifically the sanitary and phytosanitary performance requirements of recipient countries. Through the United States Agency for International Development (USAID) Integrated Pest Management Collaborative Research Support Program (IPM CRSP) biorational pest management technology measures and production protocols to control these non-economic constraints were developed.

This research reports on how IMP CRST technologies have impacted the health of those within the targeted region. The comparative health outcomes between NTAE and Non-NTAE adopters in a selected population of Guatemalan farmers producing snow pea crops were studied to answer the research question: Does the adoption of IPM technology measures to improve the sanitary and phytosanitary performance standards also improve the health outcomes of a selected population of Guatemalan farmers and their families?

Methodology

This research is both descriptive and correlational in design. Twenty NTAE IPM CRSP farms and 20 NTAE farms that were Non-Adopters of IPM CRSP technologies and protocols were selected from the Las Camelias area in the Xeabaj region of Chimaltenango, Guatemala. Within these farms a sampling frame of applicators, exposed farm workers, farm dwellers, and villagers who were in direct or indirect contact with water, soil, pesticides, or snow peas produced on the sample farms were selected. Data on each participant were collected through survey, physical examination, and blood acetylcholinesterase level.

Data analysis through multivariate statistics revealed relationships and health outcomes between NTAE groups. Findings on research covariants will be presented and recommendations for a model to improve health outcomes of farmers and farm families engaged in snow pea production in Guatemala will be presented.

179 New Cases of Occupational Asthma in Employees of Swine Production Facilities and a Malt Plant

10:10-10:30
Oral

J Lawson (presenter), *JA Dosman, S Kirychuk, J Biem, Y Cormier*, Institute for Agricultural Rural and Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Various agricultural industries have been shown to have negative impacts on respiratory health. Intensive swine production is one such industry although these effects typically occur after a long duration of employment or acutely in naïve volunteers. Also, several agricultural industries, such as malt plants, have not yet been adequately assessed with regards to their impact on respiratory health. We describe four cases that address these areas of concern.

None of the four cases were aware of a history of asthma or allergy, however, all developed wheezing and cough suggestive of asthma and showed improvements in respiratory health following withdrawal from exposure. Cases 1 and 2, both women, developed symptoms within weeks of commencing full time employment in intensive swine production facilities. Despite improvements following exposure cessation, both continued to have asthma symptoms and increased airways responsiveness. Case 1 participated in a work re-entry trial which had to be terminated within an hour of entry. PC20 measured some 5 hrs later was lower than pre-trial PC20. To our knowledge, this is the first report of occupational asthma occurring in newly employed swine production workers following short term exposure. Cases 3 and 4, brothers, had spent more than 20 years working at a malt plant. Both cases had increasing symptoms over several years. Following withdrawal from work, both cases experienced decreased symptoms and improved PC20. In Case 1, PC20 declined following re-exposure at work and again improved following exposure cessation. In both cases an exposure free period of at least 4 weeks was necessary to see respiratory improvements. We believe that there is a need to investigate malt plants as a potential source of exposure leading to impaired respiratory health.

These cases demonstrate the need to investigate the health of employees in a wide range of agricultural occupations and to monitor the health of previously unexposed employees. We also demonstrate the need for physicians to consider agricultural exposure in the assessment of respiratory health and bring cases such as these to the attention of the research community to highlight areas of the agricultural industry that should be investigated.

145 The Effect of Water Hyacinth on Rural Communities: a Case Study of Kendu Bay Community, Kenya

10:50-11:10
Oral

S Otieno Okoth (presenter), *T Omondi Onyango*, Institute for Development Studies, University of Nairobi, Kenya

Lake Victoria, which is located within the East African region, is the biggest and second largest fresh water lake in Africa and the world respectively. The last decade has been marked by the proliferation of water hyacinth in the lake. Water hyacinth (*Eichhornia crassipes*) is an invasive and neotropical weed of fresh water. By the end of the 20th century, water hyacinth had become a national issue in Kenya.

The objectives of this study were to investigate the effect of water hyacinth on the community's accessibility to clean and safe domestic water from the lake; its effect on the frequency of use of off-shore transportation between Kendu Bay community and its diaspora; its effect on the fish stock and its use as source of raw material for making various products.

A written questionnaire of 100 households was used in the study, of which 20 were drawn from each of the 5 locations in the area of study using purposive sampling design. The units of analysis were heads or

representatives of households that included the fishermen, farmers, domestic water collectors and artists. The data was collected using both quantitative and qualitative data collection techniques.

The study was conducted in Kendu Bay community, which is a rural community on the shores of Lake Victoria, Kenya. The study found out that: where the water hyacinth has spread, dried and decayed, the water becomes polluted, dirty and unsafe for human consumption, leading to increased cases of cholera; water hyacinth forms an ideal breeding ground for mosquitoes which has led to increased incidences of malaria in the community; water hyacinth has created a conducive habitat for snakes and crocodiles which has led to increased snake and crocodile bites to the fishermen and water collectors; water hyacinth has led to the development of new fish species and that 10 per cent of the households use the weed for making various products.

The study concluded that the proliferation of water hyacinth in the lake has led to both constraints and opportunities to the rural communities living around the lake.

**80 The Assessment of the Impact of the Anthropogenic Activities on the
Migratory Corridors of Nairobi National Park: A Geographic Information
Systems Approach**

MW Gichuhi, Kenya Polytechnic, Nairobi, Kenya

11:10-12:00

Poster
Discussion

The impact of anthropogenic activities on the wildlife migration corridors of Nairobi National Park was studied from between 1990 – 2000. The main land use transformations, which were considered in the assessment, included expansion of urban residential areas, proliferation of industrial and commercial activities, establishment of small-scale agricultural activities and construction of a wide range of urban-based infrastructural facilities. Both primary and secondary data was used to track down the temporal population profiles of a wide range of wildlife species including Wildebeest, Zebra and Eland against the occurrence of land use change. Rainfall data was used to assess the possible role of climate change. Both SPOT and LANDSAT imagery was used in the overall assessment of land use and land cover change. Finally, Geographic information system (GIS) was used for the integration of climatic, land use and wildlife data. The characteristics of buffer zones around the national park were used in the overall diagnosis of negative environmental change in the area.

The findings showed that most of the park's seasonal migration corridors have been seriously affected by recent land use and land cover changes. The most affected corridors were the Leopard Cliff and the southwestern corridor through the Maasai Lodge. The Wildebeest and Zebra were identified as the most vulnerable animals because they migrate in and out of the park at different seasons. There was no significant change in rainfall pattern. The results implied that careful management of the park buffer area is necessary in order to sustain the traditional migratory routes for the animal and minimise the increasing human-wildlife conflicts while ensuring the future existence of Nairobi National Park, which is one of the most unique throughout the world.

**89 Factors Determining Population Growth for Rural Counties in Minnesota
from 1990 to 2000**

K Oishi (presenter), P Glewwe, Applied Economics, University of Minnesota, USA

11:10-12:00

Poster
Discussion

This study estimates the impact of different factors on population growth in rural counties in Minnesota during the 1990s, using data obtained from the rural counties in Minnesota and its neighboring states (Iowa, North Dakota, South Dakota and Wisconsin). The base regression model uses several natural and social variables that can be assumed to be exogenous with respect to migration decisions. Other variables

were added to the base model, using two stage least squares for variables likely to be endogenous. The paper then, compares the result of regression analysis with case studies in five selected counties. The regression analysis shows the importance of climate: average maximum temperature in summer, the average minimum temperature in winter, the amount of snowfall, and the ratio of water surface over land area had significant or marginally significant impacts on population growth in rural Minnesota counties. In particular, cool summers and mild winters make counties more attractive. When water-land area ratio is interacted with the summer maximum temperature, it is marginally significant, which implies that large bodies of water offset the negative impact of extreme summer heat. The amount of precipitation, the number of sunny days in the winter, and summer humidity and the scale of geographical variation had no significant impacts on population growth. Turning to social variables, distance to the nearest large metropolitan area and existence of interstate highways had significant effect on population growth in rural counties. The further from the Minneapolis-St. Paul MSA, the less attractive a county is unless there are offsetting highway systems. Existence of casinos also raised population growth in the rural counties. In some rural counties, efforts to promote employment likely helped retain their local workforce during the 1990s. Thus, the unemployment rates were positively correlated with population growth although their endogeneity was not fully explained by the factors included in the analyses. Natural conditions are significant factors to be attractive, but active employment promotions, likely had significant impacts on population growth in rural counties in the 1990s.

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| 159 Urban Governance and the Environment: the Case of Accra (Ghana)
<i>N Obirih-Opareh</i> , Science & Technology Policy Research Institute (STEPRI), Council for
Scientific & Industrial Research (CSIR), Accra, Ghana | 11:10-12:00
Poster
Discussion |
|--|-------------------------------------|

The African state has undergone a transformation as a result of local government reforms following decentralisation and privatisation. Urban management takes place in the context of a weak state. This paper examines urban management, environment and partnerships in the African context. In this paper, we will place the concept of urban management in the context of current thinking about urban governance and the global debate on sustainable development. We will first discuss the concept, building blocks and ideology of urban management. Next, we will focus on urban governance. We will show that urban management has moved to urban governance, to include new actors and actions, including public-private partnerships. Concerns about the environment, embodied in the global debate on sustainable development, are addressed in the third section of this paper. We conclude by introducing the concept of urban environmental management as a body of ideas to manage the urban environment within the context of sustainable development.

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| 164 Riparian Ecosystem and Water Quality Protection Through Strategic
Agricultural Production
<i>JK Schmutz</i> (presenter), <i>JK Holm</i> , Centre for Studies in Agriculture, Law & Environment,
Division of Environmental Engineering (CSALE), University of Saskatchewan, Canada | 11:10-12:00
Poster
Discussion |
|--|-------------------------------------|

Water quality parameters including total dissolved solids, nutrient loading (Phosphorous and Nitrogen) and abundance of sestonic algae (Chlorophyll a) in the Wood River of southern Saskatchewan were examined. Water samples taken in 2002 suggest that the Wood River is eutrophic and high in nutrients. Nutrients and dissolved solids exceeded Canadian guidelines for drinking water and for the protection of aquatic life.

The purpose of this study was to make recommendations for adapting land use immediately adjacent to the Wood River and its tributaries such that ecological function of riparian areas and source-water protection can be restored. Recommendations are also needed to alter the release of municipal waste

water. The Wood River's waters are used for consumption by humans and livestock, for irrigation and provide habitat for wildlife, including bird areas of national and international stature.

Approaches to ecosystem and water quality protection include personal conviction and stewardship, funded stewardship, and policy and regulations. In addition, this project has lead to landowner cooperatives with the goal to protect riparian function through strategic placement of permanent cover bordering the Wood River.

- 242 Big Oil, Rural Poverty and Environmental Degradation in the Niger Delta** 11:10-12:00
Region of Nigeria Poster
KK Aaron, Department of Political Science, Rivers State College of Education, Discussion
Port Harcourt Rivers, Nigeria

The Niger Delta Region of Nigeria is richly endowed with both renewable and non-renewable natural resources – it is home to 20 billion of Africa's proven 66 billion of oil reserves and more than 3 trillion cubic meters of gas reserves. Oil and gas resources of the Niger Delta account for over 85% of the nation's GDP, over 95% of the national budget and over 80% of the nation's wealth.

Paradoxically, the Niger Delta remains the poorest region, due largely to the ecologically unfriendly exploitation of oil and gas and state policies which expropriate the indigenous peoples of the Niger Delta of their right to their natural resources. Essentially fisher folks and farmers, the ecological devastation occasioned by the activities of oil transnationals have rendered farming and fishing useless. Deprived and poor without anything to show as producers of wealth on which the entire nation depends, and reduced to "benefiting" only from incidents of compensation for oil pollution, there has been increasing incidents of oil spills in the Niger Delta region of Nigeria. In this paper, we argue that the ecologically unfriendly activities of oil TNCs and Petroleum development policies lead to poverty in the Niger Delta and poverty in turn leads to environmental degradation. It is the dynamics of this inter-connectedness that we wish to explore.

- 353 Climate Change Implications in Boreal Forest Fringe in Saskatchewan** 11:10-12:00
A Carr (presenter), *P Weedon*, *D Weedon* (presenter), Geo-Spatial Timberline Inc., Poster
Saskatchewan, Canada Discussion

The fringe forest area in Saskatchewan is sensitive to climate change. Rural peoples in the forest fringe will be affected by climate change and will be looking for alternate sources of economic and ecological stability. A warmer and drier future climate will be accompanied by significant losses of forest cover due to several factors, including increased severity of drought, in combination with fire, and insect infestation. The suitability of adaptive forest management approaches will be investigated for a range of Global Climate Model scenarios for the 2020s, 2050s and 2080s.

Opportunities for agroforestry as a management approach to promote sustainable forest cover in non-forested agricultural areas will be explored. The introduction of non-resident trees into the forest and agricultural landscape will produce alternate cropping options and expand economic choices for the rural people of Saskatchewan. This project develops silviculture and management choices that will adapt to potential changes in site suitability in the boreal forest fringe to maintain forest cover. As well, there will be a focus on evaluating the option of converting agricultural land to growing tree crops (agroforestry). The development of methodology as a component of this project will find application to boreal fringe forest areas in other provinces, and other areas influenced by climate change.

Rural Communities XI

Batoche Room – 08:30-12:00

Co-Chairs: *H Bilinski*, Continuing Nursing Education, University of Saskatchewan, Canada
D Rennie, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

- 274 Child Psychiatry Services for Children and their Families in Rural Sask:** 08:30-08:50
Challenges and Approaches Oral
G Ferguson (presenter), *D Quinn*, *E Cherland*, *M Clark*, *D Reisner*, Department of Psychiatry, Child & Youth Division, University of Saskatchewan, Canada

Objectives

Children and youth in rural Saskatchewan who require Psychiatric care face obstacles in gaining access to these specialized services. The aims of the study are to identify access barriers that face this group as well as to identify strategies to overcome them.

Methods

Children, youth and their families who are residents of rural Saskatchewan who currently are attending a psychiatric clinic based at Royal University Hospital in Saskatoon, Saskatchewan will be requested to complete a survey identifying barriers that they face in accessing psychiatric services as well as on-going barriers faced in maintaining adequate contact with their psychiatrist and obtaining mental health care in their communities. Patients and their families will also be asked to identify what strategies, if any, they have used to overcome the identified barriers. The five psychiatrists who work within the clinic will be surveyed to identify what strategies they have employed to attempt to provide and improve psychiatric care to their rural patients.

The survey results will be compiled and presented to highlight the most frequent and most critical issues encountered by patients and their families. Strategies to deal with the identified barriers will be developed and presented. These strategies may be useful to other medical specialists and health care and government administrators.

- 331 Comparison of Acute Respiratory Symptoms in Children from Two Rural** 08:50-09:10
Communities Oral
DC Rennie (presenter), *A Senthilselvan*, *J Lawson*, *HH McDuffie*, Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

Indoor and outdoor air quality has been known to be associated with respiratory symptoms and airway inflammation in children. We explored differences in respiratory symptoms from two rural agricultural communities where one community, Estevan, is also the site of coal-fired power plants, strip mining of coal and oil and gas production. In 2000, we conducted a cross-sectional survey of parents of 2038 children attending Grades 1 to 6 in either community. Response rate to the survey was 91.3%. Higher rates of asthma were found for children living in Estevan compared to Swift Current (21.4% and 16.2%, respectively). The present analysis explores the acute respiratory symptoms (past 3 months) experienced by children from these communities. Compared with Swift Current children, Estevan children were reported to have more throat irritation ($p < 0.01$), hoarse voice ($p < 0.05$), stuffy nose ($p < 0.001$), cough on waking ($p < 0.05$), night cough ($p < 0.01$) in the past three months. Children did not differ on other symptoms of itchy eyes, muscle aches or fever. Differences between towns for symptoms continued following control for age, sex, household conditions such as air conditioning, renovations, pets, passive

smoking and damp housing. Although some associations were found for indoor exposures, reasons for differences between towns are inconclusive. Outdoor air quality could be an important factor in these symptoms and requires further investigation.

- 173 The Prevalence of Obesity and Being Overweight in Children Living in Two Saskatchewan Rural Communities** 09:10-09:30
Oral
*JM Seeley*¹ (presenter), *DC Rennie*², *J Lawson*², *A Senthilselvan*², ¹College of Nursing, University of Saskatchewan, Canada; ²Institute of Agricultural Rural & Environmental Health (I.ARE.H), Centre for Agricultural Medicine, University of Saskatchewan, Canada

The rising prevalence of children who are overweight and obese is becoming a dominant public health concern in developed countries such as Europe, Canada, United States, and Australia. Some of the major outcomes of being obese or overweight as a child include low self-esteem, diabetes, hypertension and gall bladder disease. Previous research has addressed three main areas including the prevalence of childhood obesity. Natural history of obesity from childhood to adulthood and the relationship between obesity and risk factors. In Canada, the study of obesity has focused on large urban children and little is known about obesity in children living in smaller centers.

In 2000, a cross-sectional survey of children was conducted that primarily assessed the respiratory health of children, attending Grades 1 to 6 in two southern Saskatchewan communities, Swift Current and Estevan. The survey questionnaire, completed by a parent, also included information on children regarding demographics, past and parental history of diabetes, heart disease, weight loss behaviours, lifestyle factors, and physical activity patterns. Height and weight measurements were available for 1238 children in Grades 1 to 4 who participated in pulmonary function assessment. The response rate to the overall survey was 89.1%. The purpose of this proposed secondary analysis is to estimate, describe and compare the prevalence of obesity as defined by Cole and Colleagues (2000) using body mass index (BMI) measurements in children attending Grades 1-4. The research will examine the relationships between BMI and environmental, socio-economic and demographic factors as reported in the study.

- 302 An Evaluation of Actual Instructional Practices at Just-For-Kids Safety Day Camps** 09:30-09:50
Oral
JM Mazur, HP Cole, D Reed, Southeast Center for Agricultural Health and Injury Prevention, University of Kentucky, USA

Safety Day Camps have long been a staple of instructing rural farm youth in health and safety practices. But are they effective? As part of an extensive mixed method evaluation of safety day camps in six states, we conducted an in-depth analysis of videotaped instructional episodes focused on a) equipment safety, b) animal safety and c) tractor safety. In this presentation we will present data analyzing both instructor and participant videotapes. Using this innovative methodology, we have identified the actual instructional strategies and tools used by safety day camp facilitators and examined participants engagement and reactions to the various presentations and activities.

There was evidence of a wide range of instructional approaches across the day camps studied. Findings regarding instructional methods include the use of various kinds of models (scale and realistic), team teaching techniques (often with older teens), demonstrations, use of rehearsal and group recitation, guided inquiry and direct instructional techniques. There were also examples of problematic approaches. These include discrepancies between didactic information and demonstrations, inaccurate information and inattention to participant questions. Materials distributed were often irrelevant to the instruction. Overall, however, the breadth of strategies supported high levels of attention and engagement (even in several

highly distracting environments). Results of pre-and post-test findings on these topic areas are also available to triangulate instructional method with outcomes.

The use of videotaping for data collection enhanced validity regarding this investigation of instructional strategies. Additionally, we can also report an unanticipated benefit to the use of such video records: Day camp organisers and researchers were able to view the tapes and give feedback to improve presenter performance and effectiveness for subsequent offerings of the day camps.

The authors will present an interactive multimedia paper illustrated with annotated, digitized video examples of the various methods and tools used in the various day camps in the selected topical areas of equipment safety, animal safety and tractor safety.

- 237 Physical Activity Patterns in a Sample of Saskatchewan Rural Children** 09:50-10:10
HN Bilinski (presenter), *KM Semchuk*, College of Nursing, University of Saskatchewan, Oral
Canada

Physical inactivity has been identified as a cardiovascular risk factor and has been found to influence other risk factors. Few studies have examined the physical activity of Canadian rural children.

This cross-sectional study, conducted in June of 2001, used a self-report questionnaire survey of physical activity patterns of 103 students (58.3% girls and 40.8% boys) in grades 4 through 6 in a rural school division in central Saskatchewan. The students completed the questionnaire at home with a parent or guardian. Potential differences in physical activity patterns were explored between boys and girls and between farm and town residents. Physical activity patterns were compared with the national guidelines in place at the time.

Factors thought to influence children's physical activity were examined. Factors positively associated with meeting national physical activity guidelines included the children's involvement in organized physical activities and farm residence. There were no significant gender differences in the proportion of children who met the national physical activity guidelines and no significant association between the children's physical activity and their television watching behavior or their parents educational levels. The non-significant results may be due to low statistical power.

This information will assist nurses and other clinicians in developing health promotion programs aimed at enhancing physical activity and cardiovascular health of rural children. The findings also suggest hypotheses for future research concerning physical activity patterns.

- 218 Progress in the Implementation of a National Strategy for Child Safety** 10:10-10:30
on Farms Oral
L Stiller (presenter), *L Fragar*, *J Depczynski*, Australian Centre for Agricultural Health and Safety, University of Sydney, Australia

Background and Objectives

In 1997, Farmsafe Australia (a nationally representative farmer-led partnership of industry and government) began a consultative process, facilitated by the Australian Centre for Agricultural Health and Safety (ACAHS) which led to the finalisation of a National Strategy for Child Safety on Farms in 1999. The strategy aims to reduce injury and death in children aged 0-14 years on Australian farms. In 2002 strategy implementation commenced with 3 year funding from the Federal Department of Health and Ageing.

The strategy has eight key components including a national framework for action which recognises the ongoing commitment to action required by key stakeholders at the national, state and local community level. Other strategy components include:

- Identification of key hazards – developing a profile of key agents of injury and risk factors.
- Identification of evidence-based strategies to control key injury risks.
- Identification of educational needs and development of resources to meet the needs of key target groups.
- Identification and development of flexible child care options for farmers in rural and remote areas.
- Promotion of preventive strategies to target groups.
- Identification of further research needs.
- Evaluation of the national strategic plan.

The major risk to children on farms have been identified as:

- Drowning of children aged 0-5 years Injury associated with farm machinery - for both younger (0-9 yrs) and older children (10-15 yrs).
- Injury associated with 2 and 4 wheeled motorcycles for children aged 5-14 years.
- Injury associated with other farm vehicles.
- Horse-related injury.

Discussion

There has been progress in implementing all areas of the strategy under the guidance of a representative Child Safety on Farms Reference Group. The presentation will cover current, completed and planned action.

Conclusions

While the elevated risk of death and injury for children through on-farm incidents in Australia and overseas has been known for some time previous attempts to pursue this issue in Australia have met with resistance from the farming community who perceived them as an unwanted and unnecessary intrusion into their family lives. This strategy and associated programs have however been welcomed due primarily to the consultative approach to strategy formulation and continued throughout the implementation process.

212 Is the Physical Activity and Fitness of Rural Children Declining?

10:30-10:50

D Eslinger (presenter), *JD Barnes, JL Copeland, MS Tremblay*, College of Kinesiology,
University of Saskatchewan, Canada

Oral

Objective

The purpose of this study was to compare the fitness and physical activity levels of children from rural Saskatchewan (RSK, n=165) to Old Order Mennonite children (OOM, n=124) from southwestern Ontario. The lifestyle of OOM children is different from that of contemporary rural children where technology has lessened the physical activity associated with daily living.

Methods

The children (aged 8-13) participated in a battery of fitness tests called the Canadian Physical Activity, Fitness & Lifestyle Appraisal (CPAFLA). The CPAFLA includes measures of health (blood pressure and resting heart rate), anthropometry (skinfolds, waist girth, and body mass index (BMI)), aerobic fitness (step test), and musculoskeletal fitness (handgrip, push-ups, partial curl-ups and sit-and-reach flexibility). Following the CPAFLA, physical activity (PA) was measured directly for seven days using an

accelerometer (MTI Actigraph 7164). Accelerometers are motion sensors worn on the hip that objectively measure minute by minute PA of varying intensities. The data were analyzed using ANOVA with statistical significance set at ($p < 0.05$).

Results

The OOM children had greater grip strength, and aerobic fitness than the RSK children. However, no significant differences were found for BMI, triceps skinfold, or partial curl-ups. The OOM children performed significantly more PA per day than the RSK children (OOM=139 vs. RSK=114 minutes of moderate intensity PA per day).

Conclusion

OOM children are more active, more aerobically fit and stronger than RSK children, which may have implications for the current and future health status of rural children. This research was supported by the Canadian Population Health Initiative of the Canadian Institute for Health Information.

154 FS4JK Day Camps - Who Learns the Most?

DT Claunch (presenter), *D Reed*, *MK Rayens*, *S Burgus*, *D Slusher*, College of Nursing,
University of Kentucky, USA

10:50-12:00

Poster
Discussion

Objective

The purpose of this NIOSH funded study (2001-2004) is to evaluate the effectiveness of FS4JK day camps in improving campers' knowledge of selected farm safety units and to evaluate the camps' impact on campers' parents and the community. This paper focuses on the campers' knowledge.

Method

Six camps in five states across the United States were included for evaluation. Camps were selected based on their historical involvement in FS4JK day camps, anticipated number of attendees in grades 4 and 5, differences in farming type, and geographic location. The camps used school-based field trips and included both farm and nonfarm children. A 33 item pre and post test was designed by the investigators and administered to children who attended the camps. The survey tested knowledge about tractor safety, animal safety, and power equipment safety.

Results

1,220 children who attended the camps completed both the pre and post tests. For the total sample there were significant increases ($p < .05$) in knowledge on each of the three areas evaluated. There were no differences in change scores by gender. The safety score improvement was significantly greater for the nonfarm children ($n=680$), compared with children who lived/worked on a farm ($n=540$) for the outcomes of animal safety, power equipment safety, and overall safety.

The two groups did not differ on change in tractor safety. After adjusting for the corresponding safety knowledge baseline measure, there was no difference between farm and nonfarm campers; however, girls demonstrated greater change than boys.

Conclusions

Farm safety day camps are effective in improving both farm and nonfarm children's knowledge about farm safety.

158 Predictors of Asthma and Wheezing in Infants, Preschool, Elementary School Children and You

W Midodzi (presenter), *A Senthilselvan*, *B Rowe*, *C Majaesic*, University of Alberta and University of Saskatchewan, Canada

10:50-12:00

Poster
Discussion

Factors associated with asthma and wheezing vary with age in children. This variation was investigated using a cross-sectional survey of Canadian children. We used the first cycle of the National Longitudinal Survey of Children and Youth (NLSCY) conducted in 1994-1995 which comprised of 4,696 infants (0 to 23 months), 5,844 preschool children (2-4 years), 8,837 elementary school children (5 to 9 years) and 3,434 youth (10 to 11 years). Logistic regression analysis for clustered binary data was used to determine predictors. The lifetime prevalence of asthma and wheezing in previous 12 months (no asthma reported) were 4.5% and 16.9% in infants, 9.2% and 14.2% in preschool children, 13.5% and 9.2% in elementary school children, and 14.1% and 6.0% in youth. Allergic history was a significant predictor in all age groups with adjusted odds ratios increasing with age for both asthma (2.86 in infants to 7.09 in youth) and wheezing (1.67 to 2.47). Male gender was a significant risk factor for asthma in all age groups with a decline in the odds ratio (1.82 to 1.42). Number of siblings in the family was a risk factor of asthma in infants but a protective factor in elementary school children. Use of daycare was a significant risk factor for both asthma and wheezing in infants. Lower gestational age and prenatal problems were significant risk factors for wheezing in infants. Physical activity was a significant protective factor for wheezing in elementary school children. Infants and preschool children from homes where language spoken was other than English or French, and preschool children of immigrant mothers had a lower risk of wheezing. Age groupings of children should be given special consideration in planning etiological studies of asthma and wheezing.

233 Survey Research Lessons Learned from Children

D Reed (presenter), *D Claunch*, *D McCallum* (presenter), *S Burgus*, *D S Slusher*, *S Reynolds*, University of Kentucky, USA

10:50-12:00

Poster
Discussion

Objectives

Describe the challenges and successes encountered in conducting survey research with children in rural communities.

Discussion

Two NIOSH-funded studies are currently evaluating the effectiveness of farm safety day camps for children. For both studies, pre-test data were collected with written instruments administered in small groups prior to the camp. Follow-up data are being collected using mailed and telephone survey research methods. These two independent studies have both encountered a number of challenges, as well as successes, that are especially relevant to conducting survey research with children. This presentation outlines these issues, including the process of gaining consent and access to participants, child and parental response to participation in the studies, achieving comparability across presentation modes, and possible threats to the reliability and validity of the data. The use of publicity, incentives for participation, and impact of regulations on gathering sensitive information will be discussed.

Conclusion

Survey research with children and their families poses special challenges and opportunities for researchers. Understanding the nature of these challenges and opportunities and a variety of options for addressing them will aid future research endeavors with children.

PHARE Program

Kelsey/Saskatchewan – 08:30-12:00

Chair: *S Kirychuk, I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan*

234 Maternal Characteristics and Household Determinants of Health in Canadian Infants and Children

8:30-12:00

Oral

W Midodzi (presenter), *A Senthilselvan, C Estabrooks*, University of Alberta and University of Saskatchewan, Canada

We examined the effects of maternal and household characteristics on the health of Canadian children through structural models. The main study concept was the general health of infants and children rated by their mothers on 5-point Likert scale rating (1=poor, 5=excellent). The data was obtained from National Longitudinal Survey of Children and Youth (NLSCY), conducted in 1994-95 by the Statistics Canada under federal governments "Brighter Future" initiative for children. Only those responses by biological mothers were included in the analysis. Data was obtained for 7784 children less than 4 years of age across 6268 households.

Structural linear relationship models were used to analyze the effect of maternal characteristics and household factors on children health. The model has eleven concepts, six of these were exogenous: sex, mothers education, second-hand smoking, gestational age, use of cigarette and alcohol during pregnancy; and five endogenous concepts: household income, birth weight, child's health, mother's health, crowding index. A single indicator was used to measure each of these concepts. The effects were estimated using maximum likelihood methods. After adjusting for child factors, the results based on close fit model ($p=1.000$) suggest that both maternal and household factors significantly contributed to the health of infants and children. The major risk factors were crowding, $-0.100 (<0.001)$ and use of alcohol, $-0.054 (p=0.036)$. The effects of education, $0.002 (p=0.825)$, and second-hand smoking, $-0.005 (p=0.566)$, were relatively weak, while that of household income was of borderline significance $0.013 (p=0.086)$. The effect of mothers' health, $0.251 (p<0.001)$, was significantly a predictive factor, i.e., mothers with better health rating were much likely to give higher rating on their children's health status. Female children have a significantly better health rating than that of their male counterparts. Other child characteristics, such as normal birth weight and higher gestational age are indicative of better child health.

The findings suggested that maternal and household factors should be given special consideration in programs aim at improving infant and child health. When permitted by Statistics Canada, stacked models would be use to examine the differential effects these factors may have on children from rural and urban household.

244 Role of Dendritic Cells in the Viral-Induced Enhanced Antigen Sensitization in HP

8:30-12:00

Oral

M Girard (presenter), *E Israel-Assayag, Y Cormier*, Centre de Recherche, Hopital Laval, Institut Universitaire de Cardiologie et de Pneumologie, University of Laval, Quebec, Canada and University of Saskatchewan, Canada

A parainfluenza virus infection enhances sensitization to inhaled *Saccharopolyspora rectivirgula* (SR) antigen in mice. One possible mechanism involved in this exacerbated antigenic response is the recruitment, the maturation and the persistence of dendritic cells in the respiratory epithelium following a viral respiratory infection. Dendritic cells (DC) are potent antigen-presenting cells which exist at different stages of maturation determining their capacity to regulate T-cell immunity. Environmental factors such

as microbial, viral or allergenic products regulate the differentiation and function of DC which in turn determine the outcome of the immune response. Immature or semi-mature DC induce tolerance to inhaled antigens, whereas mature DC can be activated to prime T cells.

In the present study, 2 distinct subsets of DC (CD11c+ and CD11c-) were generated from human peripheral blood monocytes cultured with GM-CSF and IL-4 (immature DC), and then further incubated with pro-inflammatory cytokines (TNF, IL-1b, IL-6, PGE2) to induce a more mature phenotype. Results are expressed as % positive cells.

Population 1 CD11c-				
	Subject 1		Subject 2	
	Immature	Mature	Immature	Mature
Isotype	1,4	3,3	1,6	2,1
CD208	2,1	4,2	2,0	4,2
CD11c	9,3	15,9	13,0	20,6
CD86	17,0	24,8	16,1	24,4
Population 2 CD11c+				
	Subject 1		Subject 2	
	Immature	Mature	Immature	Mature
Isotype	1,8	4,4	3,0	1,8
CD208	3,2	13,5	4,0	13,6
CD11c	97,2	91,6	98,7	95,5
CD86	97,9	96,1	97,8	98,2

Immature monocyte-derived DC will be incubated with either 50 mg/ml SR homogenate or pulsed with SR and then infected with 150 hemagglutination units per milliliter of Sendai virus. After 24 hrs incubation, the cells phenotype will be analysed. Further experiments will include incubation of these antigen-pulsed, virus-infected DC with autologous T cells and the characterization (phenotype and cytokine profile) of these stimulated and expanded T cells. We expect to see expansion of immunosuppressive producing cells for DC primed with SR antigen, versus Th1 polarized cells by SR-pulsed DC infected with Sendai virus.

245 Impact of Inhaled Swine Barn Dust on Airway Hyperactivity and Inflammation

8:30-12:00
 Oral

J Cleave (presenter), JR Gordon, PJ Willson, Veterinary Infectious Disease Organization, University of Saskatchewan, Canada

Endotoxins, a component of the cell wall of Gram-negative bacteria, are ubiquitous in the environment and are often present in high concentrations in organic dusts. Studies have demonstrated that inhalation of endotoxin-contaminated air is associated with the classic features of asthma, including reversible airflow obstruction, inflammation, and airway hyperreactivity (AHR) and remodeling. To determine the impact of inhaled swine barn dust (SBD) on lung function and inflammation, 28 CD1 male mice (6 treatment groups) were exposed to nebulized SBD, for two weeks, via a whole body chamber. SBD suspensions were prepared daily and analyzed for endotoxin content. Airway reactivity to methacholine (MCh) was determined, and lung inflammation was assessed in whole lung lavage. Group 1 was exposed to sterile water (0.052 EU/mL), group 2 was exposed to 0.00004 mg/mL SBD (1.39 EU/mL), group 3 was exposed

to 0.0004 mg/mL SBD (3.073 EU/mL), group 4 was exposed to 0.004 mg/mL SBD (36.8 EU/mL), group 5 was exposed to 0.04 mg/mL SBD (124.9 EU/mL), and group 6 was exposed to 0.4 mg/mL SBD (1395.0 EU/mL).

The results of the airway reactivity to MCh were inconclusive, however a trend indicated that the high exposure groups (4, 5, and 6) displayed AHR compared to group 2. Groups 3, 4, 5, and 6 had increases in their numbers of bronchoalveolar lavage (BAL) fluid lymphocytes, as compared to groups 1 and 2, suggesting the presence of specific immune responses. Whole blood differential counts showed increases in the numbers of neutrophils proportionate to the SBD exposures, consistent with inflammatory responses. Interleukin-1, IL-6, IL-12, and TNF were measured in BAL fluid. The results from the cytokine assays demonstrated a similar trend with group 4 responding the most, whereas the responses of groups 1, 2, 3, 5 and 6 were significantly reduced ($P < 0.05$). The lack of response in the high exposure groups may have been due to an inflammatory response tachyphylaxis in spite of high levels of endotoxin (suspected in groups 5 and 6).

This study demonstrated that the strongest inflammatory responses were associated with exposure to 0.004 mg/mL SBD (group 4), the exposure level of the average swine barn worker.

256 Rural Work Environment: Evaluation of Air Harmfulness by In-Vitro Tests on Pulmonary Epithelial Cell

8:30-12:00

Oral

V Letourneau (presenter), *A Meriaux, J Chakir, Y Cormier, C Duchaine*, University of Laval, Quebec, Canada

Rationale

Different rural work environments (e.g., sawmills, dairy barns, peat moss processing plants, swine confinement buildings) are responsible for respiratory symptoms and diseases including hypersensitivity pneumonitis, organic dust toxic syndrome, asthma, bronchitis, and pneumonia. These diseases are caused by inflammatory and cytotoxic reactions in host cells. In vitro assay can be performed to characterize the overall air contaminants quantifying various inflammatory/toxic markers in cell cultures. Such in vitro tests could be used to rapidly characterize air samples in order to introduce environmental hygiene solutions to prevent the development of respiratory diseases in the exposed workers.

Hypothesis

Extracts from the air of various work environments will induce different response in in vitro cell cultures. Effects of air samples will depend on the composition of the sample microbial constituent.

Material and Methods

Air samples from different work environments were obtained with All-glass impingers-30. Cultured pulmonary epithelial cells (A549, BEAS-2B) were exposed to lyophilized air samples. Cells were also exposed to standardized concentrations of b-glucan, endotoxins, peptidoglycan and mycotoxins. After 24 hours of incubation, the cytotoxic and immunogenic reaction was characterized by quantifying interleukin-8 and tumor necrosis factor alpha (TNF- α) and evaluating the cellular death (necrosis/apoptosis). Trypan blue exclusion and the TUNEL technique were used to characterize cell necrosis and apoptosis respectively.

Data Analysis

Comparisons of the air sample effects with those of b-glucan, endotoxins, peptidoglycan and mycotoxins standards will be performed. Correlations between the inflammatory/toxic effects and intensity obtained on this pulmonary epithelial cells in vitro model and the microbial content (plate count), endotoxin, mycotoxin, ergosterol and b-glucan levels will also be obtained.

Expected Results

The effect of air samples on in vitro cell cultures will depend on the type of contaminants (bacterial vs fungal; Gram positive vs Gram negative, endotoxins, glucans). The in vitro testing of an air sample will help predict the potential effects on human respiratory health (immune vs. toxic response etc.). We expect that, because of synergism, air samples will induce a stronger response than what would be expected by their different components taken separately. The opposite is also possible since some components could counteract the effects of others.

271 Assessment of Exposure to Mycobacterium in Peat Moss Plants using Quantitative PCR and rRNA Analysis

8:30-12:00

Oral

MP Cayer (presenter), *M Veillette*, *R Hamelin*, *MJ Bergeron*, *Y Cormier*, *C Duchaine*,
University of Laval, Quebec, Canada

Introduction

Peat moss processing plant workers are exposed to high levels of bioaerosols which contain molds, dust, bacteria, and mycobacteria. Exposure to mycobacteria may lead to respiratory problems such as hypersensitivity pneumonitis. Assessment of exposure to mycobacteria using culture-based methods is difficult since they are fastidious, produce small colonies, and are not easily isolated when molds are abundant. Their isolation from contaminated samples requires decontamination processes that can harm several mycobacterial species.

Objectives

The aims of this project were: 1) to quantify mycobacteria from peat moss processing plants air samples using quantitative (q)PCR, 2) to clone and sequence amplified 16S rDNA in order to identify the species present, and 3) to identify isolated colonies from peat moss using sequence analysis.

Methods

Peat moss processing plant air samples were taken using AGI-30 at sieving and bagging sites. The samples were kept in sterile saline water and frozen prior to DNA extraction. DNA was extracted and qPCR was performed using *Mycobacterium* sp. primers. Sample quantification and standard curve were performed in the same reaction conditions. Mycobacterial colonies were isolated from bulk peat moss samples after decontamination prior to plating. DNA was isolated and standard PCR performed with the same *Mycobacterium* specific primers and PCR products were sequenced.

Results

Using qPCR, we estimated the exposure of peat moss processing plant workers to *Mycobacterium* sp. at 108 DNA copies (or cells)/m³. Species identified from air samples included *M. malmoense*, *M. graecum*, *M. smegmatis* ssp., *M. interjectum*, and *M. bohemicum* whereas peat moss showed different species (*M. avium*, *M. intracellulare*, *M. terrae*, *M. bohemicum*, *M. palustre*). Several of those species are associated with respiratory diseases but were never described in the context of industrial hygiene.

This paper describes the novel use of qPCR for exposure assessment to organic dust contaminants. We conclude that this tool is an interesting surrogate for culture in estimating exposure to mycobacteria since it avoids decontamination process required to isolate mycobacteria from molds and allows microbial community analyses. Presence of inhibitors and possible amplification of bacteria other than mycobacteria still have to be studied.

275 Investigating the Respiratory and Dermatological Health Issues in Offshore Workers

8:30-12:00
Oral

K Zinszer (presenter), *J Guernsey*, *V Gagner*, *S Weerasinghe*, Community Health and Epidemiology Centre for Clinical Research, Dalhousie University, Nova Scotia, Canada

Offshore drilling conditions require the use of a complex lubricant. Exposure to the lubricant, also known as drilling mud, can occur through dermal contact, inhalation, or ingestion generated by mists or splashes during certain operations. The health effects from exposure to such fluids have not been widely studied.

The objective of this study is to examine the association between the exposure to drilling fluids on the offshore drilling platforms and the occurrence of symptoms related to occupational contact dermatitis and respiratory tract ailments.

The study will encompass approximately 1200 participants currently employed on six different rigs. The six rigs will be identified through discussions with the Canada-Nova Scotia Offshore Petroleum Board, the offshore industry, and worker representatives. The entire working population of the six rigs will be surveyed in order to obtain cross-sectional information. The survey is aimed to capture data on respiratory symptoms and indications of occupational contact dermatitis, in addition to previous work histories and lifestyle factors. Exposures will also be captured through work-related questions in the survey.

Simple logistic regressions will be used for each independent variable and for each of the outcomes; a crude odds ratio will then be calculated. Stratification will occur by job positions, which will allow for the identification of employees at high risk. Stratifying by rig will also occur, allowing for the quantification of confounders or effect modifiers, such as: differences due to the chemical compositions of the fluids, meteorological factors, and technology aboard the rigs. Adjusted odds ratios will be calculated.

- Thursday Luncheon -

Adam Ballroom – 12:00-14:00

Co-Chairs: *S Kirychuk*, *L Holfeld*, *L Lockinger*

I.ARE.H, Centre for Agricultural Medicine, University of Saskatchewan, Canada

422 Developing a Winning Attitude

12:00-14:00

G Gregor, Educational Counsellor, Moose Jaw, Saskatchewan, Canada

“If you always think the way you always thought, you will always get what you always got.” If you don’t control your destiny, someone else will. Instead of focusing on obstacles, handle your fears and focus on results to achieve your goals.

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