Health Systems as Research Platforms

Enhancing Science, Value and Innovation

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Institute of Medicine
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Mayo Clinic provides inpatient, outpatient and community-based health care

3 locations
- 526,000 unique patients*
- 132,000 hospital admissions

70-community health system

*Individuals counted once annually
Source: 2008 Mayo Clinic Annual Report
An Outgrowth of Patient Care

• Part of our heritage and culture
"Left open for further thought and research"

William Worrall Mayo, MD
An Outgrowth of Patient Care

- Part of our heritage and culture
- Singular focus... *The needs of patients*
- Strong emphasis on value
  - Individual patients
  - Broader health care system
- Translation of...

... KNOWLEDGE → DELIVERY
Health Systems as Research Platforms

Serving patients’ needs today and preparing to serve the needs of patients tomorrow

1. Rochester Epidemiology Project – population based
2. Total Joint Registry – clinical practice based
3. Anticoagulation optimization
4. High Value Health Care Initiative
5. Enterprise Data Trust
Rochester Epidemiology Project

- Collaboration among health care providers in Olmsted County, MN
  - Share medical records for research
  - Research health and illnesses of people living in this community
  - Improve health/health care in the entire country

- Unique resource
  - One of few places for population-based research
  - NIH funded since 1966
  - Supports ~ 40 individual NIH grants
  - Cumulative publications to date = 2,042
Impact on Patient Care

Selected examples

- Occurrence of Guillain-Barré syndrome after swine flu vaccine only slightly increased (Beghi et al, 1985)

- Putative adverse sequelae of silicone breast implant not confirmed (Gabriel et al, 1994)

- Putative increased risk of autism after immunizations not confirmed (Barbaresi et al, 2005)

- Increased mortality and increased risk of neurological disorders after prophylactic oophorectomy (Rocca et al, 2006, 2007, 2008)
Mayo Clinic
Total Joint Registry

- Data on 97,500 arthroplasties since 1969 (i.e., world’s most comprehensive joint replacement registry)
- Structured, standardized information gathered before, during and at scheduled intervals after surgery, for the lifetime of the patient and implant
- Allows comparisons of surgical technique, implant types, patient demographics, conditions and outcomes
- Identifies most effective surgical practices and implant models
Total Hip Arthroplasty
Age/Sex Adjusted Survival Free of Revision
7,989 patients, 9,584 hips

Impact on Patient Care

Longitudinal comparative analysis of cup designs allowed Mayo to change practice employing only those designs that significantly improved time to revision.

Types of cups used BEFORE study

Types of cups used AFTER study
Anticoagulation Optimization
Warfarin Project

**Definition**
Any inpatient receiving Warfarin is unsafe if any subsequent inpatient INR is >5.0

**Baseline defect rate**
MC 3.5%

**Primary goal**
Reduce the proportion of unsafe Warfarin Inpatients to <1.5%

**2005 Baseline**
18,700 Annual Warfarin Patients

- **3.5%** Hazardous INR >5
- **96.5%** INR within safe range
Impact on Patient Care

Standardization

1. Standardized rules-based, robust algorithm launched by prescriber order, then
2. Run by pharmacist
3. System and algorithm improved dozens of times (PDSA cycles) based on surveillance, performance data and user feedback

Starting in 2009
18,700 Annual Warfarin Patients

- INR within safe range: 98.5%
- Hazardous INR >5: <1.5%

Countermeasure: No increase in proportion of patients with INR <1.7 after 3 doses
Improving Value of Care

The Mayo Clinic Value Equation

Quality
(outcomes, safety, service)

Value = ____________________________

Cost over time

Pay for results, outcomes, value, not process compliance

Goal: Quality care with decreased unexpected variation and lower use of resources
Improving Value of Care
The High Value Health Care Initiative

• Characterize the quality and cost of best practices over time
  • Phase I: The distribution of costs of best practices compared to costs for risk matched patients
• Implement evidence based best practice and shared decision making
• Study new reimbursement models that support high value care
• Improve the value of care for our patients

Collaborative effort between
• The Mayo Clinic
• The Dartmouth Institute
• Intermountain Health Care
• Geisinger Health System
Generating Knowledge in Daily Clinical Settings

Patient Data
- Clinical
  - Lab
  - Imaging
  - EMR
  - Dept. systems
- Biological
  - (Biobanking)

Integrated Database
(Controls and disease states)

Data Synthesis
- Patient Data
- Analytics/Computation

Objectives
- Research
  - Genetic epidemiology
  - Etiology
  - Progression
- Clinical
  - Risk analysis/prevention
  - Diagnosis
  - Prognosis
  - Treatment
  - Stratification & Rx planning
- Educational
  - Public
  - Profession
  - Clinical practice
  - Research grants
- Business
  - DLMP, MML, MVSS
  - Licensing

Outcomes
- Cure
- Wellness
- Quality of life
- Value

Security
- Data Governance
- Meta Data, Standards and Ontologies (informatics)
The Knowledge-Driven Health Care Delivery System of the Future

• Patient-centered care – focus on quality (best results) and coordination of care
• Real time data and feedback for providers at point-of-care (horizon scanning)
• Culture of collaboration, innovation and translation of scientific knowledge into improved health for patients and communities
• Health information technology (HIT) systems – integration, standardization, interoperability
• Delivery of high-value health care in an information-enabled single practice
Questions and Comments