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Unit Patient Safety Culture: Test of a Model

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Disclosure

- Author: Debbie Anglade, PhD, RN, LHRM, CPHQ, CCM
- Assistant Professor at University of Miami School of Nursing and Health Studies
- No commercial support or Conflict-of-Interest to Report
- Learning Objectives:
  - Examine application of the bioecological model in nursing research.
  - Identify the five nested context systems of the bioecological model.

Background of Problem

- Institute of Medicine (IOM) Report *To Err is Human*
  - Reported that avoidable medical errors annually contributed to 44,000 to 98,000 deaths in the United States.
  - Wake-up call
  - A recent study by John T. James estimates the number of hospitalized patients who suffer some type of preventable harm that contributes to their deaths is now between 210,000 and 440,000 patients annually
  - Newer estimates are supported by Dr. Lucian Leape.

- Cost of Medical Errors
  - The national costs of preventable adverse events (medical errors resulting in injury) are estimated at between $17 billion and $29 billion, of which health care costs represent over one-half.

James, 2013; IOM, 2000; Marshall, 2013

Statement of Problem

- Over a decade since the IOM report *To Error Is Human*, only isolated examples of improvement can now be found.
- To date, patients continue to have negative patient outcomes (i.e. falls, hospital-acquired pressure ulcers, and infections) within the healthcare system.
- There was a need to address health care staff behavioral obstacles (i.e. apathy, disassociation, and mistrust evident in unit patient safety culture and compassion fatigue) that may impinge on achieving sustained positive patient outcomes.

Barclay, 2013; Chassin & Loeb, 2013

Study Aims

The specific aims:

Examine the relationship between inpatient nursing units' patient safety culture, nurse compassion fatigue, nurse compassion satisfaction, and the impact on nurse-sensitive patient outcomes.

Study Constructs

Patient Safety Culture → The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management.

Compassion Fatigue → The conceptual definition is “a secondary traumatic stress reaction resulting from helping, or desiring to help, a person suffering from traumatic events”. (Secondary traumatic stress & Burnout)

Compassion Satisfaction → The conceptual definition is a sense of achievement or pleasure resulting from the care-giving experience.

Nurse-Sensitive Patient Outcomes → The conceptual definition is patient outcomes influenced by nursing. (Falls, falls with Injury, HA pressure ulcers, CAUTI, and CLABSI)

AHRQ, 2011; Figley, 1995b (p. 7); Figley, 2002a; Kearney et al., 2009; Lynch & Lobo, 2012; NQF, 2004

Research and Conceptual Model

- Quantitative research is performed within the context of a theoretical framework.
- A conceptual model broadly presents an understanding of a phenomenon.
- Models are built inductively from observations and must be evaluated by testing deductions from it.
- This study used Bronfenbrenner's bioecological model as a framework to evaluate the interrelated relationships between unit patient safety culture and individual nurse's behavior and self-management (compassion fatigue and/or satisfaction) and the impact on nurse-sensitive patient outcomes.

Polit & Beck, 2012

Conceptual Framework

- Bronfenbrenner conceptualized human development as ongoing processes through which individuals gain greater conception of their environment and progressively become more successful in participating and restructuring said environment.

- Bronfenbrenner Bioecological Model operate under the assumption that human behavior is determined by a series of interactions; with the individuals' psychological adjustments dependent on their daily interactions as well as the systems that structure the individual's daily realities. Over time the individual change due to multiple interconnections between five nested context systems.

Neville & Mobley, 2001; Bronfenbrenner, 1979; Forrest, Miller, & Elman, 2008; Tudge, Mokrova, Hatfield, & Karnik, 2009

Bronfenbrenner Bioecological Model

- The bioecological model contains five nested level of systems or contexts that are important to the individual's development.
- The central sphere represents the individual and is surrounded by five concentric spheres.

    - The **microsystem** is the innermost system and immediate environment which encompasses direct interactions and relationships of daily life.

    - The **mesosystem** consists of interactions between two or more microsystem environments and reflects reciprocal influences of various structures on the person and the person on the structures.

Bronfenbrenner, 1979; Tacón, 2008; Neville & Mobley, 2001; Hoare, 2009

Bronfenbrenner Bioecological Model cont.

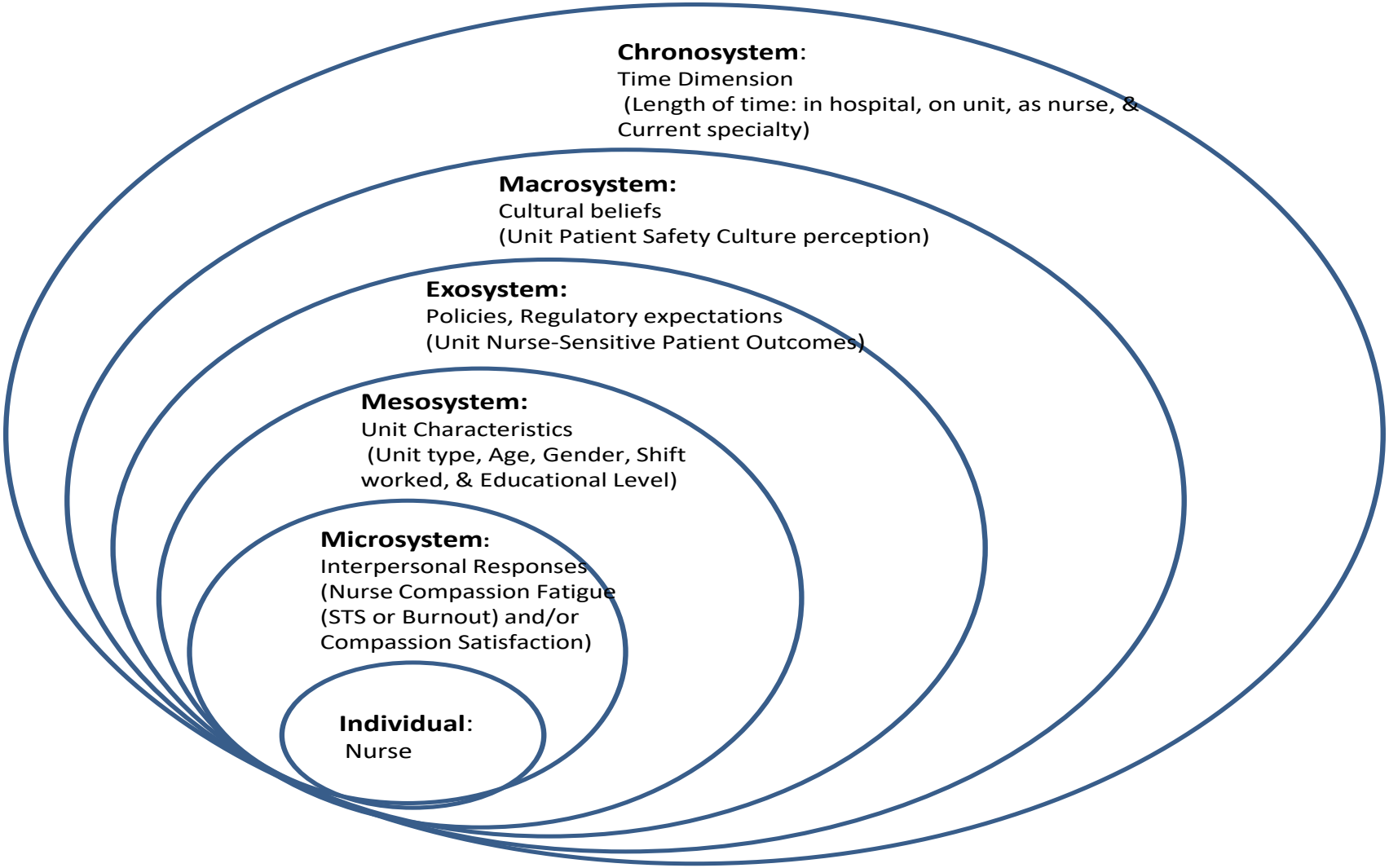
- The **exosystem** is the linkage between subsystems that indirectly influence the developing person. It comprises of the larger institutions which influence individuals such as government, laws, and regulations

- The **macrosystem** a context encompassing any group whose members share value or belief systems. The macrosystem represents the larger socio-cultural context of ideology, customs, and culture.

- The **chronosystem** is the final outer sphere which involves changes in systems overtime through a process of mutual accommodations.

Neville & Mobley, 2001; Hoare, 2009 ; Tudge, Mokrova, Hatfield, & Karnik, 2009; Lollis, 2009; Forrest et al., 2008

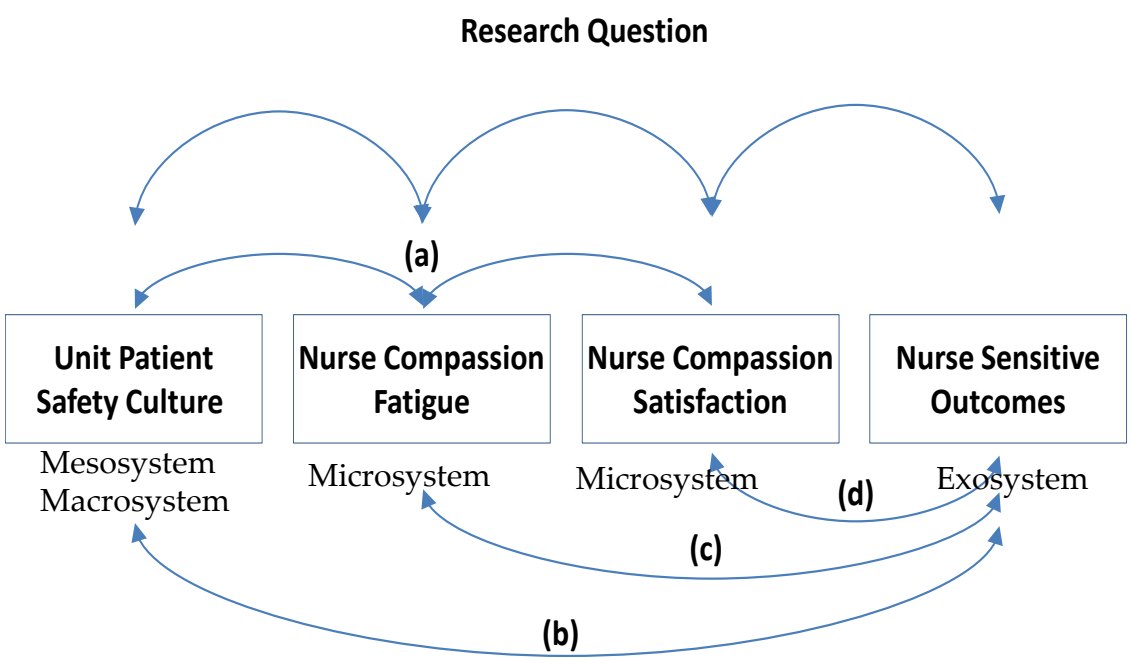
Bronfenbrenner's Biological Model Applied to Study



Study Questions

- The research question was: what is the relationship between inpatient nursing units' patient safety culture, nurse compassion fatigue, nurse compassion satisfaction, and the impact on nurse-sensitive patient outcomes (adverse events) at a teaching hospital in South Florida?

- Within the context of this question, four sub-questions will be explored:



a) What is the relationship between nursing units' safety culture and nurse compassion fatigue and nurse compassion satisfaction?

b) What is the relationship between nursing units' safety culture and nurse-sensitive patient outcomes

c) What is the relationship between nursing units' nurse compassion fatigue and nurse-sensitive patient outcomes?

d) What is the relationship between nursing units' nurse compassion satisfaction and nurse-sensitive patient outcomes?

Study Hypotheses

The study hypotheses were:

1) Nursing units with positive unit safety culture, moderate to low nurse compassion fatigue, and high compassion satisfaction will have positive nurse-sensitive patient outcomes (low adverse event rates).

2) Nursing units with negative unit safety culture, high nurse compassion fatigue, and low compassion satisfaction will have negative nurse-sensitive patient outcomes (high adverse event rates).

Methods – Data Collection

A quantitative descriptive correlational design, which used primary and secondary data was used.

Primary Data Collection

- Primary data on patient safety culture, compassion fatigue, and compassion satisfaction were collected through a convenience sampling of registered nurses (N = 127), employed on inpatient units of University of Miami Hospital.
  - The participants self-administered the survey which included a modified Hospital Survey on Patient Safety Culture and the Professional Quality of Life Scale (ProQOL), version 5.
  - Both survey tools have well established acceptable validity & reliability with similar participant groups

Secondary Data Collection

- Secondary administrative 2013 NDNQI data was provided by the hospital for unit nurse-sensitive patient outcomes.

NDNQI = National Data Base of Nursing Quality Indicators

Methods - Instruments

- **Modified Hospital Survey on Patient Safety Culture**
  - The original AHRQ *Hospital Survey on Patient Safety Culture* includes 12 dimensions and 42 items, plus background questions. The survey items are 5-point likert scales, 1 = Strongly Disagree to 5 = Strongly Agree, with both positively and negatively worded items. This researcher modified the survey retaining seven unit level dimensions, two outcome dimensions specific to safety culture perception, and demographic data.
- **Professional Quality of Life Scale (ProQOL)**
  - *ProQOL* consists of three scales which measures three separate constructs; secondary traumatic stress (STS), burnout (BO) and, compassion satisfaction (CS). The survey consists of 30 items with 5-point likert scales with both positively and negatively worded items.

Administrative Data:

- **NDNQI**
  - Established by the ANA to collect longitudinal, unit-level data on nursing-related variables from acute care hospitals. Contains structure, process, and outcome measures such as nurse turnover, and patient outcomes.

AHRQ = Agency for Healthcare Research and Quality; NDNQI = National Data Base of Nursing Quality Indicators; ANA = American Nurses Association

Methods – Protection of Human Subjects

- IRB approval was obtained from the University of Miami
- Qualtrics anonymous survey
- Invitation was sent via e-mail to 460 potential participants
- Survey data collection occurred from June 9, 2014 through July 31, 2014
- Informed Consent Procedures
  - Upon survey access participants had to first consent prior to moving through the survey
- An electronic $10.00 gift card was offered as an incentive
- Confidentiality of the participants was assured as no identifying survey data was collected
- Only de-identified data was used
- Only the investigator had access to password protected data.

Methods - Statistical Analysis

- IBM SPSS Version 22 software was used for data analysis.
- Pearson Correlations
- Multiple Regression statistical analyses to answer the research questions
- Three-way Analysis of Variances (ANOVA) were calculated to address the hypotheses
- Cronbach's alpha coefficients were used to examine the reliability of the study measures
- Descriptive statistics were used to describe the demographic data.
- Minimum sample size of 63 participants was computed by an a priori power analysis using G*Power 3.1.7 statistical program.

Results

Study Participants Demographic Characteristics (N = 127)

Variables	n	M ± SD	Range
Age (years old)	117	36.27 ± 11.16	21 to 62
Years as RN <1 year as RN	115 12	9.15 ± 8.90 1.91 ± .282	1 to 38 -
Years at Hospital <1 year at Hospital	110 17	6.39 ± 6.48 1.87 ± .342	1 to 32 -
Years on Current Unit <1 year on Current Unit	102 25	6.17 ± 6.27 1.80 ± .399	1 to 32 -
Years in Current Specialty <1 year in Current Specialty	104 23	7.48 ± 7.86 1.82 ± .387	1 to 37 -

Results (Continued)

Distribution of Study Participants Demographic Characteristics (N = 127)

Variables	*f* (%)
Gender	
Female	104 (81.9)
Male	17 (13.4)
Missing	6 (4.7)
Unit Type	
Medical/Surgical	20 (15.7)
Intensive Care Units	34 (26.8)
Telemetry	40 (31.5)
Step Down	13 (10.2)
Oncology	6 (4.7)
Psychiatry	13 (10.2)
Missing	1 (0.8)
Primary Work Shift	
Morning (7:00AM – 7:00PM)	68 (53.5)
Night (7:00PM – 7:00AM)	55 (43.3)
Other (8:30AM – 5:00PM & alternate)	2 (1.6)
Missing	2 (1.6)

Variables	*f* (%)
Education Level at Entry to Nursing	
BSN	75 (59.1)
ADN	40 (31.5)
Other	10 (7.9)
Missing	2 (1.6)
Highest Level of Education	
BSN	92 (72.4)
ADN	18 (14.2)
MSN	3 (2.4)
ARNP	2 (1.6)
Other	9 (7.1)
Missing	3 (2.4)
Other Degree Besides Nursing	
Yes	43 (33.9)
No	82 (64.6)
Missing	42 (1.6)

Results (Continued)

Nurse-Sensitive Outcomes

Reported Nurse-Sensitive Outcome Variable Rates Means, Standard Deviations, and Ranges

Variable	N	Mean	SD	Range
Falls	126	2.35	1.2	0.5 to 3.6
Falls with Injury	113	.43	.27	0.1 to 0.9
Hospital Acquire Pressure Ulcer	113	7.93	5.1	1.3 to 14.4
CAUTI	113	.48	.21	0.0 to 0.7
CLABSI	113	.47	.20	0.3 to 0.8

CAUTI = Catheter Associated Urinary Track Infection; CLABSI = Central Line Associated Blood Stream Infection

Results (Continued)

Multiple Regression Analysis of Select Predictor Variables on Falls			
Predictors	*β*	*t*	*p*
Unit Type	.373	4.455	<.001*
Years RN	-.399	-3.060	.003*
Years in Specialty	.349	2.557	.012*
OPSP	.007	.072	.942
Teamwork	-.164	-1.799	.075
Sup/Manager on PS	-.010	-.121	.904
Org Learning	-.132	-1.230	.221
Staffing	-.188	-2.088	.039*
Error Feedback	.177	1.643	.103
Error Non-Punitive	.317	3.515	<.001*
Open Communications	-.138	-1.520	.131
BO	.053	.367	.714
STS	.075	.806	.422
CS	.123	.999	.320

Note: $R^2 = .439$, $F(14, 110) = 6.152$, $p < .001$. N = 125 *$p < .05$

Results (Continued)

Multiple Regression of Select Predictor Variables on Falls With Injury			
Predictors	β	t	p
Unit Type	-.236	-2.783	.006*
Years RN	-.443	-3.226	.002*
Years in Specialty	.297	2.141	.035*
OPSP	.028	.257	.798
Teamwork	-.196	-1.974	.051
Sup/Manager on PS	-.018	-.201	.841
Org Learning	-.109	-.900	.370
Staffing	-.271	-2.684	.009*
Error Feedback	.144	1.133	.260
Error Non-Punitive	.362	3.701	<.001*
Open Communications	-.123	-1.270	.207
BO	.114	.697	.487
STS	-.044	-.418	.677
CS	.155	1.095	.676

Note: R^2 =.421, $F(14, 97) = 5.041$, $p < .001$. N = 112 *$p < .05$

Results (Continued)

Multiple Regression Analysis of Select Predictor Variables on HA Pressure Ulcer			
Predictors	*β*	*t*	*p*
Unit Type	.210	2.274	.025*
Years RN	.328	2.200	.030*
Years in Specialty	-.307	-2.036	.044*
OPSP	.008	-.069	.945
Teamwork	.154	1.429	.156
Sup/Manager on PS	.013	.136	.892
Org Learning	.219	1.662	.100
Staffing	.193	1.759	.082
Error Feedback	-.230	-1.665	.099
Error Non-Punitive	-.340	-3.204	.002*
Open Communications	.077	.728	.468
BO	-.106	-.598	.551
STS	-.094	-.820	.414
CS	-.144	-.936	.352

Note: $R^2 = .317$, $F(14, 97) = 3.214$, $p < .001$. N = 112 *$p < .05$

Results (Continued)

Multiple Regression Analysis of Select Predictor Variables on CAUTI			
Predictors	*β*	*t*	*p*
Unit Type	-.407	-4.296	<.001*
Years RN	-.368	-2.399	.018*
Years in Specialty	.344	2.216	.029*
OPSP	-.011	-.087	.931
Teamwork	-.021	-.188	.851
Sup/Manager on PS	-.009	-.094	.925
Org Learning	-.178	-1.315	.192
Staffing	-.121	-1.070	.287
Error Feedback	.157	1.106	.272
Error Non-Punitive	.198	1.813	.073
Open Communications	-.107	-.989	.325
BO	-.071	-.391	.696
STS	.143	1.217	.226
CS	.040	.250	.803

Note: $R^2 = .277$, $F(14, 97) = 2.657$, $p = .003$. N = 112 *$p < .05$

Results (Continued)

Multiple Regression Analysis of Select Predictor Variables on CLABSI			
Predictors	*β*	*t*	*p*
Unit Type	.514	6.093	<.001*
Years RN	-.123	-.904	.368
Years in Specialty	.219	1.591	.115
OPSP	.012	-.105	.917
Teamwork	.000	-.003	.997
Sup/Manager on PS	-.002	-.026	.979
Org Learning	-.217	-1.807	.074
Staffing	-.020	-.202	.841
Error Feedback	.189	1.496	.138
Error Non-Punitive	.132	1.360	.177
Open Communications	-.021	-.217	.829
BO	-.019	-.120	.905
STS	.204	1.950	.054
CS	.034	.244	.808

Note: $R^2 = .428$, $F(14, 97) = 5.191$, $p < .001$. N = 112 *$p < .05$

Discussion

- Analyses to test Bronfenbrenner's bioecological model demonstrated the complexities of nurses' interactions with their immediate environment:

Discussion

Nested context systems	Results
Microsystem (Interpersonal responses - STS, BO and CS)	Two-way interactions between compassion fatigue constructs and compassion satisfaction construct were significant on CLABSI rates.
Mesosystem (Unit Characteristic - unit type)	Was significant across all outcomes
Exosystem (Healthcare policy and regulatory expectations)	Falls with injury demonstrated significant interactions with elements of the microsystem (CS) and macrosystem (OPSP). CLABSI rate demonstrated significant interactions with the microsystem (BO, STS, and CS).
Macrosystem (Cultural beliefs)	Identified staffing, Teamwork, and error non-punitive as significant predictors of outcomes.
Chronosystem (Time dimension)	Years as RN and years in specialty were significant predictors of outcomes.

Future Implications

- More research must be conducted to better understand patient safety culture, compassion fatigue, and compassion satisfaction so as to develop effective strategies, to improve patient safety
- Use of he Bronfenbrenner's bioecological model in research will help to understand the complexity and multidimensionality of patient safety culture.
- Improvement to patient safety culture requires development in several systems of the Bronfenbrenner's bioecological model, such as communication, teamwork, and leadership support in the macrosystem.
- There is no "quick fix" to transforming organizations. It will take time and commitment but the benefit to both patients and staff could be considerable.

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Thank You

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