

Driving Patient Outcomes through Clinical Decision Support Systems and Nurse-Directed Protocols

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Virtua

High-Level Purpose



CDSSs

- **CDSSs & Physicians**
 - can improve physician performance; however, their effects on patient outcomes and cost-effectiveness are inconsistent and understudied (Garg et al., 2005).
 - **Review of 17 high-quality systematic reviews** (Jaspers et al., 2011).
 - 57% report significant impact on provider performance
 - 30% report positive impact on patient outcomes
 - Most common positive outcomes related to medication ordering and provision of preventive care
- **Features of CDSSs yielding greatest impact** (Kawamoto et al., 2005)
 - electronic provision of automatic support
 - automatic integration into charting or order entry
 - requirement of a physician response
 - provision of support at the point of care
- **Reports from the IT Industry** (Glaser & Hess, 2011; Hess, 2009).
 - benefits to patient of CDSSs are promising
 - based on quality improvement studies
 - No defined controls
 - Limited generalizability

CDSSs & Nursing

- CDSSs have the potential to impact nurse behaviors, patient outcomes and the cost of care.
- Nurses are more likely to adhere to guidelines and assessment recommendations when prompted by a CDSS (Beeckman et al., 2013; Ficke et al., 2011; Hagiwara et al., 2013; Lyerla, 2008; Lyerla et al. 2010)
- Outcomes such as frequency of urinary incontinence (Petrucci et al., 1991), immunization compliance (Swenson et al., 2012), attainment of target INR (Fitzmaurice et al., 2000), glycemic control (Boord et al., 2000; Eslami et al., 2012; Fogel & Baker, 2013; Harrison et al., 2013; Lipton et al., 2011; Morris et al., 2008; Plank et al, 2006; Rood et al., 2005; Vogelzang, Zijlstra & Nijsten, 2005), appropriate triage assignment (Dong et al., 2005), prevention of malnourishment (Fossum et al., 2011) and correct staging of pressure ulcers (Alvey, Hennen & Heard, 2012) are improved with the support of CDSSs.

CDSS & Nursing: Literature Gaps

- Research on CDSSs in nursing is not robust in quantity or quality
- Literature highlights the importance of nursing culture, experience, local practices, and beliefs in the adoption of CDSS recommendations, and nurses' desires for flexibility from the CDSS (Campion et al., 2011; Dowding et al., 2009).
- Need for more research with larger and more adequately controlled samples on the use of CDSS by nurses
- The question of why nurses override CDSS recommendations and how this can be addressed to improve patient outcomes related to CDSSs must be investigated.

High-Level Purpose



CDSS

Protocol for
Nurse-Directed
Urinary Catheter
Removal

CAUTI
Prevention

CAUTI

- CAUTI is a significant and preventable healthcare complication.
- The single most effective intervention in CAUTI prevention is early removal of urinary catheters (Chenoweth & Saint, 2011; Gould et al., 2009; Hooton et al., 2010; Maki & Tambiyah, 2001), **yet catheters remain in place after medically necessary** (Harstein et al., 1981; Jain et al., 1995; Jamulitrat & Panmanee, 2007; Raffaele, et al., 2008; Tiwari et al., 2012).
- Evidence-based guidelines recommend reminder systems and nurse-directed protocols as strategies to eliminate unnecessary catheters (Gould, 2009; Hooton, 2010).

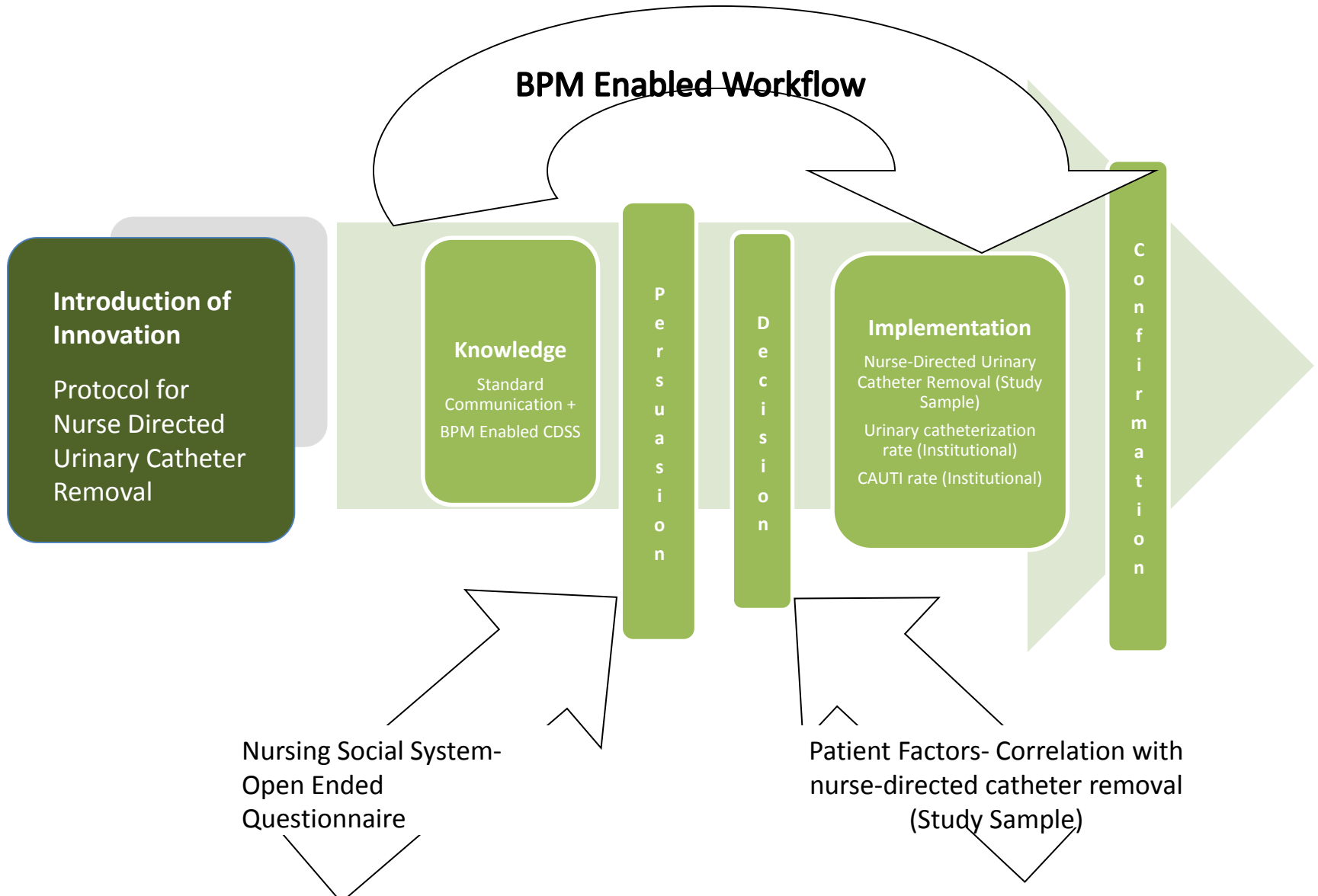
Prevention of Unnecessary Urinary Catheters

- Evidence-based strategies promoting prompt removal of unnecessary urinary catheters
 - Physician reminder systems
 - Nurse-directed catheter removal protocols (Gould et al., 2009; Hooton et al., 2008)
- Despite national guidelines:
 - CAUTI prevention practice utilization remains low (Krein, Kowalski, Hofer & Saint, 2012)
 - Physician Reminder Systems: 52% implementation, 27% adherence (Stone et al., 2014)
 - Nurse-Directed Protocols: 27% implementation, 22% adherence (Stone et al., 2014).
 - CAUTI rate is on the rise
 - Low of 4.0/100 catheterizations in 2006 to 5.3/100 catheterizations in 2010 (Daniels, Lee, & Frei, 2014).

CAUTI: Literature Gaps

- The evidence to support the use of nurse-directed protocols is limited and requires further, more rigorous study (Gould, 2009).
- Nurses have questioned their authority to remove catheters without a physician order (Arentzen, 2011; Newman et al., 2011; Wenger, 2010). Research will need to explore the impact of the nurses and their culture on the successful adoption of nurse-directed catheter removal protocols.
- Research should focus on the combined effect of utilizing a reminder system with a nurse-directed catheter removal protocol.
- Current evidence suggests a connection between risk for incontinence and inappropriate catheterization (Apisarantharak et al., 2007; Fakhri et al., 2010; Holroyd-Leduc et al., 2005; Jansen et al., 2012; Rafaele et al., 2008; Tiwari et al., 2012). Research will need to explore the effect of patient factors on nurse-directed catheter removal.

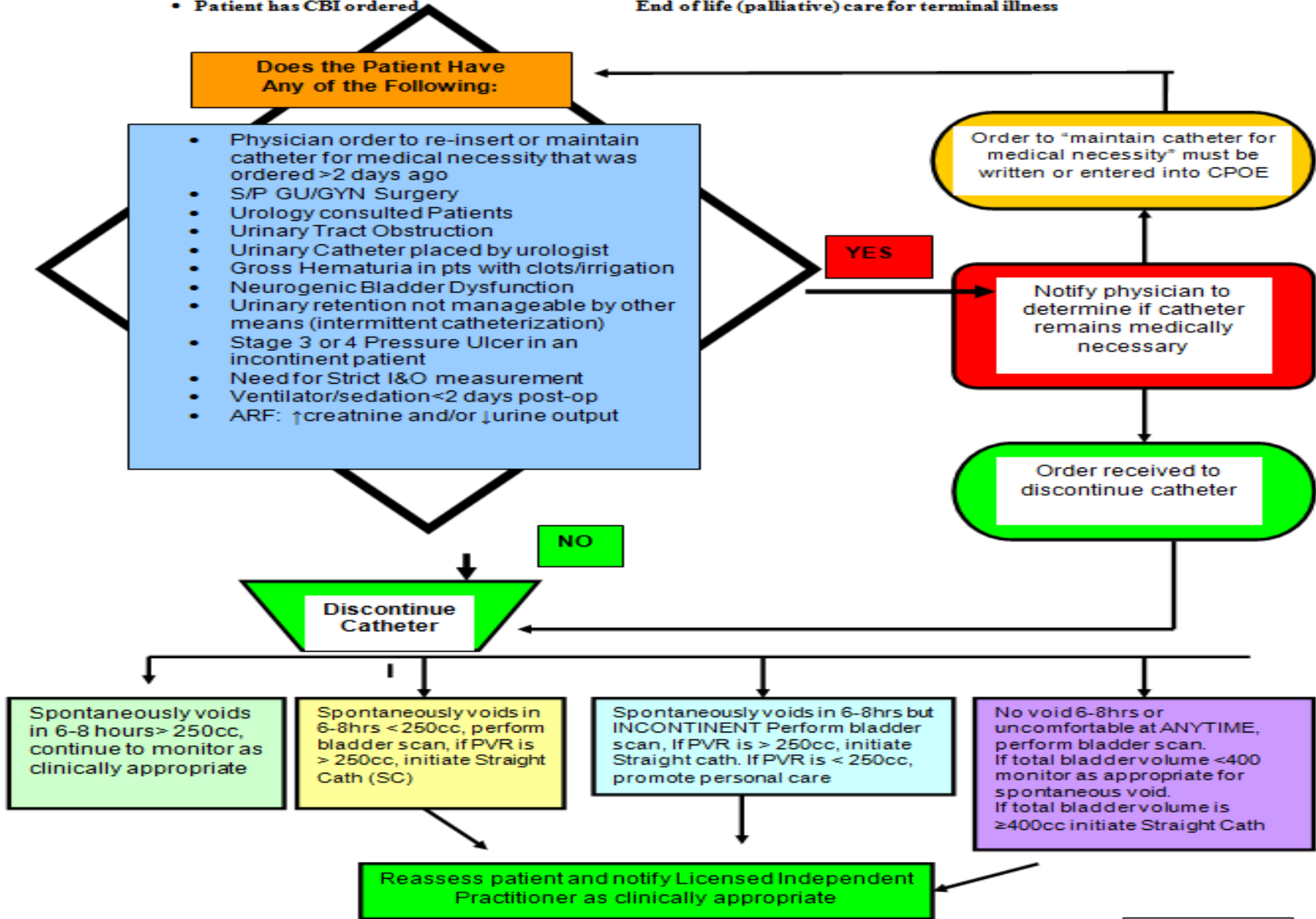
Mixed-Method Design (Rogers, 2003)



FOLEY REMOVAL PROTOCOL

Nurse to assess daily with the following exceptions:

- Foley removal date already ordered
 - Order to reinsert or maintain foley for medical necessity present within the last two days
 - Foley is a chronic foley
 - Patient has CBI ordered
- Patient will be discharged with foley
End of life (palliative) care for terminal illness



Nurse-Directed Order for Removal

Patient Care Orders

Ordered By ... Entered By Amy Elizabeth Glasofer, RN Target Cosigner1 ...

Order Source Per Protocol Order ID 39801031

On 06/08/2014 10:48

Allergies NKA NKDA NKFA Service Provider MARLTON Status Active

Weight kg 78.02 Height ft.in 5 ft. 8 in. HB-CFL05-L

Remove Urinary Catheter (Indwelling)_PCare

Details

Instructions

Reason For Request

Start Repeat Stop

Priority Routine Once After 1 Times

On 06/08/2014 06:00 Every Until D/C

One Time

VH_ORD_CPOE_PCare_Communication

Verbal Order to Maintain Catheter

Patient Care Orders

Ordered By Entered By Amy Elizabeth Glasofer, RN TargetCosigner1

Order Source Verbal Order On 06/08/2014 10:52 Order ID 39801076

Allergies NKA NKDA NKFA Service Provider MARLTON Status Active

Weight kg 78.02 Height ft.in 5 ft 8 in HB-CFL05-L

Indwelling Urinary Catheter Management_PCare Maintain Indwelling Catheter for Medical Necessity

Details

Instructions

Reason For Request Maintain Indwelling Catheter for Medical Necessity

Start Repeat Stop

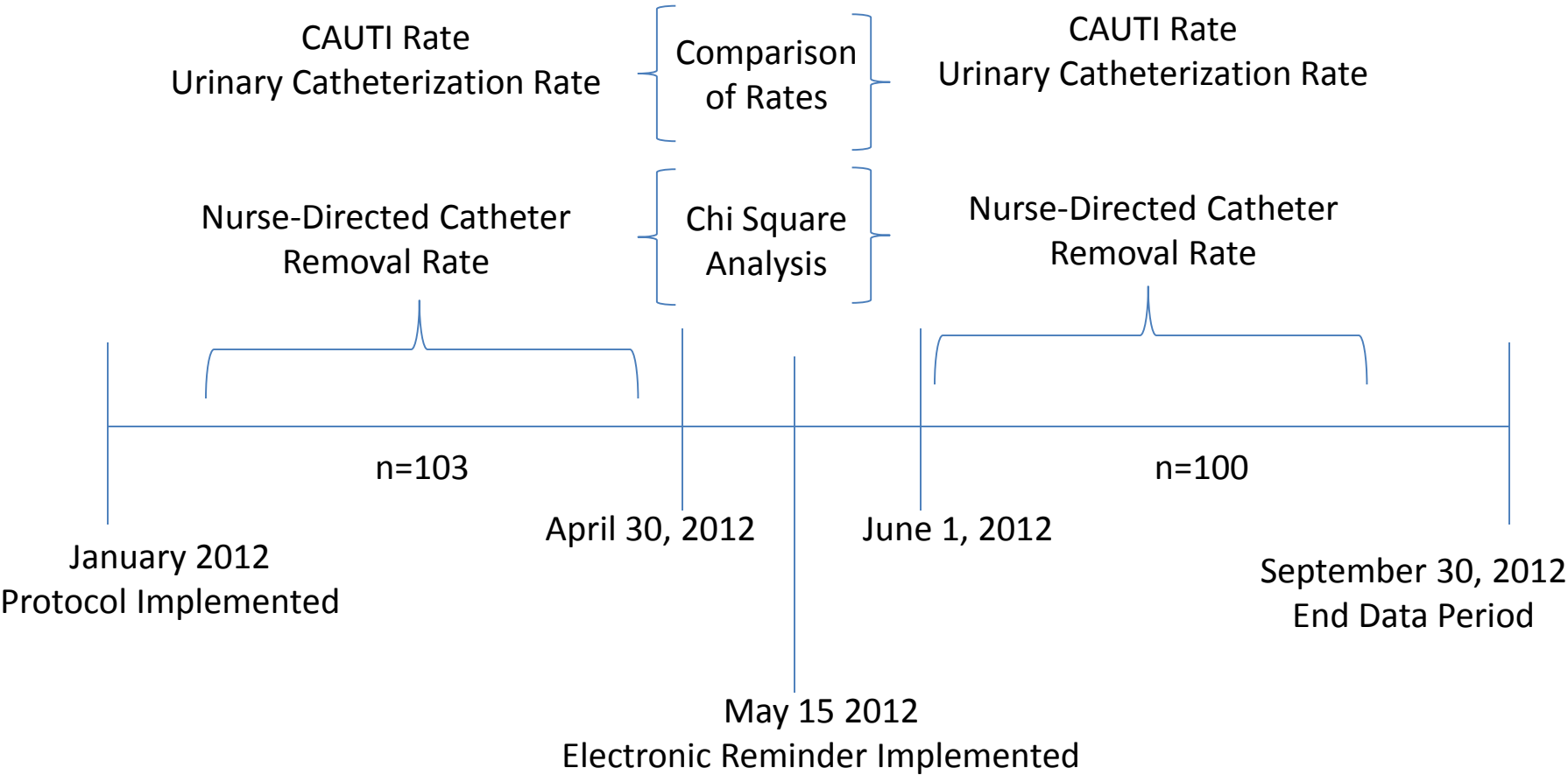
Priority Routine Once. After 1 Times

On 06/08/2014 06:00 Every Until D/C

One Time

VH_ORD_CPOE_PCare_Communication

Specific Aim: *To examine the impact of a BPM enabled workflow on nurse-directed urinary catheter removal, urinary catheterization and CAUTI rates.*



Specific Aim: To examine the impact of a BPM enabled workflow on nurse-directed urinary catheter removal

Analysis of Nurse-Directed Catheter Removal			
Phase	Removal Per Protocol (n) %	Non-Removal Per Protocol	Chi Square Analysis
1	(43) 42%	(60) 58%	$\chi^2=19.6$ df=1 p<.001
2	(76) 76%	(24) 24%	

All cells > minimal expected count of 5

Table 4: Odds of Nurse Directed Catheter Removal		
Phase	Odds	Odds Ratio
1	(43/60) .72	(3.17/.72) 4.4
2	(76/24) 3.17	

Specific Aim: *To examine the impact of a BPM enabled workflow on urinary catheter utilization and CAUTI rates.*

Table 5: Analysis of Urinary Catheter Utilization and CAUTI Rates

Phase	Patient Days	Catheter Days	CAUTIs	Urinary Catheter Utilization Rate p=.953	CAUTI Rate p=.362
1	16,722	4,362	3	0.26	0.69
2	15,312	3,989	1	0.26	0.25

Summary of Qualitative Analysis

Theme	Subtheme	Summary
Professional Values	Autonomy	Protocol promoted autonomy. 59% comfortable to remove catheter based on protocol
	Accountability	Protocol ↑ accountability for patient outcomes. Lack of peer-to-peer or leadership accountability
	High Quality Care	Protocol and CDSS result in decreased urinary catheter utilization and prevent CAUTI Nurses prioritize pressure ulcer and fall prevention of CAUTI prevention
Avoidance of Conflict		Discomfort with holding peers accountable Fear that following protocol may anger physician
Ease of Workflow	Barriers	Protocol: time consuming, error prone Alert: triggered and timed inappropriately
	Enhancements	Protocol & CDSS simplify work CDSS a good reminder in chaotic environment

Autonomy

“Makes me uncomfortable!! We have been taught to never do anything without a physician order.”

2. Staff feel free to question the decisions or actions of those with more authority. (C4)



Nonpunitive Response to Error 1

1. Staff feel like their mistakes are held against them. (A8R)



2. When an event is reported, it feels like the person is being written up, not the problem. (A12R)



3. Staff worry that mistakes they make are kept in their personnel file. (A16R)



Accountability

“Overall a good alert, but is not addressed consistently by nurses.”

2. Mistakes have led to positive changes here. (A9)



1

1. We are given feedback about changes put into place based on event reports. (C1)



1


- 84% of clinical care providers work with someone who takes shortcuts that could be dangerous to patients
- 31% have spoken to the person and shared their full concern


2,3

High Quality Care

“What is worse? Potential for skin breakdown or possible infection?”

1. We have enough staff to handle the workload. (A2)  54% 1

4. We work in "crisis mode," trying to do too much, too quickly. (A14R)  50% 1

3. Whenever pressure builds up, my supv/mgr wants us to work faster, even if it means taking shortcuts. (B3R)  75% 1

Avoidance of Conflict

“I’m worried that if it has to go back in, a physician is going to be angry.”

1. Staff will freely speak up if they see something that may negatively affect patient care. (C2)



- 77% are concerned about disrespect they experience ^{2,3}
- 7% have spoken with this peer and shared their full concerns
- 52% work with some number of people who abuse their authority- pull rank, bully, threaten, or force their point of view on them. ^{2,3}

“Night shift often ignores the alert and it is left up to day shift to address and use the protocol. It’s just easier to take care of it myself”



CDSS

Evidence

Practice &
Outcomes

Culture of Safety

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