Culture, Behavior and Human Factors – beyond the bundle

Lindsay E. Nicolle

Professor, Department of Internal Medicine and Medical Microbiology

University of Manitoba

Goals: Long Term Care

- quality of life
- safety
- cost minimization

Infection Control in Long Term Care vs Acute Care Facilities

Smith ICHE 2008

- fewer resources
- less expertise/increased turnover staff
- multiple duties of ICP
- diagnostic facilities limited/off site
- residence

Effectiveness of short-term, enhanced, infection control support in improving compliance with infection control guidelines and practice in nursing homes: a cluster randomized trial (England)

G. Gopal Rao, A. Jeanes, H. Russell, D. Wilson, E. Atere-Roberts, D. O'Sullivan, N. Donaldson

Epidemiol Infect 2009; 137:1465-1471

Infection Control Support for NH

Rao et al Ep Inf, 2009; 137:1465

- cluster randomized: N = 6 intervention, N = 6 control
- intervention infection control team
  - teaching/training IC
  - environmental cleanliness
  - hand hygiene/alcohol gel
  - waste disposal
  - 24 hr support for IC problems
- outcome:
  - compliance with IC guidelines in audit tool

Infection Control Support for NH

Rao et al Ep Inf, 2009; 137:1465

Proportion compliance with IC guidelines

Table 4. *Statistical analysis of changes in compliance before and end of study*

Category	Control (95% CI)	Intervention (95% CI)	Mean difference (95% CI)	*P* value (two-sample *t* test)
Hand hygiene facilities (T2 – T1)	6·7 (−10 to 23·3)	11·2 (−11·2 to 34·2)	−4·5 (−29·1 to 20·1)	0·69 (n.s.)
Environment cleanliness (T2 – T1)	27·2 (4·6 to 49·7)	16·7 (−7·3 to 40·6)	10·5 (−18 to 39)	0·43 (n.s.)
Clinical waste disposal (T2 – T1)	16·5 (−1·8 to 34·8)	17·5 (2·6 to 32·4)	−1 (−21·5 to 19·5)	0·92 (n.s.)

CI, Confidence interval; T1, baseline observations; T2, final observations; n.s., not significant.

Infection Control Support for NH

Rao et al Epi Info, 2009; 137:1465

Conclusions:

- infection control practice improved in intervention and control groups
- could not demonstrate that short-term, enhanced, infection control support in NH had a significant impact in infection control practice
- Issues: not blinded, ascertainment of interview responses, outcome variables indirectly addressed by intervention, Hawthorne effect.

A Short-Term, Multicomponent Infection Control Program in Nursing Homes: A Cluster Randomized Controlled Trial (France)

Chami et al JAMDA, 2012; 13:c9-c17

- 50 NH, 4345 beds, 5 months
- cluster randomized; not blinded
- IC bundle targeted to caregivers
  - interactive educational meetings
  - hand hygiene posters, kit, products
  - periodic reminders/knowledge surveys
- Outcome: incidence of infection
  - definite or probable

A Short-Term, Multicomponent Infection Control Program in Nursing Homes: A Cluster Randomized Controlled Trial (France)

Chami et al JAMDA, 2012; 13:e9-e17

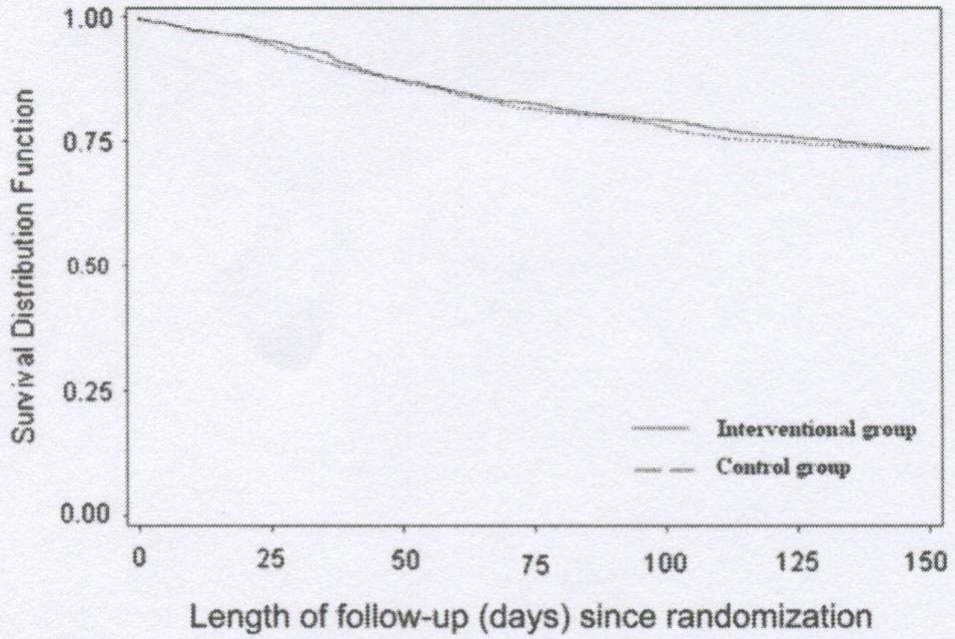


Fig. 3. Kaplan-Meier survival curves of the cumulative risk of not having infection (urinary, respiratory, and gastrointestinal) in an intention-to-treat population.

A Short-Term, Multicomponent Infection Control Program in Nursing Homes: A Cluster Randomized Controlled Trial (France)

Chami et al JAMDA, 2012; 13:e9-e17

Potential reasons for no impact

- may be attributed to environmental and contextual features of the NHS as well as staffing-related issues
  - staffing: turnover, nurse : patient ratios
  - diagnostic testing access
  - engagement of directors but not caregivers
- burden of infections among elderly residents in NH may not be as dependent on IC measures as the conventional wisdom would have us believe
- limitations in study design
  - no blinding (Hawthorne effect)

Cluster randomised controlled trial of an infection control education and training intervention programme focusing on meticillin-resistant *Staphylococcus aureus* in nursing homes for older people

N.S. Baldwin, D.F. Gilpin, M.M. Tunney, M.P. Kearney, L. Crymble,C. Cardwell, C.M. Hughes

Jour Hosp Infect 2010; 76:36-41

Intervention for MRSA in nursing homes

Baldwin et al, JHI 2010

- cluster randomized (N=32), Northern Ireland
- interventions
  - staff education & training repeated 0,3,6 mo.
    - infection control practice improvement
    - demonstrations: hand hygiene, decontamination equipment and environment
    - selected staff each home: IPC link
  - infection control audits 0, 3, 6, 12 mo.
  - audit scores back to intervention NH managers
    - written report suggesting improvements
  - nasal swabs, wounds, urine for catheters; residents/staff 0, 3, 6, 12 mo.
- outcomes: primary – MRSA prevalence residents/staff
  secondary – change in audit scores

Infection Control Audit Scores

Baldwin et al 2010

Time (month)	Intervention	Control	p
0	56%	53%	
3	74%	57%	< 0.001
6	81%	63%	< 0.001
12	82%	64%	< 0.001

Baldwin et al, JHI 2010

Table III
Analysis for residents recruited at baseline

Sampling time point	MRSA positive/total (%)		Relative risk[a] (95% CI)	*P*
	Control homes	Intervention homes		
3 months	81/315 (26)	77/312 (25)	0.98 (0.74, 1.29)	0.87
6 months	67/271 (25)	55/272 (20)	0.83 (0.60, 1.16)	0.28
12 months	47/244 (19)	44/234 (19)	0.99 (0.69, 1.42)	0.95

MRSA, meticillin-resistant *Staphylococcus aureus*; CI, confidence interval.
[a] Relative risk and *P*-value calculation accounts for clustering.

Table IV
Analysis for residents recruited at baseline and during the course of the study

Sampling time point	MRSA positive/total (%)		Relative risk[a] (95% CI)	*P*
	Control homes	Intervention homes		
3 months	111/406 (27)	101/407 (25)	0.96 (0.75, 1.23)	0.75
6 months	104/406 (26)	84/398 (21)	0.85 (0.54, 1.34)	0.48
12 months	83/404 (20)	67/381 (17)	0.81 (0.51, 1.30)	0.39

MRSA, meticillin-resistant *Staphylococcus aureus*; CI, confidence interval.
[a] Relative risk and *P*-value calculation accounts for clustering.

Why did the intervention fail?

Baldwin et al 2010

- limited engagement/commitment management
  - limited attempts to address non-compliance
- staffing issues (not measured)
- nursing home not a closed system
- Hawthorne effect

"Culture Change" Movement in LTC

Miller Med Care Res Rev 2010; 67:655

Deinstitutionalize nursing home environments and individualize care:

- initiated 10 years ago (2006)
- resident-centered/directed care focus

Six constructs:

- care/all resident related activities directed by residents
- living environment designed as home rather than institution
- close relationships between residents/family/staff/community
- work organized to support and empower all staff to respond to residents' needs and desires
- management enables collaborative and decentralized decision making
- systematic processes that are comprehensive and measurement-based and that are used for continuous quality improvement

Culture Change Models and Resident Health Outcomes in LTC

Hill J Nurs Scholar 2011; 43:30

Purpose:

To examine the scientific evidence for the effect of comprehensive culture change model implementation on resident health outcomes in LTC.

Conclusion:

"The available scientific evidence does not show a strong association between comprehensive culture change models and physical health benefits to residents, although findings regarding psychosocial benefits are more persuasive."

Culture Change Models and Resident Health Outcomes in LTC

Hill J Nurs Scholar 2011; 43:30

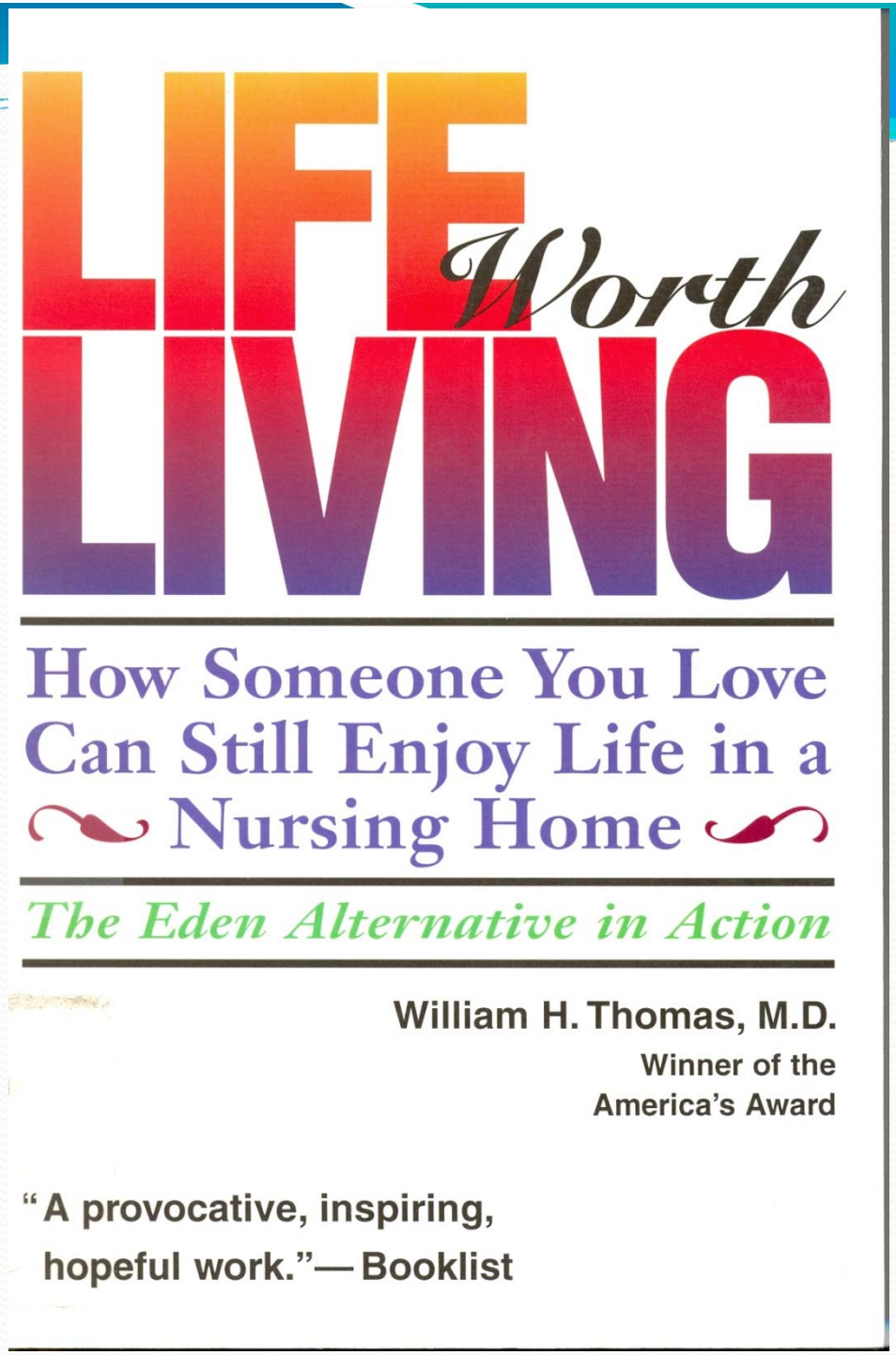
Physical health benefits:

3/11 studies: infection rate (all Eden Alternative)

Thomas (1996): "Significant decrease in infection rate and mortality"

Ransom (2000): "Significant increases in urinary tract infections and chair-bound residents"

Coleman (2002): "No significant differences in survival… or in infection rate"



Published 1996

Life Worth Living: The Eden Alternative in Action

W.H. Thomas 1996

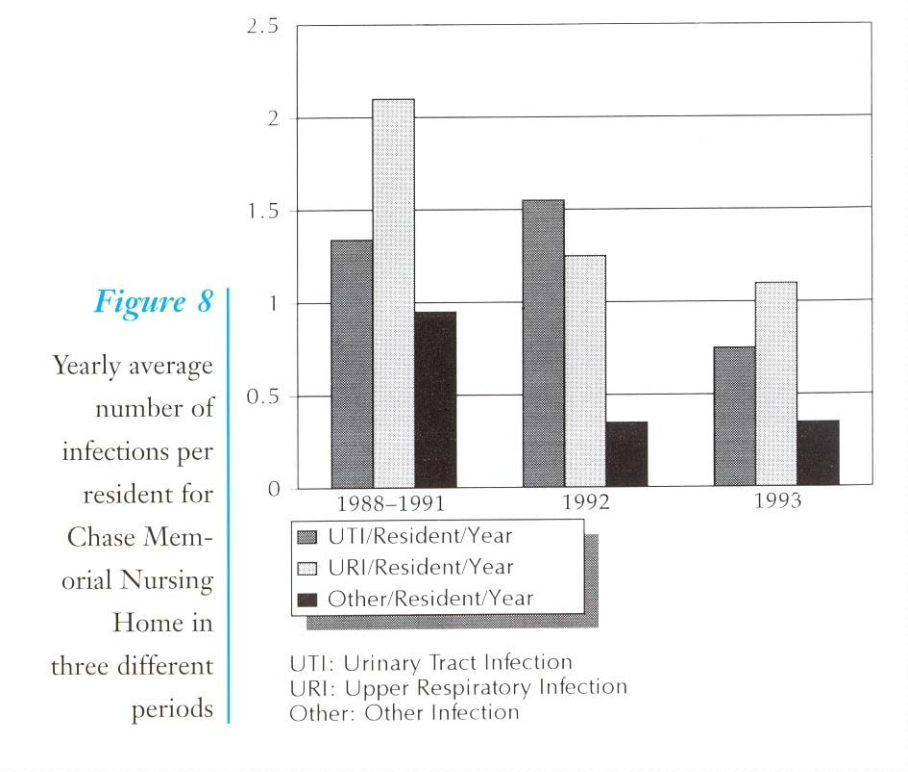


Figure 8

Yearly average number of infections per resident for Chase Memorial Nursing Home in three different periods

? definitions
? ascertainment

Life Worth Living: The Eden Alternative in Action

W.H. Thomas 1996

"Plants increase the relative humidity and decrease the number of bacteria in the air. From the onset of the Eden Alternative, we've found a striking decrease in the rate of urinary and respiratory tract infections at Chase (Figure 8). There are surely many reasons for this decrease, but we wonder to what extent plants may have played a role."

Eden Alternative: The Texas Project

Ransom IQILTHC series 2000

Research questions:

1. Are Dr. Thomas' findings repeated, specifically:
   c) decrease in infection rate?
2. Are there changes in other health indicators such as
   d) changes in specific infection rates

→

Table 2

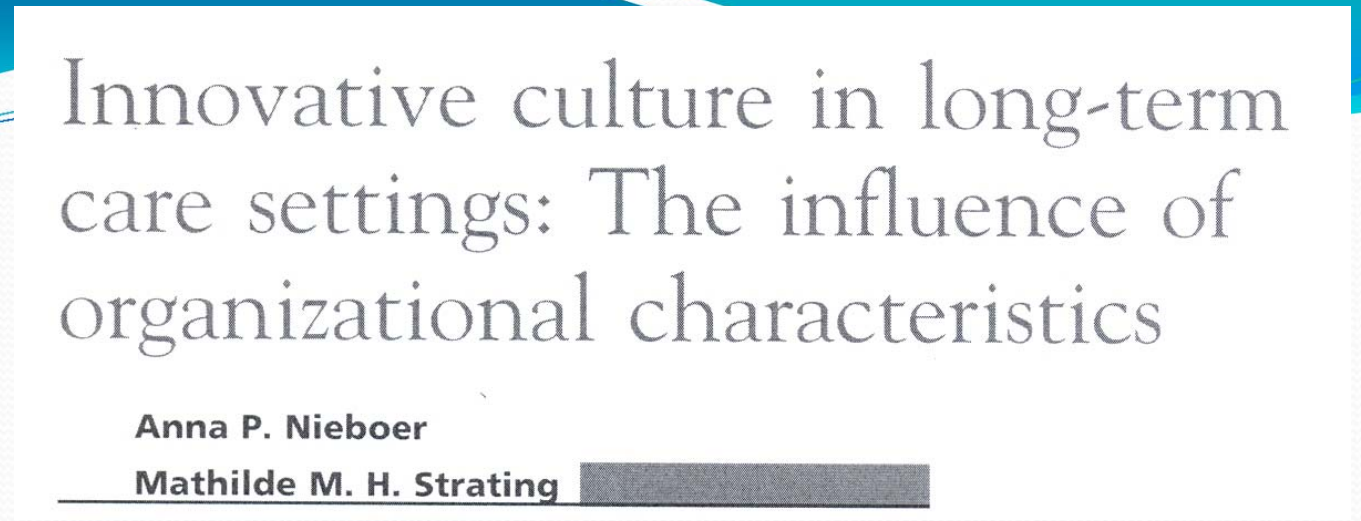
Behavioral Incidents	60% decrease
Stage I – II Pressure Sores	57% decrease
UTIs	29% increase
Bedfast	25% decrease
Restraints	18% decrease
Census	11% increase
Chairbound	8% increase

? definitions
? ascertainment

The Eden Alternative: Findings after 1 Year of Implementation

Coleman J Geront Med Sci 2002; 57A:M422

Infection rate: Aggregate data (not shown) indicated that the mean number of laboratory tests per resident that were positive for infection remained fairly constant at both sites during the study period with no significant differences.



Health Care Man Res 2012; 37:165

Dutch LTC; cross-sectional

Multilevel regression analysis on innovative culture: ($p<0.05$)

- Environmental dynamism
- Formalization: job codification
- Formal external exchange of information
- Leadership: Transformational
- Quality improvement commitment
- Exploratory innovation strategy

Resident Safety Culture in LTC

Patient Safety: “the prevention of harm caused by errors of commission and omission”

Assessing Resident Safety Culture in Nursing Homes: Using the Nursing Home Survey on Resident Safety

Nicholas G. Castle, PhD. Laura M. Wagner, PhD, RN.§ Subashan Perera, PhD.‖ Jamie C. Ferguson, MHA.¶ and Steven M. Handler, MD, MS, CMD†‡*

J Patient Saf 2010; 6:59

Responses of NH staff to a NH specific survey instrument to assess PSC.

<u>Domains</u>

1. Teamwork
2. Staffing: number, turnover
3. Compliance with procedures
4. Training and skills
5. Nonpunative response to mistakes
6. Handoffs

Assessing Resident Safety Culture in Nursing Homes: Using the Nursing Home Survey on Resident Safety

Nicholas G. Castle, PhD. Laura M. Wagner, PhD, RN.§ Subashan Perera, PhD.‖ Jamie C. Ferguson, MHA.¶ and Steven M. Handler, MD, MS, CMD†‡*

J Patient Saf 2010; 6:59

7. Feedback and communications about incidents
8. Communication openness
9. Supervisor expectations and actions promoting resident safety.
10. Overall perceptions of resident safety.
11. Management support for resident safety.
12. Organizational learning.

Registered Nurse Staffing Mix and Quality of Care in Nursing Homes: A Longitudinal Analysis

Hongsoo Kim, PhD, MPH,[1, 2] Charlene Harrington, PhD,[3] and William H. Greene, PhD[4]

California 1999 – 2003

RN to total nurse staffing ratio:

- negatively related to serious deficiencies in homes that consistently met staffing standards
- negatively associated with total deficiencies in homes that failed to meet staffing standards

RN to licensed vocational nurse ratios

- negatively related to total deficiencies and serious deficiencies in both groups

Conclusions: A higher RN mix is positively related to quality of care, but the relationship is affected by overall nurse staffing levels in NHs.

Staff Turnover and Quality of Care in Nursing Homes
Author(s): Nicholas G. Castle and John Engberg
Source: *Medical Care*, Vol. 43, No. 6 (Jun., 2005), pp. 616-626

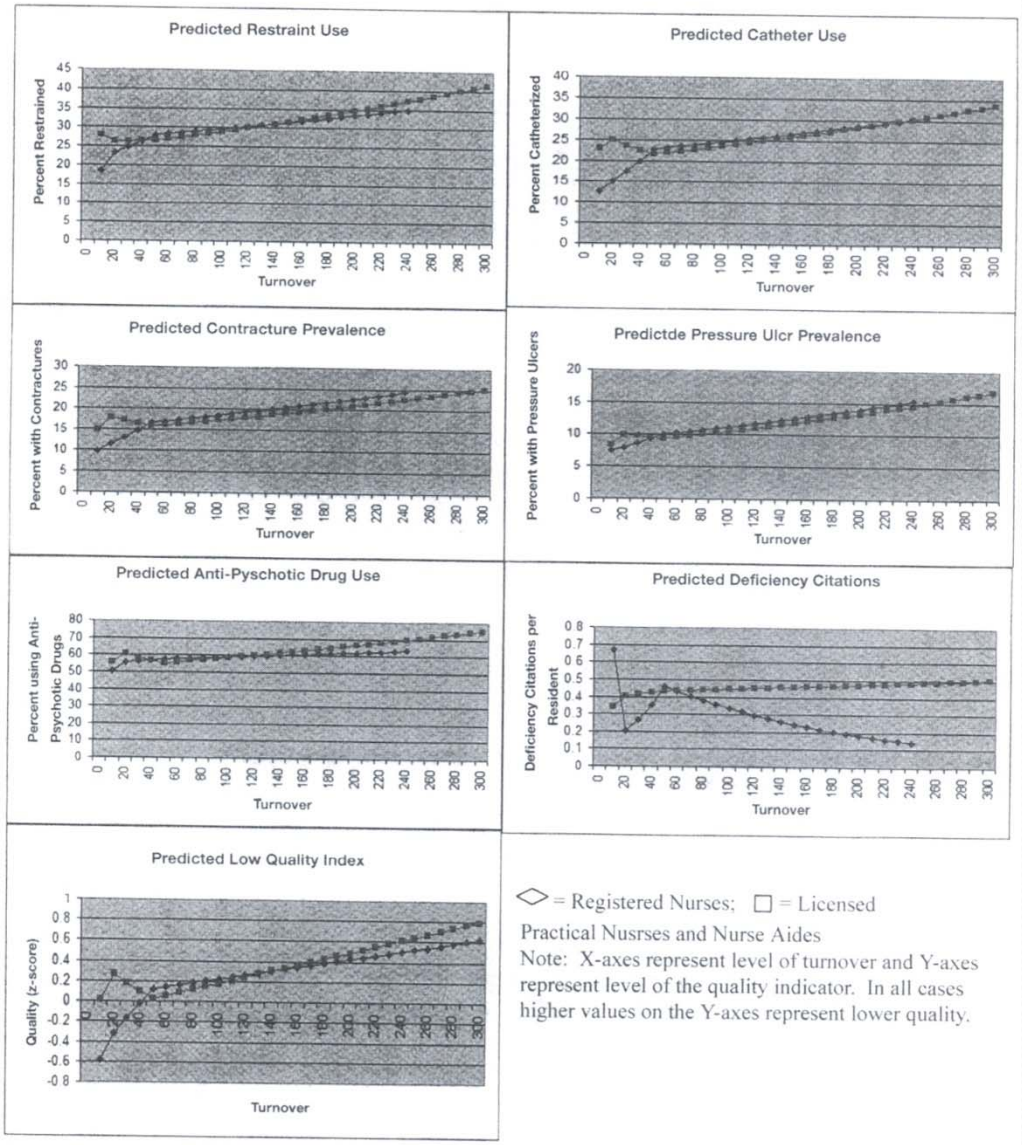


FIGURE 1. Relationship between RN and LPN + NA turnover and quality indicators.

1 year turnover:
NA 98.6%
LPNs 66.8%
RNs 55.4%

↓Quality with ↑ turnover
RN: low to moderate levels
NA/LPN moderate to high levels

? cause or effect

Impact of organisational characteristics on turnover intention among care workers in nursing homes in Korea: a structural equation model

Jong Goon Ha[1] , PhD Candidate
Ji Man Kim[2] PhD, Assistant Professor
Won Ju Hwang[3] RN, PhD, Assistant Professor
Sang Gyu Lee[4,5,6] MD, PhD, MBA, Associate Professor

Aust Health Review 2014; 38:425-431

South Korea

Table 4. Results of path analysis for hypotheses tested

HPWPs, high-performance work practices. $^{*}P < 0.05$, $^{**}P < 0.01$

Hypothesis	Estimate	Critical ratio
H1: HPWPs →organisational support	0.429**	0.667
H1: HPWPs →organisational commitment	0.638**	1.382
H3: Organisational support →organisational commitment	0.165*	11.231
H4: Organisational support →turnover intention	0.134*	8.467
H5: Organisational commitment →turnover intention	−0.369**	−4.564
H6: HPWPs →turnover intention	−0.148*	0.627

Conclusion: Reduced turnover intention of HCWs by increasing organizational commitment by actively implementing HPWPs

Impact of organisational characteristics on turnover intention among care workers in nursing homes in Korea: a structural equation model

Jong Goon Ha[1] , PhD Candidate
Ji Man Kim[2] PhD, Assistant Professor
Won Ju Hwang[3] RN, PhD, Assistant Professor
Sang Gyu Lee[4,5,6] MD, PhD, MBA, Associate Professor

Aust Health Review 2014; 38:425-431

High performance work practices

- Incentive compensation
- Training
- Employee participation
- Selective/flexible work arrangements

→ increase knowledge, skills, abilities

→ empower employees to leverage KSAs for organizational benefit

→ increase employees motivation

Consistent Assignment of Nursing Staff to Residents in Nursing Homes: A Critical Review of Conceptual and Methodological Issues

Tonya Roberts, PhD, RN,*[,1,2] Kimberly Nolet, MS,[2] and Barbara Bowers, PhD, RN[2]

[1]Geriatric Research Education & Clinical Center (GRECC), William S. Middleton Veteran Affairs Hospital, Madison, Wisconsin. [2]School of Nursing, University of Wisconsin, Madison.

Gerontologist 2015; 53:434

Conclusions:

"many conceptual and methodological inconsistencies… make it difficult to draw strong conclusions regarding whether outcomes are due to consistent assignment. In particular, whether consistent assignment works differently at different levels, works better under certain conditions, or requires a particular care, or work environment to be successful is little studied."

Are multifaceted interventions more effective than single-component interventions in changing health-care professionals' behaviours? An overview of systematic reviews

Janet E Squires[1,2*], Katrina Sullivan[2], Martin P Eccles[3], Julia Worswick[4] and Jeremy M Grimshaw[2,5]

Implementation Science 2014; 9:152

Systematic reviews:

- Dose response/effect based: 3
- Direct comparisons: 8
- Indirect comparisons: 23

<u>Conclusions</u>

This overview of systematic reviews offers no compelling evidence that multifaceted interventions are more effective than single component interventions.

Antibiotic prescribing in long-term care facilities: a qualitative, multidisciplinary investigation

Aoife Fleming,[1] Colin Bradley,[2] Shane Cullinan,[1] Stephen Byrne[1]

BMJ Open 2014; 4:

Qualitative: MD's nurses, pharmacists

TDF (theoretical domains framework) and BCT (behavioral change technique)

Conclusions:

"a detailed insight into behavioral factors influencing the antibiotic prescribing process"

"The key component which requires attention in future antimicrobial stewardship interventions is motivation which will result if participants have in-depth knowledge of antibiotic prescribing practices as captured by antibiotic surveillance."

Antimicrobial stewardship in residential aged care facilities: need and readiness assessment

Ching Jou Lim[1], Megan Kwong[2], Rhonda L Stuart[3,4], Kirsty L Buising[2,5,6], N Deborah Friedman[7], Noleen Bennett[8], Allen C Cheng[9,10], Anton Y Peleg[9,11], Caroline Marshall[2,5*] and David CM Kong[1]

BMC ID 2014; 14:40

Australia, 12 RCAFs: 40, nurses, 15 GPs, 6 pharmacists

Major themes:

- perceptions of current antibiotic prescribing behavior
- perceptions of antibiotic resistance
- attitudes/understanding of AMS
- perceived barriers/facilitators of AMS
- feasible AS interventions

Antimicrobial stewardship in residential aged care facilities: need and readiness assessment

Ching Jou Lim[1], Megan Kwong[2], Rhonda L Stuart[3,4], Kirsty L Buising[2,5,6], N Deborah Friedman[7], Noleen Bennett[8], Allen C Cheng[9,10], Anton Y Peleg[9,11], Caroline Marshall[2,5*] and David CM Kong[1]

BMC ID 2014; 14:40

Observations:

- GPs and pharmacists > nurses felt antimicrobials over-prescribed
- antibiotic resistance an issue for infection control rather than clinical decisions

Feasible AMS interventions:

- all stakeholders supportive of AMS implementation
- barriers related to workload and logistical issues
- most useful: nursing-based education; aged care specific antibiotic guidelines; regular antibiotic surveillance

Explaining the Success or Failure of Quality Improvement Initiatives in Long-Term Care Organizations From a Dynamic Perspective

Francis Etheridge, Yves Couturier, Jean-Louis Denis, Lucie Tremblay, and Cara Tannenbaum, J Appl Geront 2014; 33:62

Four case studies: Quebec, Canada

Case 1: Restraints reduction program (success)
Case 2: Continence program (failure)
Case 3: Constipation prevention program (success)
Case 4: Falls prevention program (failure)

Successful programs: strategies combined "let-it happen" "help it happen", "make it happen"

Explaining the Success or Failure of Quality Improvement Initiatives in Long-Term Care Organizations From a Dynamic Perspective

Francis Etheridge, Yves Couturier, Jean-Louis Denis, Lucie Tremblay, and Cara Tannenbaum, J Appl Geront 2014; 33:62

"four potentially active ingredients of successful change processes conducted in LTCO's"

- urgency – "creative tension"
- solidarity – "team learning"
- intensity – "undertake change initiatives one at a time to prevent dispersing "slack resources""
- accumulation: - "short term wins" and "consolidating improvements"

Culture, Behavior and Human Factors – beyond the bundle