

# Teletrauma and Telepresence Resuscitation: Southern Arizona Experience

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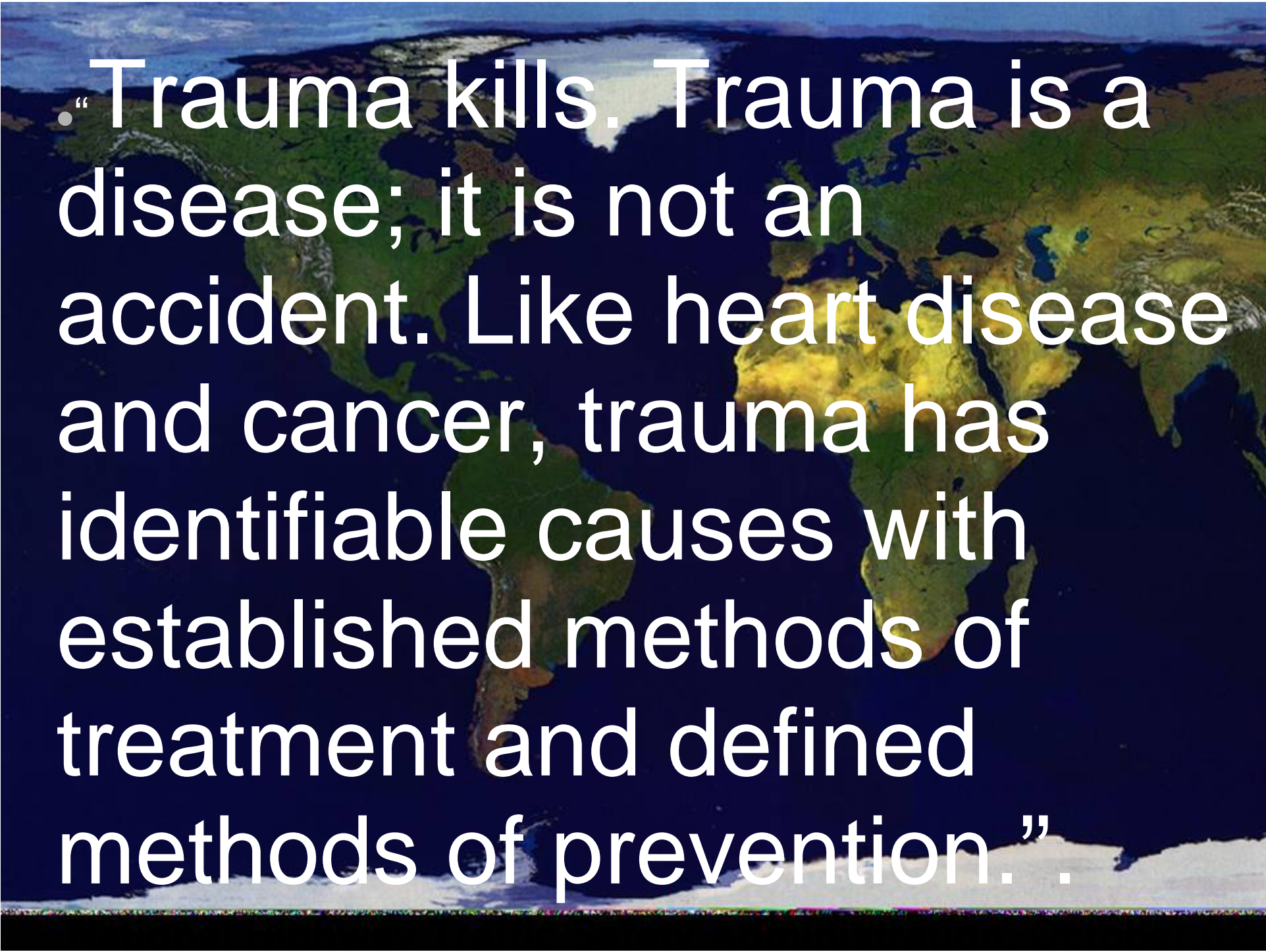
Tucson, Arizona

Med@Tel 2005, Luxembourg







A satellite view of the Earth from space, showing the Americas, Europe, and Africa. The text is overlaid on the image in a large, white, sans-serif font.

• “Trauma kills. Trauma is a disease; it is not an accident. Like heart disease and cancer, trauma has identifiable causes with established methods of treatment and defined methods of prevention.”.

# Trauma is predictable

“ It happened yesterday,  
it is happening  
today, and it will happen  
tomorrow.”

# Serious Problem

- 1995 in the USA:  
148,000 deaths from trauma  
\$ 260 billion in cost
- 12% of all national medical spending
- Most trauma patients are young!

# Facts:

- 23%-25% of population resides in rural America; 56.9% of deaths from MVC!
- Only 15 states have state wide 911 or enhanced 911!
- 600 people die each day or sustain long term disability from trauma!
- 40% of deaths could have been prevented!
- 600 times more likely to die from MCV if you live in Loving, Texas than if you live in Manhattan !











Courtesy: S. Fergusson, Alaska







# Rural world lacks

- Trauma surgeons...
- Neurosurgeons...
- Orthopedic surgeons...
- Vascular surgeons...
- Good emergency medicine...
- Technology...

# Major trauma centers

- Are concentrated in urban settings.
- Subsequently, most of the population of the world is not covered by specialized trauma systems.

# Trauma in the 21<sup>st</sup> Century: Main Issues for the next decades

- Organizational (creating systems)
- Medical advances in the resuscitation of trauma patient
- Technological advances
- Distance education



There is a tremendous need

“For new approaches in trauma care in order to reduce death and disability from the disease of trauma”.

# *Trauma...*

- Unpredictable to time, place, severity and the number of injured people
- Require different types of treatment
- Often real-time information missing
- Organized infrastructure and protocols

# Causes:

Earth behavior (floods, tornados, hurricanes, avalanches, landslides, storms, earthquakes, epidemics...)

- Man made disasters: wars, terrorist attacks, other catastrophes...





## *During disasters*

- Radio communication causes transmission mistakes and radio-overload.
- Manual distribution of the same data for many receivers using different communication lines causes confusion

## *What is needed:*

- Computer-assisted Command and Control System (CACCS)
- Telemedical support through ad-hoc networks and running services
- Database-dependent resources networks
- Medical intelligence
- Real-time information

# Key infrastructure elements of trauma systems

- Leadership
- Professional Resources
- Education and Advocacy
- Information Management
- Finances
- Research
- Technology ; Disaster Preparedness and Response - Conventional & Unconventional



# Question:

Where do we stand with tele-trauma and telepresence (telemedicine) for injured and critically ill patients?

Answer:

● No where, really!

# Why not?

- We have communication technology, we have telemedicine, we know how to do it?
- So, what is wrong then?

## Reason (s):

- Telemedicine and telepresence from nine to five does not work when it comes to trauma!



# Another question:

- So, is there a crisis in trauma care and trauma education world wide?

# Yes!

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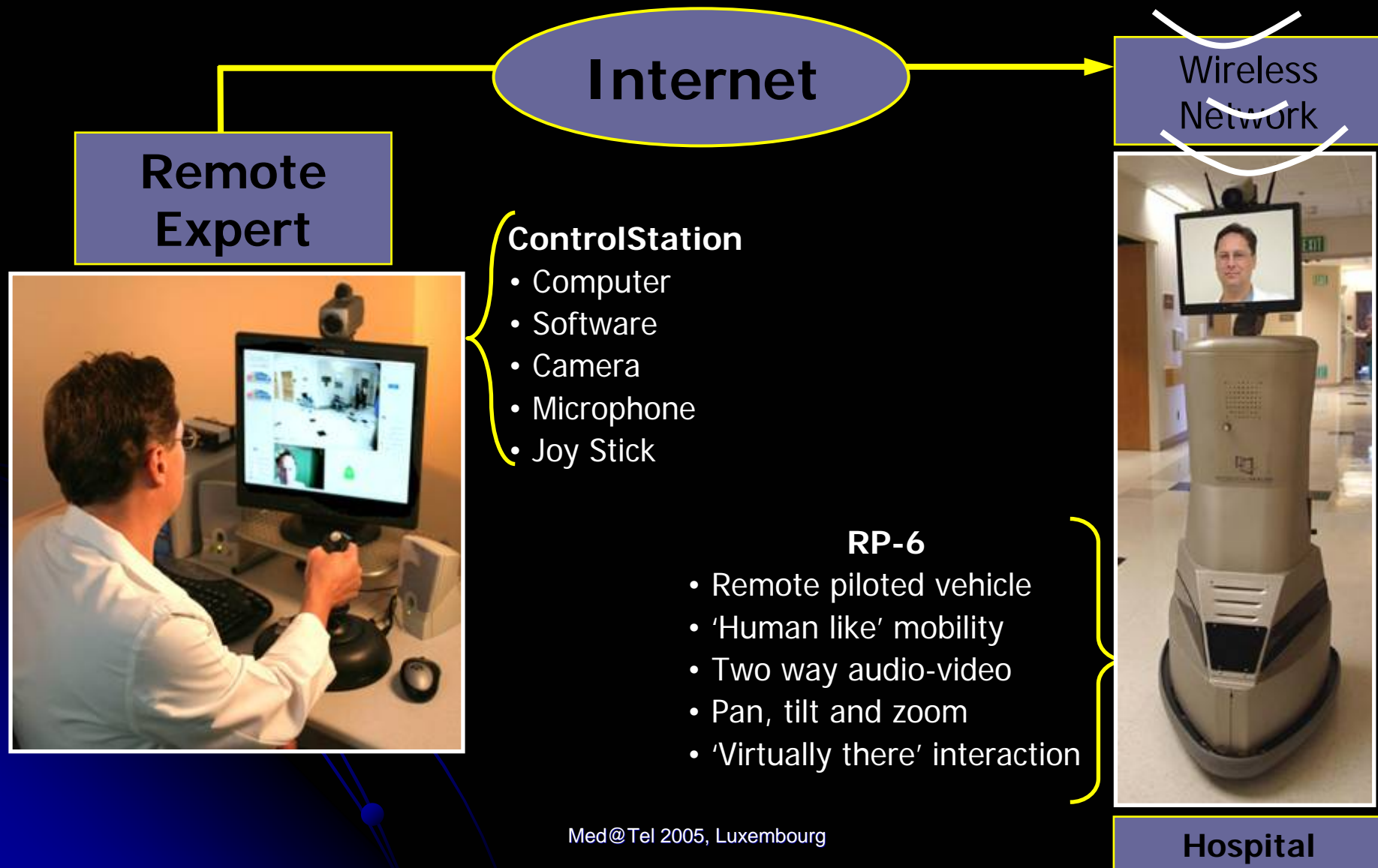
# How can we change this?

- Have expertise of trauma centers available and accessible to small hospital ERs in rural regions 24 hours a day seven days a week through VIRTUAL TRAUMA SURGERY PRESENCE

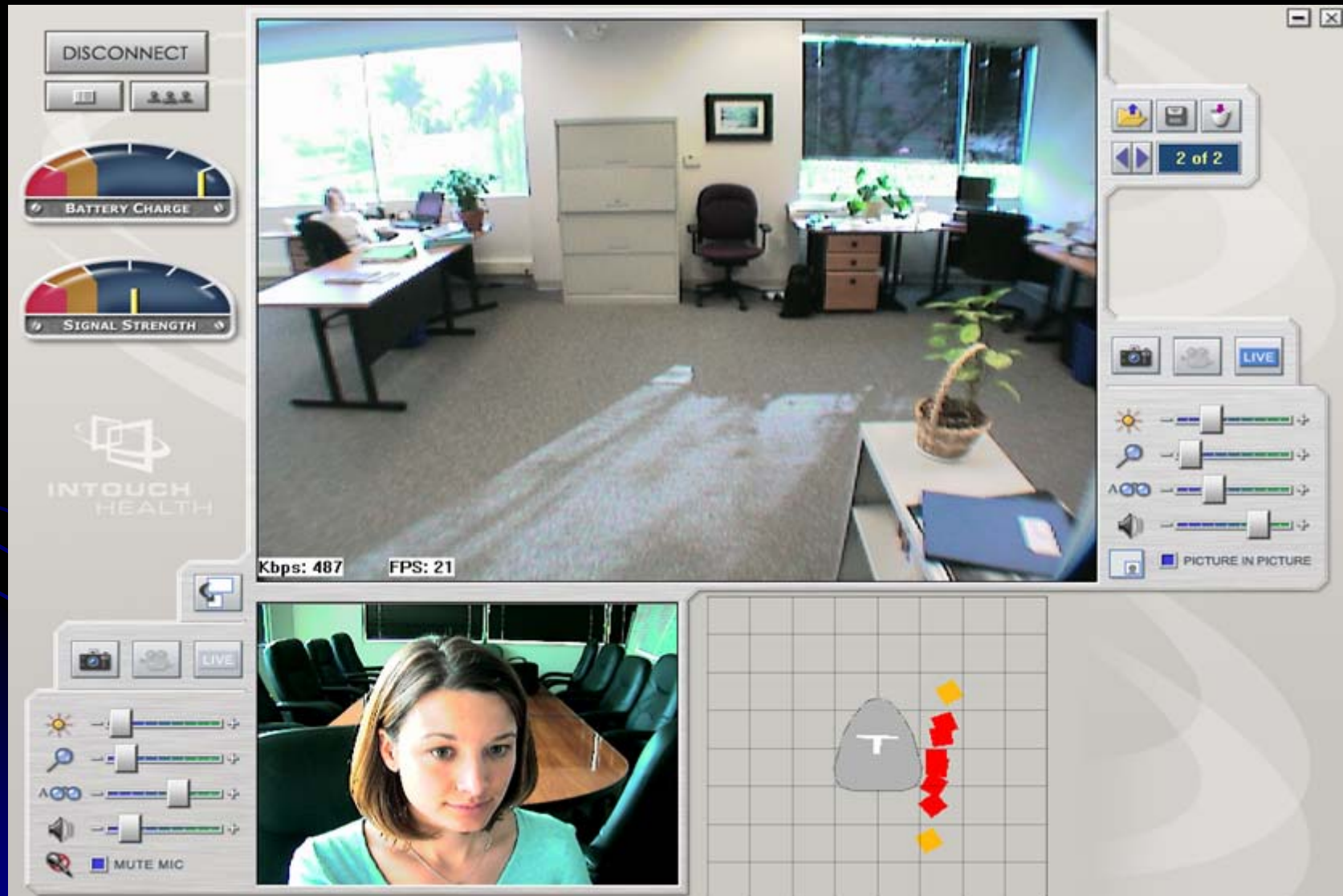




# Remote Presence/Telepresence



# ControlStation Dashboard



# Satisfaction

- In 61% of cases trauma surgeon felt that teletrauma improved patient's care
- 83% of cases referring providers felt that teletrauma improved patient's care
- Easy to use: 86%-88%
- Will have not been able to provide adequate consultation via telephone- 67% of cases






1,950 the cruelest border miles on earth...





A digital display with a black screen and a dark frame, mounted on a reddish-brown structure. The screen shows the number 111 followed by a degree symbol. The background is a clear blue sky.

111°

130 degrees on the ground



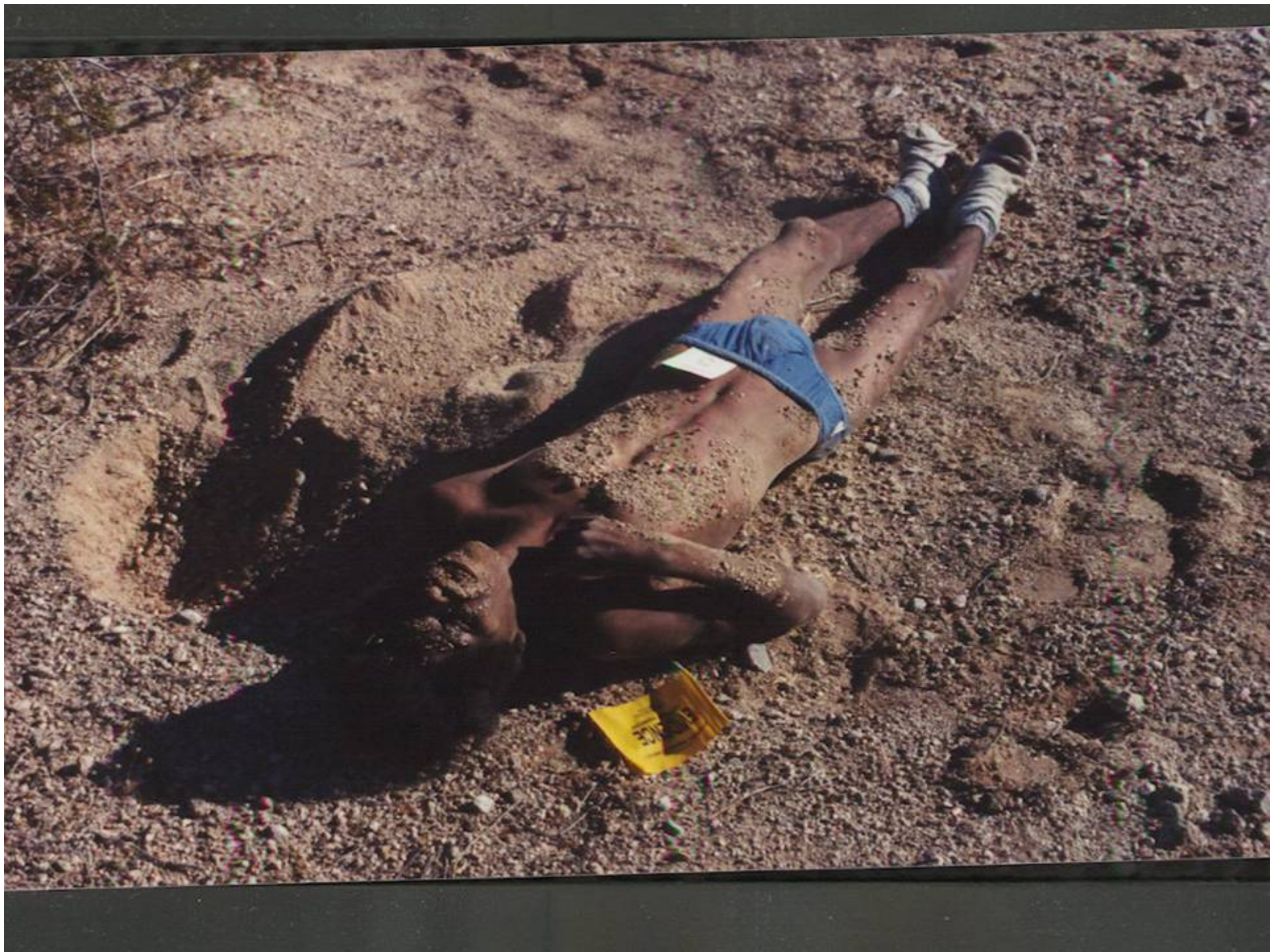


Over Crowded Roll Over Vehicles Smuggling Illegal Immigrants:  
41 people in a pick up truck







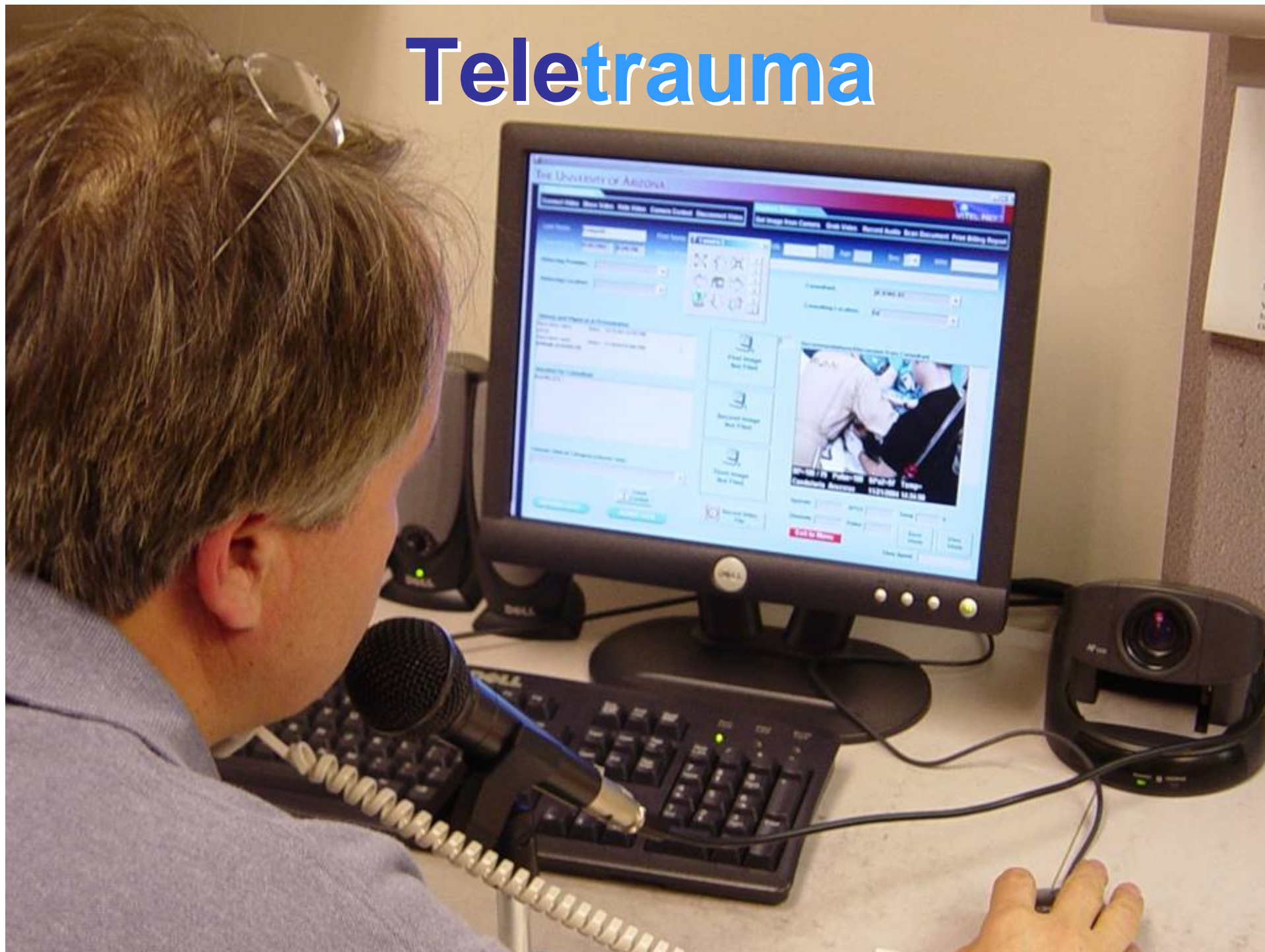




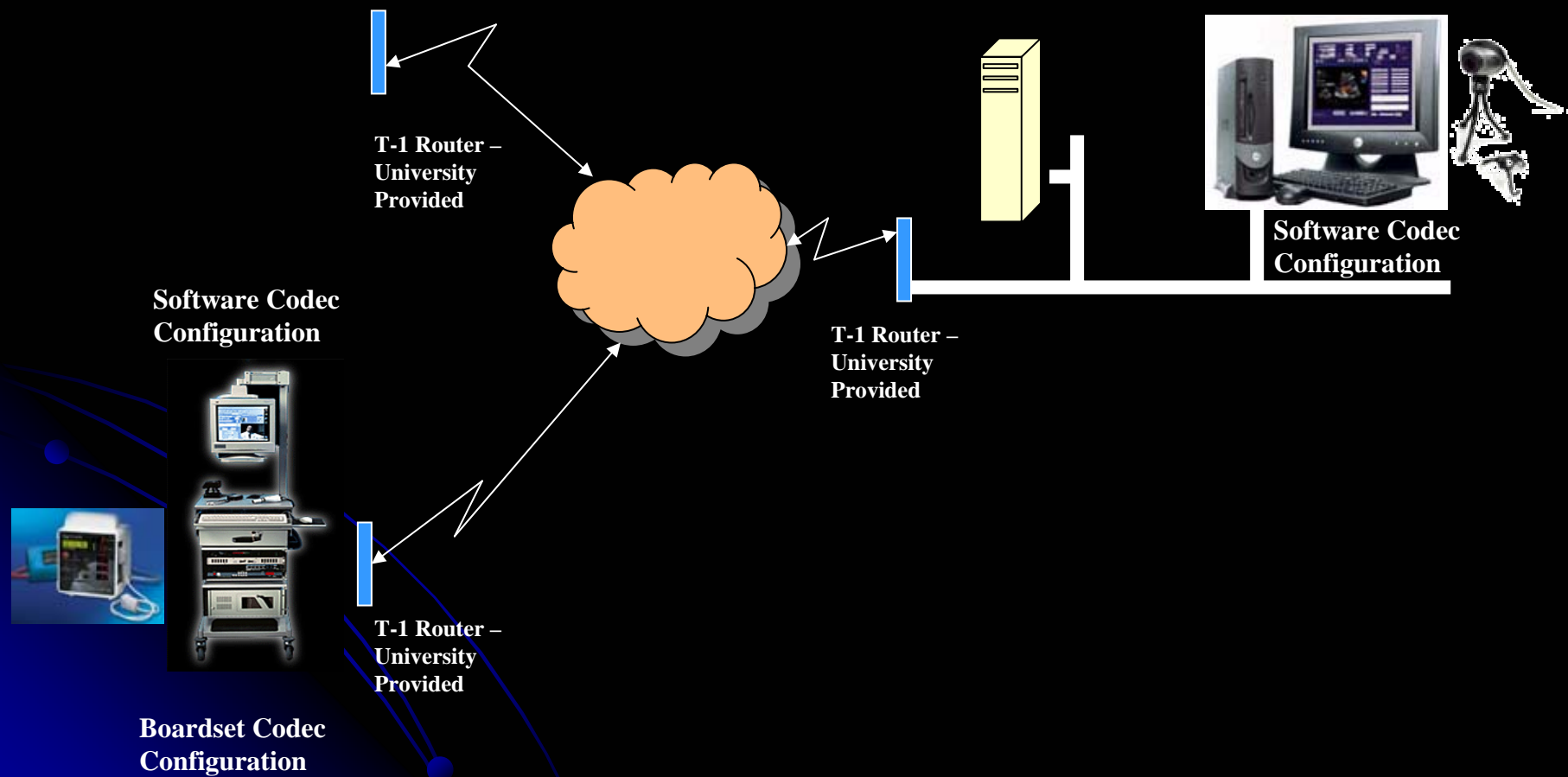




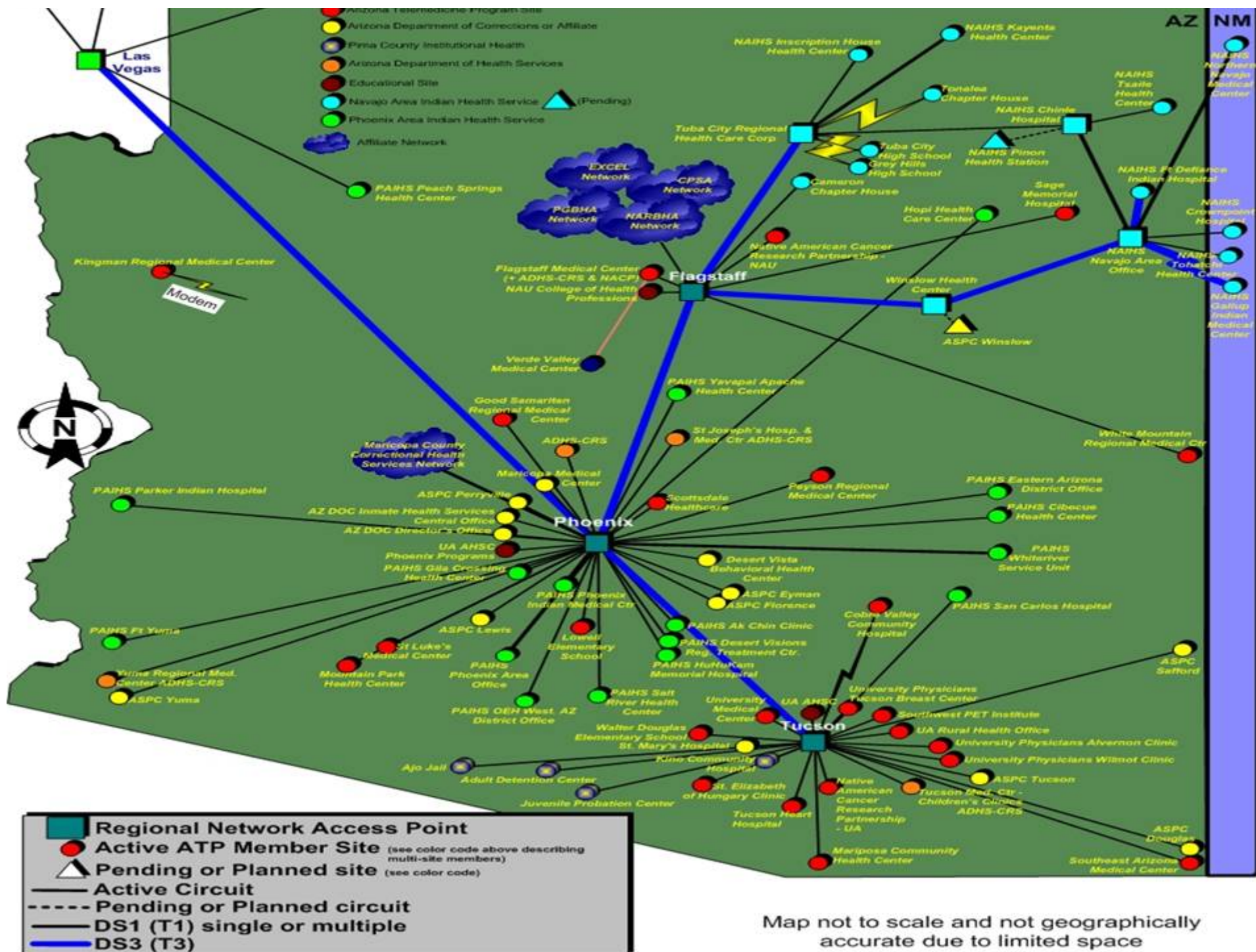
# Teletrauma



## University of Arizona Telemedicine Program Emergency Service Application



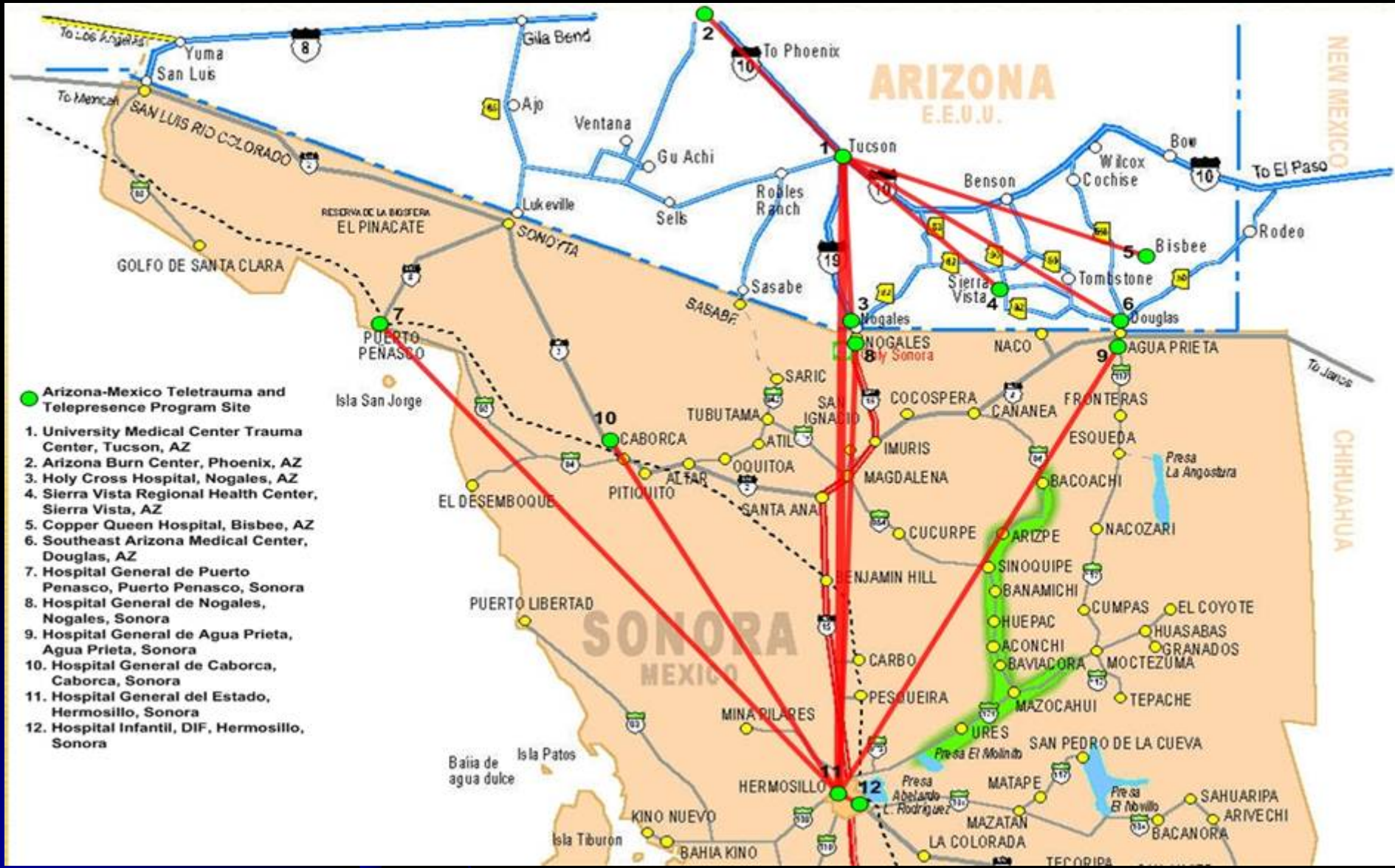




Map not to scale and not geographically accurate due to limited space



# Arizona-Mexico Teletrauma and Telepresence Program



# Case Presentation

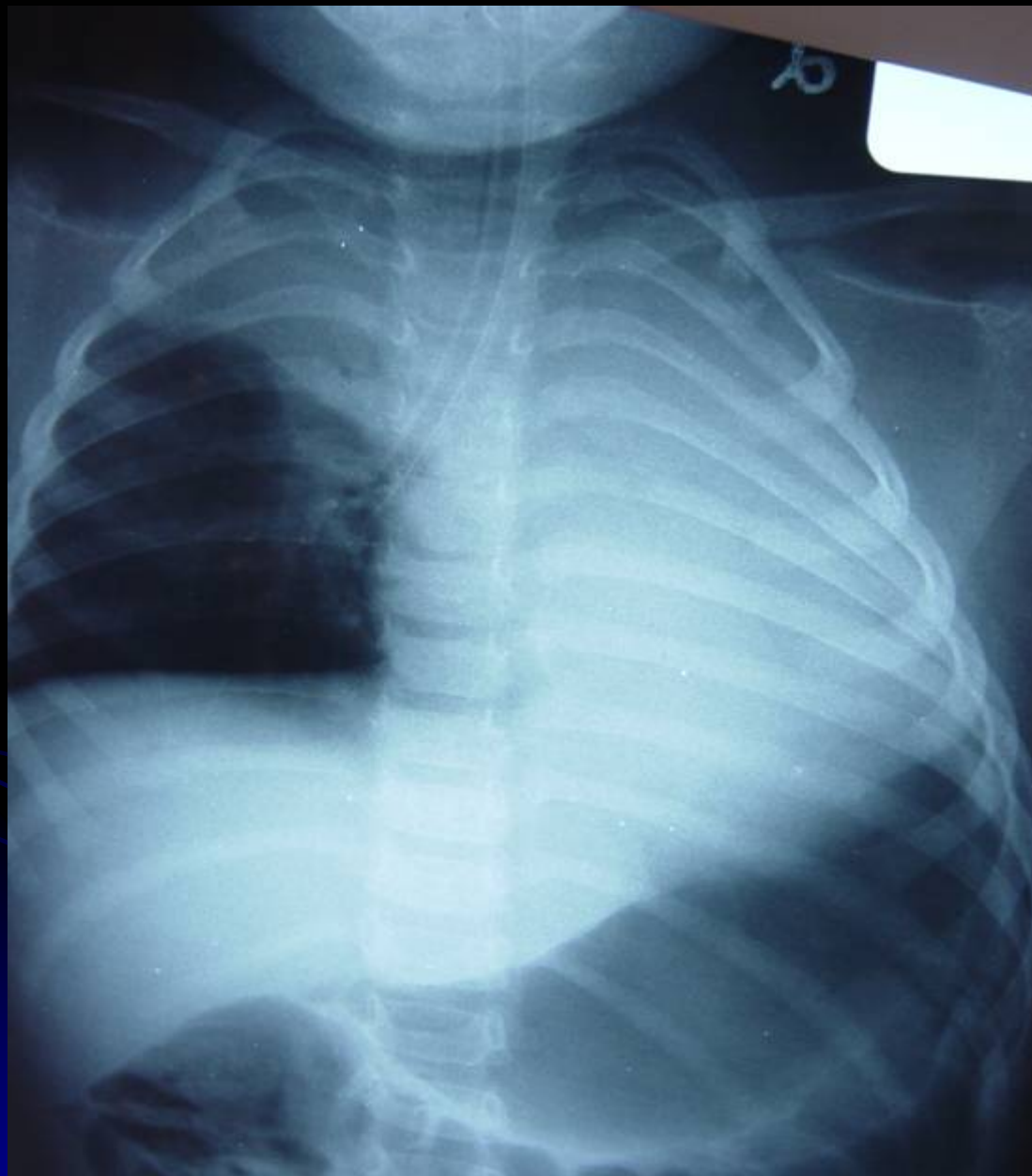
- 18 months old baby brought to SAMC ER in Douglas, AZ, three hours after motor vehicle with three fatalities
- Injuries: Severe and complex scalp laceration, right tib-tib fracture, left femur fracture
- In coma
- Hypoxic (saturation in the 70s) , hypotensive (SBP in the 50s), severe acidosis (Base deficit 9.0, anemic (hemoglobin 5.8)
- No IV access



Once Intubated...

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Advise:  
Pull the  
tube back,  
decompress  
the stomach...

Results:  
Clinical  
Improvement  
Better SBP  
Improvement  
of Saturation



Able to see even detailed attempt to place an IV...





Transferred to UMC trauma team: Surgery and pediatric intensivist meet the patient

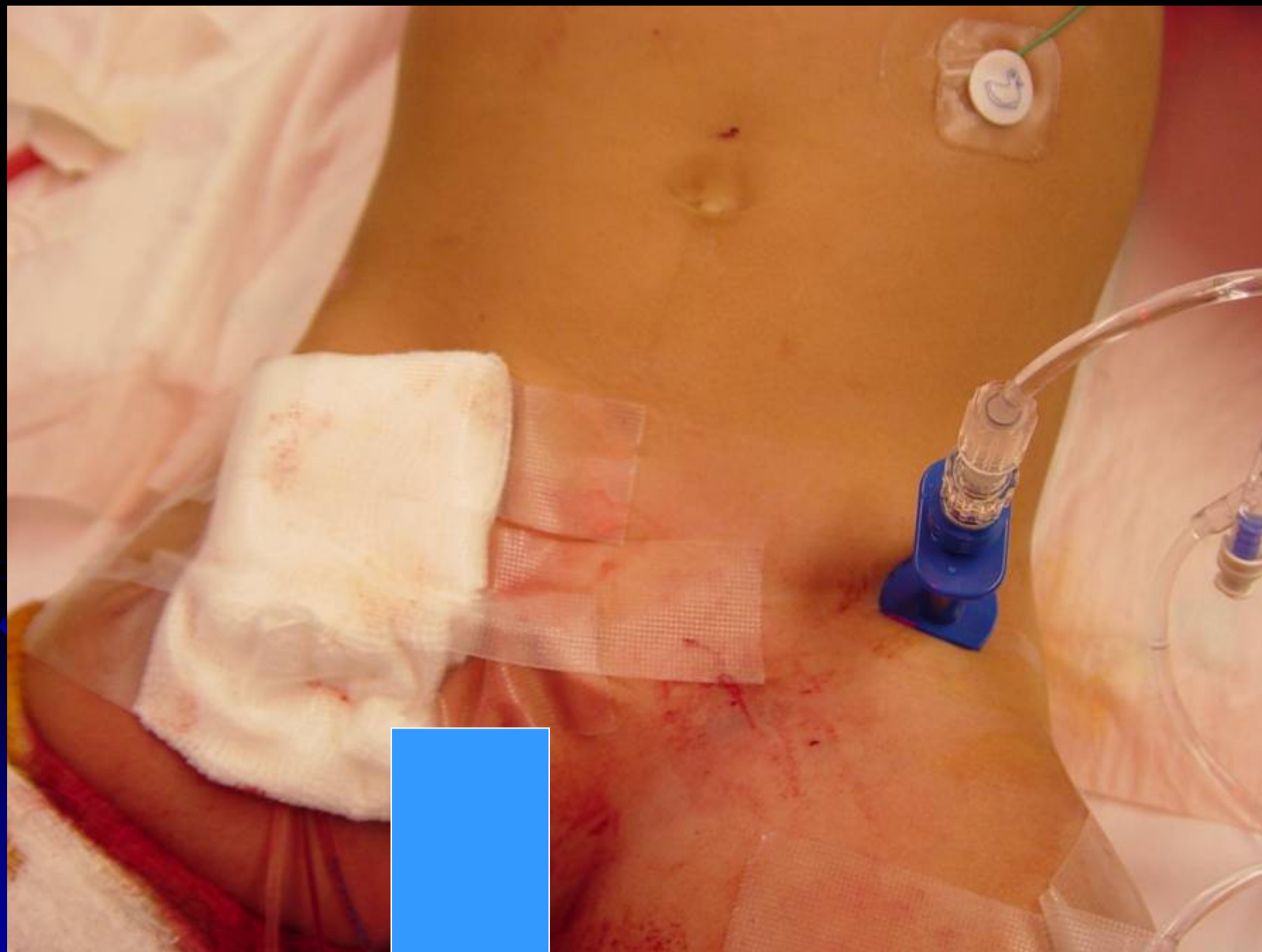


Severe femoral fracture





At trauma room at UMC: Femoral IV access lost in flight, hypotensive.  
Cut down and ligation of right femoral vein (dr. Latifi), intraosseous access (dr. Berg)



# Interventions

- Intubate the patient
- Able to evaluated chest raising after intubation
- Reposition the ET tube from the right main bronchus
- Assessed the CR, Bag her with small tidal volumes
- Sedate, paralyze the patient
- Obtain femoral vein/arterial access
- Aggressively resuscitate with lactated ringer
- Obtain a blood gas, CBC, Start blood transfusion, Give antibiotics, Suction the ET tube
- Place the orogastric tube to decompress stomach

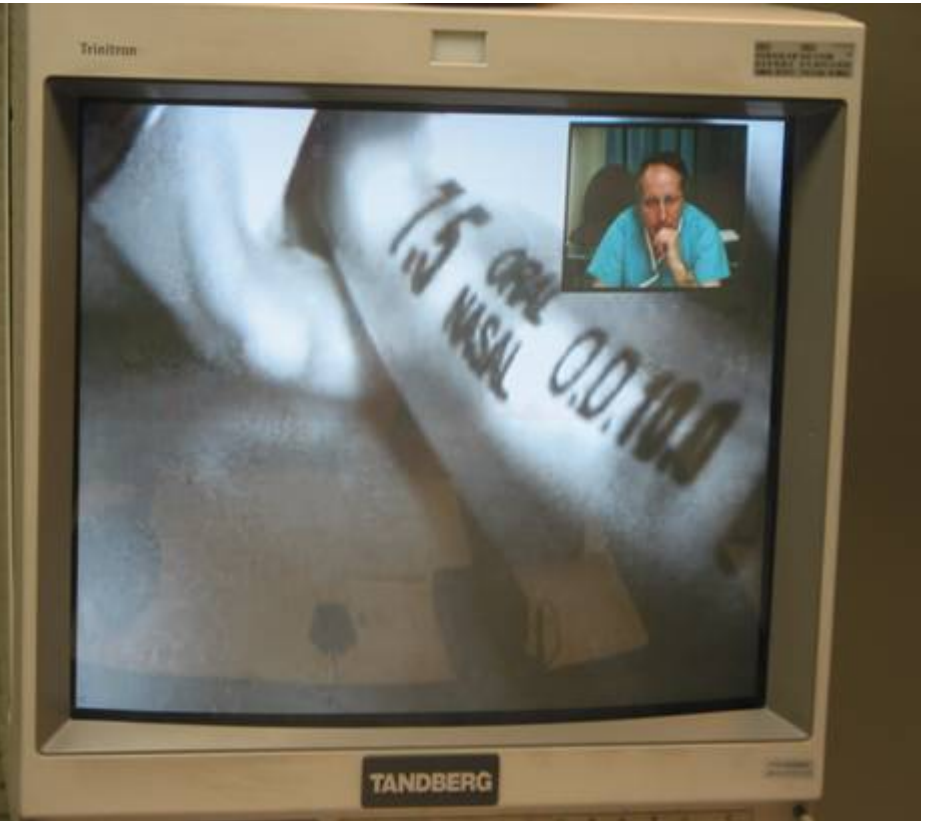


# Hospital Course

- Acidosis treated, Fractures fixed
- Large mesenteric hematoma managed non-operatively
- ARDS treated with lung protective strategy
- Child was discharged back to home in Agua Prieta

# Continuous Telepresence...

- Is it possible technically?
- Is it acceptable by first responders?
- Is it acceptable by trauma and emergency docs
- “The big brother is watching concept”







# Conclusions

- Trauma resuscitation can be done via telemedicine and will save lives!
- Creativity and commitment by Trauma Centers to render care to its population-key!
- Use your telemedicine network and expertise:
  - It is here in you door step!
- Talk to each other!

# Real Limitation of Telesurgery and Teletrauma: Nontechnical

- Ethical
- Re-imbursement
- Legal issues
- Referral pattern
- Patient behavior pattern
- Physicians behavior pattern

# www.telemedicine.arizona.edu

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Arizona Telemedicine Council

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## Arizona TELEMEDICINE

Wednesday, January 5, 2005

### Telemedicine Updates

- > [A Life Saved through New Teletrauma Service](#) new
- > [Arizona Achieves Number One Status in Telemedicine](#)
- > [Telemedicine Saves Millions of Dollars for Arizona](#)
- > [Telemedicine Benefits Thousands of Arizona Patients](#)
- > [Prison Telemedicine Promotes Public Safety in Arizona](#)
- > [Arizona Telemedicine Program Builds Cost-Effective Rural Health Care Telecom Network](#)
- > [Arizona Leads the Nation in Native American Telemedicine](#)
- > [ATP's Arizona Diabetes Virtual Center of Excellence](#)



# Thank You!

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