

Project Submission:
2009 Delaware Valley Patient Safety Award

DOYLESTOWN HOSPITAL

*“Monitoring Compliance of Infection Prevention
Interventions through the
Use of a Patient-Centered Dashboard”*

Title: Monitoring Compliance of Infection Prevention Interventions Through the Use of a Patient Centered Dashboard

Abstract:

Evidence based interventions to prevent hospital acquired infections (HAIs) are multifaceted due to the various types of infections and strategies for prevention. In addition, information on patient risk factors and documentation on compliance with interventions are spread across various modules within a hospital's patient care computer system. Traditionally, infection prevention – which is an information dependent endeavor – required the creation of multiple patient census reports, admission reports and microbiology reports to identify patients at risk for hospital acquired infections. Infection preventionists would then sort through these reports to determine patients with active infections, with a history of Multidrug-Resistant Organism (MDRO) infection or colonization, with a central line or Foley catheter, and whether the patient was in isolation precautions – among other parameters relevant to ensuring patient risk for hospital acquired infections was minimized.

Our initiative implemented patient-centric census reports that allowed infection preventionists to perform efficient rounding on patient floors to rapidly assess compliance with infection prevention procedures, engage front line staff in ensuring appropriate contact precautions were used based on patient risk, and discuss with nurses and physicians reasons for use of Foley catheters or central lines. The results demonstrate that integrating data from multiple sources not only improves efficiency and helps focus resources on improvement rather than paper shuffling, but in combination with other ongoing infection prevention initiatives dramatically decreases hospital acquired infections.

Goals:

- Create a highly usable, patient-centric, information rich census report for use on daily infection prevention rounds.
- Conduct daily rounds every weekday on all floors using the census.
- Improve compliance with bundles including reducing the use of Foley catheters.
- Improve compliance with the use of contact precautions when appropriate.
- Decrease hospital acquired infection rates, especially catheter-related and transmission-related infections.

Baseline Data:

Prior to use of the patient-centric infection prevention census there was no tracking of the frequency of daily rounds. Measurement and documentation of daily rounds began in the 1st quarter 2008. The goal was set to perform daily rounds on all days excluding weekends and holidays for a numeric goal of 67% of days with daily rounds.

Because we believed that use of a patient-centric census with daily rounds could possibly have wide impact on infection rates, we present hospital acquired infection rates at baseline in aggregate and for specific types of infections. It was likely that the Foley catheter utilization rate could also be impacted.

Figure 1 shows baseline data for 2006 and 2007 for a number of hospital acquired infection types. At baseline for 2007 our hospital reported 266 acquired infections or a rate of 5.1 hospital acquired infections per 1000 patient days. Foley catheter utilization rate was 0.22 per patient day and a catheter associated UTI (CA-UTI) rate of 8.8 per 1000 Foley days. The ventilator associated pneumonia (VAP) rate was very low since implementing the VAP bundle in 2003; the baseline rate was 0.93 per 1000 ventilator days. The baseline (2007) *C. difficile* and MRSA rates were 1.55 and 0.35 infections per 1000 patient days respectively.

Interventions:

In October 2007, a hospital team was convened consisting of the infection preventionists, the director of improvement and a process improvement consultant to review evidence based literature and brainstorm new interventions to reduce hospital acquired infections and to monitor compliance with these initiatives. The hospital at that point had several initiatives and bundles in place to reduce catheter-associated urinary tract infections (CA-UTIs), catheter line associated blood stream infections (CLA-BSIs), ventilator associated pneumonias (VAPs) and transmission of Multiple Drug Resistant Organisms (MDROs) and *Clostridium difficile*. The infection preventionists needed to be actively involved in the monitoring of compliance with the initiatives and bundles during daily hospital rounds. Since online nursing documentation contained the information needed to monitor these initiatives, the director of improvement developed a summary report using a commercially available statistical display and analysis package used during daily rounds.

The line listing for each patient (Figure 2) contained: demographics; admitting diagnosis; patient isolation precautions status; presence of Foley catheter including reason for catheter and indwelling days; presence of ventilator and status of head of bed, tubing location and oral care; history of MRSA, VRE and/or other resistant organism; MRSA screen performed with date and result; and presence of diarrhea and testing and result for *C. difficile*. The initial single report was expanded to an additional MRSA specific census report (Figure 3).

Figure 4 shows how the report is generated from computer data sources and the ways in which the infection preventionists used the report in their daily rounds. The report is semi-automated and includes only data available in the patient care computer system. The report is generated daily and is available between 9 a.m. and 10 a.m.

Preparation before rounding, which can occur in the infection preventionists' office, involves reviewing isolation precaution status, evaluating the need for Foley catheters, reviewing admission diagnoses and reviewing the patient's history of resistant

organisms. In addition, the status of MRSA surveillance cultures and investigation into the potential cause of diarrhea in patients can be done. The report is used to verify the correct isolation precautions of patients when rounding, check on compliance with the ventilator bundle and review with the nurse the need for a Foley catheter. Rounds are an opportunity for addressing issues and concerns with staff regarding infection prevention.

The rounding process began late in the fall of 2007 and evolved over time to include more items on the census. Items added throughout 2008 include documentation of diarrhea, documentation of time of insertion of Foley catheters and use of the insertion checklist, and the creation of a separate census focused on MRSA prevention.

Results:

With the use of the Infection Control Census, Foley catheter utilization rate dropped from a hospital-wide rate of 0.22 per patient day in 2007 to 0.20 in 2008. The hospital also saw a sustained lower rate of 0.14 per patient day in the 1st quarter 2009. The CA-UTI rate dropped from 8.80 per 1000 Foley catheter days in 2007 to 6.64 in 2008, and a dramatic drop to 1.59 per 1000 Foley catheter days in the 1st quarter 2009. The introduction of a Foley insertion checklist and reduction in the rate of Foley insertion in the Emergency Department contributed to this impressive drop in CA-UTI rates. VAP rates have remained stable throughout 2006, 2007 and 2008.

Hospital acquired *C. difficile* infections dropped from 1.55 per 1000 patient days in 2007 to 0.96 in 2008 and 0.73 in the 1st quarter 2009. The hospital acquired MRSA infection rate remained stable from 2007 to 2008. A decrease in the MRSA rate in 1st quarter 2009 is not significant, but will continue to be monitored.

These measures are shown in Figure 1. The shaded boxes indicate statistically significant (p value $< .05$) changes in the rate compared to the prior time period.

How this initiative may be replicated throughout the region:

Hospital computers are becoming the means of documenting nursing assessments and compliance with patient safety and infection prevention initiatives. It is important for patient care that this information is integrated with laboratory, pharmacy and microbiology data to allow caregivers and infection preventionists a global view of patient needs and to ensure patient safety. When data is available through a hospital online computerized documentation system or data warehouse, a report such as the one developed for this project can be created.

Measure	2006		2007		2008		2009		Measure Definition
							1Q		
Hospital Acquired Infections (HAIs)	312	266	237	33	Number of Hospital Acquired Infections				
Hospital Acquired Infection Rate	5.9	5.1	4.3	2.4	HAIs per 1000 patient days				
Foley Catheter Utilization Rate	0.24	0.22	0.2	0.14	Housewide Foley days per patient day				
Catheter Associated Urinary Tract Infections	8.94	8.80	6.64	1.59	CA-UTIs per 1000 Foley days				
Catheter Associated Urinary Tract Infections	115	99	75	3	Hospital acquired CA-UTIs				
Ventilator Associated Pneumonia	0.50	0.93	0.76	1.62	VAPs per 1000 ventilator days				
Ventilator Associated Pneumonias	1	2	2	1	Ventilator associated pneumonias				
C. difficile Infection Rate	1.44	1.55	0.96	0.73	C.diff infections per 1000 patient days				
C. difficile Infections	76	80	53	10	Hospital acquired C.diff infections				
MRSA Infection Rate	0.27	0.35	0.34	0.15	MRSA infections per 1000 patient days				
MRSA Infections	14	18	19	2	Hospital acquired MRSA infections				

Figure 1

Infection Prevention Census

MRSA Prevention Census as of 05/26/09 10:25:27., For Improvement Purposes Only

Location	Room	MRN	Age	Adm Date	LOS	Admission Diagnosis	History		Admit Source	MRSA Screen	
							M	R		Last Coll Date	Stat
	218-01 SP	XXXXXX	55	19-May-2009	7	Dehydration, Pneumonia	No		Home	20-May-2009 01:56:00	COMP
	219-01 CP	XXXXXX	90	18-May-2009	8	RLL PNA	Yes		Home		
	220-01 SP	XXXXXX	86	24-May-2009	2	pneumonia	No		Home	25-May-2009 06:09:00	COMP
	221-01 CP	XXXXXX	64	03-May-2009	23	Respiratory Distress	Yes		Home	04-May-2009 01:37:00	COMP
	223-01 SP	XXXXXX	75	18-May-2009	8	Sepsis	No		Nursing Home	18-May-2009 21:27:00	COMP
	224-01 EP	XXXXXX	57	21-May-2009	5	ADRENAL INSUFFICIENCY/SEPSIS	No		Home	21-May-2009 19:26:00	COMP
	225-01 CP	XXXXXX	62	19-May-2009	7	DIVERTICULITIS	Yes		Home		
	226-01 SP	XXXXXX	62	24-May-2009	2	PLEURAL EFFUSION	No		Home	25-May-2009 05:54:00	COMP
	227-01 CP	XXXXXX	79	22-May-2009	4	CHF	Yes		Home		
	228-01 SP	XXXXXX	56	25-May-2009	1	Diverticulitis	No		Home	26-May-2009 07:54:00	RECD
2 WEST ACU	229-01 CP	XXXXXX	27	10-May-2009	16	PNEUMONIA, SEPSIS	Yes		Nursing Home	10-May-2009 18:38:00	COMP
	230-01 CP	XXXXXX	84	25-May-2009	1	MS Change increase sodium fever	Yes		Nursing Home		
	231-01 SP	XXXXXX	71	23-May-2009	3	copd/chf/dm	No		Home	24-May-2009 05:48:00	COMP
	232-01 SP	XXXXXX	57	20-May-2009	6	RLL DVT	No		Home	20-May-2009 20:18:00	COMP
	233-01 SP	XXXXXX	92	20-May-2009	6	encephalopathy, dementia, bakers cyst	No		Home	21-May-2009 05:32:00	COMP
	234-01 SP	XXXXXX	89	11-May-2009	15	GI BLEED, ANEMIA	No		Nursing Home	12-May-2009 06:14:00	COMP
	235-02 SP	XXXXXX	76	19-May-2009	7	acute renal failure	No		Nursing Home	19-May-2009 20:09:00	COMP
	236-02 SP	XXXXXX	80	23-May-2009	3	Vertebra compression/fx w/exac of back pain	No		Home	24-May-2009 06:00:00	COMP
	237-02 CP	XXXXXX	84	21-May-2009	5	SEPSIS, EKG CHANGES	Yes		Home		
	238-01 SP	XXXXXX	60	24-May-2009	2	syncope afib	No		Home	25-May-2009 05:50:00	COMP
	238-02 SP	XXXXXX	84	21-May-2009	5	ABDOMINAL PAIN	No		Home	21-May-2009 20:05:00	COMP

Figure 2

MRSA Prevention Census

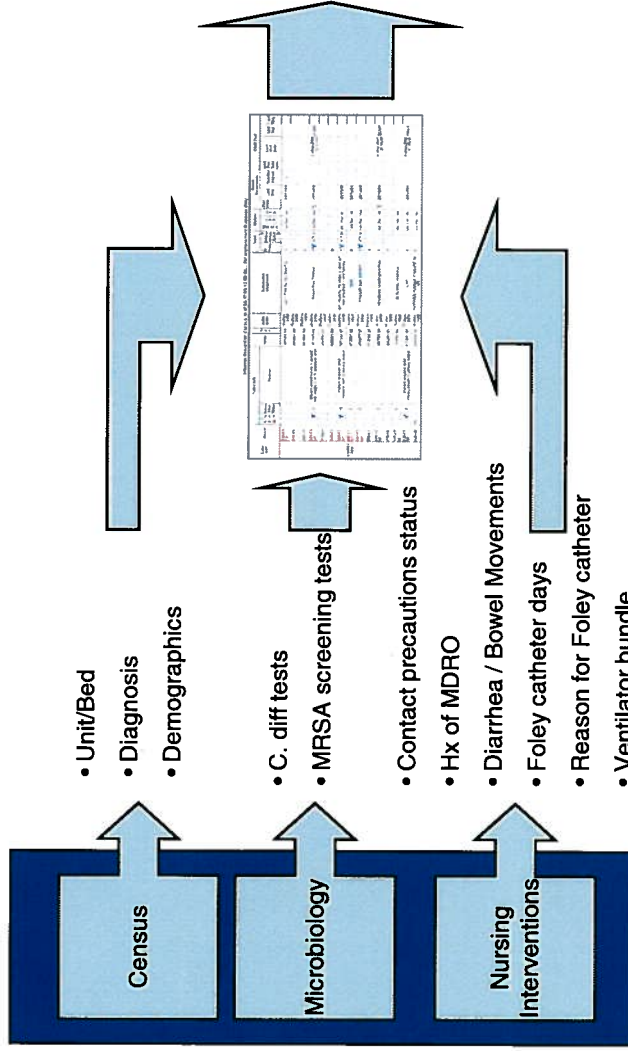
Infection Prevention Census as of 05/26/09 10:39:46, For Improvement Purposes Only

Location	Room	Foley Info		MRN	Adm Date	Admission Diagnosis	Vent			History			Bowel Movements			CDIFF Test				
		Adm	Days This Stay				Reason	IR	On	Hi	Di	Tr	U	U	U	U	U	U	U	U
	218-01 SP		2		19-May-2009	Dehydration, Pneumonia	0			No	No	No	05/25/09			22-May-2009 11:31:00	COMP			
	219-01 CP		0		18-May-2009	RLL PNA	1			Yes	No	No	05/26/09	2		24-May-2009 13:59:00	COMP			
	220-01 SP		0		24-May-2009	pneumonia	0			No	No	No								
	221-01 CP	Y	23	Urinary incontinence in patient with Stage III or IV pressure ulcer	03-May-2009	Respiratory Distress	3	Y	Y	Yes	No	Yes	05/26/09			19-May-2009 14:48:00	COMP			
	223-01 SP		0		18-May-2009	Sepsis	1			No	No	No	05/26/09							
	224-01 EP		0		21-May-2009	ADRENAL INSUFFICIENCY/SEPSIS	0			No	No	No	05/25/09	1		24-May-2009 09:27:00	COMP			
	225-01 CP		0		19-May-2009	DIVERTICULITIS	0			Yes	No	No	05/23/09			23-May-2009 19:59:00	COMP			
	226-01 SP		0		24-May-2009	PLEURAL EFFUSION	0			No	No	No								
	227-01 CP	No	0		22-May-2009	CHF	0			Yes	No	No								
	228-01 SP		0		25-May-2009	Diverticulitis	0			No	No	No								
2 WEST ACU	229-01 CP		6		10-May-2009	PNEUMONIA, SEPSIS	1	Y	Y	Yes	No	Yes	05/24/09	1		17-May-2009 10:02:00	COMP			
	230-01 CP	Y	1	Physician order	25-May-2009	MS Change increase sodium fever	2	Y	Y	Yes	No	Yes								
	231-01 SP	No	0		23-May-2009	copd/cht/dm	0			No	No	No	05/26/09							
	232-01 SP	No	0		20-May-2009	RLL DVT	0			No	No	No	05/21/09							
	233-01 SP		0		20-May-2009	encephalopathy, dementia, bakers cyst	0			No	No	No	05/21/09							
	234-01 SP		0		11-May-2009	GI BLEED, ANEMIA	1			No	No	No	05/19/09							
	235-02 SP	Y	7	Known or suspected urinary tract obstruction	19-May-2009	acute renal failure	2			No	No	No	05/26/09			23-May-2009 04:43:00	COMP			
	236-02 SP	No	0		23-May-2009	Vertebra compressionfx w/exec of back pain	0			No	No	No								
	237-02 CP		0		21-May-2009	SEPSIS, EKG CHANGES	0			Yes	No	No	05/25/09							
	238-01 SP		0		24-May-2009	syncope afib	0			No	No	No								
	238-02 SP	No	0		21-May-2009	ABDOMINAL PAIN	0			No	No	No	05/24/09							

Figure 3

Use of Infection Control Census on Daily Rounds

Daily Census Report Data Integration



- **Pre-Rounds Review**

- Review isolation precautions status
- Evaluate need for Foley catheter
- Review admission diagnosis
- Review history of resistant organisms
- Check on MRSA active surveillance cultures
- Review patients with diarrhea
 - Potential cause
 - Infectious status
 - Isolation precautions status (Enhance Contact Precautions)

- **Rounds**

- 5 days or more per week
- Verify isolation precautions
- Check compliance with ventilator bundle
- Verify admission diagnosis
- Validate need for Foley catheter with nurse
- Address issues or concerns of staff

Figure 4