Health Service Research: What is it?

Michael Weiner, M.D., M.P.H.
Associate Professor of Medicine

Indiana University School of Medicine
Division of General Internal Medicine & Geriatrics
Indiana University Center for Health Services and Outcomes Research
VA HSR&D Center for Health Information and Communication
Regenstrief Institute, Inc.
Indianapolis, Indiana, U.S.A.
mailto:mweiner@iu.edu

Presentation for ASHFoundation Implementation Science Summit

20 March 2014
Disclosure

• Michael Weiner
• Associate Professor of Medicine, Indiana University School of Medicine, Indianapolis
• Speaker Disclosures
  • No relevant financial relationships
  • No relevant non-financial relationships
• The views expressed herein are those of the author and do not necessarily represent the views of the Department of Veterans Affairs.
Goals for Today

• Define health services research (HSR)

• Learn about key concepts and methods used in HSR

• Consider HSR’s relevance to implementation science
Definition
What is a health service?

• “All services dealing with the diagnosis and treatment of disease, or the promotion, maintenance, and restoration of health.”

• Includes personal and non-personal health services.

• “Service provision refers to the way inputs such as money, staff, equipment, and drugs are combined to allow the delivery of health interventions.”

• Factors needed to improve access, coverage, and quality of services
  • Availability of services
  • Organization and management of services
  • Incentives influencing providers and users

http://www.who.int/topics/health_services/en/
Definition of health services research

- Organizational structures and processes
- Health technologies
- Social factors
- Financing systems
- Personal behaviors

- Access to care
- Quality
- Costs
- Health

- Domains: individuals, families, organizations, institutions, communities, and populations

HSR asks questions

• What works?
• For whom?
• At what cost?
• Under what circumstances?
What is not HSR?
Basic and clinical research

- Efficacy studies of experimental clinical interventions (e.g., drugs or devices) with clinical outcomes
- Animal studies
- Bench science
- Most epidemiological studies that focus on characterizing diseases (e.g., incidence or prevalence)
- But: the dividing lines are sometimes blurred

http://www.hsrd.research.va.gov/funding/what-is-hsr.cfm
Concepts and Methods
What is access to care?

• Affordability
• Acceptability and relevance of services
• Equitable access
• Rural vs. urban
• Primary care vs subspecialty care
• Supply vs. demand
• Patients’ knowledge about health system
What are costs?

- Public
- Private
- Out-of-pocket
- Emotional or psychological
- Costs to whom?
- Societal costs
What is quality?

• Safety
• Errors
• Adherence to guidelines
• “Standard of care”
What is health?

• Quality of life
• Well-being
• Functional status or disability
• Absence of disease
• Survival (absence of death)
The Research Question Determines the Best Study Design
Methods for reporting evidence: observational vs. interventional

- "Expert" opinion / animal research
- Case report or series
- Correlation
- Cross-sectional
- Case-control
- Cohort
- Nonrandomized trial
- Randomized trial
- Systematic review
- Meta-analysis
Case Report & Case Series

- Document new and unexpected events or conditions
- Often used to study outbreaks of rapidly spreading infectious diseases
- May lead to formulation of a new hypothesis
- Not for identifying statistical association
Correlational Study

• Concerned with measuring strength and direction of relationship between variables

• Is the relationship linear?

• Are there outliers?

• Are the distributions skewed?
Cross-Sectional Survey

- Assess exposure and disease in a defined population
- Defined interval
- Can be used to assess prevalence
- Can be the first step in a cohort study
- May not be productive in studying rare diseases if a general population is sampled
# Case series vs. Cohort study

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Case series</th>
<th>Cohort study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure</td>
<td>±</td>
<td>Yes</td>
</tr>
<tr>
<td>Outcome</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Comparison group</td>
<td>No</td>
<td>±</td>
</tr>
<tr>
<td>Enables calculation of risk or rate for outcome</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Basis for sampling</td>
<td>Outcome</td>
<td>Exposure</td>
</tr>
</tbody>
</table>

- In case series, all participants are identified on the basis of a specified outcome.
- Presence of exposure may be included in case series.
- In a cohort study, sampling is based on exposure.

Examples of types of data sets

- Yours (primary collection)
- Administrative
- Clinical
  - Medical records: electronic vs. paper
- Registries
- Public health; and death
- Research databases
Examples of HSR and non-HSR
Survey of Otolaryngology Services in Central America: Need for a Comprehensive Intervention

Richard Wagner, MD¹, and Johan Fagan, MBChB, MMed²

No sponsorships or competing interests have been disclosed for this article.

Abstract

In the developing world, there exists a scarcity of services and training in otolaryngology, audiology, and speech therapy, which is reflected by the gap between health care delivery in high-income countries and low-income countries. We sur-

combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health, are unequally disproportionate in developing countries.

As pointed out in a previous article, “Survey of Otolaryngology Services in Africa,”² this inverse relationship is most evident in Africa. However, other regions, such as Central America, although not frequently studied, have similar challenges. Along similar lines, Paul Farmer identi-
### Table 1. Comparison of otolaryngology surgeons, audiologists, and speech therapists/100,000 people, with the United States.

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (millions)</th>
<th>Otolaryngology Surgeons</th>
<th>Audiologists</th>
<th>Speech Therapists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Per 100,000</td>
<td>Number</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>4.7</td>
<td>83</td>
<td>1.76</td>
<td>10</td>
</tr>
<tr>
<td>El Salvador</td>
<td>6.2</td>
<td>75</td>
<td>1.2</td>
<td>5</td>
</tr>
<tr>
<td>Guatemala</td>
<td>14.7</td>
<td>60</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>Honduras</td>
<td>7.7</td>
<td>64</td>
<td>0.83</td>
<td>4</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>5.9</td>
<td>56</td>
<td>0.94</td>
<td>2</td>
</tr>
<tr>
<td>Panama</td>
<td>3.6</td>
<td>70</td>
<td>1.94</td>
<td>65</td>
</tr>
<tr>
<td>United States</td>
<td>311.6</td>
<td>10917</td>
<td>3.5</td>
<td>11969</td>
</tr>
</tbody>
</table>

### Table 2. Training programs.

<table>
<thead>
<tr>
<th>Country</th>
<th>Medical Schools</th>
<th>Otolaryngology Surgery</th>
<th>Audiology</th>
<th>Speech</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Number</td>
<td>Number with Otolaryngology Training</td>
<td>Number of Otolaryngology Who Qualify per Annum</td>
<td>Training Program?</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>8</td>
<td></td>
<td>4</td>
<td>Yes</td>
</tr>
<tr>
<td>El Salvador</td>
<td>5</td>
<td></td>
<td>1</td>
<td>No</td>
</tr>
<tr>
<td>Guatemala</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>No</td>
</tr>
<tr>
<td>Honduras</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>No</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>3</td>
<td></td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>Panama</td>
<td>4</td>
<td></td>
<td>3</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Changing practice: Implications of the World Report on Disability for responding to communication disability in under-served populations

KAREN WYLIE¹, LINDY MCALLISTER¹, BRONWYN DAVIDSON² & JULIE MARSHALL³

¹The University of Sydney, Sydney, Australia, ²The University of Melbourne, Melbourne, Australia, and ³Manchester Metropolitan University, Manchester, UK
Mild Bilateral and Unilateral Hearing Loss in Childhood: A 20-Year View of Hearing Characteristics, and **Audiologic Practices** Before and After Newborn Hearing Screening

Elizabeth M. Fitzpatrick,¹,² JoAnne Whittingham,² and Andrée Durieux-Smith¹,²
Mining and analysis of audiology data to find significant factors associated with tinnitus masker

Muhammad Naveed Anwar
Significant regional differences in Denmark in outcome after Cochlear implants in children

Lone Percy-Smith¹, Georg W. Busch², Minna Sandahl³, Lena Nissen³, Jane Lignel Josvassen¹, Michael Bille¹, Theis Lange⁴ & Per Cayé-Thomasen⁵,⁶
### Table 4

Regional differences of rehabilitation of the 83 tested recipients.

<table>
<thead>
<tr>
<th>Rehabilitation hours per week (n = 80)</th>
<th>East, % (n)</th>
<th>West, % (n)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>37 (16)</td>
<td>5 (2)</td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>53 (23)</td>
<td>95 (35)</td>
<td>0.00008</td>
</tr>
<tr>
<td>3-5</td>
<td>9 (4)</td>
<td>0 (0)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parent participation (n = 62)</th>
<th>East, % (n)</th>
<th>West, % (n)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>37 (10)</td>
<td>71 (25)</td>
<td>0.001</td>
</tr>
<tr>
<td>Yes</td>
<td>63 (17)</td>
<td>29 (10)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Support teacher hours per week (n = 78)</th>
<th>East, % (n)</th>
<th>West, % (n)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>31 (13)</td>
<td>17 (6)</td>
<td>0.017</td>
</tr>
<tr>
<td>5-15</td>
<td>48 (20)</td>
<td>31 (11)</td>
<td></td>
</tr>
<tr>
<td>&gt;15</td>
<td>21 (9)</td>
<td>53 (19)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parental mode of communication (n = 82)</th>
<th>East, % (n)</th>
<th>West, % (n)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spoken + sign</td>
<td>7 (3)</td>
<td>24 (9)</td>
<td>0.031</td>
</tr>
<tr>
<td>Spoken only</td>
<td>93 (42)</td>
<td>76 (28)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational placement (n = 83)</th>
<th>East, % (n)</th>
<th>West, % (n)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special</td>
<td>4 (2)</td>
<td>27 (10)</td>
<td>0.005</td>
</tr>
<tr>
<td>Mainstream</td>
<td>96 (44)</td>
<td>73 (27)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paid compensation (n = 80)</th>
<th>East, % (n)</th>
<th>West, % (n)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>No reduction</td>
<td>37 (17)</td>
<td>41 (14)</td>
<td>0.82</td>
</tr>
<tr>
<td>Reduction</td>
<td>63 (29)</td>
<td>59 (20)</td>
<td></td>
</tr>
</tbody>
</table>
We think that everyone might benefit if the most radical protagonists of evidence based medicine organised and participated in a double blind, randomised, placebo controlled, crossover trial of the parachute.
Common pitfalls

• Ascertainment: problems with sensitivity and specificity
• Failure to consider missing data, nonlinear data, and outliers
• Relating resource utilization to quality
• Association does not prove causation
• Confounders: extraneous factor that is associated with both predictor and outcome
• Bias: non-causal systematic error
Ways to consider potential bias

• Do participants accurately represent the target population?
• Does measurement of predictor (exposure) accurately represent the predictor variable of interest?
• Does measurement of outcome (disease) accurately represent the outcome variable of interest?
Relevance to Implementation Science
Health services research and implementation science

- Organizational structures and processes
- Health technologies
- Social factors
- Financing systems
- Personal behaviors

- Access to care
- Quality
- Costs
- Health

- Integrate findings into practice
- Methods to achieve improvement
- Reasons for adoption or effectiveness
- Applying findings in new settings
- Effects of bundling interventions
- Behaviors of health professionals
• Supporting the development and use of evidence
• Targeting quality, accessibility, and value of health care
• Reducing disparities
• Improving health
• Addressing the health system’s needs
• Informing health policy
• Translating evidence into action
• http://www.academyhealth.org/
Key points

- Select a study design that fits the question
- Do your measures represent what you think they do?
- Look at raw data as well as summaries
- Consider possibilities
  - Outliers
  - Bias
  - Confounding
  - Interaction among factors of interest
- Association does not prove causation
health