



A Collaborative Approach to Preventing Bloodstream Infections in Dialysis

March 25, 2010

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Bloodstream Infections (BSI) in Hemodialysis Patients

- Cause substantial morbidity and mortality
- Central venous catheter (CVC) major risk factor
- CVC use among prevalent hemodialysis patients increasing
- Hospitalization rate for BSI has increased 31% since 1993
- Dramatic BSI reductions in inpatient healthcare settings not reflected in dialysis
- Demand for interventions that are effective and simple

Why A Prevention Collaborative Model?

**What is the Preventable Fraction of
Healthcare Associated Infections (including
those associated with Dialysis)?**

What is the Preventable Fraction of Healthcare Associated Infections?

- Study on the Efficacy of Nosocomial Infection Control (SENIC) study results
 - 1971-1976
 - Suggested 6% of all nosocomial infections could be prevented by minimal infection control efforts, 32% by “well organized and highly effective infection control programs
- Harbarth et al: at least 20% of infections are preventable [J Hosp Infection 2003;54:258](#)

What is the Preventable Fraction of Healthcare Associated Infections?

- Some may have interpreted these data to mean that most healthcare associated infections are inevitable
 - What impact has this had on the psychology of prevention?
- How has this influenced the way infection control programs operate?
 - Difficult to define success when achievable results unknown-what should the goal be?

**Eliminating catheter-related bloodstream infections
in the intensive care unit**

Berenholtz, S et al. Critical Care Medicine. 32(10):2014-2020, October 2004.

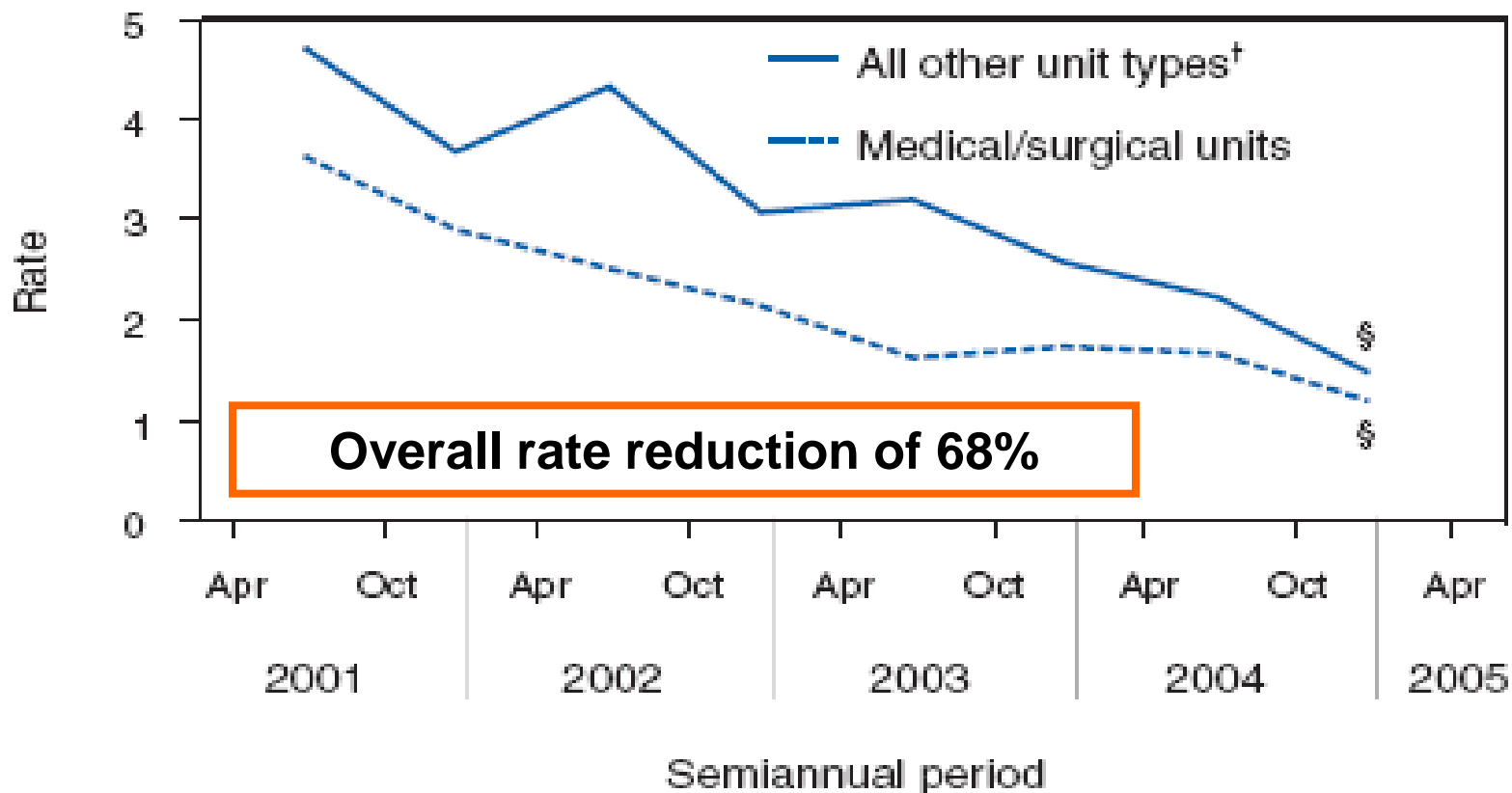


Bloodstream Infection Interventions: Pittsburgh Regional Healthcare Initiative, 32 hospitals, 66 ICUs

Intervention:

- Promotion of targeted, evidence-based catheter insertion practices
- Development / promotion of educational module
- Promotion of standardized tools for recording catheter insertion practices
- Promotion of standardized catheter insertion supply kits
- Regular feedback of BSI rates
 - Standardized definitions and case finding methods
- Process to share information and experience

FIGURE. Central line–associated bloodstream infection rate* in 66 intensive care units (ICUs), by ICU type and semiannual period — southwestern Pennsylvania, April 2001–March 2005

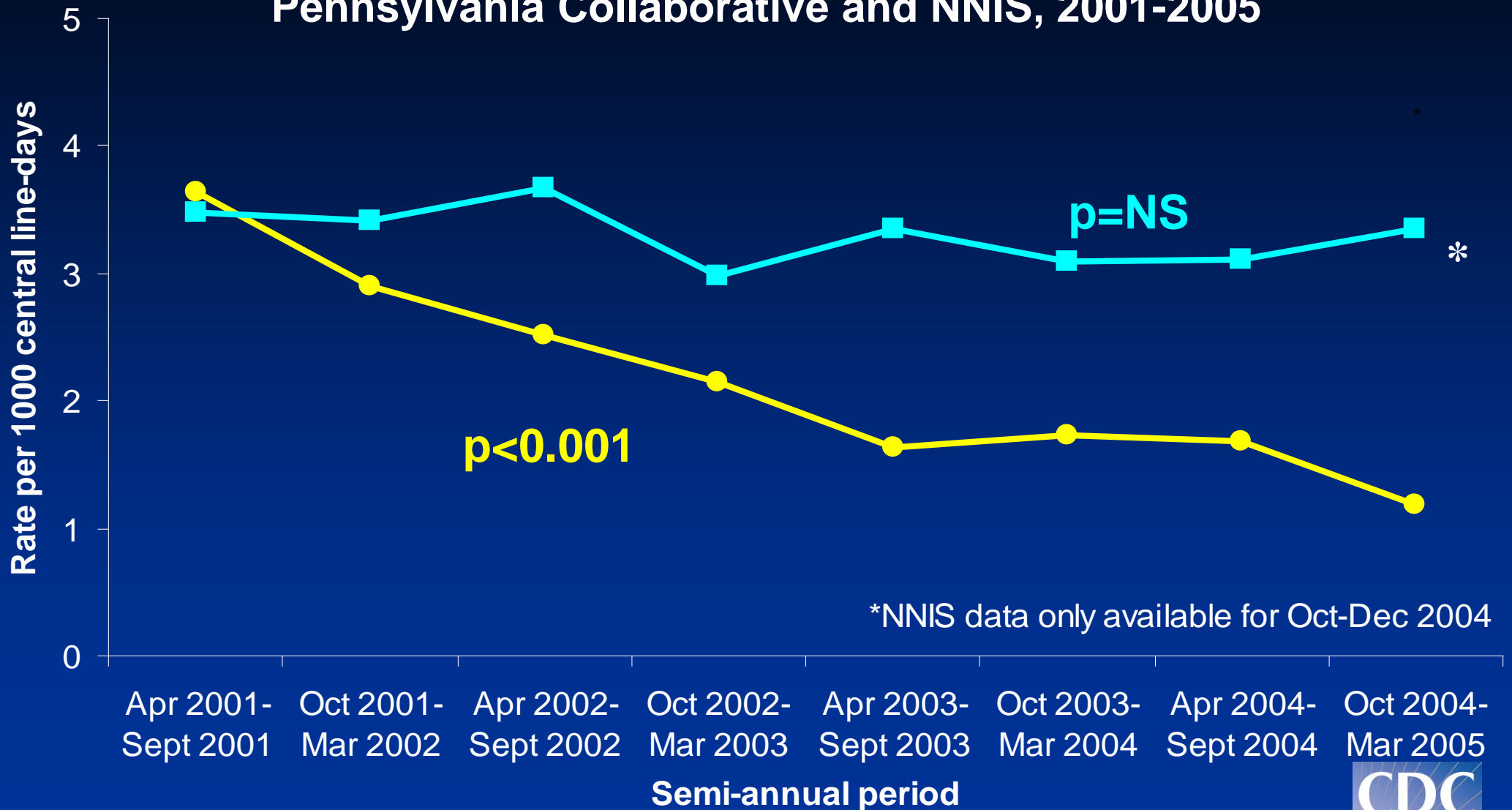


* Pooled mean rate per 1,000 central line days.

[†] Includes cardiothoracic, coronary, surgical, neurosurgical, trauma, medical, burn, and pediatric ICUs.

[§] $p < 0.001$.

Semi-Annual Central Line-associated Bloodstream Infection Rates in Medical-Surgical Intensive Care Units Participating in the Southwest Pennsylvania Collaborative and NNIS, 2001-2005



*NNIS data only available for Oct-Dec 2004

Michigan Keystone Initiative



Michigan Keystone ICU Project (103 ICUs, 67 hospitals)

- Intervention:
 - Training of team leaders in science of safety
 - Standardized central-line cart with necessary supplies
 - Checklist was used to ensure adherence to catheter-insertion practices
 - Providers were stopped (in nonemergency situations) if these practices were not being followed
 - Removal of catheters was discussed at daily rounds
 - Regular feedback of BSI rates



Michigan Keystone ICU Project (103 ICUs, 67 hospitals)

Table 3. Rates of Catheter-Related Bloodstream Infection from Baseline (before Implementation of the Study Intervention) to 18 Months of Follow-up.*

Study Period	No. of ICUs	No. of Bloodstream Infections per 1000 Catheter-Days				
		Overall	Teaching Hospital	Nonteaching Hospital	<200 Beds	≥200 Beds
<i>median (interquartile range)</i>						
Baseline	55	2.7 (0.6–4.8)	2.7 (1.3–4.7)	2.6 (0–4.9)	2.1 (0–3.0)	2.7 (1.3–4.8)
During implementation	96	1.6 (0–4.4)†	1.7 (0–4.5)	0 (0–3.5)	0 (0–5.8)	1.7 (0–4.3)†
After implementation						
0–3 mo	96	0 (0–3.0)‡	1.3 (0–3.1)†	0 (0–1.6)†	0 (0–2.7)	1.1 (0–3.1)‡
4–6 mo	96	0 (0–2.7)‡	1.1 (0–3.6)†	0 (0–0)‡	0 (0–0)†	0 (0–3.2)‡
7–9 mo	95	0 (0–2.1)‡	0.8 (0–2.4)‡	0 (0–0)‡	0 (0–0)†	0 (0–2.2)‡
10–12 mo	90	0 (0–1.9)‡	0 (0–2.3)‡	0 (0–1.5)‡	0 (0–0)†	0.2 (0–2.3)‡
13–15 mo	85	0 (0–1.6)‡	0 (0–2.2)‡	0 (0–0)‡	0 (0–0)†	0 (0–2.0)‡
16–18 mo	70	0 (0–2.4)‡	0 (0–2.7)‡	0 (0–1.2)†	0 (0–0)†	0 (0–2.6)‡

* Because the ICUs implemented the study intervention at different times, the total number of ICUs contributing data for each period varies. Of the 103 participating ICUs, 48 did not contribute baseline data. P values were calculated by the two-sample Wilcoxon rank-sum test.

† P≤0.05 for the comparison with the baseline (preimplementation) period.

‡ P≤0.002 for the comparison with the baseline (preimplementation) period.

Overall rate reduction of 66%

Pronovost et al. NEJM 2006;355:2725-2732



**Maybe the Preventable Fraction of
Healthcare-associated Infections is
Much Larger than we Thought?**

Conclusions from Pittsburgh and Michigan Experiences

- Decreases in central line-associated BSI rates >60% achieved in hospital ICUs of varying types
- The prevention practices utilized during these interventions were not novel
 - Improving adherence to existing evidence-based practices can prevent BSIs
 - Collaboration may be helpful in identifying and overcoming commonly shared barriers to adherence

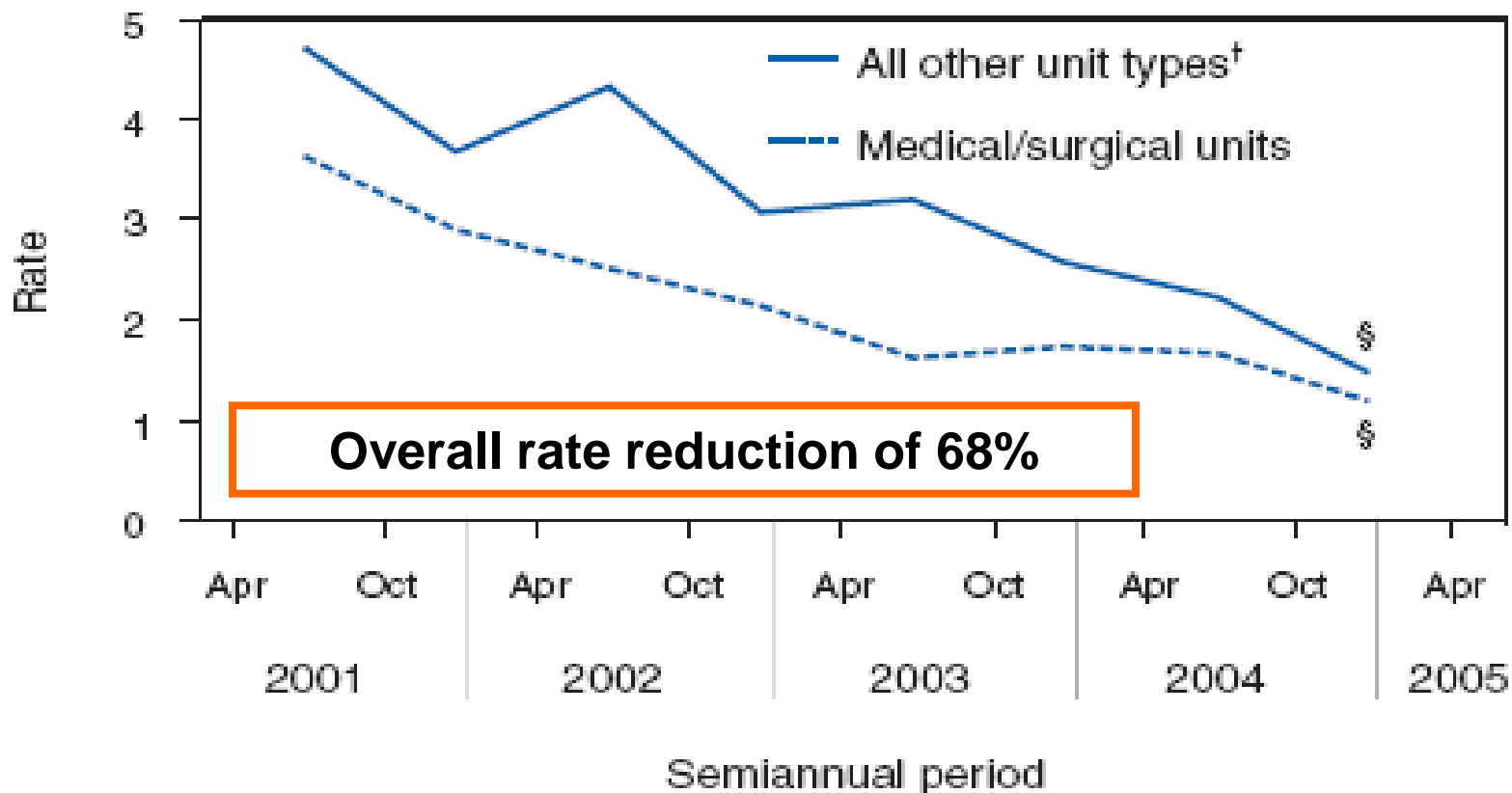
Conclusions from Pittsburgh and Michigan Experiences

- Results from successful collaborative demonstration projects may be an important strategy for influencing global changes in practice in ways that improve quality
 - Disarms uncertainties about preventability that can hamper improvement efforts
 - Helps identify practical strategies that can be successful across many facilities

A Successful, multi-center BSI Prevention Collaborative For Hemodialysis Patients Will Have National Impact

- Must involve motivated hemodialysis centers who are interested in working in partnership with others to:
 - Identify setting-specific barriers and challenges (because dialysis centers are very different from ICUs)
 - Identify workable and practical solutions to those barriers
 - Be open to innovation
 - Collect and share data in a uniform fashion
 - Contribute to an effort that will likely have major and enduring impact on the health of hemodialysis patients not only in your center, but across the Nation

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