Research 201

AAPA
American Academy of PAs

Introduction to Outcomes Research

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Faculty and Disclosure Statement

Dr. Everett is a Professor, Founding Physician Association (PA) Program Director and Chief of the Division of PA Studies at the Medical College of Wisconsin and maintains an adjunct appointment in the Department of Population Sciences at Duke University. She is also a research consultant to SullivanCotter. Dr. Everett is also a practicing PA and has worked in rural emergency departments and provided primary care to people recovering from substance use disorders.

Her research initiatives focus on healthcare team design and the impact on patient, provider, and organizational outcomes. She has authored over 40 peer-reviewed publications in journals such as Health Affairs, Medical Care, and Annals of Internal Medicine. She has also contributed chapters to 3 books and been invited to speak in Canada, New Zealand, and the United Kingdom. Recent work has focused on defining primary care teams, how they work together, and how they relate to outcomes for patients with diabetes. She is currently also a Research Editor for the Journal of the American Academy of Physician Assistants.

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RELEVANT DISCLOSURES

- Research Consultant: SullivanCotter
- JAAPA Research Editor
- Adjunct Associate Professor, Department of Population Health Sciences, Duke University

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RECOGNITION AND RESOURCES

- Kane R. Understanding health care outcomes research: Jones & Bartlett Learning, 2006.
- Kane RL, Radosevich DM. Conducting health outcomes research: Jones & Bartlett Publishers, 2010.
- Block DJ. Healthcare Outcomes Management: Strategies for Planning and Evaluation. Jones & Bartlett Publishers, 2006
- CTSA Community Engagement Key Function Committee. Principles of Community Engagement 2nd Edition. CTSA Awards Consortium. NIH Publication No. 11-7782 2011

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OBJECTIVES

- Explain importance of outcomes research
- Define outcomes research
- Describe the outcomes approach
- Discuss study designs
- Discuss conceptual models
- Discuss measurement
- Describe key steps in outcomes research
  - Example of outcomes research

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IMPORTANCE OF OUTCOMES RESEARCH

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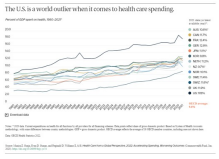
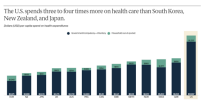
WE SPEND A LOT

-Almost 18% of GDP spent on healthcare



-Spend more than other OECD Countries per capita



US Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes. Issue Brief January 2023. Commonwealth Fund. Global Perspective on U.S. Health Care | Commonwealth Fund

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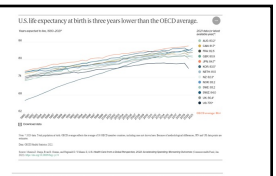
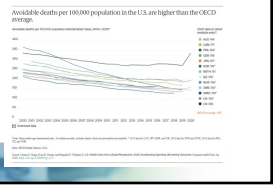
WE DON'T GET GREAT OUTCOMES

- US life expectancy at birth is 3 years lower than OECD average
- US has highest ratio of avoidable deaths





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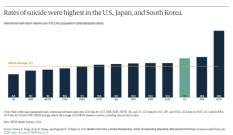
WHY? WE HAVE HIGHER HEALTH RISKS

- Elevated suicide rates
- #1 is deaths from assault



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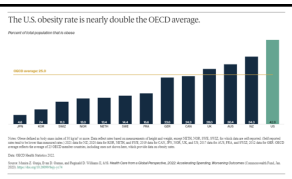
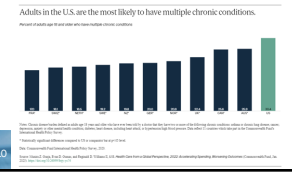
WHY? WE HAVE LOWER HEALTH STATUS

- #1 obesity rate
- #1 with multiple chronic conditions





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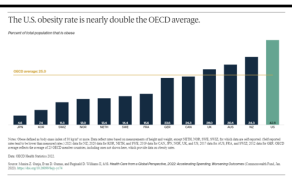
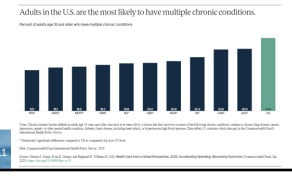
WHY? WE DON'T UTILIZE EFFICIENTLY

- Low rates of physician visits
- High rates of ambulatory-care major surgery (hip replacement)





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WHY OUTCOMES ANALYSIS IS DONE

- Evidence for decision-making
  - Patients
  - Purchasers
  - Policy makers
  - Health delivery organizations
- For accountability
- To improve the knowledge base of medicine

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DEFINING OUTCOMES RESEARCH

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WHAT IS OUTCOMES RESEARCH?

- No consistent definition
- Many disciplines involved- social sciences
- How it differs from "traditional" medical research
  - Effectiveness vs. efficacy
  - Broader range of interventions (ex: patient education)
  - Different outcomes- more holistically focused (ex: functional status, quality of life, treatment burden)

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THE OUTCOMES APPROACH

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OUTCOMES INFORMATION SYSTEM

Outcomes = f (baseline, patient clinical characteristics, patient demographic/psychosocial characteristics, treatment, setting)

- Clinical outcomes
- Risk factors
- Treatment characteristics

Is a "treatment" appropriate in a given situation?

Kane R. Understanding health care outcomes research. Jones & Bartlett Learning, 2006.

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STUDY DESIGNS

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RANGE OF STUDY DESIGNS

- Experimental (Randomized Control Trials)
- Quasi-experimental
- Observational

The design MUST match the question

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STUDY DESIGN CONSIDERATIONS

A good study design will address these questions:

- Is there a relationship between the treatment and outcome?
  - Capacity to make a statistical conclusion
- Is the observed relationship causal?
  - Internal validity
- What explains the relationship?
  - Construct validity
- How representative is the relationship?
  - External validity

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COMMON THREATS TO VALIDITY

- Internal Validity
  - Statistical Conclusion
    - Low statistical power
    - Violated assumptions and inappropriate statistical tests
    - Reliability of measures
  - Internal Validity
    - Selection
    - Regression to the mean
    - Attrition
    - Missing data
- External Validity
  - Construct Validity
    - Inadequate conceptual design
    - Treatment diffusion
  - External Validity
    - Person
    - Setting
    - Time

Kane R. Understanding health care outcomes research: Jones & Bartlett Learning, 2006.

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CONCEPTUAL MODELS

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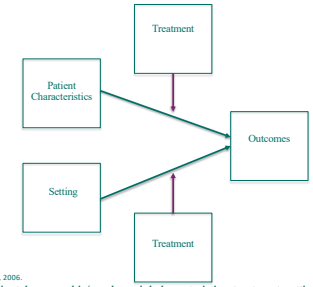
WHAT IS IT?

- A representation of what you think causes of the outcome of interest
- Not necessarily same as a theoretical model (it is testable)
- Organizes concepts and hypotheses
- Provides a general framework for measurement and analysis



Kane R. Understanding health care outcomes research: Jones & Bartlett Learning, 2006.

Outcomes = f (baseline, patient clinical characteristics, patient demographic/psychosocial characteristics, treatment, setting)

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MEASUREMENT

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WHY IT IS SO CRITICAL

- Operationalization of the conceptual model
  - Specify the assumptions
  - Translate concepts into empirical variables
- DO NOT measure something you cannot conceptualize
- ONLY use a measure that can be analyzed correctly
- EVERYTHING is measured with error

Kane R. Understanding health care outcomes research: Jones & Bartlett Learning, 2006.

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MEASUREMENT ISSUES- DEFINE THE GOAL

- Determine what construct to measure
- Determine how that measure will be used
- Determine if you need a broad or narrow measure(s)
  - Generic vs. disease specific?
  - Scope of the measure?
  - Range of the measure? (wider range= less precision)
  - What level of precision?
- Information source
- Mode of administration

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TYPES OF OUTCOMES-QUALITY

- Generic Measures
  - Comprehensive measures that transcend one disease (breadth)
  - Can be used to compare effects of treatments across diseases
  - Examples: morbidity, mortality, QALYs
- Condition-specific measures
  - Measure changes in key aspects of a single condition
  - Types
    - Clinical (signs, symptoms or tests)
    - Experiential (impact on patient)
- Patient reported outcomes
  - Self-reported
  - Performance-based measures
  - Observer reported measures
  - Clinician reported measures

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RISK ADJUSTMENT

- Demographics
- Clinical
  - Status at outset of treatment
  - Usual status before the onset of problem
- Treatment
- Setting

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ANALYSIS

- The analytic approach will depend on the specific conceptual model/study design
- Key issues
  - Assumptions
  - Missing data
- Common approaches
  - Regression
  - Propensity scores
  - Instrumental variables
  - Structural equation modeling
  - Hierarchical linear modeling
  - Interrupted time series

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KEY STEPS IN OUTCOMES RESEARCH

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KEY STEPS IN THE OUTCOMES RESEARCH PROCESS

- Identify the research question
- Build a team
- Develop a conceptual model
- Identify critical dependent and independent variables
- Identify appropriate measures for each
- Develop an analysis plan

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IDENTIFY THE RESEARCH QUESTION

- Goal: Compare the Effectiveness of PA/NP roles in primary care on outcomes for patients with diabetes
- Aims
  1. Evaluate the distribution of primary care services between PA/NPs and physicians for patients with diabetes
  2. Characterize the roles of PA/NPs in primary care and identify panel characteristics that predict PA/NP role
  3. Determine whether different PA/NP roles on primary care panels relate to the quality of diabetes-specific care

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FORM THE TEAM

- Community or organizational partner
- Identify necessary expertise
- Identify necessary skills
- Identify individuals that will match the culture of your team
  - Work style
  - Responsiveness
  - Collaboration style
  - Communication style

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EXAMPLE: PA/NP ROLES IN PRIMARY CARE

- Community/organizational partners
  - Large, multi-specialty physician group in Wisconsin
- Identify necessary expertise
  - Primary care
  - Job design/Role theory
  - Quality outcomes
  - Observational studies
  - Biostatistics
- Identify necessary skills
  - Electronic health record data
  - Medicare data
  - Missing data
  - Study design
  - Higher order biostatistics (SEM, propensity scores, cluster analysis, HLM, etc.)
- Identify individuals that will match the culture of your team
  - Work style- planners with deep curiosity that go the extra mile
  - Responsiveness- within 1 week
  - Collaboration style- very collaborative, non-hierarchical
  - Communication style- direct and non-judgmental

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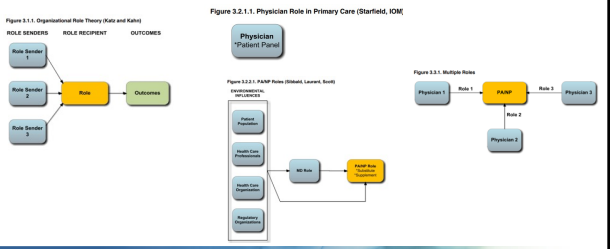
DEVELOP CONCEPTUAL MODEL



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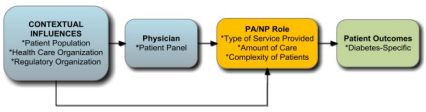
FINAL CONCEPTUAL MODEL

Figure 3.1. Conceptual Model of PA/NP Role on Primary Care Panels of Patients with Diabetes (adapted from Katz & Kahn, Starfield/IOM and Sibbald)



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CRITICAL INDEPENDENT AND DEPENDENT VARIABLES

- Visit level
  - Services provided
- Patient level
  - Demographics
  - Clinical
  - Social
- Panel level
  - Who delivers care
  - Characteristics of the panel (roll up of patient-level variables)

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DEVELOP MEASURES-VISITS

Table 2. Description of Number of Visits per Patient in 2008 by Provider and Membership on Panel Defined by PA/NP Involvement ($N = 2,603$).

	Doctor as usual provider, no PA/NP				Doctor as usual provider, supplemental PA/NP				PA/NP as usual provider			
	Mean *n*	SD	Min	Max	Mean *n*	SD	Min	Max	Mean *n*	SD	Min	Max
Visits with usual provider	4	3	1	52	4	2	1	17	3	3	1	24
Visits with supplemental doctors	0	1	0	7	0	1	0	10	1	1	0	7
Visits with supplemental PA/NPs	0	0	0	0	0	1	0	7	0	1	0	3
Total visits	4	3	1	52	4	3	1	25	5	5	1	43

Note. Adjusted to mean age, ACG score, and panel size, and overall percentages of race, Medicare, disability entitlement, dementia, obesity, and peripheral ulcers across patients. Other visit = prevention, pregnancy, ill-defined symptoms, vision, and hearing; PA/NP = physician assistant/nurse practitioner; SD = Standard deviation.

Everett et. al. Division of Primary Care Services Between Physicians, Physician Assistants, and Nurse Practitioners for Older Patients with Diabetes. MCRR 70(5) 2013

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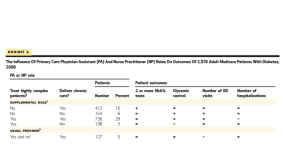
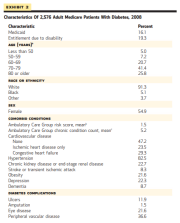
DEVELOP MEASURES-PATIENTS





Everett et. al. Physician Assistants and Nurse Practitioners Perform Effective Roles on Teams Caring for Medicare Patients with Diabetes. Health Affairs 32(11) 2013

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DEVELOP MEASURES-PANELS

Characteristic	Mean of all panels	SD
Usual provider specialty: internal medicine or geriatrics	41	
Usual provider specialty: family medicine	59	
Number of study patients on the panel	10	13
Average panel ACG	1.4	0.7
Average panel age	70	9
Percentage of female patients on panel	57	33
Percentage of Medicaid buy-in on panel	23	30

Everett et. al. Th roles of primary care PAs and NPs caring for older adults with diabetes. JAAA 27(4) 2014

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ANALYSIS

- Descriptive
- Predictive Probabilities
- Regression clustering on clinic

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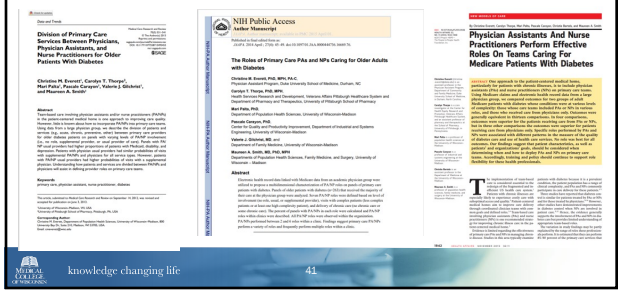

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Additional Talks

- Baseline Evidence-Based Medicine
- Research Methods: Quality Improvement
- Maximizing Secondary Data for Research Use
- The Ins and Outs of Networking
- Using Advanced Excel Tools for Managing Your Data

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For additional information

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