“The Use of Mobile Phones in Health Care”
Selected US Army Medical Department Projects and Research Focus

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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."
Overview

• Overview: TATRC & mHealth

• mHealth projects
  – mCare
  – Mobile Health Information Service for Dengue Vaccine Clinical Trial
  – Mobile Learning Environments

• Challenges
What is the Telemedicine & Advanced Technology Research Center (TATRC)

• Subordinate element of HQ, U.S. Army Medical Research and Material Command (USAMRMC), Fort Detrick, MD

• Mission: Explore science and engineering technologies ahead of regularly programmed research, leveraging other programs to maximize benefits to military medicine

• Manages the following funding types (>$550M/year):
  – Congressional Special Interest (CSI)
  – Broad Agency Announcement (BAA)
  – Small Business Innovative Research (SBIR)
  – DOD Medical Research Program (DHP RDTE)
    • Health IT
    • Medical Simulation
  – US Army Medical Department (OperationalTelemedicine/Adv.Med.Technology)
TATRC Portfolios

DoD Medical Research Categories

1. Medical Information & Training Technologies
4. Infectious Diseases
5. Military Operational Medicine
6. Combat Casualty Care
8. Clinical & Rehabilitative Medicine

- Human Performance & Optimization
- Psychologic Health
- Resilience & Retraining
- Simulation & Training Technology
- Bio-Monitoring Technologies
- Medical Robotics
- Advanced Prosthetics & Human Performance
- Genomics & Proteomics
- International Health
- Medical Imaging Technologies
- Health Information Technologies
- Computational Biology
- Nano-Medicine & Biomaterials
- Regenerative Medicine
- Infectious Disease
- Blood Products & Safety
- Trauma
- Head & Spinal Cord Injury
- Vision
- Acoustic Trauma

DoD Medical Research Categories

UNCLASSIFIED September 2010
Recent Innovations

Sequenced Human Genome, root cause
> 100 common diseases

Cell phones > 5 billion

Internet use > 2 billion

Facebook users > 550 million

Medicine is in for a major shake-up!
OMG! I JUST GOT BORN!
Military Health System Vision

- US Military Health System- $43B global health system serving over 9.8 million beneficiaries.
- Interested in mHealth as a mechanism to preserve and promote health and ensure soldier fitness.
- In addition, given its size, scale, distribution and diverse mission the MHS is positioned to make contributions to advance the field of mobile health both in the US and abroad.
Cell Phone Applications for mHealth

- Clinical consultation
- Education
- Research
- Biosurveillance
- Disease Management
mCare: Description of a Mobile Telephony-based Patient Secure Messaging System for the Case Management for Injured Soldiers
mCare Project Overview

What it is:

✓ Synchronization over distance of:
  • mTBI patients
  • Other Wounded Warriors
  • Military care team members

✓ Uses patients’ EXISTING cell phones

✓ Secure, HIPAA compliant messaging

✓ Simple patient responses
  (typically 1 character or one click)

✓ Care team leverages a website to access information

What it is not:

✗ Issuing soldiers cell phones

✗ Expecting patients to perform complicated technology tasks

✗ Text messaging (SMS) of PII or PHI

✗ Expecting care team members to “text message” the patient

mCare Message Utilization to Date

n = 445
mCare Dashboard

Wellbeing / CTP / Weight
- General Well-Being
- Comprehensive Transition Goal Plan
- Monthly Weight

Physical Pain
- Extent of Pain
- Severity of Pain
- Change in Pain Levels
- Impact of Daily Activities

Mood
- Life Satisfaction
- Good Spirits
- Future Outlook

Anger Management
- Temper Control
- Anger Interfering at Work
- Anger Interfering at Home

Relationships
- Getting Along with Family and Spouse
- Getting Along at Work
- Impact on Work

Energy and Sleep
- Energy Level
- Energy Daily Activities
- Sleeping
- Hours of Sleep

Legend
- critical status requiring immediate action
- improvement since last reported
- poor or unacceptable status that will require follow-up
- hospital status that will require monitoring
- poor or acceptable status

mCare Toolbox

Toolbox
- Announcements: With this tool you can Add News, Schedule and Add Existing Announcements
- Health & Wellness Tips: With this tool you can Add News, Schedule and Add Health & Wellness Tips
- Questionnaires: With this tool you can Add News, Schedule and Add Questionnaires
- Websites / Links: With this tool you can Add News, Edit, Duplicate and Delete Websites / Links

Call Phone Group Admin
- With this tool you can Add News, Edit, Transfer and Delete Groups

Appointment Confirmation (All Patients)
- With this tool you can Add News, Confirm, Edit and Delete Appointment

Scheduler
- With this tool you can Add News and Forwarding scheduler

Extras / Fun Stuff
- With this tool you can Add News, Edit and Delete Extras for Staff
Questionnaires on mCare

mCare: General Well Being Questionnaire

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mCare Application Card Name: My Questionnaires
Header: General Well Being Questionnaire
Message Type: Questionnaire
Day of Week: Monday
Timeframe: Week 1-36
Requires SMS Alert? Yes

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Thank you for answering these questions.

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cell phone user feedback accessed through the web portal dashboard

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Weeks

1 Month 3 Months 6 Months 9 Months 12 Months Custom Data Range

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Life Event - Mouse Over for Details
No Response Received From Question

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Getting Along with Family/Spouse
Getting Along at Work
Impact on Work
Comprehensive Transition Goal Plan

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Energy Level
Energy Daily Activities
Shopping
Anger Interfering at Work
Anger Interfering at Home

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Life Satisfaction
Good Spirits
Future Outlook

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Thank you for answering these questions.

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Over the past week in general, how would you say things have been going for you?

I’ve done REALLY GREAT this week
I’ve done OK this week
I’ve done POORLY this week
I’ve done TERRIBLE this week

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Have you spoken to a member of your DFWU team about how things have been going with the past week?

Yes
No

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Triggers:
System Rule:
Update dashboard
well being to green status

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Triggers:
System Rule:
Update dashboard
well being to amber status

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Triggers:
System Rule:
Update dashboard
well being to red status

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Thank you for answering this question.
Dengue Vaccine Clinical Trial
Mobile Health
Augmenting Dengue Vaccine Trials

• Leading arboviral infection of humans
• >110 countries w/ infection, >3.5 billion people at risk
• 50-100M infections/yr, >30K deaths/yr (mostly children)
• No licensed vaccine or specific anti-viral treatment
• Dengue vaccine best strategy to reduce disease
• Sanofi Pasteur dengue vaccine in phase 2b
• Sanofi global phase 3 program being implemented
• USAMRMC co-developing vaccine in US and Asia
  – USAMRMC phase 3 trial sites in Thailand & Philippines
  – vaccine vs. placebo, efficacy endpoint, long term F/U
Mobile Health
Augmenting Dengue Vaccine Trials

- Create mHealth network within vaccine trial cohort
- Use network to improve **safety, quality, compliance**
  - Ensure reliable staff ↔ subject communication
  - Improve sensitivity of disease (dengue) surveillance
  - Reduce protocol deviations by decreasing non-compliance
  - Facilitate dissemination of health information
  - Support execution of risk communications plan
  - Create feelings of “teamwork” among cohort
  - Facilitate timely triage of ill subjects
Mobile Learning
Mobile Learning- Problem

• US military seeks new tools and methods for training medical personnel—particularly for those enroute to a complex humanitarian emergencies or a natural disaster.

• The need for “quick reference” and “just in time” learning is critical for complex multi-national operations.

• The ability to leverage a global cellular network, mobile phones and emerging mobile application/services models affords opportunities to extend the training continuum.
Mobile Learning

• **M-Learning**- use mobile devices to wirelessly link remote and highly mobile users directly with resources to obtain training and education.
• **UK experience with m-learning** has shown.
  • That m-learning works, and can be an effective way to deliver learning & training into new, and mobile contexts
  • That it can enhance the delivery of a curriculum, as well as broaden exposure to learning
  • That it is especially effective when there are barriers to other forms of learning
  • That “making m-learning” is still a fairly technical task requiring specialist input
  • That many existing e-learning design guidelines do not apply to mobile
• **That there is no common platform to deliver rich interactivities to all phones.**
Mobile Learning Environment (MOLE Project)

• TATRC serves as the technical lead for a 14 nation research initiative focused on developing cross-platform learning applications for mobile phones.

• Objective- Enable access to training and/or mission rehearsal from any location, at any time, independent of bandwidth, infrastructure, cultural and/or geographic constraints.

• Addresses the need for a distributed, sustainable, scaleable, and systemic information-sharing solution that not only serves the needs of US forces but also fosters interoperability and integration with Coalition partners.

• Advance global standards and technologies for m-learning moving forward.
Mobile Health critical challenges

1. Integration of mobile applications with legacy information systems
   - Electronic Medical Records (EMR)
2. Information overload to providers – how best to manage?
3. Support for a variety of handheld devices (e.g., iPhone, Droid, Blackberry) and a variety of network connections (e.g., 802.11 Wireless Local Area Network (WLAN)/Wi-Fi, Bluetooth Personal Area Network (PAN), wireless broadband Wide Area Network (WAN), Ultra Wideband (UWB));
4. Security, privacy & confidentiality of patient data on the handheld and during transmission
5. FDA impact – mobile phone vs. medical device? - Role is evolving

Questions?

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