U.S. Army Telemedicine Programs in the Pacific Theater

COL Ron Poropatich, MD
Deputy Director
Telemedicine & Advanced Technology Research Center
(TATRC)
US Army Medical Research & Materiel Command
Fort Detrick, MD

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Medical Informatics Consultant to the U.S. Army Surgeon General

29 September 2008
Disclaimer: "The views and opinions expressed in this presentation are those of the author and do not reflect official policy or position of the Department of the Army, Department of Defense or the U.S. Government."
Acknowledgements

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• LTC Eric Crawley, MD

TATRC Hui
Dr. Stan Saiki, MD
Alan Furuno
Army Medical Department Investment in Telehealth

- World-wide deployed capability
  - Radiology (>100 DICOM servers in AMEDD, 16 in SW Asia)
  - Pathology (22 systems) linked to the AFIP, including Baghdad
  - Ophthalmology (LRMC, WRAMC, TAMC)
  - Dermatology (tri-service program supporting 31 sites)
- Medical Center (MEDCEN) expertise
  - Landstuhl Regional Medical Center, Landstuhl, Germany
    - Radiology – support to Europe and SW Asia
  - Brooke AMC, San Antonio, TX
    - Dermatology – 400 consults/month
    - Cardiology – 300 Echo’s/month
  - Tripler AMC, Honolulu, HI
    - Pediatrics – 50 consults/month
    - eICU consults with Guam Naval/Seoul, Korea
  - Walter Reed AMC, Washington, DC
    - Psychiatry – 2000 consults/month
    - Neurosurgery – 200 consults/month
  - Martin ACH, Fort Benning, GA
    - Mental Health Chapter evaluations – 100 consults/month
  - Madigan AMC, Fort Lewis, WA
    - Pediatric Cardiology – 100 consults/month
U.S. Army Teleconsultation program for OIF/OEF

Background

• Initiated in April 2004

• Email based system with JPEG image attachments – no patient identifying information; no patient privacy violations

• Utilizes theater providers’ personal digital camera & routine Internet email access

• U.S. based medical specialists answer tele-consults 24x7

• Response time: ~ 5 hours (average for more than 4300 consults)

• Strong favorable response from deployed providers
Current U.S. Army Tele-Consultation
Clinical Specialties in OIF/OEF

Burns-Trauma
Dermatology
Internal Medicine
Neurology
Ophthalmology
Preventive Medicine
Toxicology
Orthopedics
Microbiology/Laboratory Medicine
Infection Control

Cardiology
Infectious Diseases
Nephrology
Occupational Medicine
Pediatrics
Rheumatology
Urology
Traumatic Brain Injury (TBI)
Program Summary

- 18 clinical specialties with contact groups
- 4,306 teleconsultations (Apr 04 to Sep 08 – 55 months)
- 65 known evacuations prevented
- 151 known evacuations facilitated following consultant’s recommendation
- 1,217 different referring health care professionals
- 583 teleconsultations on non-US patients
- Average Reply Time 5 hr 9 min

<table>
<thead>
<tr>
<th>Country</th>
<th>Non-U.S. Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan Army</td>
<td>20</td>
</tr>
<tr>
<td>Afghanistan Detainee</td>
<td>4</td>
</tr>
<tr>
<td>Afghanistan Non-Combatant</td>
<td>120</td>
</tr>
<tr>
<td>Australian Army</td>
<td>1</td>
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<tr>
<td>Australian Navy</td>
<td>2</td>
</tr>
<tr>
<td>Bangladesh Contractor</td>
<td>1</td>
</tr>
<tr>
<td>Bosnian Child</td>
<td>1</td>
</tr>
<tr>
<td>Bosnian Officer</td>
<td>1</td>
</tr>
<tr>
<td>Bosnian Contractor</td>
<td>1</td>
</tr>
<tr>
<td>British Contractor</td>
<td>1</td>
</tr>
<tr>
<td>British Soldier</td>
<td>1</td>
</tr>
<tr>
<td>British Air Force</td>
<td>3</td>
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<tr>
<td>Bulgarian Army</td>
<td>2</td>
</tr>
<tr>
<td>Canadian Soldier</td>
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</tr>
<tr>
<td>Colombian Army</td>
<td>2</td>
</tr>
<tr>
<td>Congo Child</td>
<td>1</td>
</tr>
<tr>
<td>Djibouti National</td>
<td>3</td>
</tr>
<tr>
<td>Dutch Army</td>
<td>2</td>
</tr>
<tr>
<td>Fiji Contractor</td>
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<tr>
<td>German Child (Turkey)</td>
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<tr>
<td>Georgia Contractor</td>
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<tr>
<td>Ghana Child</td>
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<td>Hungarian Contractor</td>
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<td>Hungarian Army / Police</td>
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<td>India Army / Police</td>
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<tr>
<td>India Contractor</td>
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<tr>
<td>Iraq Contractor</td>
<td>10</td>
</tr>
<tr>
<td>Irish Civilian</td>
<td>212</td>
</tr>
<tr>
<td>Total</td>
<td>583</td>
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U.S. Army Tele-Consultation
Program Summary for Deployed Forces
April 2004 to 1 September 2008

By Specialty
- 55% Dermatology
- 9% Infectious Diseases
- 5% Ophthalmology

By Location
- 68% Iraq
- 11% Afghanistan
- 4% Kuwait

By Patient Branch
- 54% Army
- 12% Marine Corps
- 9% Air Force
- 10% Non-Combatant

N = 4306 consults
Teleconsultation

Measures Of Effectiveness

Relevant to deployed medical support

• Improved access to specialty care (demonstrated in all specialties)
• Avoided or facilitated medical evacuations due to second opinion consult
• Elevation of the quality of care by allowing rapid multi-specialty consultation (e.g. Infectious Disease & Dermatology)
• Improved optimization of medical resources (consult management in theater)
Pacific Island Health Care Project

- Initiated in 1989 for TAMC to provide medical care to US Associated Pacific Islanders (Public Law 99-239, Jan. 1986)

- From FY97 - FY06 funded by Congress ($4.5M annually)

- Beginning FY07 funding stopped by Congress – MEDCOM UFR & a TAMC funding shortfall

- Since 1997 – 3100 patient consults seen at TAMC & Continuing Medical Education to over 337 remote providers

- Initial prototype for telemedicine consultation to island nations established in 1992
### Pacific Island Health Care Project

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Population</th>
<th>Area*</th>
<th>Islands</th>
<th>US Association</th>
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<tr>
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<td>541</td>
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<td>63,786</td>
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<tr>
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<td>69,398</td>
<td>477</td>
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<tr>
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<td>65,507</td>
<td>181</td>
<td>1,225</td>
<td>Free Association</td>
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<tr>
<td>Federated States of Micronesia</td>
<td>131,500</td>
<td>702</td>
<td>607</td>
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<tr>
<td>Republic of Palau</td>
<td>18,467</td>
<td>458</td>
<td>350</td>
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<td><strong>Total</strong></td>
<td><strong>500,371</strong></td>
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Population based on 2000 estimates

* Square miles
Compact of Free Association of the United States with the RMI, FSM, ROP

In accordance with Public Law 99-239, Jan 14, 1986

“The Secretary of Defense shall make available the medical facilities of the Department of Defense for use by individuals from the FSM, the RMI and the ROP who are properly referred to such facilities by government authorities responsible for provision of medical services of the FSM, the RMI, the ROP, Guam, … the CNMI and American Samoa”…
Tripler Army Medical Center Telemedicine Programs

- Pacific Island Health Care Project
- Pacific Asynchronous Telehealth (PATH)
  - Tele-Auscultation Heartsounds
  - Tele-Education Asynchronous Local/Overseas Hospital Academic System (ALOHA)
  - Pediatric Diabetes Education Portal
- Telehealth Voice Therapy in Remote Regions in the Pacific Basin
- ICU Multi-Point Military Pacific Consultation Using Telehealth (IMMPACT)
- Telehealth Traumatic Brain Injury
U.S. Army Telemedicine Programs in the Pacific Theater

Tripler Army Medical Center

Pacific Asynchronous TeleHealth (PATH)

https://www2.tamc.amedd.army.mil/path

LTC C. Becket Mahnke, MD
COL/R Donald A. Person, MD
Marc Eble, Software Engineer
Pacific Asynchronous TeleHealth (PATH) System

- Internet-based, HIPAA compliant, secure system
- Provider-to-Provider consultation
- Asynchronous (store & forward), multi-media
- Pediatric, adult, & “other” modules
- MEDEVAC Coordination/Case Management
- Decreased lost duty time & Reduced testing/duplication
- Remote Provider Education/Mentoring
U.S. Army Telemedicine Programs in the Pacific Theater

COL Ron Poropatich, Ron.poropatich@amedd.army.mil

UNCLASSIFIED
Pacific Asynchronous TeleHealth (PATH) Workload

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008 Jan-Aug</th>
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<td># pediatric</td>
<td>181</td>
<td>259</td>
<td>290</td>
<td>301</td>
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<tr>
<td>consultations</td>
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<tr>
<td># adult</td>
<td>97</td>
<td>167</td>
<td>117</td>
<td>131</td>
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<tr>
<td>consults</td>
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<td># images</td>
<td>248</td>
<td>353</td>
<td>457</td>
<td>622</td>
<td>915</td>
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Chuukese infant with encephalocele
22 y/o Wounded Warrior (Pohnpeian)* with multiple amputations


*Older brother was treated for rheumatic heart disease at TAMC and had mitral valve replacement in 1995.
51 y/o Marshallese man with extensive post-infectious neck wound
39 y/o man with hairy cell leukemia


cNM5066
Leptospirosis: 4 cases from FSM

Heart Murmurs

Common
Scary
Difficult to dx
Problem:

- Congenital heart disease affects approximately 1% of all live births
- 90% of all pediatric patients will have a heart murmur detected at some point in their life
- high prevalence of auscultatory findings & poor auscultation skills results in frequent evaluations of innocent heart murmurs (the most common reason for pediatric cardiology referral)
Heartsounds
Tele-Auscultation
Solution:

- created a unique heartsounds recording device - utilizes adhesive sound sensors to record 6 auscultation sites simultaneously - reduced recording time to <1 minute
- user-friendly electronic stethoscopy of digital heartsounds allows transmission of these sounds to a computer for evaluation via telecardiology
- Validation study - compared with “face-to-face” evaluations, 89% of the cases were accurately classified as either normal/innocent or pathologic, with a sensitivity of 91% and specificity of 88% (Clinical Pediatrics, in press)
- received funding through the US Army Advances in Medical Practice (AMP) program to deploy six recording devices throughout the Pacific Region
Blood Pressure

<table>
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<tr>
<th>R</th>
<th>L</th>
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<tr>
<td>2+</td>
<td>2+</td>
</tr>
<tr>
<td>117/89</td>
<td>112/65</td>
</tr>
<tr>
<td>2+</td>
<td>2+</td>
</tr>
<tr>
<td>127/87</td>
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Murmur

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<th>Inspiration</th>
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<td>3/6</td>
<td>3/6</td>
</tr>
<tr>
<td>S2</td>
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Tele-education

ALOHA
Asynchronous Local/Overseas Hospital Academic System

- PEDIATRICS -
- OB/GYN -
Patient-to-Provider

PDEP
Pediatric Diabetes Education Portal
Shriners Hospital for Children in Honolulu (SHCH)

- Provides pediatric/orthopaedic teleconsultations and distance educational opportunities to:
  - Guam
  - Common Northern Mariana Islands/Saipan
  - American Samoa
  - Federated States of Micronesia (Chuuk and Kosrae)
  - Republic of the Marshall Islands (Majuro)

- Member of Pacific Islands Chapter of ATA (PICATA)

- POC: Jana Lindsey, Telemedicine Coordinator, 808.951.3637
State Telehealth Access Network (STAN) & the Pan-Pacific Education and Communication Experiments by Satellite (PEACESAT)

- Managed by the University of Hawaii Telecommunications & Information Policy Group (TIPG)

- Connects 22 Pacific Island jurisdictions and 40 health care facilities and provider networks in the State of Hawaii

- FCC Rural Health Pilot Program recently awarded $4.9M to link 96 health care facilities throughout Hawaii and the Pacific Islands with the STAN network

- POC: Norman Okamura, Director UH TIPG; 808.956-2909
The Role of Cell Phones in Clinical Care – Consultation and Education
Cell Phones for TBI Care: “Personal Tele-Rehabilitation”

- Utilize cell phones for TBI care
- Provide daily prompts & upload results to a web server
- 3 phase R&D effort
  - R&D effort
  - IRB protocol
  - U.S. Army expansion
- Consortium of expertise
  - USAMRMC/TATRC
  - Academic Research Partner
  - Commercial vendor
- Prior Clinical Uses
  - Diabetes
  - Stroke Rehabilitation
Conclusions

• DoD Telehealth:
  Provides mission & cost benefits for US based & deployed forces
  Uses simple and inexpensive solutions – cell phones & email
  Demonstrated measurable levels of clinical effectiveness

• Pacific Telehealth has a longstanding record of success:
  Multiple civilian & federal programs
  Clinical effectiveness demonstrated for many clinical specialties

• Telehealth can augment care for Pacific Islands only if a basic local
  infrastructure is in place (electricity, bandwidth, computers)

• Telehealth support for the Insular Island nations will require dedicated
  funding and a coordinated federal response from pre-existing telehealth
  programs
Thank-you

Questions??

Contact information:
COL Ron Poropatich

Ron.poropatich@amedd.army.mil
Tel.# 301-619-7967
Back-up Slides
Continental Micronesia
(Air Mike)
Republic of the Marshall Islands

Kwajalein Atoll

RMI Consulate, Honolulu

Majuro Atoll
Chuuk State Hospital, FSM

Pharmacy

Women’s Ward

Chuuk House, Honolulu
Kosrae State Hospital, FSM

Kosrae House, Honolulu
Yap State Hospital
Federated States of Micronesia
Personal Tele-Rehabilitation for mTBI Patients

• Use the patient’s existing cell phones
• Used for frequent patient daily adherence reminders in the form of text messages or data exchanges.
• Web-based software platform that sends & receives information between the Case Manager & TBI patients
• Designed to augment care provided by the Case Managers
• Patient’s self-report data automatically sent back to web server
TAMC Akamai Program

• Akamai (a Hawaiian word for clever)
  - congressionally directed project started by Sen. Daniel Inouye in 1992
  - funded multiple R&D projects at the TAMC and other sites until 2001

• DoD/VA Pacific Telehealth & Technology Hui (Hui- a Hawaiian word for partnership)
  - Joint R&D venture between TAMC & the VA Pacific Islands Health Care System.
  - 2005 TAMC transferred the Hui to the TATRC/USAMRMC where Hui now serves as a field office.
Cell Phone Use for TBI

“Personal Tele-Rehabilitation for mild Traumatic Brain Injury (mTBI) Patients”

Goal: To develop an evidence-based support program for mTBI patients & their families that enhances their ability to meet therapy goals while at home utilizing cell phones & data responses uploaded to a secure central server.