PUBLIC HEALTH RESEARCH FOR MUSCULOSKELETAL HEALTH

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Plan for today

- Public Health and its dimensions
- The practice of Health Services Research (HSR)
- HSR funding and decision-making
- HSR training and careers
- HSR impact
PUBLIC HEALTH & ITS DIMENSIONS
Public Health

“... what we as a society do collectively to assure the conditions in which people can be healthy”
Examples of Public Health Programs

- Early intervention and prevention
  - Immunization
  - Control of communicable diseases
  - School health
Population Health

“.... the health outcomes of a group of individuals, including the distribution of such outcomes within the group.”

- Health outcomes
- Health determinants
- Policies and interventions

Kindig & Stoddart (AJPH - 2003)
Examples of Population Health Programs

- Accountable care organizations
  - Medicare Shared Savings Program
- Bundled payment programs
  - Comprehensive Care for Joint Replacement
- Patient-centered medical home
  - State Medicaid Medical Home Programs
Practice and Research Dimensions

- URMC – Department of Public Health Sciences
  - Health Services Research and Policy (HSR)
  - Epidemiology
  - Social and Behavioral Sciences
Epidemiology

- Study of the distribution and determinants of health-related states and events in specified populations
Feto-infant Health and Survival: Does Paternal Involvement Matter?


Smokers Ages 50+: Who Gets Physician Advice to Quit?

Labor Epidural Anesthesia, Obstetric Factors and Breastfeeding Cessation
Health Services Research

“... how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviors affect access to health care, the quality and cost of health care, and ultimately, our health and well-being”
THE PRACTICE OF HEALTH SERVICES RESEARCH
Examples of Research Questions

**Clinical Review & Education**

*JAMA | Special Communication*

**Health Care Spending in the United States and Other High-Income Countries**

Irene Papanicolas, PhD; Liana R. Woskie, MSc; Ashish K. Jha, MD, MPH

**The NEW ENGLAND JOURNAL OF MEDICINE**

**SPECIAL ARTICLE**

**Mortality and Access to Care among Adults after State Medicaid Expansions**

Benjamin D. Sommers, M.D., Ph.D., Katherine Baicker, Ph.D., and Arnold M. Epstein, M.D.

**Research**

**Original Investigation**

**In-Hospital Outcomes and Costs Among Patients Hospitalized During a Return Visit to the Emergency Department**

Amber K. Sabbatini, MD, MPH; Keith E. Kocher, MD, MPH; Anirban Basu, PhD, MS; Renee Y. Hsia, MD, MSc

**UR MEDICINE | Orthopaedics & Rehabilitation**
Theoretical & Conceptual Frameworks

Dudley (AHRQ – 2004)
Study Designs

Analytic Studies
Examine etiology and causal associations

Experimental Studies
One or more factors altered and effects examined

Uncontrolled Trials
Trials without a control group for comparison

Controlled Trials
Trials with a control group for comparison

Observational Studies
Observations made without any interventions

Non-randomized
Subjects allocated to an intervention or control group but without randomization method

Randomized (RCTs)
Subjects allocated randomly to an intervention or control group

Cohort Study
Case-control Study
Cross-sectional Study

Fig. 1. Analytic study designs. (Adapted with permission from Joseph Eisenberg, Ph.D.)

Song (Plast Reconstr Surg – 2010)
Threats to validity in observational research

- Confounding
  - Measured or unmeasured
  - Observed or unobserved

- Bias
  - Selection bias
  - Information bias

- Chance
Data for addressing the Questions

- **Primary**
  - Surveys
  - Focused group discussions
  - Interviews
  - Delphi techniques

- **Secondary**
  - Administrative: Billing data from hospitalizations, outpatient encounters – National, State, Local
  - Medical: Medical record data from these encounters
Screenshots of secondary data

- MBSF file for 2017 – Medicare administrative data
Screenshots of secondary data

- Medical record data for 2016 – URMC Orthopaedics
Data processing

- Data curation (screenshots)
- Variable generation (screenshots)
Research Methods

- Qualitative
  - Thematic analysis
  - Content analysis

- Quantitative
  - Multivariable regressions
  - Propensity score matching
  - Difference-in-differences
  - Interrupted time series
  - Instrumental variables
  - Randomized evaluations
Health Services Research Funding & Decision-makers
Federal Funding Agencies

NIH

AHRQ
Advancing Excellence in Health Care

pcori
Other Funding Agencies

The COMMONWEALTH FUND
Affordable, quality health care. For everyone.

Robert Wood Johnson Foundation

greater rochester Health foundation

ORS
Orthopaedic Research Society

OREF
ORTHOPAEDIC RESEARCH AND EDUCATION FOUNDATION

AAOS
AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS
Associations / Foundations

AcademyHealth

American Public Health Association
For science. For action. For health.

Society for Medical Decision Making
Decision makers

- Department of Health & Human Services - USA
- Centers for Medicare & Medicaid Services (CMS)
- Excellus
- Medicare Payment Advisory Commission (MedPAC)
- American Academy of Orthopaedic Surgeons (AAOS)
Health Services Research Training & Careers
HSR Doctoral Training

- **Access, quality, and cost of care**
  - Interdisciplinary foundation, including economics, psychology, history
  - Theory-based explanations and models

- **Data and methods for addressing the research questions**
HSR: Career paths

- Academic settings – Research, teaching, staff scientist
- Consulting
- Federal / state / local governing bodies
- Healthcare facilities
- Insurance
Health Services Research Impact
HSR Impact

- Develop a scientific evidence base to support decision making
- Need to articulate and disseminate findings
- Ultimate endpoint – how will the patient be affected?
- Incremental work
- Examples – National, State, Local (Academic, non-academic)
Performance Of Safety-Net Hospitals In Year 1 Of The Comprehensive Care For Joint Replacement Model

By Caroline P. Thirukumaran, Laurent G. Glance, Xueya Cai, Rishi Balkissoon, Addisu Mesfin, and Yue Li

Health Affairs, 2019
National example (cont’d)

- Bundled payment program for joint replacements
  - Likely to disadvantage safety-net hospitals
  - Examined performance in year 1 of the program
  - Safety-net hospitals were less likely to earn rewards and the size of their rewards was smaller
What Is the Association Between Hospital Volume and Complications After Revision Total Joint Arthroplasty: A Large-database Study

Benjamin F. Ricciardi MD, Andrew Y. Liu MD, Bowen Qiu MD, Thomas G. Myers MD, Caroline P. Thirukumaran MBBS, MHA, PhD
Do hospitals with higher volumes of revision joint replacements have better outcomes?

- Measured using complications, readmissions,
- Data from inpatient admissions from New York State from 2008 to 2014
- Hospitals with higher volumes had better outcomes
Local example - Academic

Natural Language Processing for the Identification of Surgical Site Infections in Orthopaedics

Caroline P. Thirukumaran, MBBS, MHA, PhD, Anis Zaman, MA, Paul T. Rubery, MD, Casey Calabra, CIC, BSN-RN, MBA, Yue Li, PhD, Benjamin F. Ricciardi, MD, Wajeeh R. Bakhsh, MD, and Henry Kautz, PhD

Investigation performed at the University of Rochester, Rochester, New York

JBJS, 2019
Local example (cont’d)

- Can Natural Language Processing (NLP) automate the identification of surgical site infections from medical record data
  - NLP based models were comparable in their predictive abilities to manual abstraction
  - NLP can serve as a complement to ongoing manual surveillance efforts
Local example – Non-Academic

- Pediatric Surgical Quality Improvement Committee
  - Examine prevalence of complications at UR
  - Identify areas for improvement
  - Implement interventions
  - Test the impact of interventions
  - E.g. SSI prevention bundles among spine surgery patients
CONCLUSION
Public Health Research 101

- What is Public Health Research?
- How is Public Health Research organized?
- What is Health Services Research and how is it organized?
- Impact of Health Services Research?
Questions & Comments

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