

Assessing the Financial Impact of a Unit Based Clinical Leadership Model at a University Hospital: A Case Study of Reductions in Catheter-Associated Bloodstream Infections (BSI)

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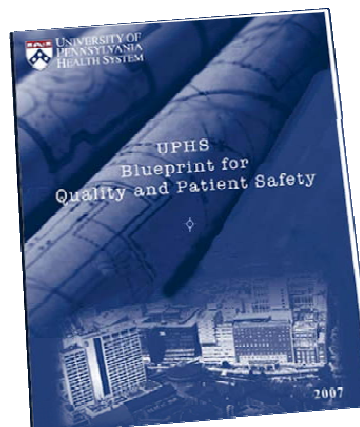
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No financial disclosures



The Blueprint for Quality is the Framework for Clinical Strategy at UPHS

UPHS Blueprint for Quality and Patient Safety	
UPHS' overarching quality goal is to prevent the preventable — reduce preventable mortality and reduce 30-day re-admissions.	
Four Imperatives	Priority Actions
1. Transitions in care	<ul style="list-style-type: none"> ▪ Transition planning ▪ Medication management
2. Reduce unnecessary variations in practice	<ul style="list-style-type: none"> ▪ Reduce hospital-acquired infections ▪ Reduce medication errors
3. Coordination of care	<ul style="list-style-type: none"> ▪ Interdisciplinary rounding
4. Accountability	<ul style="list-style-type: none"> ▪ Unit based clinical leadership



Unit Based Clinical Leadership (UBCL)

Physician Leader, Nurse Leader, Quality Coordinator



UBCL is accountable for quality on their unit.

Transitioned into five units at Hospital of University of Pennsylvania between FY2008 Quarters 1 and 2

3

UBCL FY'08 Quality Improvement Projects

	UBCLs	Reducing Infections	Other Projects to Reduce Variations in Practice
HUP	Founders 12	UTIs/ BSIs	Interdisciplinary rounds
	Founders 14	UTIs/ BSIs	
	Silver 11	UTIs/ BSIs	Interdisciplinary rounds
	Rhoads 6	UTIs/ BSIs	Handwashing initiative
	Rhoads 7	UTIs/ BSIs	House staff orientation

4

Study Objective

- To evaluate the quality and financial impact of the UBCL intervention
- Quality and financial impact measured by reductions in blood stream infections (BSIs) and the associated costs

5

Methods

- Controlled before-after study to measure impact of UBCL on BSIs
 - Intervention group had UBCL model implemented
 - Control group did not
- Data from hospital infection control dashboard and cost accounting database

6

Impact of UBCL on BSI

- But other interventions occurring on units may also impact BSI rates:
 - Biopatch
 - Theradoc
 - Discontinuation of pressure caps
 - Newer transparent dressings
 - Change in definition of BSI
 - QI initiative to reduce BSI by “Value capture”

7

BSI Interventions on Various Units

UBCL	Biopatch	Theradoc	No pressure cap	New dressing	BSI definition change	Value capture
F12	F12	F12	F12	F12	R6	R6
F14	F14	F14	F14	F14	R7	R7
S11	S11	S11	S11	S11		MICU
R6	R6	R6	R6	R6		R3
R7	R7	R7	R7	R7		
	SICU	SICU	SICU	SICU		
	R1	R1	R1	R1		
	R4	R4	R4	R4		
	S7	S7	S7	S7		
	S9	S9	S9	S9		
	S10	S10	S10	S10		
	Ravdin 9	Ravdin 9	Ravdin 9	Ravdin 9		
	S12	S12	S12	S12		
	CCU	CCU	CCU	CCU		
	SICT/SIGS	SICT/SIGS	SICT/SIGS	SICT/SIGS		
	SINA/SINB	SINA/SINB	SINA/SINB	SINA/SINB		
	R5	R5	R5	R5		
	MICU	MICU	MICU	MICU		
	R3	R3	R3	R3		

8

Complexity given multiple interventions during time frame of UBCL initiation

Groups	Units	FY07		FY07		FY08		FY08	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
UBCL Intervention Groups									
Intervention 1	Founders 12 Founders 14 Silverstein 11 (new 11_06)					UBCL phase-in	UBCL in progress	UBCL in progress	
						Theradoc (Aug 2008)		Biopatch (Feb 2008)	
							New dressing		CLC Cap removed (Feb 2008)
Intervention 2	Rhoads 6 Rhoads 7					UBCL phase-in	UBCL in progress	UBCL in progress	
						Biopatch July 2007- Dec 2008		Biopatch (Jan 2008)	
						Theradoc (Aug 2008)		BSI definition change (Jan 2008)	
						New dressing		CLC Cap removed (Feb 2008)	
								Value Capture (Mar 08)	

9

Can we control for contemporaneous trends and effect of other interventions?

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						Theradoc (Aug 2008)		BSI definition change (Jan 2008)	
						New dressing		CLC Cap removed (Feb 2008)	
								Value Capture (Mar 08)	
Potential Control Groups									
Control-a	CICU							Biopatch (Feb 2008)	
	Rhoads 1					Theradoc (Aug 2008)		CLC Cap removed (Feb 2008)	
	Rhoads 4								
	Silverstein 7								
	Silverstein 9						New dressing		
	Silverstein 10								
Ravdin 9 11_06 (former S11)									
Silverstein 12									

10

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	Silverstein 7								
	Silverstein 9								
	Silverstein 10								
Ravdin 9 11_06 (former S11)									
Silverstein 12									

11

Estimating reductions in BSIs associated with UBCL

- Used quarterly rates of BSI per 1000 device days in each unit from “infection control dash board”
- Compare BSI rates before-after UBCL in **Intervention 1** group and **Control A** group
 - Compare BSI rates in Q3Q407 (before-UBCL) with rates in Q3Q408 (after-UBCL) in each group
 - Exclude Q1Q208 (phase in period of UBCL)

12

Estimating reductions in BSIs associated with UBCL

Decrease in BSI rate per 1000 device days in Intervention 1 group	3.4
Decrease in BSI rate per 1000 device days in Control A group	1.4
Decrease in BSI rate per 1000 device days associated with UBCL	2.1

15

Estimating reductions in BSIs associated with UBCL

- Apply the same rate of BSI reduction observed in Intervention 1 group to **Intervention 2** group
- Calculate the total number of BSIs avoided in UBCL units over 9 months
 - 10.8 in Intervention 1 Group
 - 22.2 in Intervention 2 Group
 - 33.0 total BSIs avoided

16

Incremental Cost of BSI

- FY08 hospital accounting database
 - Created a list of DRGs for all BSI-related hospitalizations
 - Sample of all (BSI & non-BSI) hospitalizations with one of those DRGs
 - Further excluded DRGs not likely to result in stay in one of the five UBCL units (e.g. neonatal DRGs)
 - Compared direct variable supply costs of BSI vs. non-BSI hospitalizations

17

Incremental Cost of BSI

- Unadjusted incremental cost
 - \$25,931
- Adjusted for age, gender, insurance type, and DRG using generalized linear models
 - \$14,425
 - Incremental cost statistically significant at 5% level

18

Cost Savings associated with UBCL

- # of BSIs avoided x Incremental Cost of BSI
- 33 x \$14,425 = \$ 477,200

19

Investment in UBCL Program in 5 Units

- 4 Physician leaders
 - \$20,000 each annually
- 3 Assistant nurse managers to free up time of nurse managers in UBCLs
 - \$120,000 each annually (however, only 1 hired, two already available)
- 5 Quality coordinators
 - Reassigned from other quality roles

20

Cost of UBCL Program in 5 Units

Over 3 quarters (Q308, Q408, Q109)

Less conservative

- \$150,000
 - \$60,000 for 4 physicians
 - \$90,000 for 1 asst. nurse mgr

More conservative

- \$330,000
 - \$60,000 for 4 physicians
 - \$270,000 for 3 asst. nurse mgrs

21

Net impact of UBCL over 3 quarters (Q308, Q408, Q109)

- \$477,200 BSI costs savings
 - \$330,000 program cost (**more conservative #**)
-
- \$147,200 total net savings

22

Net impact of UBCL over 3 quarters (Q308, Q408, Q109)

- \$477,200 BSI costs savings
 - \$150,000 program (**less conservative #**)
-
- \$327,200 total net savings

23

Limitations

- Quasi-experimental design
- Extrapolation of BSI reductions from Intervention 1 to Intervention 2 Group

24

Conclusions

- **The UBCL model likely results in cost savings due to BSIs avoided that appear to offset its implementation costs**
- **These estimates do not account for potential cost savings of UBCLs due to:**
 - other quality improvement outcomes
 - less litigation
 - improved bed utilization
 - revenue from pay-for-performance contracting
 - avoided loss in reimbursement for healthcare-associated infections from payors

25

Implications

- This case-study provides an example of the challenges faced and approaches used when evaluating the financial impact of specific interventions in the setting of multifaceted quality improvement processes in a real-world hospital setting

26

