



Evaluation of Selected Components of the Nursing Worklife Model Pathways and Catheter Associated Urinary Tract Infection

Nancy Ballard, PhD, RN, NEA-BC

WellStar Health System



Background

Patient Outcomes – Importance in Acute Care

- **Financial Impact**
 - CMS – Reimbursement
 - Public Reporting
- **Hospital Acquired Conditions (HAC)**
 - Falls with Injury
 - Pressure Ulcers
 - Nosocomial Infections

Nosocomial Infections

- **Five Preventable**

- Ventilator Associated Pneumonia VAP
 - Surgical Site Infection (SSI)
 - Clostridium Difficile Infection (CDI)
 - Central Line Bloodstream Infection (CLBSI)
 - Catheter Associated Urinary Tract Infection (CAUTI)
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- ***Estimated Cost \$9.8 billion (95%CI, \$8.3-\$11.5 billion) in 2012 dollars****

*Zimlichman et al. (2013)

Catheter Associated Urinary Tract Infection (CAUTI)

- **Most frequent nosocomial infection**
- **13,000 deaths associated with UTI (CDC, 2010)**
- **75% of UTIs are associated with a urinary catheter (CDC, n.d.)**
- **17% of bacteremias have a urinary source**
- **Prevention supported by:**
 - Decreased use
 - Standardized care
- **Association between nurse staffing and UTI** (Aiken, Sloane, & Wu, 2012)

Practice Environment & Outcomes

- **Original Study, Magnet Hospitals (McClure & Hinshaw Eds., 2002)**
- **Nurse-to-patient staffing level major factor in prevention of HACs (Multiple investigators)**
 - Practice environment affects outcomes associated with staffing levels (Aiken et al., 2011)
- **Healthy work environment**
 - Important to nurse satisfaction
 - Patient outcomes Magnet[®] vs non-Magnet[®] hospitals (Aiken & Colleagues, 2000; Kramer & Colleagues, 2011)
- **Leiter & Laschinger (2006)** Posited Nurse Worklife Model
 - Practice Environment associated w/burnout & personal accomplishment

Gap in the Literature

Studies to date of NWLM:

- Aggregated Individual-level nurse survey data
- Nurse perception of adverse patient outcomes

Other studies of outcomes related to the practice environment:

- Hospital-level using administrative data
- Hospital-level adverse event rates

Gap: Evaluation of the association of unit level measures of practice environment with measured clinical outcomes.

Design

- **Correlational path analysis:**
 - Structural Equation Modelling (SEM) NWLM fit to the data
- **Secondary Analysis**
 - NDNQI[®] 2012 RN Satisfaction Survey Data Reporting Practice Environment Scale (PES) and Job Enjoyment Scale (JES)
 - Unit types: medical, surgical, combined medical-surgical
- **Procedures:**
 - Approval from NDNQI[®] Investigator
 - IRB approval de-identified unit level data

Measures

- ***Job Enjoyment Scale (JES)*** –
 - Seven item scale
 - Likert-type responses from strongly disagree (1) to strongly agree (6) ($\alpha = .97$)
- ***Practice Environment Scales (PES)*** –
 - Five Subscales ($\alpha = .87- .90$)
 - *3-10 items*
 - Likert-type responses, strongly disagree (1) to strongly agree (4)
- **CAUTI (NHSN definition)**
 - Rate - Total number of reported CAUTIs /total number of catheter days x 1000.

Practice Environment Scale (PES)

Variable	Definition	Items	α
PES-Collegial RN-MD Relations	Presence of collaborative working relationship (RN-MD Collaboration)	3	.87
PES-Nurse Participation in Hospital Affairs	Policy development and decisions about practice (Policy Involvement)	9	.90
PES-Staffing and resource adequacy	Staffing level is adequate to provide the care needed (Staffing Adequacy)	4	.88
PES-Nurse manager ability, leadership, and support	Nursing manger viewed as a leader who provides strong support (Strong Leadership)	5	.90
PES-Nursing Foundations for Quality Care	Nursing practice is supported by high standards, professional nursing philosophy, education, expectation of competency, and measurement of quality (Nursing Model of Care)	10	.88

Data Analysis

- **Descriptive statistics & ANOVA (SPSS version 18)**
- **SEM –correlational path analysis**
 - Mplus Software version 7 to test the hypothesized *a priori* NWLM
- **Incremental fit indices**
 - Comparative Fit Index (CFI) - Acceptable range: $> .90$
 - Root Mean Square Error of Approximation (RMSEA) - Acceptable range: $< .08$
 - Standardized Root Mean Square Residual (*SRMR*) $< .08$

(Hooper, Coughlan & Mullen, 2008)

Using 2012 NDNQI® RN Survey & Quality Outcomes Data

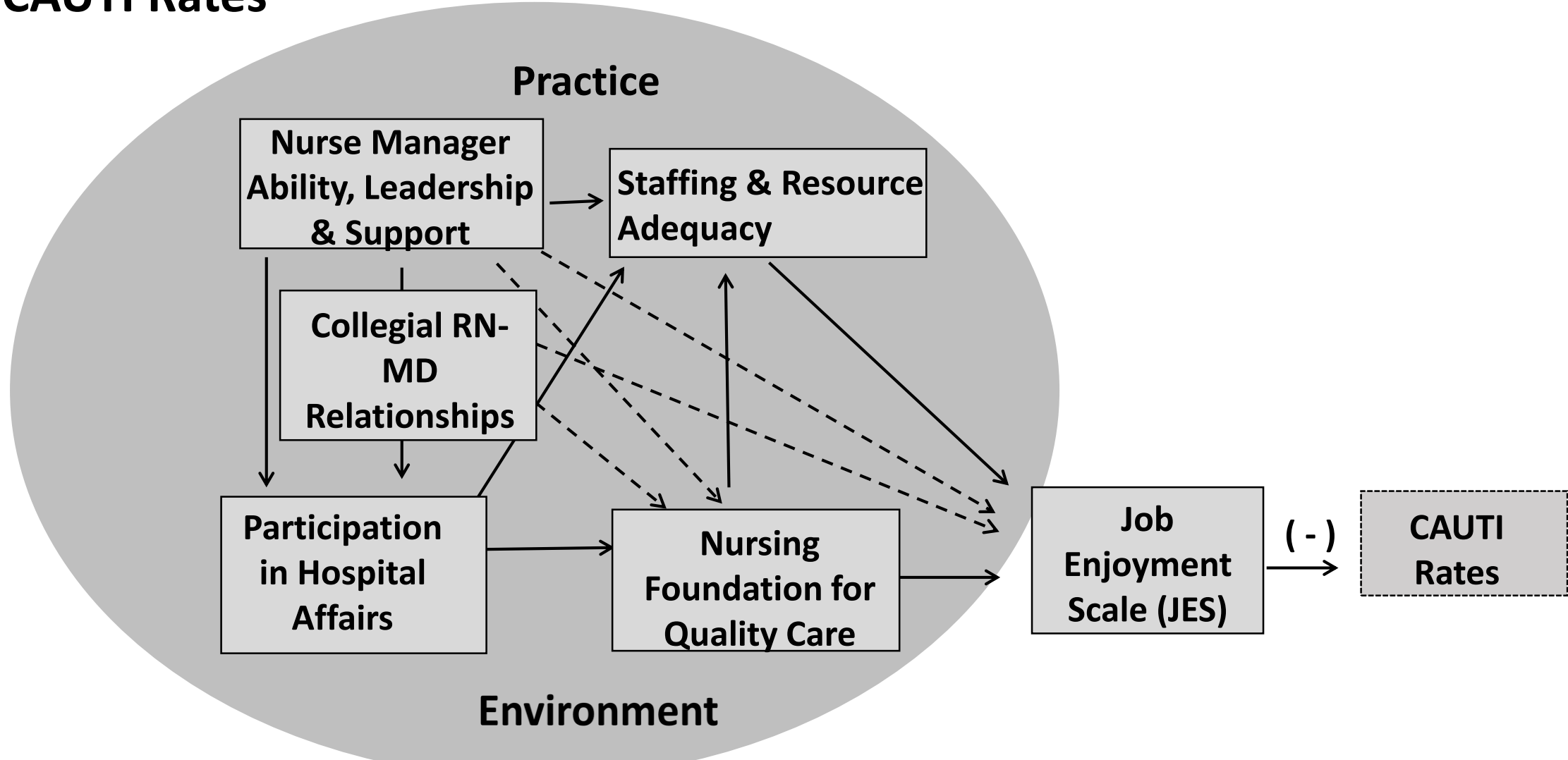
- **Study Aim**

- Confirm structure of the modified NWLM of Job Enjoyment from 2011 data set
- Evaluate the relationship of elements of the nurse practice environment with CAUTI

- **Assumptions:**

- Unit level data with at least 40% response rate accurately reflect the score for the unit (Kramer et al., 2009)
- CAUTI rates sufficient to determine the pathways for association of the NWLM with CAUTI incidence at the unit level.

Hypothesized Modified Nurse Worklife Model of Job Enjoyment and CAUTI Rates



Key: CAUTI = Catheter Acquired Urinary Tract Infection; Paths added to original NWLM - - - - - >

Hospital & Unit Type Characteristics (N=1,106)

Bed Size	%	Unit Types	%
< 100	8.1	Medical	33.9
100-199	18.8	Surgical	25.2
200-299	22.3	Medical-Surgical	40.5
300-399	16.4		
400-499	14.3		
500+*	20.1		

Teaching Status & Magnet Status	%
Academic Medical Center*	19.4
Teaching	34.5
Non-teaching	46.0
Magnet Status	45.0

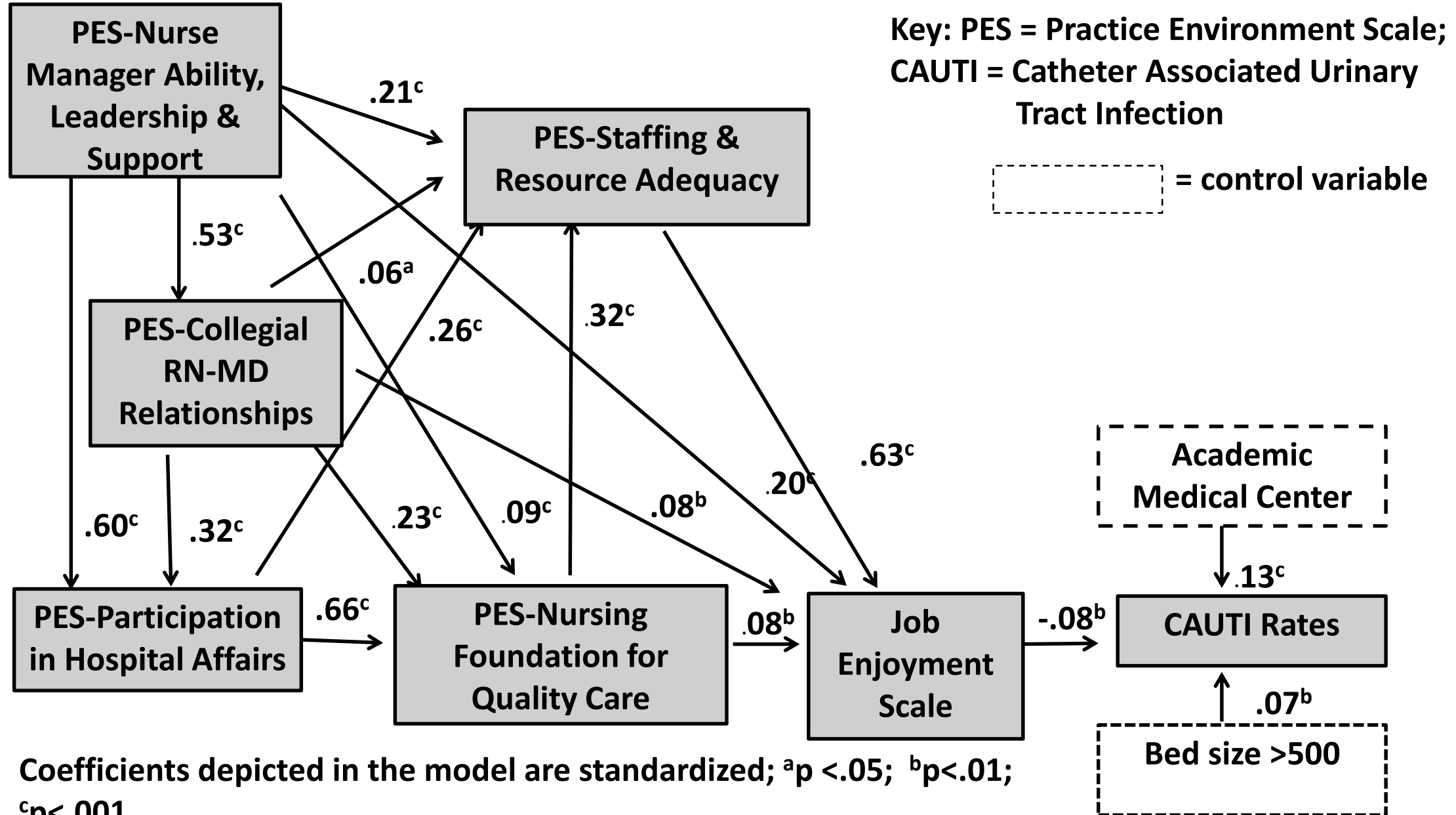
RN Characteristics	Range %	M %
Female	50-100	92
White	0-100	67
BSN or higher	0-100	56
Certification	0-100	16

***ANOVA indicated a significant difference on CAUTI rate for Academic Medical Center status & bed size > 500**

Results:

- PES subscales moderately to highly correlated ($r = .53$ to $.88$); reliabilities *range* = $.94$ to $.97$
- CFA for subscales- $CFI = .91-1.0$ with the exception of Participation in Hospital Affairs ($CFI = .85$)
- Job Enjoyment Scale similar across all unit types [$M = 3.71$ ($SD=.58$) to 3.78 ($SD=.58$)]
- CAUTI Rate
 - Medical $M = 1.91$ ($SD=2.7$)
 - Surgical $M = 1.54$ ($SD=2.1$)
 - Medical-Surgical $M = 1.91$ ($SD=2.5$)
- Model Fit Indices: $CFI = .995$, $RMSEA = 0.04$ ($95\% CI = .028-.056$), $SRMR=0.02$

Results of Modified NWLM with CAUTI Rates



Significance

- Modified NWLM of Job Enjoyment paths from previous study supported
- ***Significant negative*** association of CAUTI rate with Practice Environment through Job Enjoyment at the unit level
- Positive association of academic medical centers and hospitals with > 500 beds
 - Congruent with Thurnlow & Stukenborg (2006) findings
- Impact of the practice environment on CAUTI
Aligns with work at the hospital level by Aiken
- Pervasive impact of nurse manager in NWLM aligns research on importance of first-line nurse leadership

Limitations:

- Sample may not be representative of hospital populations across the U.S.
 - under representation of rural & smaller hospitals
 - higher proportion of Magnet[®] designated hospitals in the NDNQI[®] database.
- Units with poor practice environments may be under represented due to lack of a 40% response rate.
- Cross-sectional data limits inference of causality

Strengths:

- Large national sample from all census divisions
- Well-defined valid and reliable measures for variables
- First study with measured not perceived clinical outcome

A photograph of a sunset over a beach. The sky is filled with dark, heavy clouds, and a bright, horizontal band of orange and yellow light stretches across the horizon. The sun is visible as a small, glowing orb just above the horizon line. The ocean is calm, reflecting the colors of the sky. In the foreground, a sandy beach is visible, with several small figures of people standing near the water's edge. The word "Questions?" is overlaid in a large, black, sans-serif font in the center of the image.

Questions?