Operationalizing America's Undiscovered Laboratory for Health Services Research
Conflict of Interest Disclosure

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Have no real or apparent conflicts of interest to report
Learning Objectives

• Discuss opportunities to utilize the Air Force Medical Service Health Services Data Warehouse and related tools for comparative effectiveness, translational science, and applied informatics research

• Define the roles, policies and processes to enable the governance, management and operationalization of one of the world's largest clinical databases as a public resource

• Identify mechanisms available to researchers to participate in the Health Service Data Warehouse-enabled applied informatics research community including funding mechanisms and priority topic areas

• Recognize pilot studies and case studies enabled by the HSDW

• Describe the technical architecture, functional needs, components, development opportunities and other issues related to the medical research cloud informatics infrastructure
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  - Post Traumatic Stress Disorder (PTSD)
  - Traumatic Brain Injury (TBI)
The Vision for HIRI

To make healthcare data available as a public resource for scientific investigation to benefit the military and the nation by advancing national health priorities.
Initiative Components

- Program management office (PMO)
- Organization and data governance structures, policies, and processes
- Technology infrastructure
- Organization change management
- Learning organization
- Future states
High Speed Science

- Traditional model: **6 years** from hypothesis to findings
- Parkinson’s genetics initiative: **8 months**

Source: WIRED Magazine
## HIRI and Research

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<td>Operational Applications</td>
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<td><strong>Goals:</strong></td>
<td>Quality HA Prim Care</td>
<td>EDW Std Pt Mgmt</td>
<td>Disease Mgmt Research</td>
<td>Personalized Health</td>
<td>Human Performance &amp; Optimization</td>
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**Decreasing incidence and prevalence of disease**

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HIRI is the entity through which technologies and statistical techniques will be applied to take full advantage of data for healthcare research

- New hypotheses
- New data mining models
- “Stretch” capabilities
The HSDW is an enterprise information asset integrating data from across the MHS spectrum in order to serve as the cornerstone of an informatics strategy to better support clinical decision support, business intelligence, agile development, and improved analysis including a de-identified research view of the data.

**Focus on the HSDW**
- Shareable data resource
  - Clinical discovery
  - Personalized medicine
  - Comparative effectiveness
  - Translational research
- Real-time access to support rapid learning
- Engaged, multi-disciplinary research community
- Rigorous research to drive improvements in quality and cost of healthcare
# HIRI’s Technology Platform

## The HSDW Resource

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<tr>
<th>MTF Service Events</th>
<th>Civilian Network</th>
<th>Occupational</th>
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<tr>
<td>Appointments</td>
<td>Professional claims</td>
<td>Medical readiness</td>
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<td>Hospitalizations</td>
<td>Institutional claims</td>
<td>Disability</td>
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<td>Labs</td>
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<td>Dental status</td>
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<tr>
<th>EMR</th>
<th>Health Behavior and Risks</th>
<th>Measures</th>
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<tr>
<td>Vital signs</td>
<td>Self-reported HRA</td>
<td>HEDIS-10+7</td>
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<td>Wellness reminders</td>
<td>Fitness</td>
<td>AHRQ Patient Safety</td>
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<td>Medical procedures</td>
<td>Weight/BMI</td>
<td>Framingham CFR</td>
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50 TB of longitudinal data on 9 million patients
HIRI’s Technology Platform

- Change
- Data

- Wisdom
- Knowledge
- Information

- TMDS
- DEERS
- PDTS
- $ / M2
- DMHRSI
- EHR

- Carepoint
- Registries
- User Interfaces

- Clinical Practice Guidelines
- Medication Alerts
- Home Sensors
- Expedited Test Results

- Better Care Through Evidence Based Practice
- Better Health Enhanced Patient Safety
- Best Value Healthy Behavior
- Better Care Improved Patient Experience

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Key Policy Components

- Governance
  - Scientific review committee
  - Judge for significance, innovation, approach, and investigators
  - Stakeholder engagement & analysis
  - Sustainable model

- Enabling documentation
  - Data Use Agreement (DUA)
  - Agreement for Publication
  - Memorandum of Understanding (MOU)

- Institutional Review Board (IRB)
  - Institutional federal assurance
  - Streamlining process

- Data stewardship
  - Acquisition, storage, aggregation and de-identification for data release and use
  - Security and privacy, HIPAA review, training
Disease Condition: Post Traumatic Stress Disorder (PTSD)

- Class of mental health disorders
- In 2006, 36.2 million Americans treated: $57.5B
- Significant long-term adverse health effects
- Social and economic burden
HIRI: Research of Targeted Disease Conditions

Disease Condition: Post Traumatic Stress Disorder (PTSD)

PTSD in the military

- Increasing incidence 2000-2010
  - 21,784 new cases among those not deployed
  - 66,953 among those deployed

- RAND study: societal cost of PTSD and depression for service members – $4B to $6.2B

- Gaps in health service delivery and quality of care
HIRI: Research of Targeted Disease Conditions

Disease Condition: Post Traumatic Stress Disorder (PTSD)

PTSD and the HSDW

- Unique collection of multiple PTSD cases
- Effectiveness of alternative pharmacological therapies
- Effectiveness of different provider education strategies
CDC estimates 1.7m people each year sustain a TBI: 52,000 die

Cost to nation: $60B in 2000

Mortality, morbidity, severe cognitive, emotional, physical consequences

Leading causes of TBI

- Firearms, 39%
- Vehicle Accidents, 34%
- Falls, 10%
- Other, 17%
HIRI: Research of Targeted Disease Conditions

Disease Condition: Traumatic Brain Injury (TBI)

TBI in the Military

- Higher incidence in military personnel
- Significant interest to DoD and VA
- Complexity of accurate diagnosis

TBI Numbers By Severity – All Armed Forces

<table>
<thead>
<tr>
<th>Severity</th>
<th>Count</th>
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<tr>
<td>Penetrating</td>
<td>3,573</td>
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<tr>
<td>Severe</td>
<td>2,235</td>
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<tr>
<td>Moderate</td>
<td>35,661</td>
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<tr>
<td>Mild</td>
<td>163,181</td>
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<tr>
<td>Not Classifiable</td>
<td>8,092</td>
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Total - All Severities: 212,742

Sources:
- Armed Forces Health Surveillance Center
- DoD Numbers for Traumatic Brain Injury '00-'11 Q1 Totals

Numbers for 2000 - 2011 Q1, as of 16 May 2011.

TBI and the HSDW

- **Diagnosis**
  - Greater understanding, better clinical practice guidelines
  - Differences in health indicators before and after accurate diagnosis

- **Treatment**
  - Effectiveness of alternative rehabilitation approaches
Questions & Answers
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To stay abreast of developments and join this research community, contact Kenyon Crowley at kcrowley@rhsmith.umd.edu
Appendix 1: The Learning System

“We seek the development of a *learning healthcare system* designed to generate and apply the best evidence for the collaborative health care choices of each patient and provider; to *drive the process of discovery* as a natural outgrowth of patient care; and to ensure innovation, quality, safety, and value in health care.”

-Charter, IOM Roundtable on Value and Science-Driven Health Care
Appendix 2: Funding Opportunities

- MHS Programs
  - Broad Agency Announcements
  - Defense Medical Research and Development Program (DMRDP)
  - Joint Program Committee (JPC)

- ARRA Comparative Effectiveness Research Program
  - NIH, AHRQ, Office of the Secretary of Health and Human Services

- Future programs targeted at HIRI to be released
Appendix 3: HIRI Research Agenda Whitepaper

“Leveraging the Air Force Health Services Data Warehouse for Transformational Healthcare Research: An Action Agenda”