INDIANA UNIVERSITY

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.
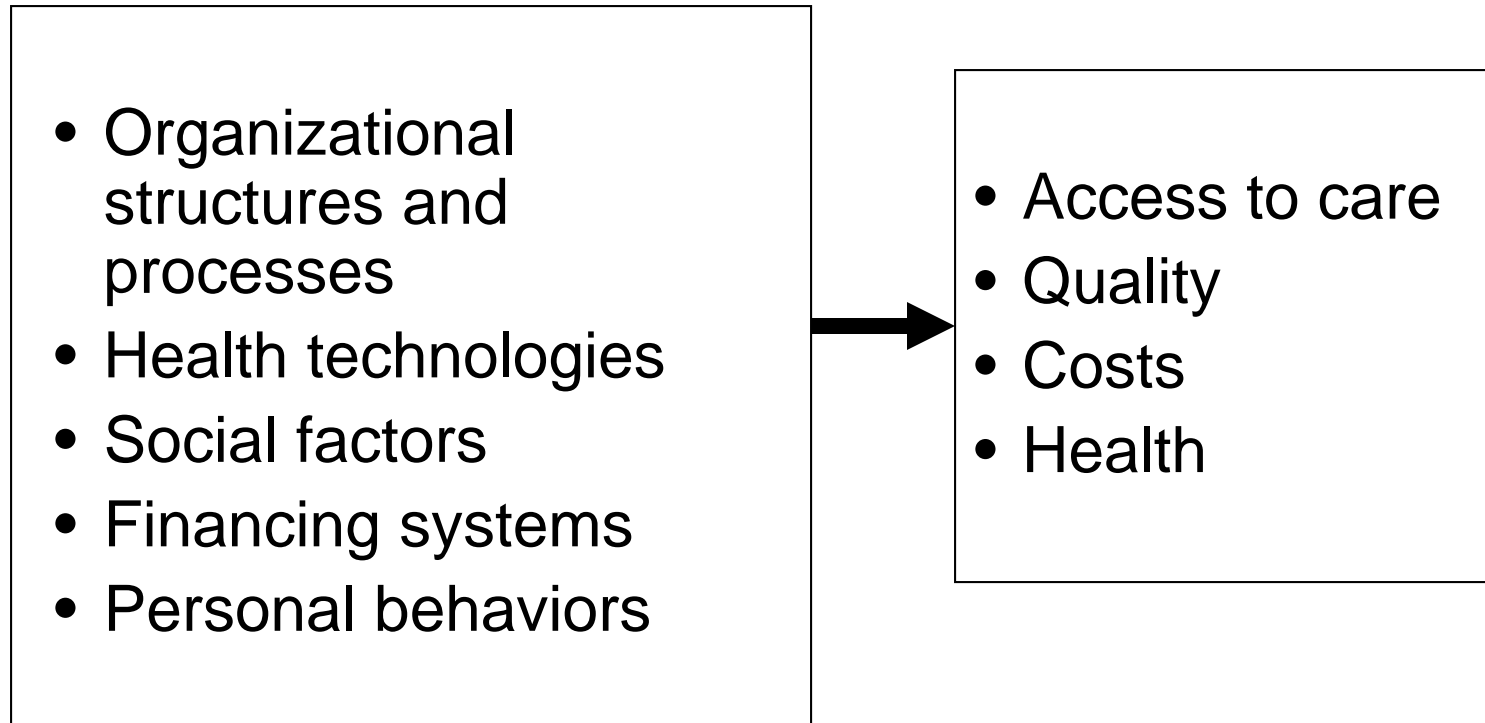
Goals for Today

- 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 <u>the way inputs such as money, staff, equipment, and drugs are combined to allow the delivery of health interventions</u>."

- Factors needed to improve access, coverage, and quality of services

  - Availability of services

  - Organization and management of services

  - Incentives influencing providers and users

World Health Organization

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

Lohr KN, Steinwachs DM. Health Serv Res. 2002 Feb;37(1):7-9.

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

Characteristic	Case series	Cohort study
Exposure	±	Yes
Outcome	Yes	Yes
Comparison group	No	±
Enables calculation of risk or rate for outcome	No	Yes
Basis for sampling	Outcome	Exposure

- 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

Dekkers OM et al. Ann Intern Med 2012; 156 (1 Pt 1):37-40.

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

Commentary

Survey of Otolaryngology Services in Central America: Need for a Comprehensive Intervention

Richard Wagner, MD[1], and Johan Fagan, MBChB, MMed[2]

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.

Country	Population (millions)	Otolaryngology Surgeons		Audiologists		Speech Therapists	
		Number	Per 100,000	Number	Per 100,000	Number	Per 100,000
Costa Rica	4.7	83	1.76	10	0.212	100	2.12
El Salvador	6.2	75	1.2	5	0.08	5	0.08
Guatemala	14.7	60	0.4	1	0.007	50	0.34
Honduras	7.7	64	0.83	4	0.052	10	0.13
Nicaragua	5.9	56	0.94	2	0.034	2	0.034
Panama	3.6	70	1.94	65	1.8	10	0.28
United States	311.6	10917	3.5	11969	3.84	126219	40.5

Table 2. Training programs.

Country	Medical Schools		Otolaryngology Surgery	Audiology	Speech
	Total Number	Number with Otolaryngology Training	Number of Otolaryngology Who Qualify per Annum	Training Program?	Training Program?
Costa Rica	8		4	Yes	Yes
El Salvador	5		1	No	No
Guatemala	4	1	2	No	Yes
Honduras	2	1	2	No	No
Nicaragua	3		3	No	No
Panama	4		3	Yes	Yes

SCIENTIFIC FORUM: LEAD ARTICLE

Changing practice: Implications of the World Report on Disability for responding to communication disability in under-served populations

KAREN WYLIE[1], LINDY McALLISTER[1], BRONWYN DAVIDSON[2] & JULIE MARSHALL[3]

[1]*The University of Sydney, Sydney, Australia,* [2]*The University of Melbourne, Melbourne, Australia,*
and [3]*Manchester 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-Smith[1,2]

RESEARCH   **Open Access**

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-Smith[1], Georg W. Busch[2], Minna Sandahl[3], Lena Nissen[3], Jane Lignel Josvassen[1], Michael Bille[1], Theis Lange[4] & Per Cayé-Thomasen[5, 6]

TABLE 4

Regional differences of rehabilitation of the 83 tested recipients.

		East, % (n)	West, % (n)	p values
Rehabilitation hours per week (n = 80)	None	37 (16)	5 (2)	
	1-2	53 (23)	95 (35)	0.00008
	3-5	9 (4)	0 (0)	
Parent participation (n = 62)	No	37 (10)	71 (25)	
	Yes	63 (17)	29 (10)	0.001
Support teacher hours per week (n = 78)	None	31 (13)	17 (6)	
	5-15	48 (20)	31 (11)	0.017
	>15	21 (9)	53 (19)	
Parental mode of communication (n = 82)	Spoken + sign	7 (3)	24 (9)	
	Spoken only	93 (42)	76 (28)	0.031
Educational placement (n = 83)	Special	4 (2)	27 (10)	
	Mainstream	96 (44)	73 (27)	0.005
Paid compensation (n = 80)	No reduction	37 (17)	41 (14)	
	Reduction	63 (29)	59 (20)	0.82

Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomised controlled trials

Gordon C S Smith, Jill P Pell

Abstract

Objectives To determine whether parachutes are effective in preventing major trauma related to gravitational challenge.

Design Systematic review of randomised controlled trials.

Data sources: Medline, Web of Science, Embase, and the Cochrane Library databases; appropriate internet sites and citation lists.

Study selection: Studies showing the effects of using a parachute during free fall.

Main outcome measure Death or major trauma, defined as an injury severity score > 15.

Results We were unable to identify any randomised controlled trials of parachute intervention.

Conclusions As with many interventions intended to prevent ill health, the effectiveness of parachutes has not been subjected to rigorous evaluation by using randomised controlled trials. Advocates of evidence based medicine have criticised the adoption of interventions evaluated by using only observational data. 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.

Introduction

The parachute is used in recreational, voluntary sector, and military settings to reduce the risk of orthopaedic,

accepted intervention was a fabric device, secured by strings to a harness worn by the participant and released (either automatically or manually) during free fall with the purpose of limiting the rate of descent. We excluded studies that had no control group.

Definition of outcomes

The major outcomes studied were death or major

Department of Obstetrics and Gynaecology, Cambridge University, Cambridge CB2 2QQ

Gordon C S Smith
professor

> "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."

causes of heterogeneity. We selected a funnel plot to assess publication bias visually and Egger's and Begg's tests to test it quantitatively. Stata software, version 7.0, was the tool for all statistical analyses.

Results

Our search strategy did not find any randomised controlled trials of the parachute.

Discussion

Evidence based pride and observational prejudice

It is a truth universally acknowledged that a medical intervention justified by observational data must be in
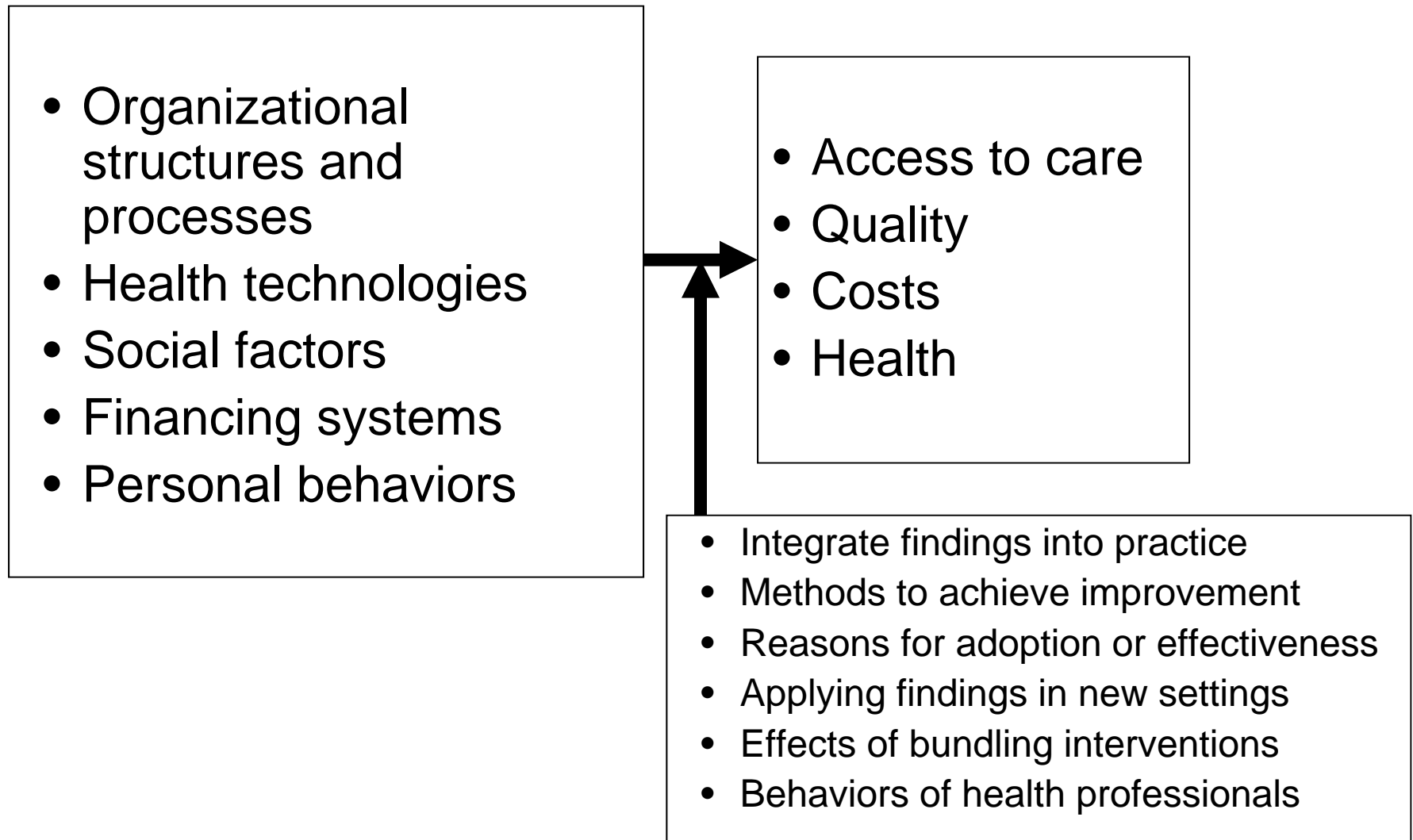
Common pitfalls

- 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
- 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

AcademyHealth Advancing Research, Policy and Practice

- 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