**Improving Stroke Care Quality in a
National Healthcare System:
Lessons on the Translational Pipeline**

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  - VA HSR&D
  - VA HSR&D QUERI program
  - VA Office of Clinical Analytics and Reporting
  - VA Office of Rural Health
  - Genentech

Overview

- How did I become an implementation researcher?
- What is QUERI and implementation research?
- Example of the research-operational change translational pipeline: acute stroke care in the VHA
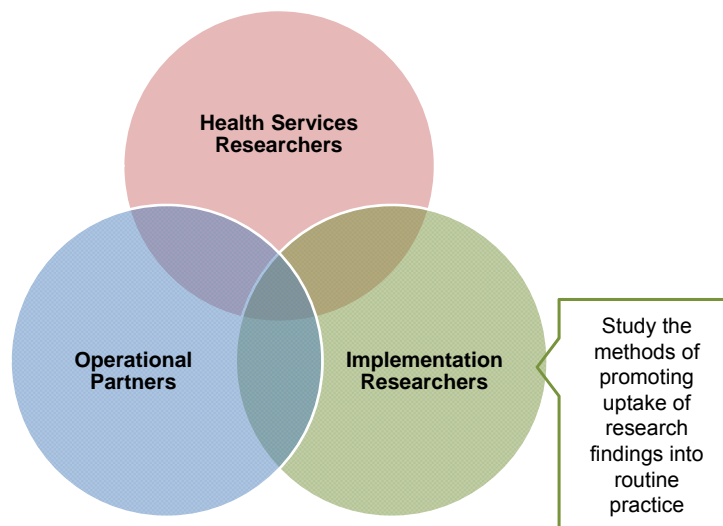- Lessons learned on the research-operational pipeline

My journey to becoming an implementation researcher

What the heck is health services research?

It seems interesting but really messy….

Cerebrovascular fellowship, Indiana University

Sometimes rejection is the best medicine

2-year general medicine and health services research fellowship
- *Quality of life, patient-centered outcomes*

VA Health Services Research and Development Career Development Award
- *Post-stroke depression, care quality*

VA QUERI Program

What is QUERI?

- **QUERI:Quality Enhancement Research Initiative**
  - **HSR&D program funded via medical/operational $$**

- **Background: VHA transformation**
  - VHA transitioned from a tertiary care/inpatient system to a primary care/outpatient-focused system in the 1990s
  - Unified, complete nationwide EHR
    - Lots of local innovation and variability
  - Embedded ongoing quality measurement, feedback, and reporting
    - Senior management compensation and provider compensation linked to patient-level performance metrics
  - QUERI was envisioned as a **programmatic link between VHA research and practice** to ensure that evidence is more quickly put into actual use to improve VHA care and Veteran outcomes
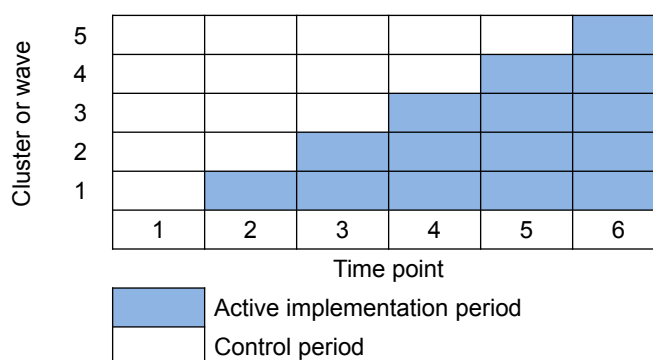
QUERI Program Structure

Health Services Researchers

Operational Partners

Implementation Researchers

Study the methods of promoting uptake of research findings into routine practice
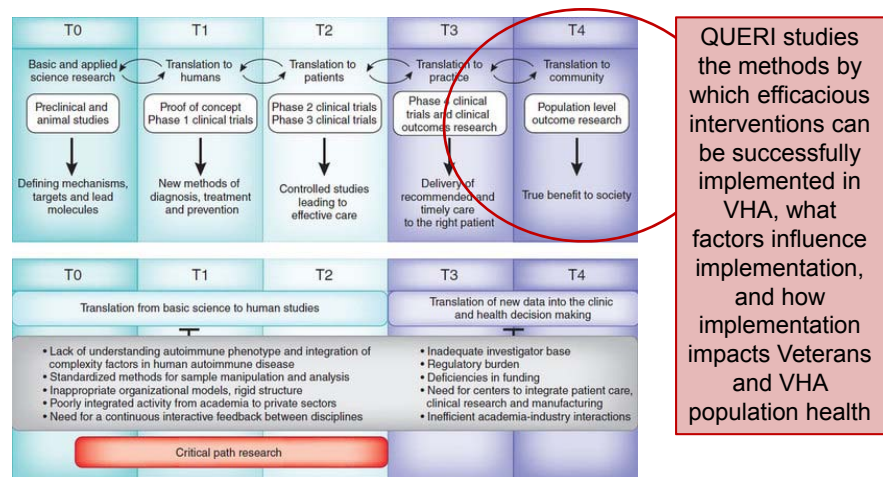
Implementation Science methods

- **Mixed methods:** both qualitative and quantitative
  - Qualitative interview analysis methods and software
  - Organizational change theory and measurement
  - Sustainability assessments
- Assess the implementation of the intervention:
  - **Context** in which the intervention is implemented
  - **Fidelity** of the implementation
  - **Organizational structure and culture** that influence the success of the implementation
- Focus both on how effective the implementation was, **what factors independently drove success**, and also on process of care or patient outcomes
- Study designs include cluster randomized trials, stepped wedge trials, or naturalistic time series studies
- Often include a business case or other cost analysis

Example: Stepped wedge design

Cluster or wave (y-axis, values 5, 4, 3, 2, 1)
Time point (x-axis, values 1, 2, 3, 4, 5, 6)

Active implementation period
Control period

- Known efficacy of the intervention (lack of equipoise), or
- Less evidence about effectiveness but strong clinical belief/use
- Comparison of outcomes during active implementation periods to control periods in all sites
- Maximizes power compared to parallel cluster-randomized designs

Where QUERI fits into Translational Research models

QUERI studies the methods by which efficacious interventions can be successfully implemented in VHA, what factors influence implementation, and how implementation impacts Veterans and VHA population health

How does VHA measure QUERI's success?

- **Clinical impacts**
  - Process of care/performance improvements
  - Morbidity/mortality improvements
  - Quality of life improvements
  - Cost/utilization savings
- **Contributions to VHA activities**
  - Change in national policy, program, or measure
  - Implementation of a directive/organizational change
- **Clinical practice products**
  - Toolkits
  - Improvement products for front-line staff
- **Research products**
  - Grants
  - Manuscripts
  - Generalizable implementation science research

Focus on system and patient-level metrics in addition to traditional research impacts

QUERI program organization

- Originally organized around **conditions:**
  - Stroke, heart disease, diabetes, etc.
- Currently organized around **broad Operational Priorities**
  - Veteran Experience, Use of data, Access to Care, etc.
  - **Stroke QUERI → Precision Monitoring QUERI (PRIS-M QUERI)**

PRIS-M QUERI Aims

- Activate local individuals and groups to **use data to transform care**

- **Implement** actionable, personalized, timely **data collection, display, and monitoring** to improve the **quality and outcomes** of care for Veterans across multiple healthcare settings

An example of a successful implementation pipeline

- Improving VHA in-hospital stroke care

- <u>Key partners</u>:
  - Office of Clinical Analytics and Reporting
    - Formerly the Office of Quality and Performance (OQP)
  - Patient Care Services Offices: Specialty Care (Emergency Medicine, Neurology), Nursing
  - Office of Rural Health

Using Research to Diagnose Gaps: 2007

- **Stroke-specific performance indicators:**
  - None
  - One general functional status measure
    - FIM (functional) screening of inpatients with stroke, amputation, or spinal cord injury
- **Stroke-relevant performance indicators:**
  - <u>Outpatient</u>:
    - BP/lipids/DM control, smoking status reported quarterly in random sample of PC patients by provider; none of these reported in a stroke or vascular cohort
  - <u>Inpatient</u>:
    - VTE prophylaxis (inpatient quality indicator, stroke not included in high risk group that makes up the denominator)
    - Smoking cessation counseling at discharge (not reported for stroke patients specifically)

Office of Quality and Performance: Stroke Special Project

- Objectives
  - Assess the quality of inpatient VA stroke care and post-stroke risk factor management
  - Feed back performance data to VAMCs
  - Provide a resource of improvement strategies and tools

- Sample
  - 5000 veterans admitted to a VA facility with discharge diagnosis of ischemic stroke, FY07
  - 100% of veterans at small volume centers (≤55 admissions)
  - 80% of veterans at high volume centers (>55 admissions)

- Chart review and feedback
  - Chart review based on electronic medical records only (not paper) by external trained nurse abstractors
    - Inpatient and post-discharge quality indicators
  - VAMCs provided opportunity to review and correct inpatient data

Final OQP In-Patient Data Summary

Process of Care	Eligible Patients N=3936	Process Present %
Antithrombotic therapy, DC	3514	96.4
Antithrombotic therapy, HD2	3523	95.6
Smoking cessation counseling	1268	94.9
Pressure ulcer risk assessment	3789	91.8
Early ambulation	3009	86.1
Rehabilitation consultation	2796	86.0
Lipid management	3009	82.1
Fall risk assessment	3673	79.3
VTE prophylaxis	1018	78.2
Anticoagulation for atrial fibrillation	409	75.3
NIH Stroke Scale documented	3640	27.7
Dysphagia screening	3591	23.4
Stroke education	2524	18.1
Thrombolysis (tPA) given	227	8.4

■ Joint Commission 2007   ■ VA-specific

Focusing implementation efforts on early care

Consolidated measure = $\left[\dfrac{\text{number of passes}}{\text{number of opportunities}}\right]$

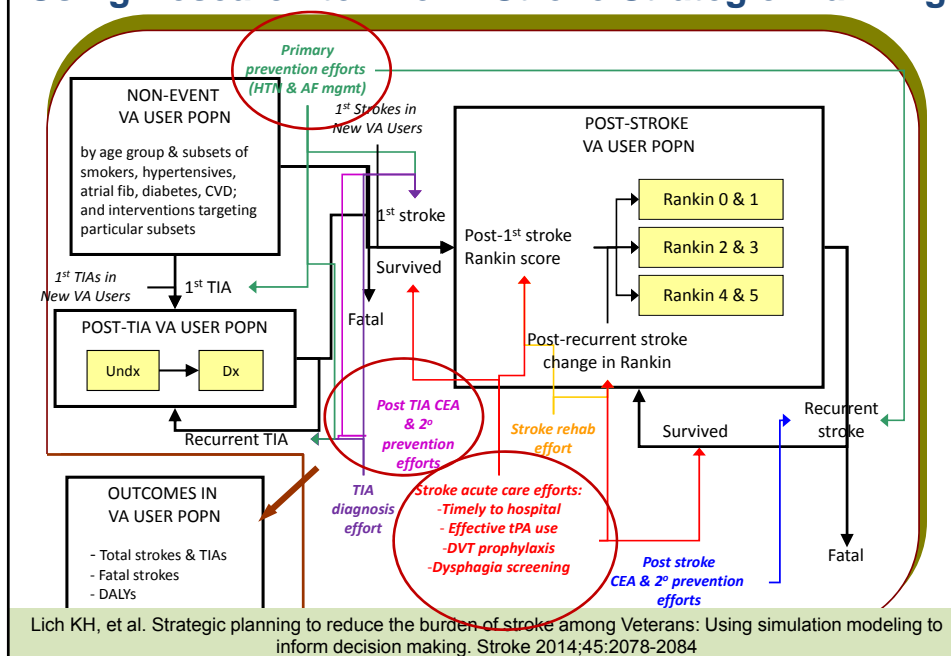| EARLY 25%	IN-HOSPITAL 87%	DISCHARGE 73%
NIHSS Dysphagia Thrombolysis	Antithrombotic, HD2 Pressure ulcer Early ambulation Rehabilitation assmt Fall risk DVT Prophylaxis	Antithrombotic, DC Smoking cessation Lipid management Anticoagulation, a fib Stroke education

Using Research to Inform Stroke Strategic Planning

Lich KH, et al. Strategic planning to reduce the burden of stroke among Veterans: Using simulation modeling to inform decision making. Stroke 2014;45:2078-2084

How can we best use the national stroke quality data?

- Traditional research
  - Write papers (identify factors associated with quality, compare methods of quality assessment or risk adjustment…20+ from the OQP project to date)
  - Provide pilot data for next series of health services research projects
- Implementation research
  - Identify practices or tools to promote/avoid via qualitative study of stroke care teams
  - Support the design of quality improvement intervention studies
- Operational Change
  - Focus system attention and resources on identified problems
  - Enhance "pull" for research products/dissemination

Traditional Research Example 1:

Is there an association between inpatient and outpatient quality indicators?

A Blood pressure — r = -0.22
B LDL — r = 0.31
C INR — r = -0.12
D HgbA1c — r = 0.20
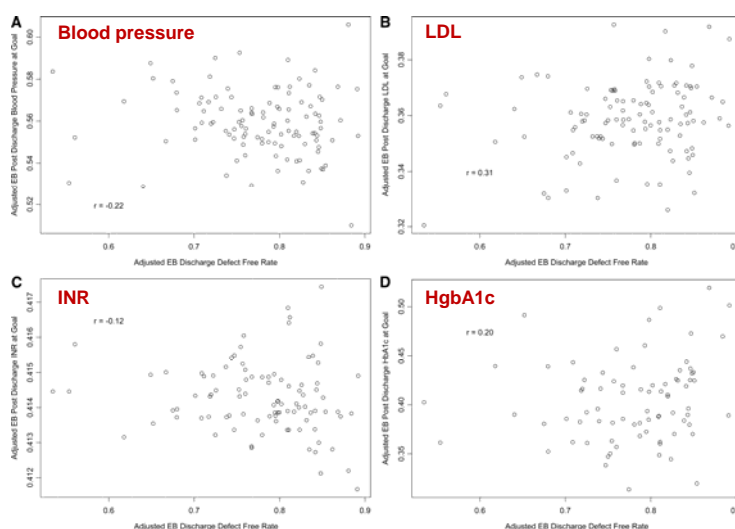
Even in an integrated healthcare system, without focused attention to care transitions there is not likely to be a relationship between inpatient and outpatient care quality on specific care processes

Traditional Research Example 2:
Does adjustment with the NIHSS change hospital-level 30-day mortality ranking?
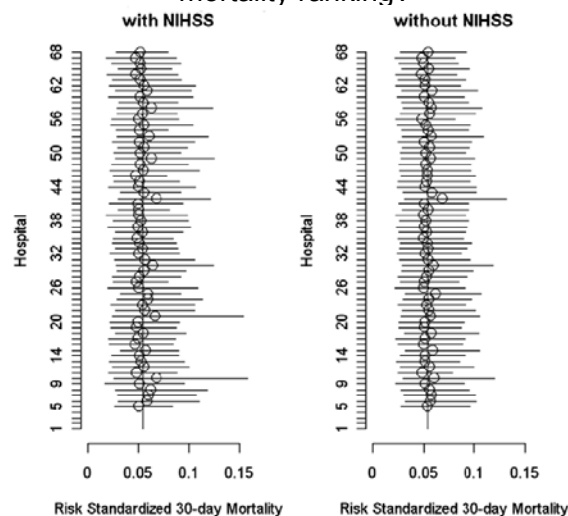
Keyhani S et al; Circulation Cardiovasc Qual Outcomes 2012;5:508-513

Implementation Research Example 1:
INSPIRE: Intervention for Stroke Performance Improvement using Redesign Engineering

Systems Redesign-based and Lean Six Sigma Training plus Data Feedback vs. Data Feedback alone

1. Map the process, identify solutions
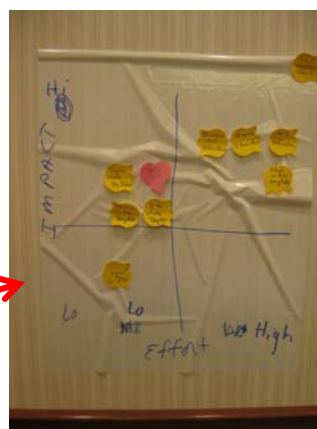
2. Rank solutions based on effort and impact

3. Develop PDSA cycles and controls (measure and check)

Team interviews to explore culture, motivations:
What drives improvement?
What sustains improvement?
What makes implementation research messy?
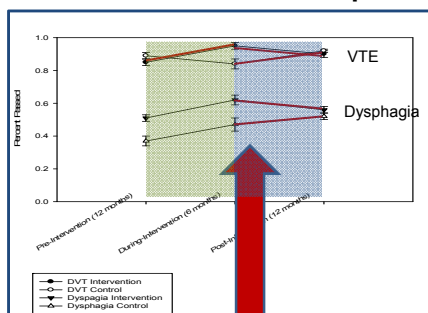
- When baseline performance is high, a high-intensity intervention is needed to drive improvement

- When a high-intensity intervention ends, performance naturally "regresses to the mean"

External system motivations can stimulate sustained improvement when teams perceive they are performing worse than their peers

- Implementation of a national VHA Directive to organize and improve acute ischemic stroke care (**AIS Directive**)
  - One element was to measure and report three quality indicators, including **dysphagia screening,** which began just after our intervention period in this study

Research to Operational Policy: VA National AIS Directive 2012

- **Each VA facility must declare in writing and submit policy supporting its self-designated ability to deliver tPA**
- If part of the plan is to transfer patients for acute care elsewhere, then an <u>official transfer policy</u> must be in place
- <u>If a facility gives tPA for stroke it must</u>:
  – Have an identified stroke team
  – Have a designated location for admission for all stroke patients
  – Require annual training for stroke providers

VA National AIS Directive

- **New measures of inpatient stroke care quality 2012:**
  – <u>All patients</u>:
    - NIH Stroke Scale documentation
    - Dysphagia screening before oral intake
    - Thrombolysis for eligible patients
  – Facilities self-report quality indicators via VHA intranet website (like other VHA inpatient quality data)
- **Additional national policy implementation 2014:**
  – Monthly external chart review for all JC inpatient stroke care indicators at all VHA facilities

Research → Implementation → System Improvements

Consolidated measure = $\left[\dfrac{\text{number of passes}}{\text{number of opportunities}}\right]$

EARLY
82% (25%)

NIHSS-81%
Dysphagia-83%
tPA for eligibles-79%

IN-HOSPITAL
93% (87%)

Antithrom HD2-98%
Rehab assmt-93%
VTE Prophylaxis-90%

DISCHARGE
87% (73%)

Antithrom DC-99%
Statin at DC-96%
Anticoag for AF-88%
Stroke education-51%

2015 data (2009 data)

New directions of research: PRIS-M QUERI

Program Goal
Implement actionable, personalized, timely monitoring to improve the quality and outcomes of care for Veterans across multiple healthcare settings (Blueprint Strategy 3)
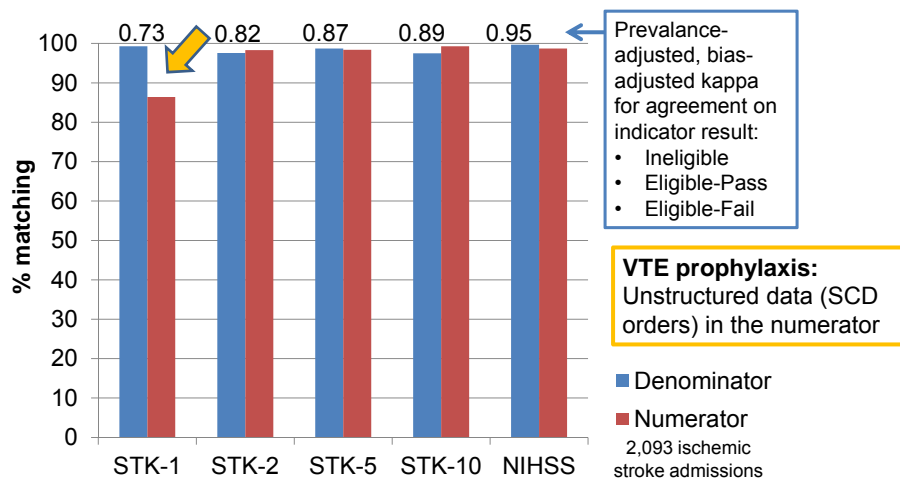
Project 1:
National Program Evaluation

Evaluation of the VHA National **Telestroke Program**

Setting: Inpatient

PI: Williams
Partners: PCS, Rural Health

Project 2:
Implementation Project

Acute telehealth and eCQM multi-site trial to improve timeliness and quality of **TIA care**

Setting: ED-Outpatient

PI: Bravata
Partners: OABI, PCS, Telehealth, VERC

Project 3:
De-Implementation Project

Multi-site decision support implementation to improve **appropriateness of carotid artery imaging** test ordering

Setting: Primary Care, Radiology

PI: Keyhani
Partner: OABI, Rad

Project 4:
Local QI Project

Remote **obstructive sleep apnea** monitoring

Setting: Patients' Homes

PI: Bravata
Partners: VISN 11/12, VERC, Telehealth

Implementation strategy: Activating local individuals and groups to use data to transform care

Partners: OABI, IPEC, Specialty Care (Neuro, ED), PCS (PC), Telehealth, Rural Health

Implementation and Data Core: Data extraction and manipulation; Usability (HCI lab); Clinical Team Engagement; Policy Perspectives; Implementation Science

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Building and testing tools: EHR implementation and informatics research

- **Acute Stroke Decision Support tool** being pilot tested in VA EDs
  - Possible future implementation intervention project
- **Natural language processing** project using text in ED notes to classify patients presenting with stroke as being within/outside the 2 hour symptom onset window
  - Improve efficiency and decrease cost of external chart review for tPA eligiblity status

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Building and validating tools:
Stroke electronic quality indicators can be accurately generated from raw EHR data

Phipps M et al. J Gen Internal Med 2016;31 (Suppl 1):46-52

Prevalance-adjusted, bias-adjusted kappa for agreement on indicator result:
- Ineligible
- Eligible-Pass
- Eligible-Fail

VTE prophylaxis: Unstructured data (SCD orders) in the numerator

■ Denominator
■ Numerator

2,093 ischemic stroke admissions

Values above bars: 0.73, 0.82, 0.87, 0.89, 0.95

Using the EHR to enhance population health management

- **MINDSPACE-Stroke**
  - Ongoing Genetech-funded project to identify which mailed messages are most effective in engaging high-risk stroke patients in their care (VA and Eskenazi Health Systems)
  - EHR data used to generate Framingham stroke risk scores, highest quintile targeted
  - Four mailed messages based on MINDSPACE behavioral economic framework strategies being tested
  - Outcomes: calls to Stroke Prevention Coach, appointments completed in 60 days

Implementation research requires you to be FAT…
Flexible, adaptable, teachable
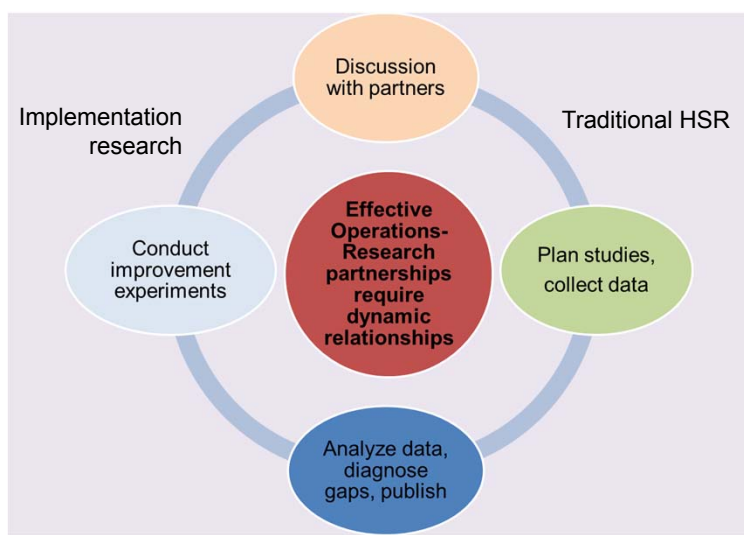
Lessons learned on the implementation pipeline

Strike while the iron is hot.

Chaucer c 1386 "Tale of Melibee"

The best is the enemy of the good.

Voltaire c 1764 "Dictionnaire Philosophique"

There is no limit to what you can accomplish if you don't care who gets the credit.

Attributed to Jacob Goldman, creator of Xerox PARC

Surround yourself with smart, **nice,** people who will argue with you.

John Wooden, Hoosier, UCLA Basketball Coach

Changing a system of healthcare is a little like turning a battleship....

Never doubt that a small number of thoughtful, committed citizens can change the world's stroke care systems, in fact it's the only thing that ever does.

Apologies to Margaret Mead

Thank you to the small groups of committed people in my life…

*To the University of Rochester, for 50 years of combining **thoughtful** people with a **commitment** to outstanding training of the whole person*

To the people who have believed in, encouraged, challenged, supported, and argued with me along the way

To my family, who love me for who I am and keep me oriented to what is truly important in life