BROWN
School of Public Health

# The Science of Changing Health System Behavior: The Kane Legacy


**Vincent Mor, Ph.D.**

**Florence Grant Pirce Professor**

**Department of Health Services, Policy & Practice**

**and**

**Senior Health Scientist**

**Providence Veterans Administration Medical Center**



BROWN
School of Public Health

# Acknowledgements


- Veterans Administration HSR&D Grant Merit Review Award CRE 12-025.
- NIH Common Fund grant UH3AG049619; NIA grant R33AG057451.
- Brown, VA and other colleagues; Rosa Baier, Amy Mosher, James Roosevelt, Brian Mittman, Debra Saliba, Joseph Ouslander

# Kane Legacy

- Applying most rigorous methods to address most important questions
- Questions emerged from clinical and personal experience
- Reinforced by a strong sense of what's right

# Kane Legacy

- RCT of Hospice in VA
- Evaluation of Evercare nursing home program
- Comparison of outcomes post-acute care in SNF, HHA and Independent Rehab
- Intervention to Reduce Acute Care Transfers (INTERACT)
- Geriatric Assessment
- Quality of Life Measurement
- Expansion of Home & Community Based Services
- Nursing Home Quality
- Systematic Reviews

# Purpose

- Draw on Kane's last work to exemplify the complexity of health system change
- His work tested the impact of health system changes on patients' outcomes
- INTERACT RCT is a quality improvement intervention in nursing home setting
- Represents Kane's last big project

# Changing Health System Behavior: Is it Really Science?

- Formative Evaluation
- Documenting the Implementation of the Intervention
- Organizational Psychology
- Industrial Organization
- Now known as “Implementation Science”
- *How to change work processes to efficiently achieve better outcomes for patients?*

# Statement of the Problem

- Need to combine knowledge of what works with knowledge of how to institutionalize changes in care processes designed to achieve the intended goals.

# Trial Problems Today

- Many interventions implemented by researchers show positive effects on outcomes
- They are done as proof of concept
- BUT, rarely consider whether and how they would be adopted in functioning health systems
- Why are some interventions adopted and others are not?
- Implementing interventions in the real world requires we understand how current care processes can be changed

# Translating Efficacy Trials into Effectiveness Research

- Clinician researcher test interventions super-imposed on existing systems in hospitals, ED, SNFs or home
- Rarely consider translating these efficacy studies into programs that can be scaled
- Like traditional biomedical studies, need to connect the dots to be “translated” into advances in clinical medicine
- Doesn’t happen by accident

# Case Study: Transcatheter Aortic Valve Replacement

- 2 trials, 2 products, show benefit even for low risk cases; can replace open heart surgery
- FDA approves
- Economics still favors open heart
- But, can monitor rates of use over time
- Translation already done; each procedure has been engineered and refined;
- Now only the distribution of use may change

# The Simpler the Intervention the Easier to Conduct a Pragmatic Trial

- ***Easy***: Substitute one vaccine for another (e.g. high dose influenza vs Standard dose)
- ***Surprisingly Complicated***: PROVEN -- Video Assisted Advance Care Planning for ALL in NH
- ***Multi-pronged:*** Music & Memory
- ***Multi-pronged Complexity:*** INTERACT, DCM-Dementia Care Mapping, Staff Training

- Logarithmic increase in complexity as more Departments and types of workers involved

# Comparative effectiveness of high-dose versus standard-dose influenza vaccination on numbers of US nursing home residents admitted to hospital: a cluster-randomised trial

*Stefan Gravenstein, H Edward Davidson, Monica Taljaard, Jessica Ogarek, Pedro Gozalo, Lisa Han, Vincent Mor*

## Summary

**Background** Immune responses to influenza vaccines decline with age, reducing clinical effectiveness. We compared the effect of the more immunogenic high-dose trivalent influenza vaccine with a standard-dose vaccine to identify the effect on reducing hospital admissions of nursing home residents in the USA.

**Methods** We did a single-blind, pragmatic, comparative effectiveness, cluster-randomised trial with a 2×2 factorial design. Medicare-certified nursing homes in the USA located within 50 miles of a Centers for Disease Control influenza reporting city were recruited, so long as the facilities were not located in a hospital, had more than 50 long-stay residents, had less than 20% of the population aged under 65 years, and were not already planning to administer the high-dose influenza vaccine to residents. Enrolled nursing homes were randomised to a facility-wide standard of care for the residents of either high dose or standard dose as the vaccine for the 2013–14 influenza season and half of each group were randomly allocated to free vaccines for staff. Individual residents were included in the analysis group if they were aged 65 years or older and were long-stay residents (ie, had been in the facility 90 days or more before commencing the influenza vaccination programme). The analysts and investigators with access to the raw data were masked to study group by coding the groups until after the analyses were complete. The primary outcome was hospital admissions related to pulmonary and influenza-like illness between Nov 1, 2013, and May 31, 2014, identified from Medicare hospital claims available for residents who were without private health insurance (is, those who were considered Medicare fee-for-service). We obtained data from the Centers for Medicare & Medicaid (CMS) and enrolled facilities. The analyses used marginal Poisson and Cox proportional hazards regression, accounting for clustering of residents within homes, on an intention-to-treat basis, adjusting for facility clustering and pre-specified covariates. Safety data were voluntarily reported according to the standard of care. This trial is registered with ClinicalTrials.gov, number NCT01815268.

**Findings** 823 facilities were recruited to the study between March and August, 2013 to participate in the trial, of which 409 facilities were randomised for residents to receive high-dose vaccine, and 414 facilities for residents to receive standard-dose vaccine. The facilities housed 92 269, of whom 75 917 were aged 65 years or older and 53 008 were also long-stay residents, and 38 256 were matched to Medicare hospital claims as of Nov 1, 2013. Staff vaccination rates did not differ between groups, so analyses focused on the high-dose versus standard-dose vaccine comparison. On the basis of Medicare fee-for-service claims, the incidence of respiratory-related hospital admissions was significantly lower in facilities where residents received high-dose influenza vaccines than in those that received standard-dose influenza vaccines (0·185 per 1000 resident-days or 3·4% over 6 months *vs* 0·211 per 1000 resident-days or 3·9% over 6 months; adjusted relative risk 0·873, 95% CI 0·776–0·982, p=0·023).

**Interpretation** When compared with standard-dose vaccine, high-dose influenza vaccine can reduce risk of respiratory-related hospital admissions from nursing home residents aged 65 years and older.

**Funding** Sanofi Pasteur, Swiftwater, PA, USA.

# The ABATE Trial

# Intervention Complexity and Health System Context

- ABATE done in acute hospital system committed to reducing infections (costs)
- Staff stability, education and turnover all undermine implementation capacity in NH
- Lean Management; no redundancy
- Few administrative layers
- Many staff have multiple jobs

# INTERACT RCT

JAMA Internal Medicine | Original Investigation

## Effects of an Intervention to Reduce Hospitalizations From Nursing Homes

## A Randomized Implementation Trial of the INTERACT Program

Robert L. Kane, MD; Peter Huckfeldt, PhD; Ruth Tappen, EdD, RN; Gabriella Engstrom, PhD, RN; Carolina Rojido, MD; David Newman, PhD; Zhiyou Yang, BS; Joseph G. Ouslander, MD

**IMPORTANCE** Medicare payment initiatives are spurring efforts to reduce potentially avoidable hospitalizations.

**OBJECTIVE** To determine whether training and support for implementation of a nursing home (NH) quality improvement program (Interventions to Reduce Acute Care Transfers [INTERACT]) reduced hospital admissions and emergency department (ED) visits.

Supplemental content



BROWN
School of Public Health

The picture can't be displayed.

# Pragmatic Cluster RCT, BUT, an Efficacy Trial?

- Post-randomization excluded NHs with PRIOR INTERACT experience
- Effect of exposure only; clean slate
- Excludes early adopters
- Exclusions improve chance of detecting a difference IF the intervention effective
- Selected for capacity to change, BUT excluded those that already had changed
- Intent to Treat

The picture can't be displayed.

# Implementation

ב,

The picture can't be displayed.

# Outcomes by Level of Implementation

ɔ,

The picture can't be displayed.

ɔ,

The picture can't be displayed.

# What is Implementation?

- INTERACT includes tools and processes, but implementation level categories based only on STOP ‘N WATCH and SBAR tools
- NHs using these tools most had greatest reduction in hospital transfers
- But most compliant NHs probably had better management; (effect may not be INTERACT)
- Least compliant were non-profit, had more RNs and highest quality score???

# INTERACT in VA NHs (CLCs)

- Just completed a pair matched, cluster RCT of INTERACT in 8 VA CLC
- Much more “hands on” implementation; in person visits, weekly calls, embed tools into local EMR
- Using counts of STOP ‘N WATCH & e-SBAR tools facility months rated as high or low

# IMPACT of INTERACT

- Based on Intent to Treat analysis, found no significant differential change in hospitalization rates (even avoidable)
- Dropped 2 CLCs and dropped ½ of study time of another CLC and did “as treated” analysis
- Pair matched Veterans in intervention CLCs that implemented with Vets in controls. No significant difference on hospital transfers

# Why INTERACT Wasn't Effective?

- VA CLCs had higher hospital transfers per 1000 (~5 vs. ~3)
- But, only ~15% of VA CLC hospital transfers are avoidable while ~33% in community NH.
- VA CLCs have sicker residents, BUT, there is greater MD involvement, higher RN staffing ratio and lower staff turnover.
- VA staff may not have agreed there was a need to adopt INTERACT

# What does INTERACT tell us about Changing Health Systems Behavior?

- Complex interventions hard to implement
- Commitment by leadership is a necessary but not sufficient condition
- Even agreement in advance doesn't guarantee implementation success
- Health Systems Management responds to market exigencies long before study end

# Implications for Studies of Health Systems Change

- Need replications of efficacy studies that are increasingly more embedded
- Need to consider how to translate interventions to scale from the outset
- Must understand dose response; how much implementation is enough?
- Multiple pilots embedded in Health Systems may be needed to get implementation right

# Testing Hypotheses or Gaining Compelling Evidence of Effectiveness

- How pragmatic a trial?
- Must all the units (MD offices, NHs, etc.) perform well for program to work?
- What criteria for selecting high, mid vs. low performing units?
- Investigators must appreciate the difference between “intent to treat”, “per protocol” and “as treated” analyses.
- What would health system leadership do? What do they expect? How sure before acting?

# Summary

- Not enough for researchers to test interventions to change health systems
- To be useful, health systems must be willing to introduce system wide
- Requires evidence of feasibility AND effectiveness in a fully functioning HCS
- Researchers must partner with HCS to implement the most salient features of researchers' interventions