

# Towards Eliminating *Clostridium difficile* Infections (CDI) in Illinois

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Illinois Campaign to Eliminate *Clostridium difficile*  
July 2012

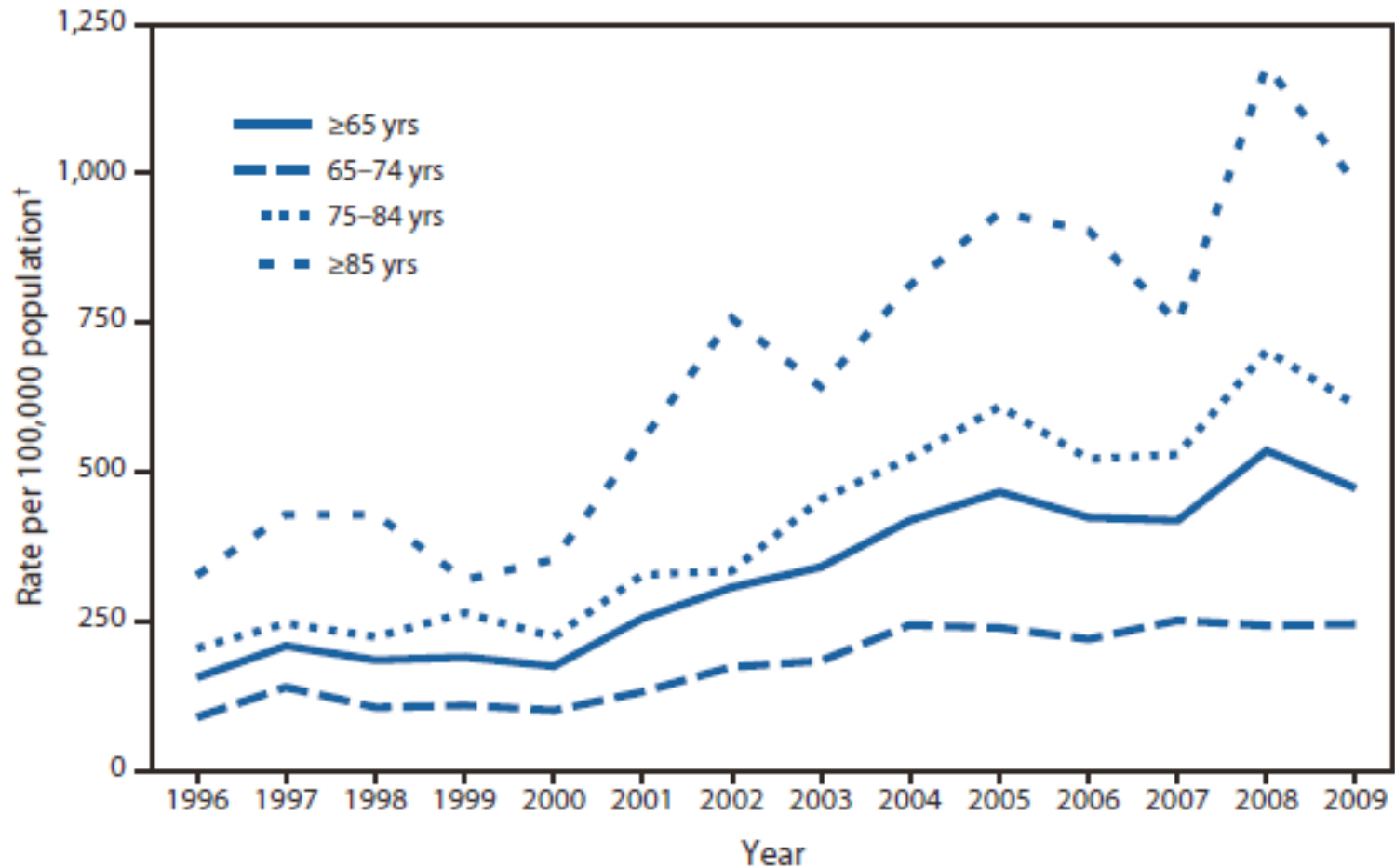
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Consultant – Ecolab, Steris, ASHES  
Patent License - Ecolab

# Objectives

- Summarize the impact of *Clostridium difficile* (*C. difficile*) statewide and nationally
- Discuss the importance of facility-specific interventions for meeting state and national agenda to eliminate *C. difficile* infections

# CDI Rates in the U.S.



# The CDI Problem in Illinois



# *C. difficile* Disease Risk Factors

## Avoid Colonization

Healthy adults: 0-5%

Hospitalized adults - One Day: 3%

One week: 20%

Four weeks: 50%

Hospital Workers: 15%

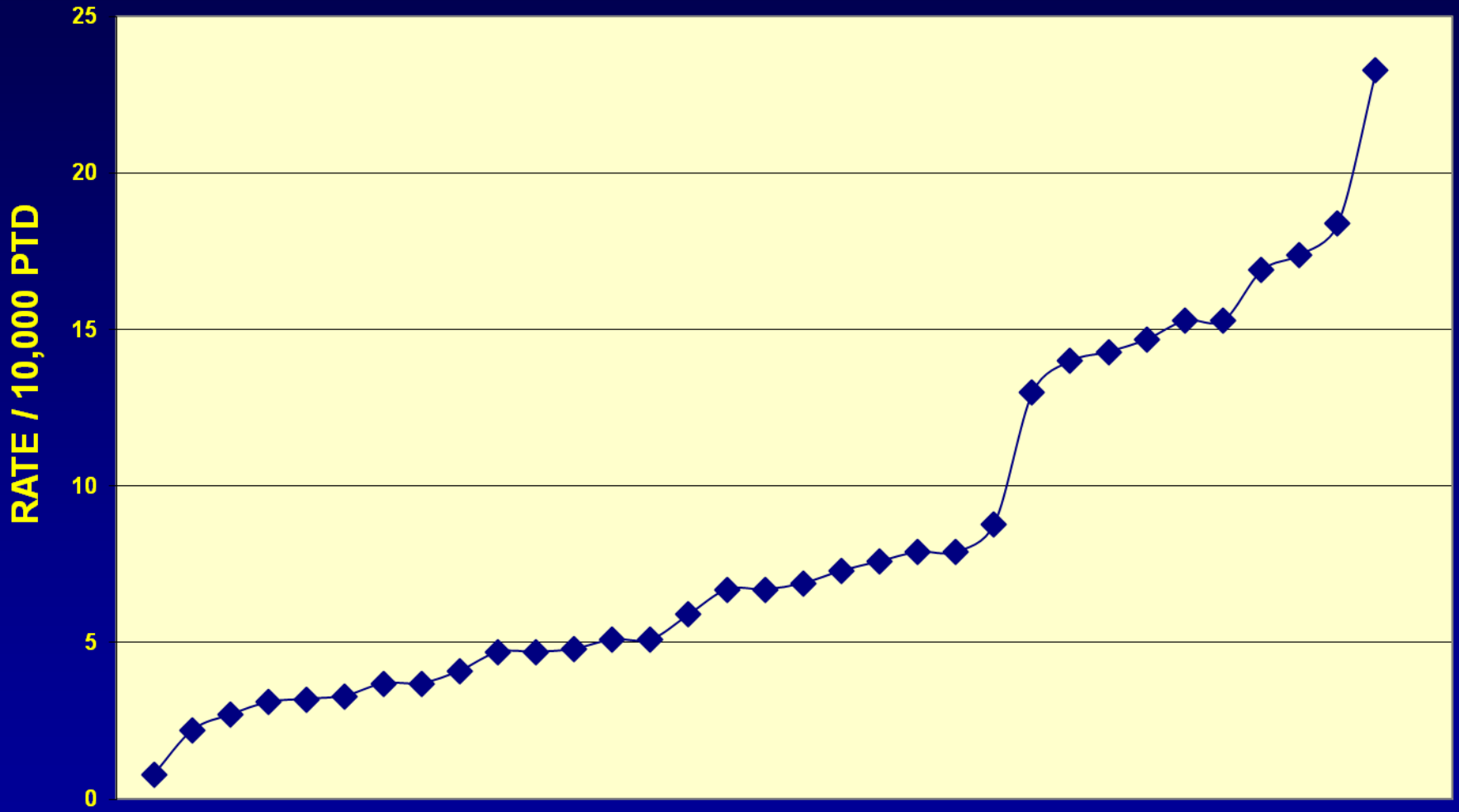
## Avoid Precipitating Factors

### Antibiotic Exposure

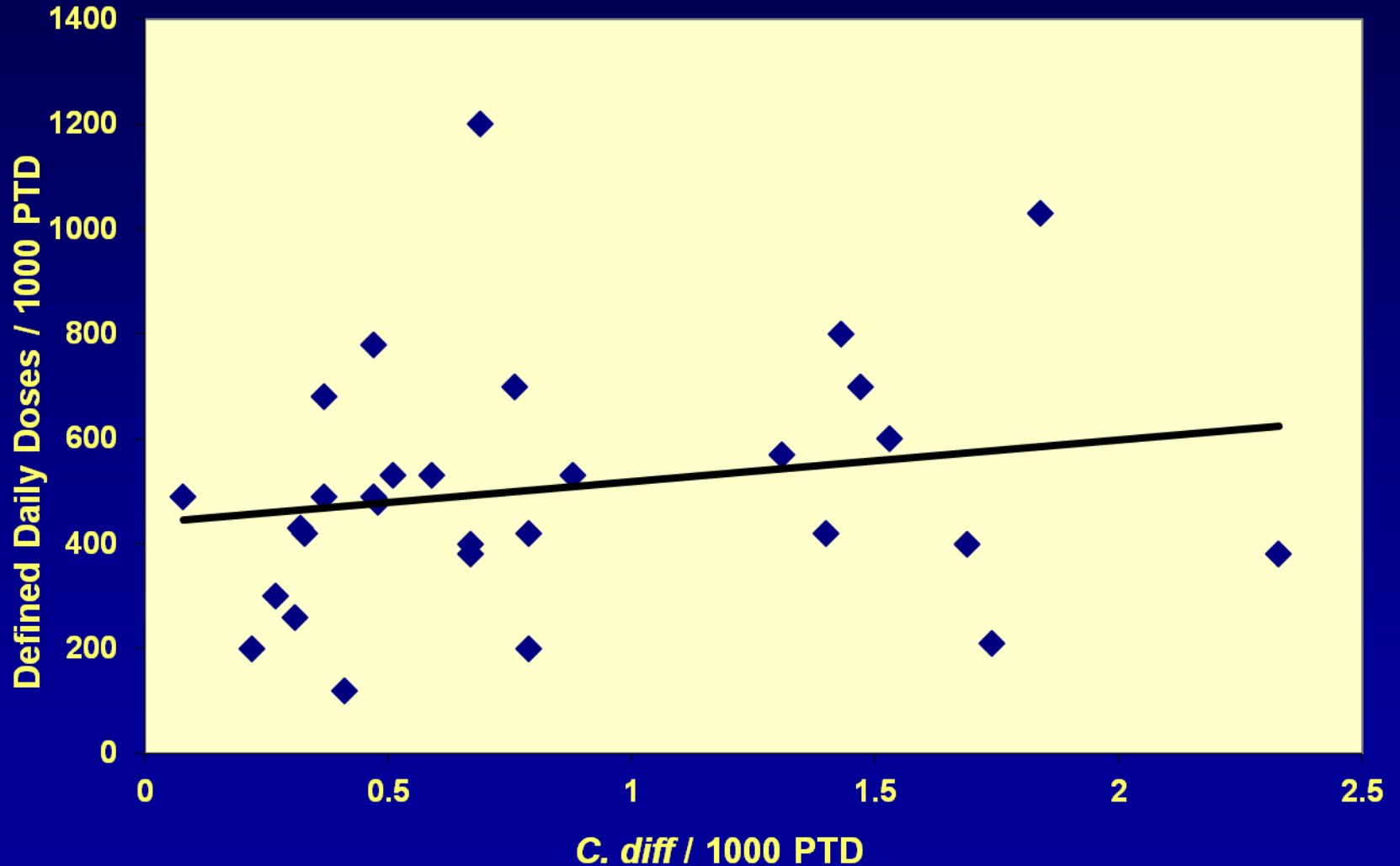
- Most associated with antibiotics which alter anaerobic flora of colon - Clindamicin
- Broad spectrum = More
- Bactrim, Vancomycin - very rare
- Aminoglycosides - No

All Hospitals are not the Same

# *C. difficile* Rates in 35 Hospitals



# Does *C. difficile* Rate Reflect Antibiotic Use?



# Risk Factors

- Antimicrobial exposure
- Acquisition of *C. difficile*
- Advanced age
- Underlying illness
- Immunosuppression
- Tube feeds
- ? Gastric acid suppression

**Main modifiable risk factors**



# The CDC Recommends Two Approaches

## 1. **Prudent Antibiotic Use**

- Provider Education
- Antibiotic Stewardship Programs

## 2. **Preventing Transmission**

- Environmental Cleaning

## Usage of Antibiotics in a General Hospital: Effect of Requiring Justification

John E. McGowan, Jr. and Maxwell Finland

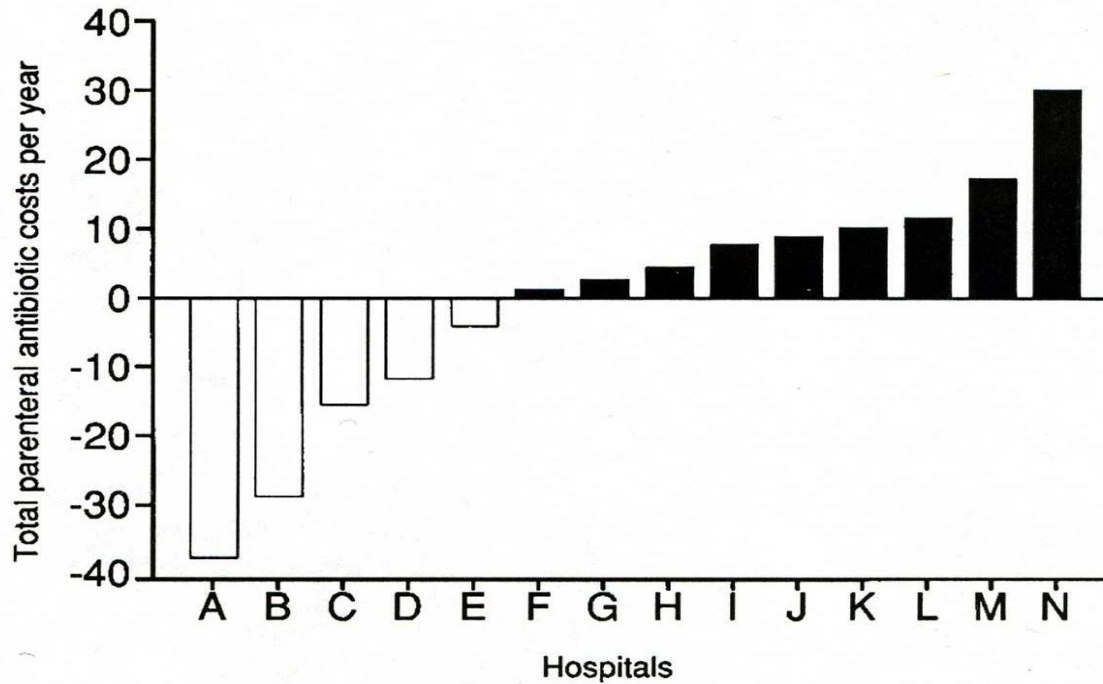
*From the Chan-  
Thorndike Memorial  
Boston City H  
Harvard M*

The amounts of certain antibiotics used at Boston City H years have been reviewed and correlated with the require choice of those antibiotics. This mild restraint on the pres for hospitalized patients appears to have substantially limite potentially toxic or expensive agents, and removal of that followed by an increase in use of those agents. Similar, rela nents may promote more effective and economical use of

# Parenteral Antibiotic Use in Acute-Care Hospitals: A Standardized Analysis of Fourteen Institutions

Philip C. Carling, Theresa Fung, and John S. Coldiron

*From the Infectious Diseases Section, Department of Medicine,  
Carney Hospital and Boston University School of Medicine,  
Boston, Massachusetts*





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# INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY™

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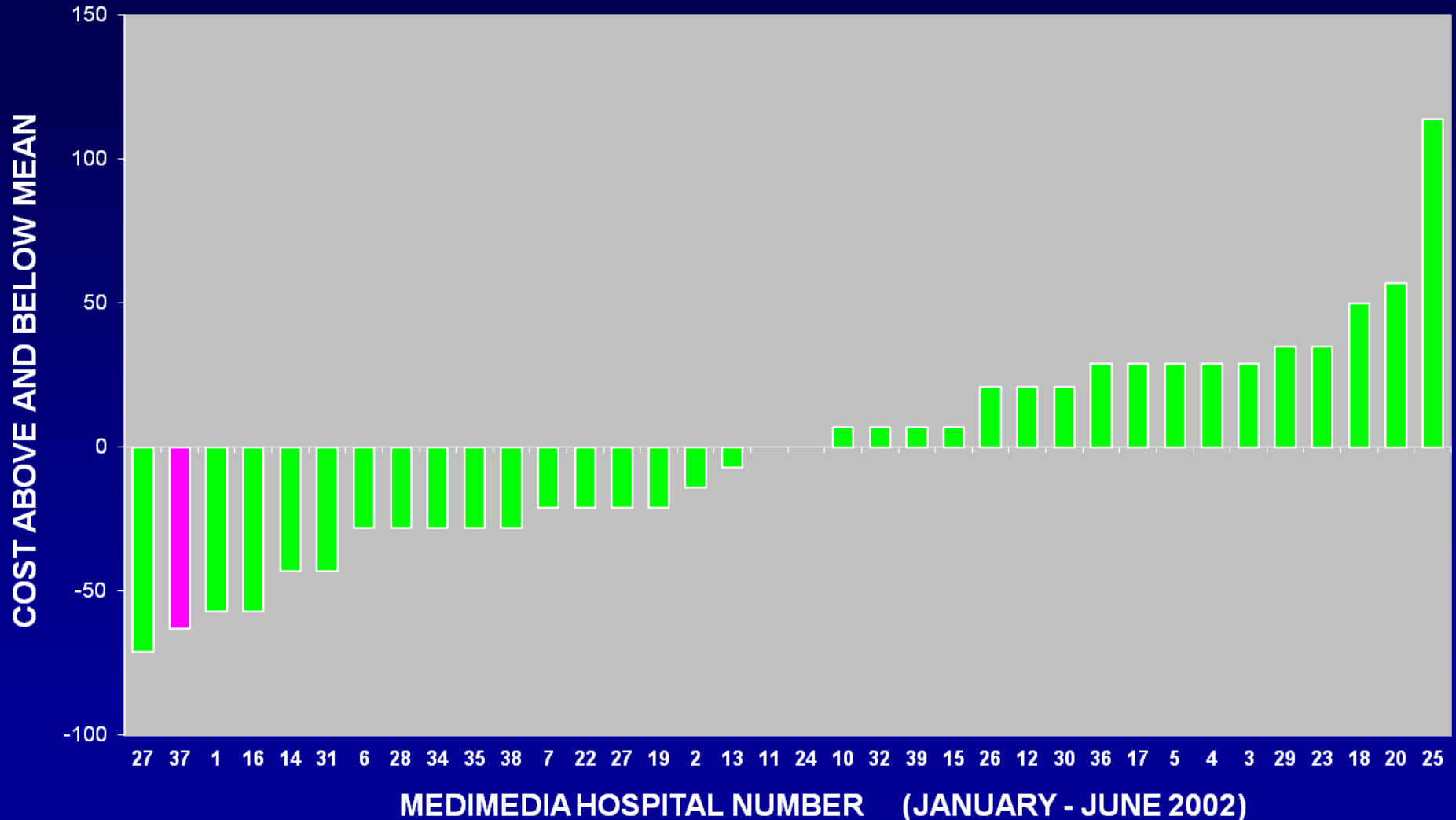
INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY

699

## FAVORABLE IMPACT OF A MULTIDISCIPLINARY ANTIBIOTIC MANAGEMENT PROGRAM CONDUCTED DURING 7 YEARS

Philip Carling, MD; Teresa Fung, PharmD; Ann Killion, RN; Norma Terrin, PhD; Michael Barza, MD

# ANTIBIOTIC COST PER 1000 PATIENT DAYS



MEAN = \$1400.

CARNEY HOSPITAL = # 37

Was there any impact of the  
program on resistant  
organisms?

# EMERGING INFECTIOUS DISEASES®



February 2006

## **Systematic Review of Antimicrobial Drug Prescribing in Hospitals**

Peter Davey,\*† Erwin Brown,‡ Lynda Fenelon,§ Roger Finch,¶# Ian Gould,\*\* Alison Holmes,††  
Craig Ramsay,‡‡ Eric Taylor,§§ Phil Wiffen,¶¶ and Mark Wilcox,##\*\*\*

1980 – 2003 = 309 Studies

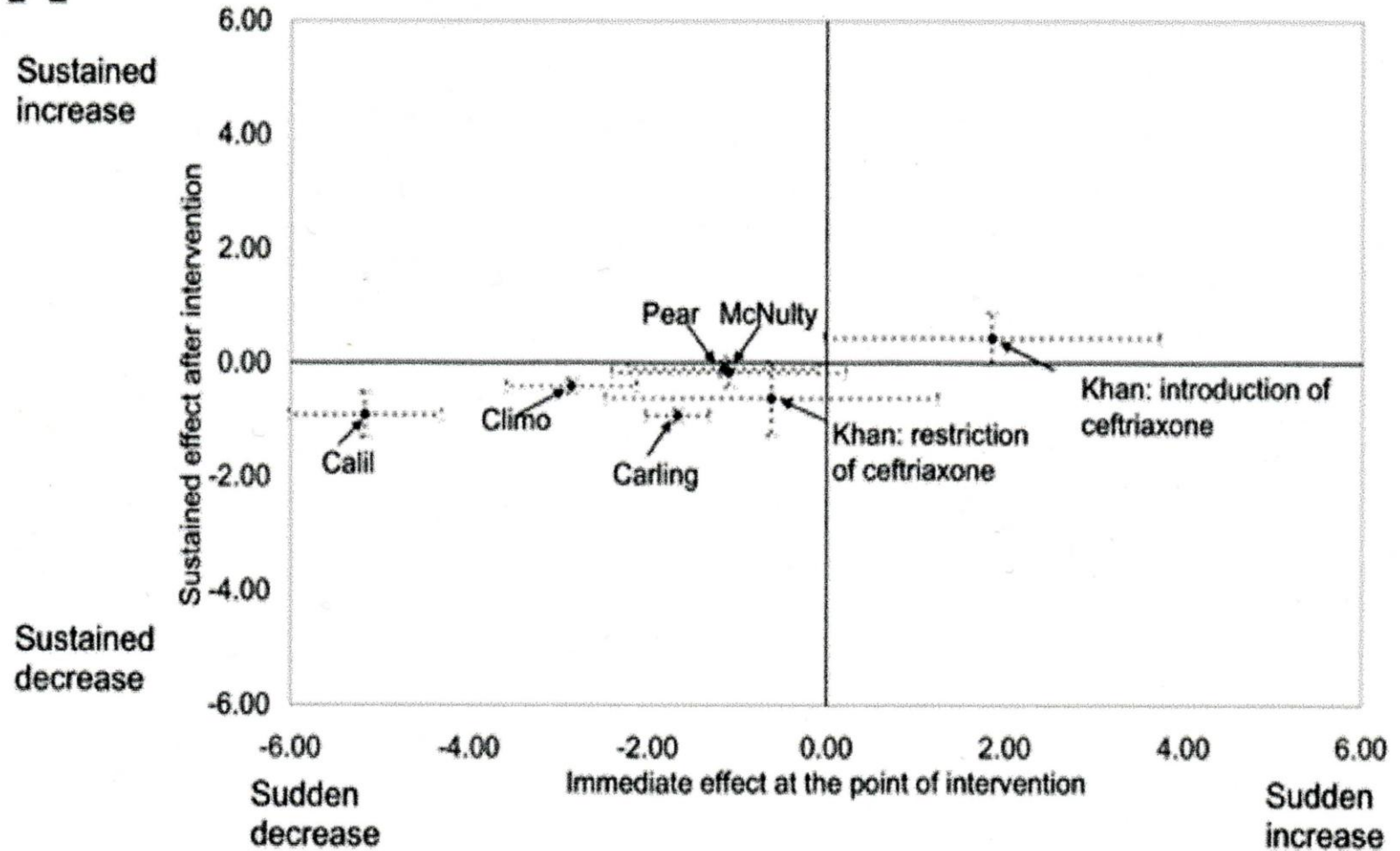
66 Studies had meaningful data analysis

16 Studies evaluated microbiologic  
outcomes

4 Studies – Favorable, 8 +/-, 4 +/-

# Impact on *C. difficile* Disease

**A**





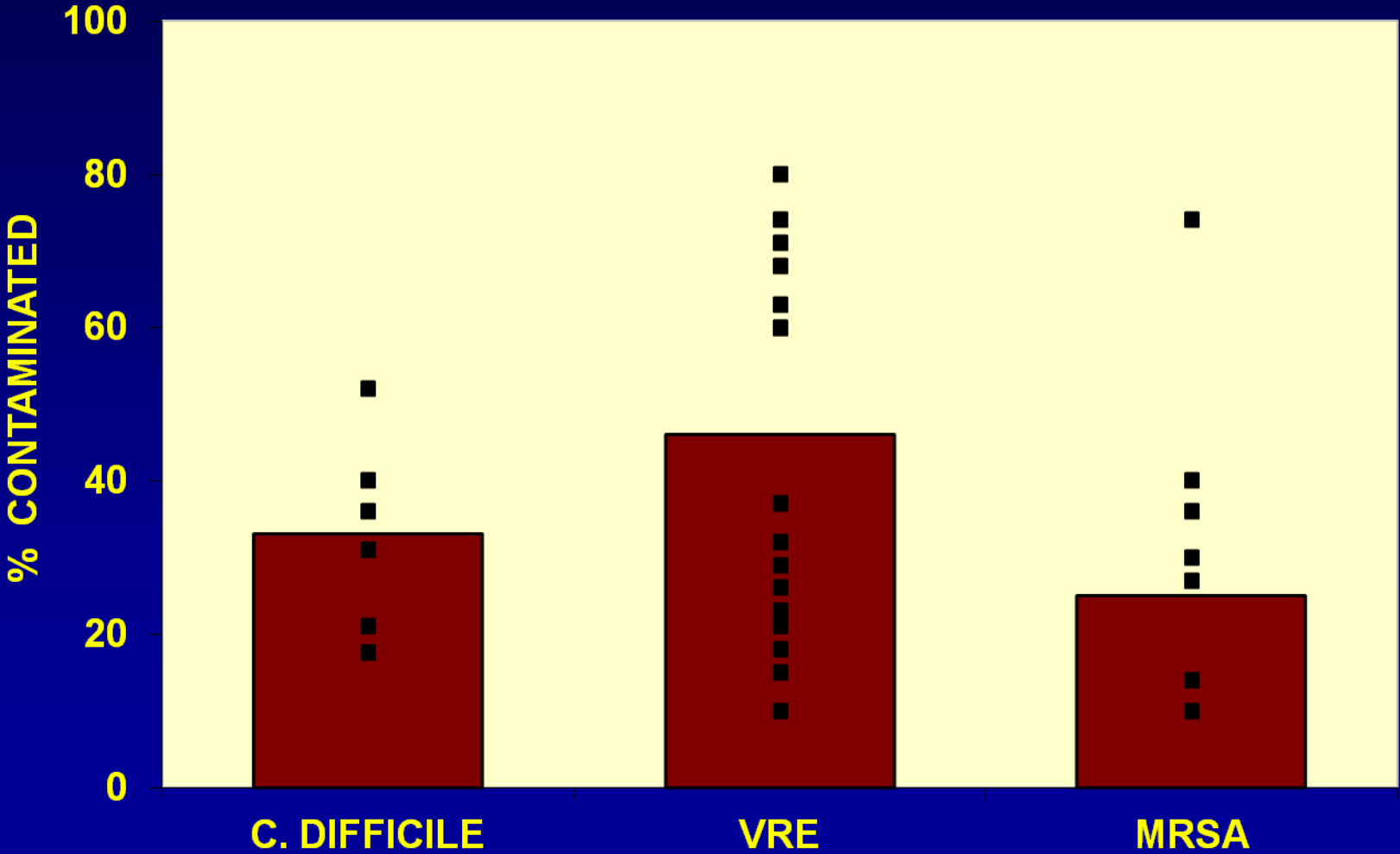
How contaminated is the  
hospital environment with *C.*  
*difficile*?

# Contaminated Surfaces

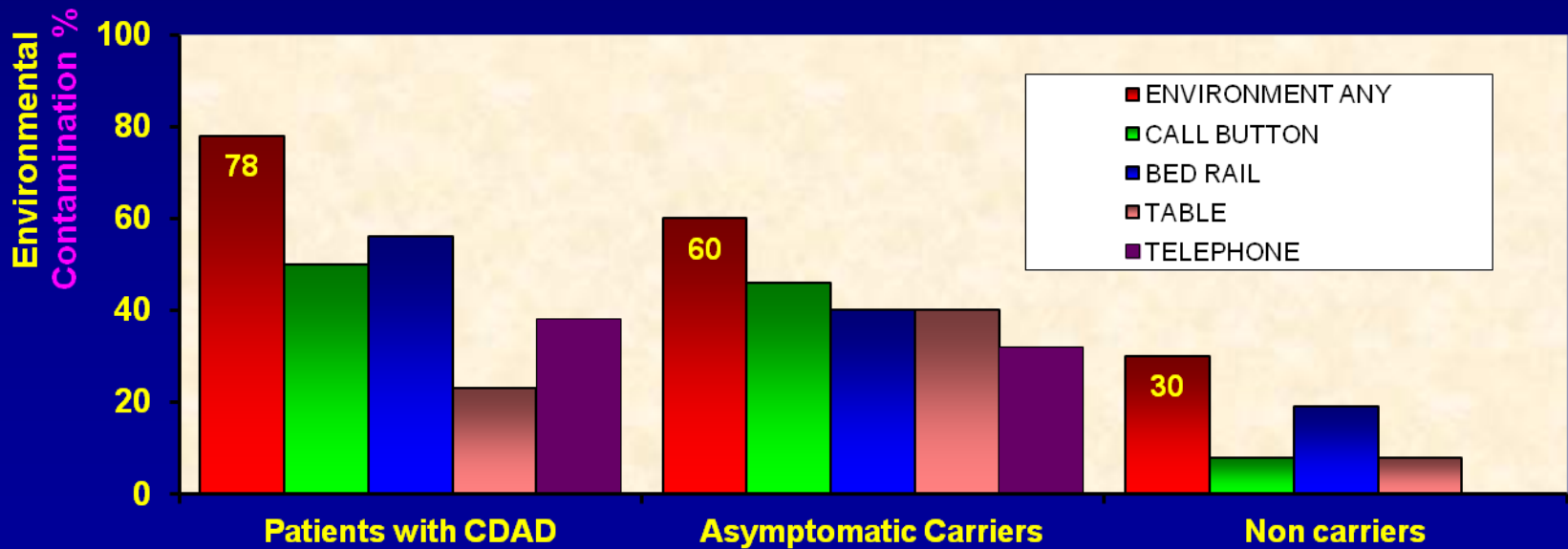
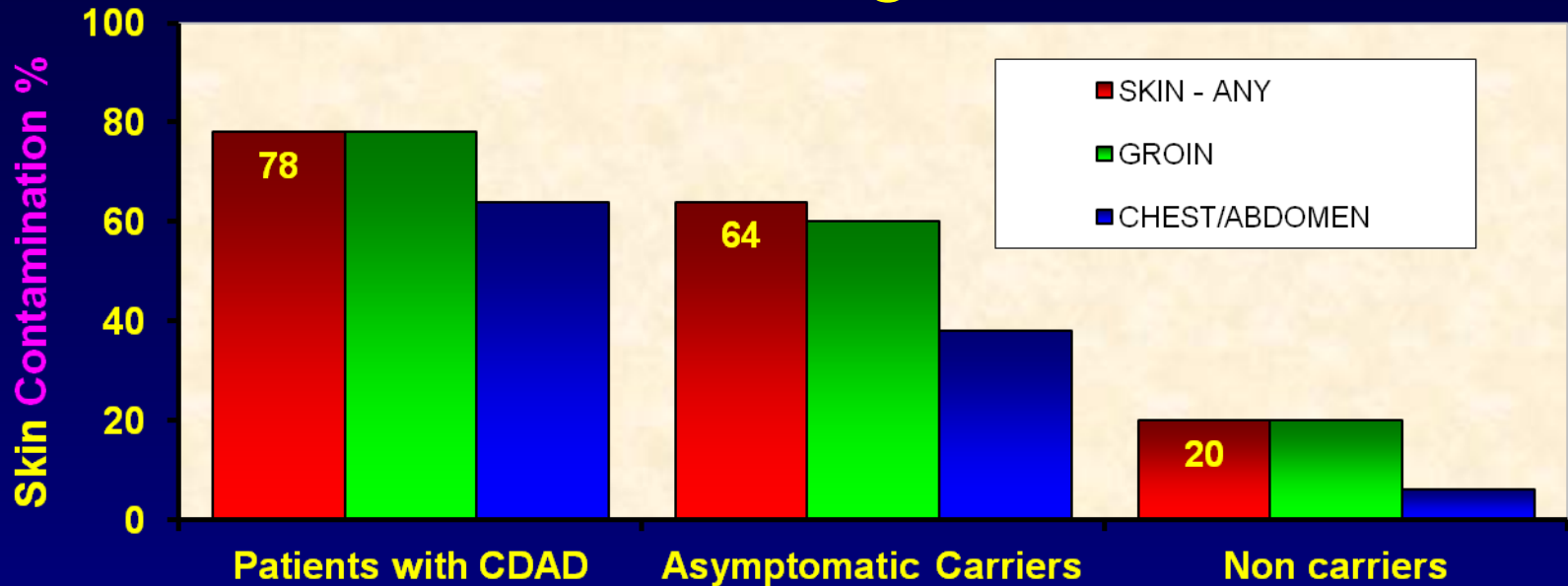
	VRE	MRSA	C. difficile
Bed Rails	+++++++	+	+++
Bed Table	+++++++	+	
Door Knobs	++	++	+
Doors	+++	+	
Call Button	+++	+	++
Chair	++	+	++
Tray Table	+++	++	
Toilet Surface	+		++++
Sink Surface	+	+	+++
Bedpan Cleaner			+

# Surface Contamination of Near-patient Environment

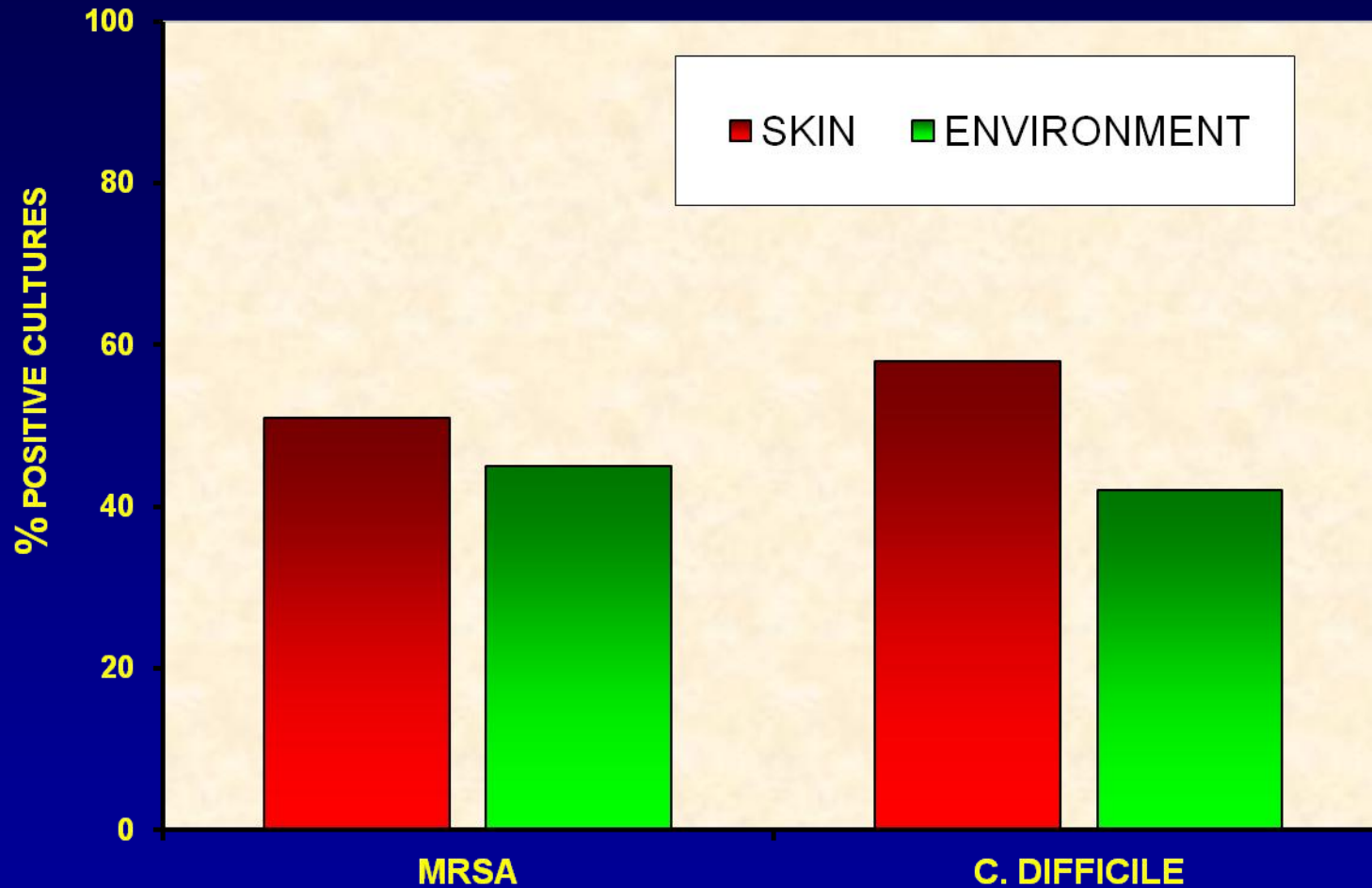
23 Studies



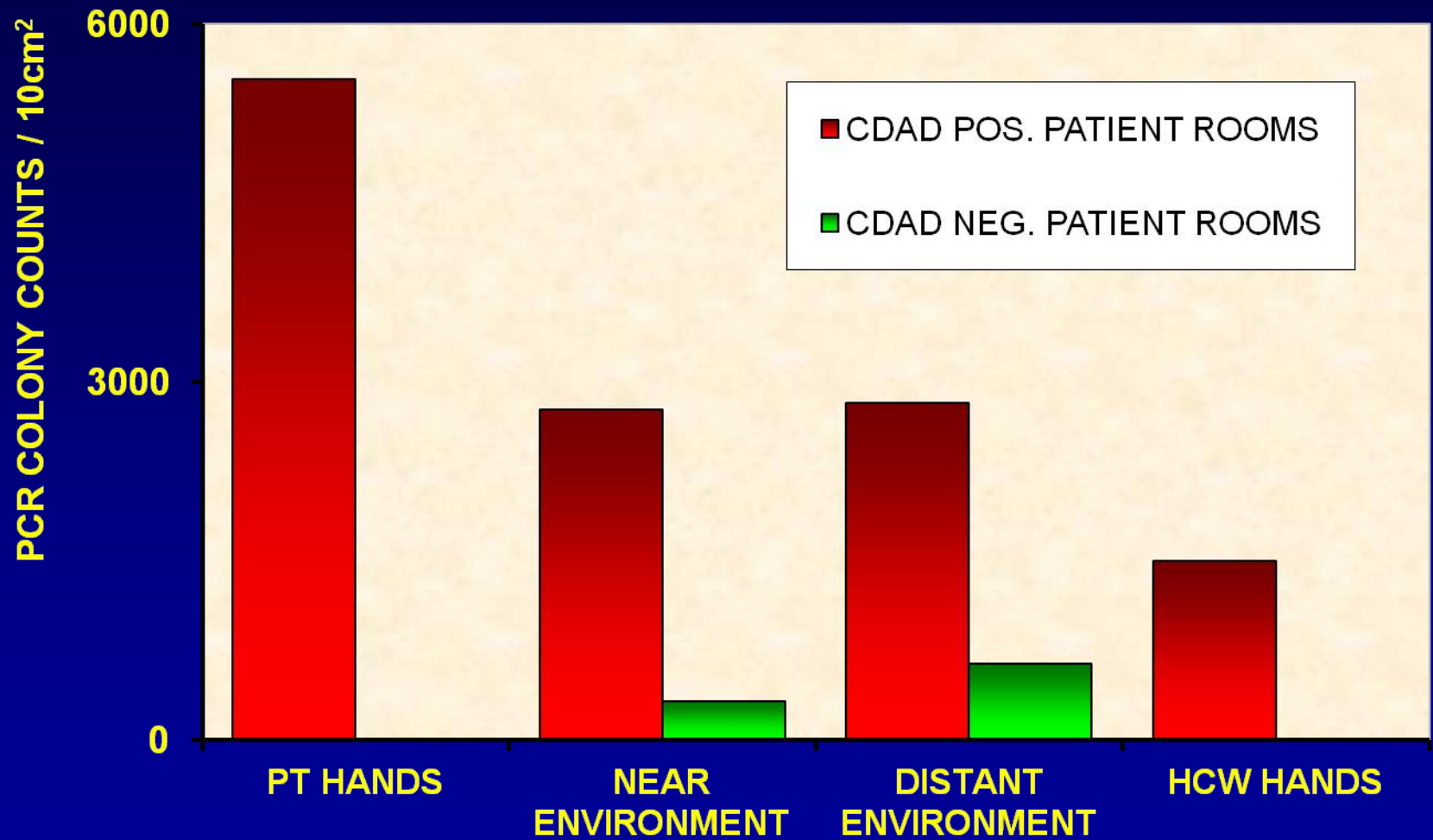
# How does it get there?



# Colonized Patient Contamination

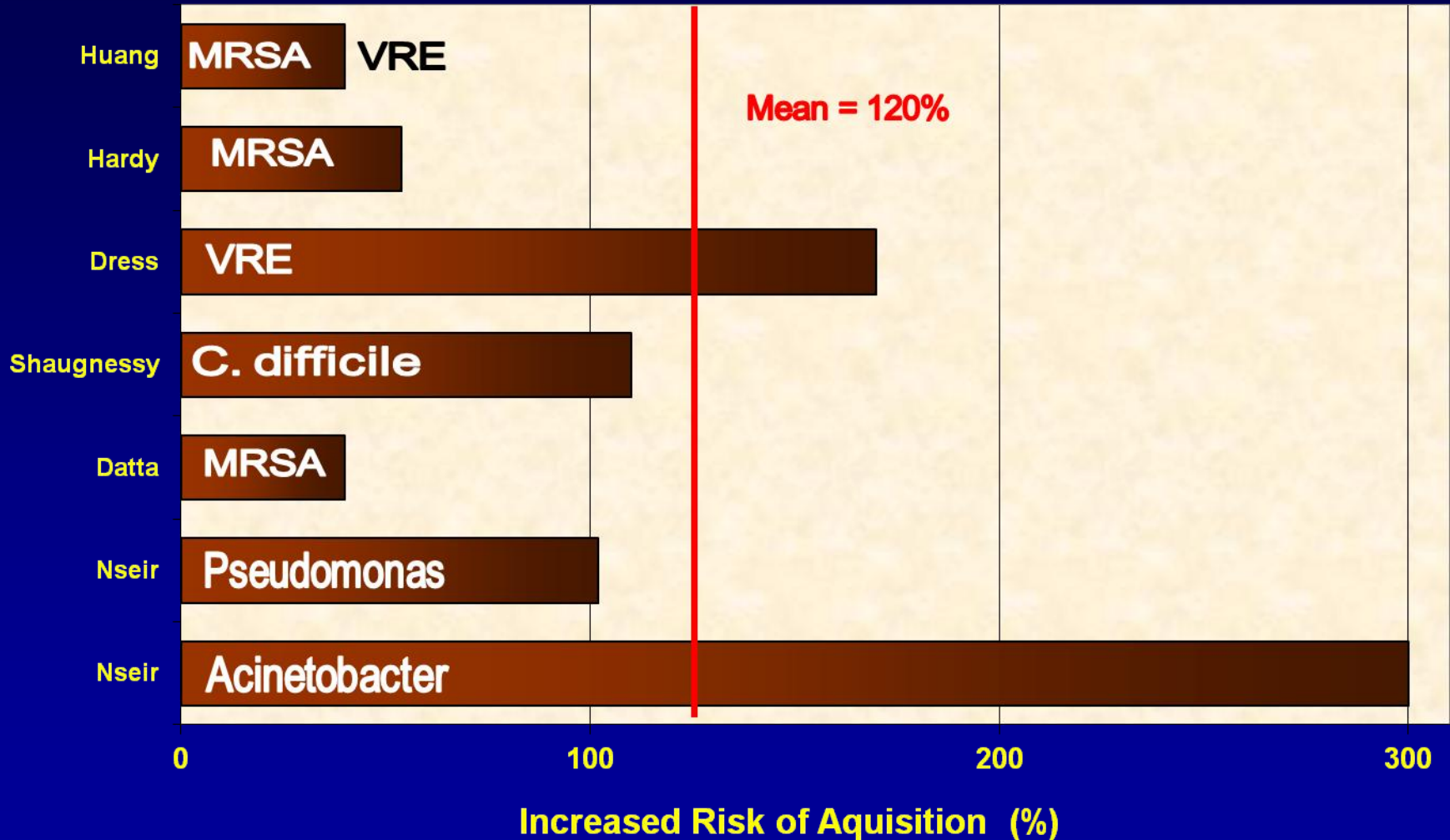


# *C. difficile* Environmental Contamination



Can *C. difficile* be transmitted  
from the environment to  
patients?

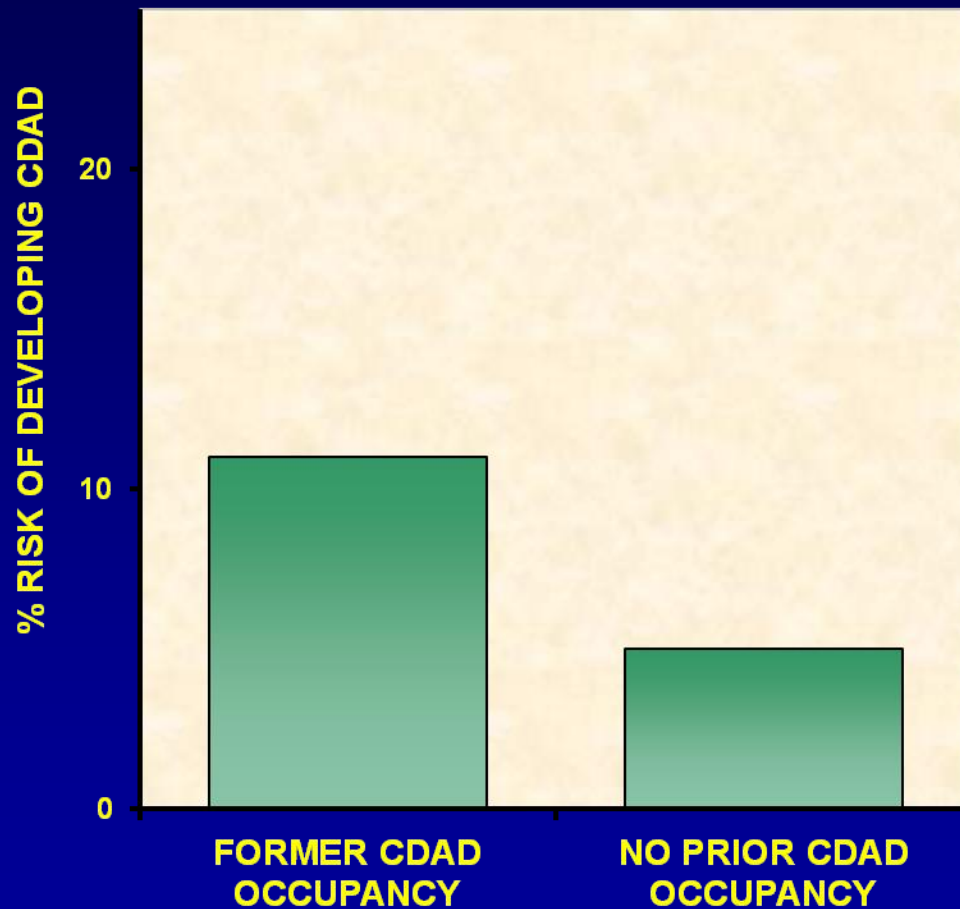
# Increased acquisition risk from prior room occupant 8 studies as of September 2011



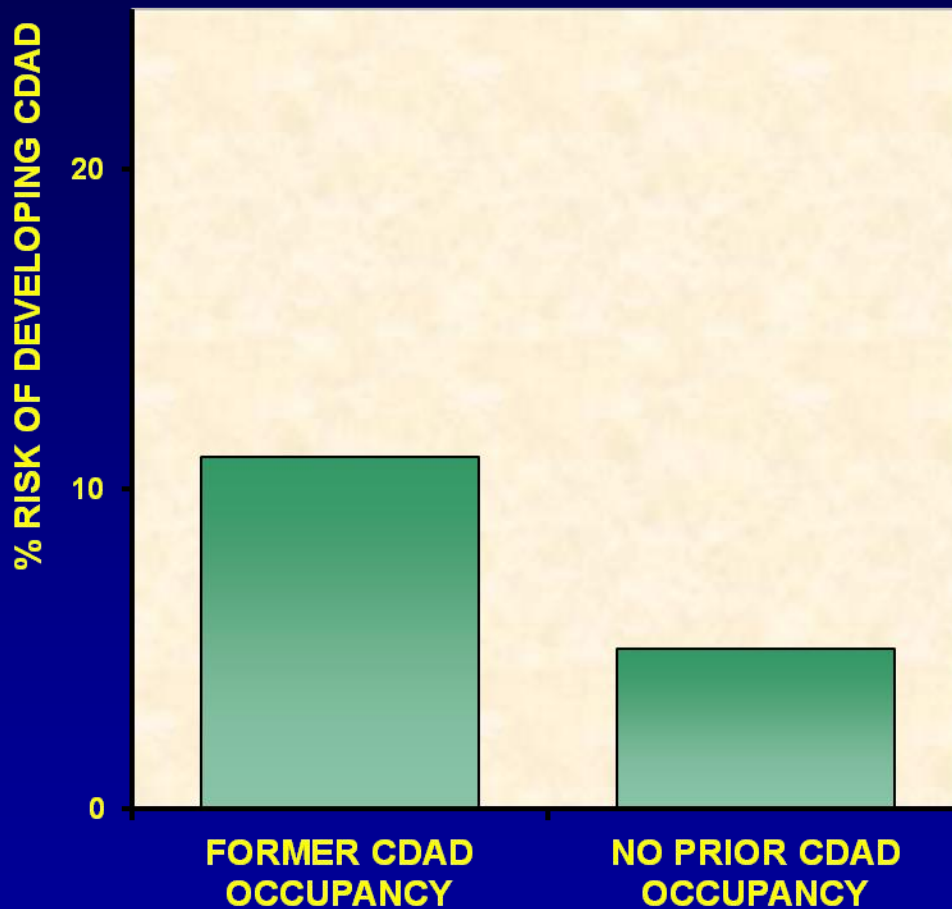
Two additional studies showed very significant risk without quantification – Martinez (VRE) and Wilks (Acinetobacter)



# *C. difficile* Transmission to Prior Room Occupants



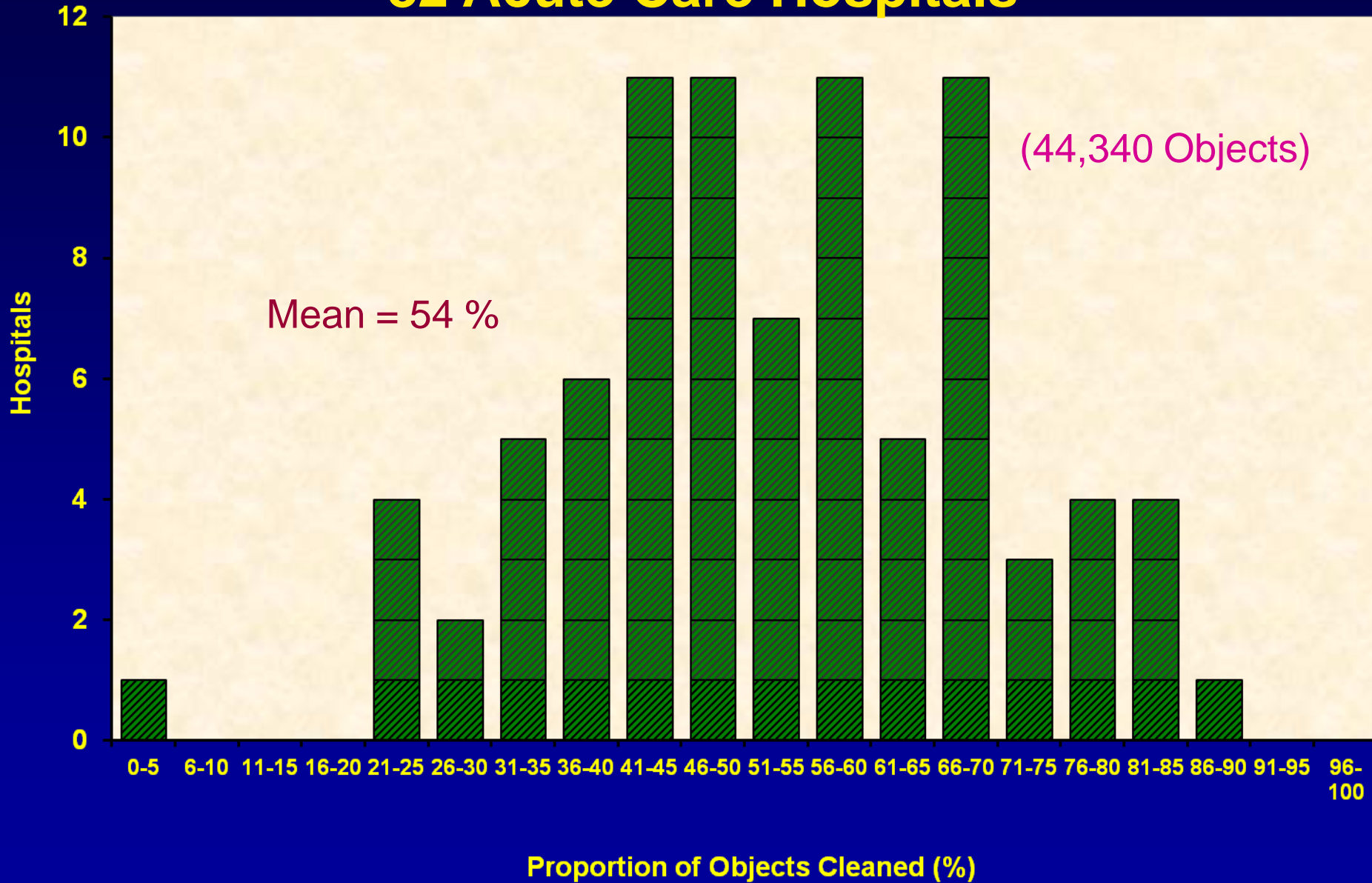
# *C. difficile* Transmission to Prior Room Occupants



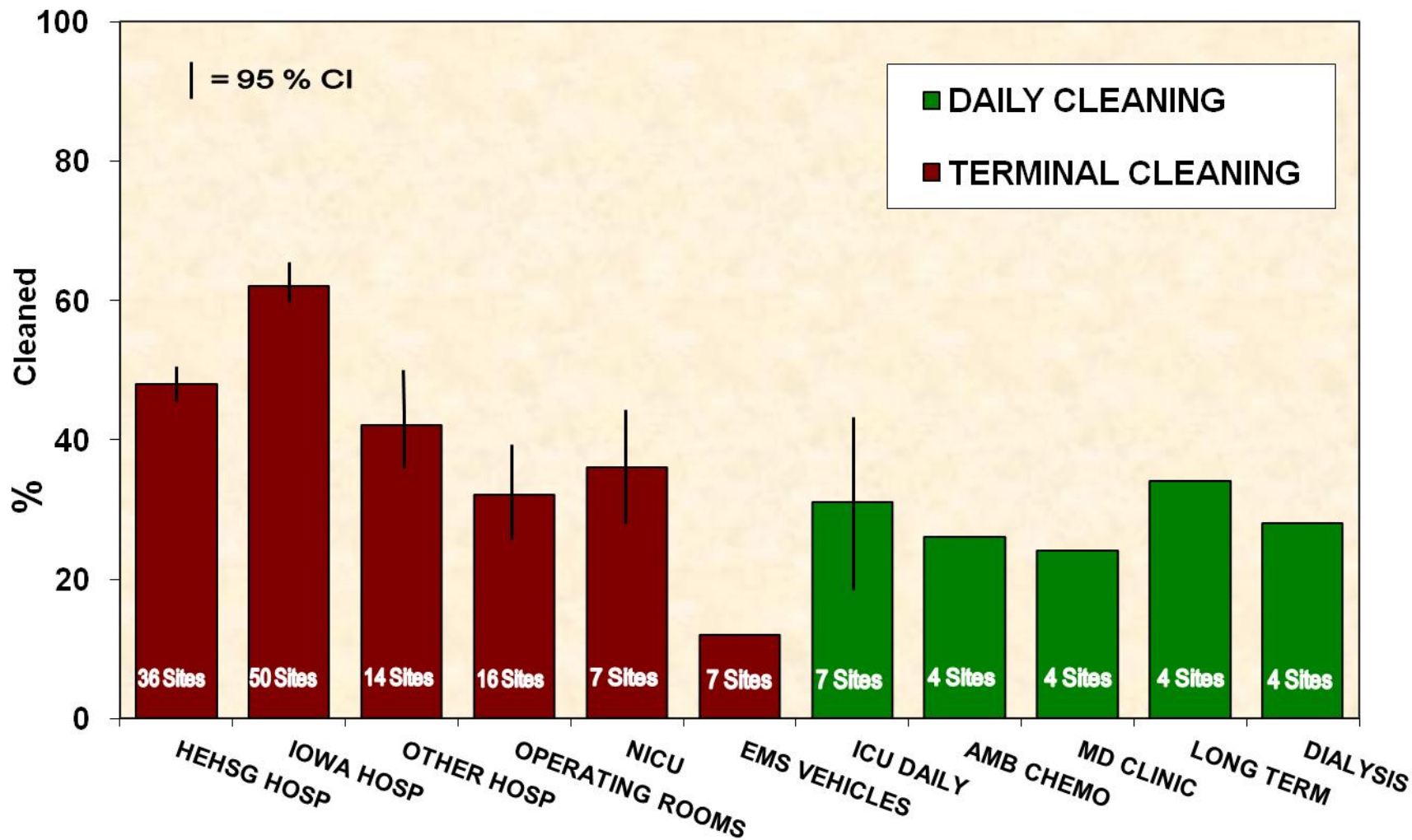
110%  
Increased  
risk

Why is *C. difficile* being transmitted to susceptible patients in U.S. hospitals ?

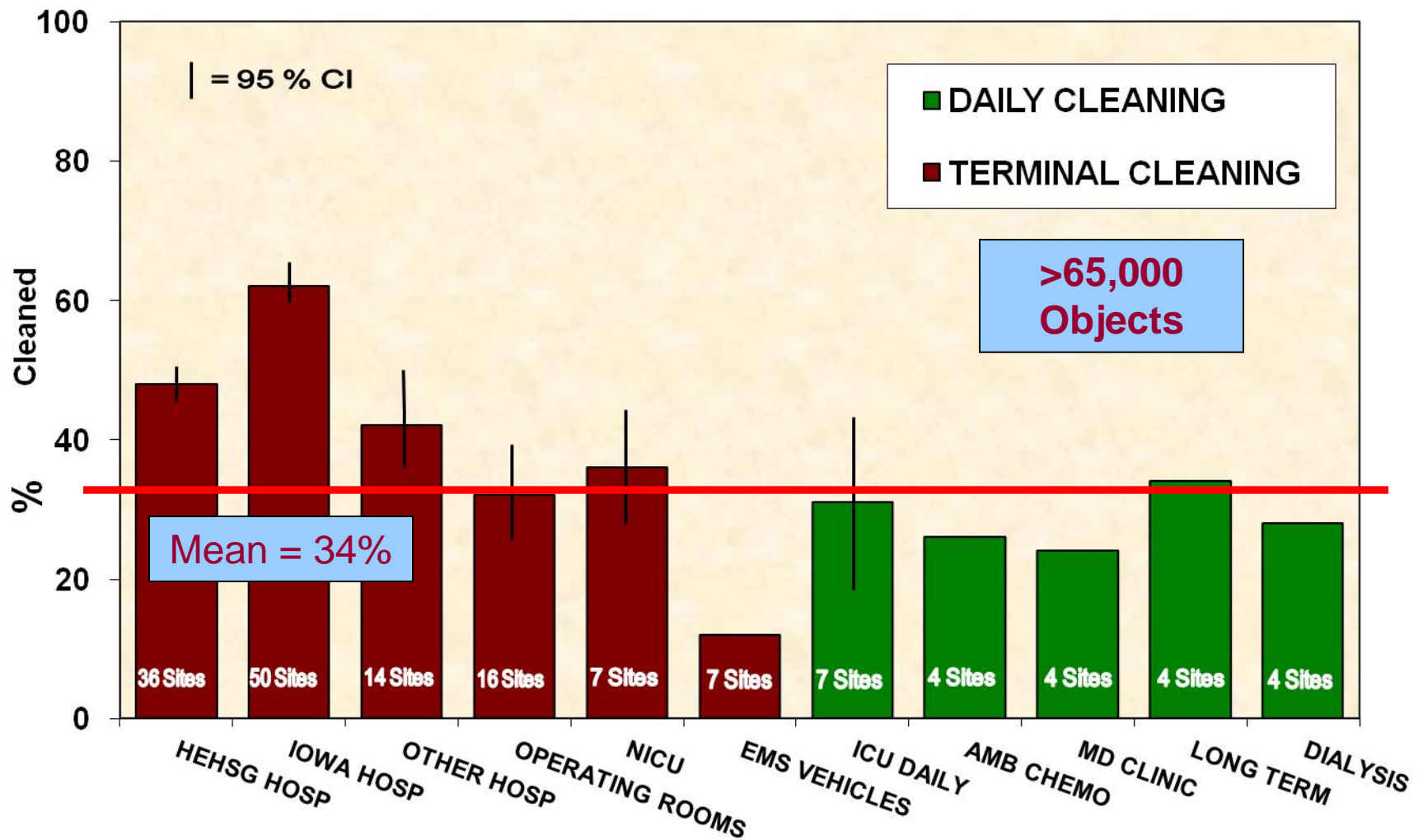
# Baseline Environmental Evaluation of 82 Acute Care Hospitals



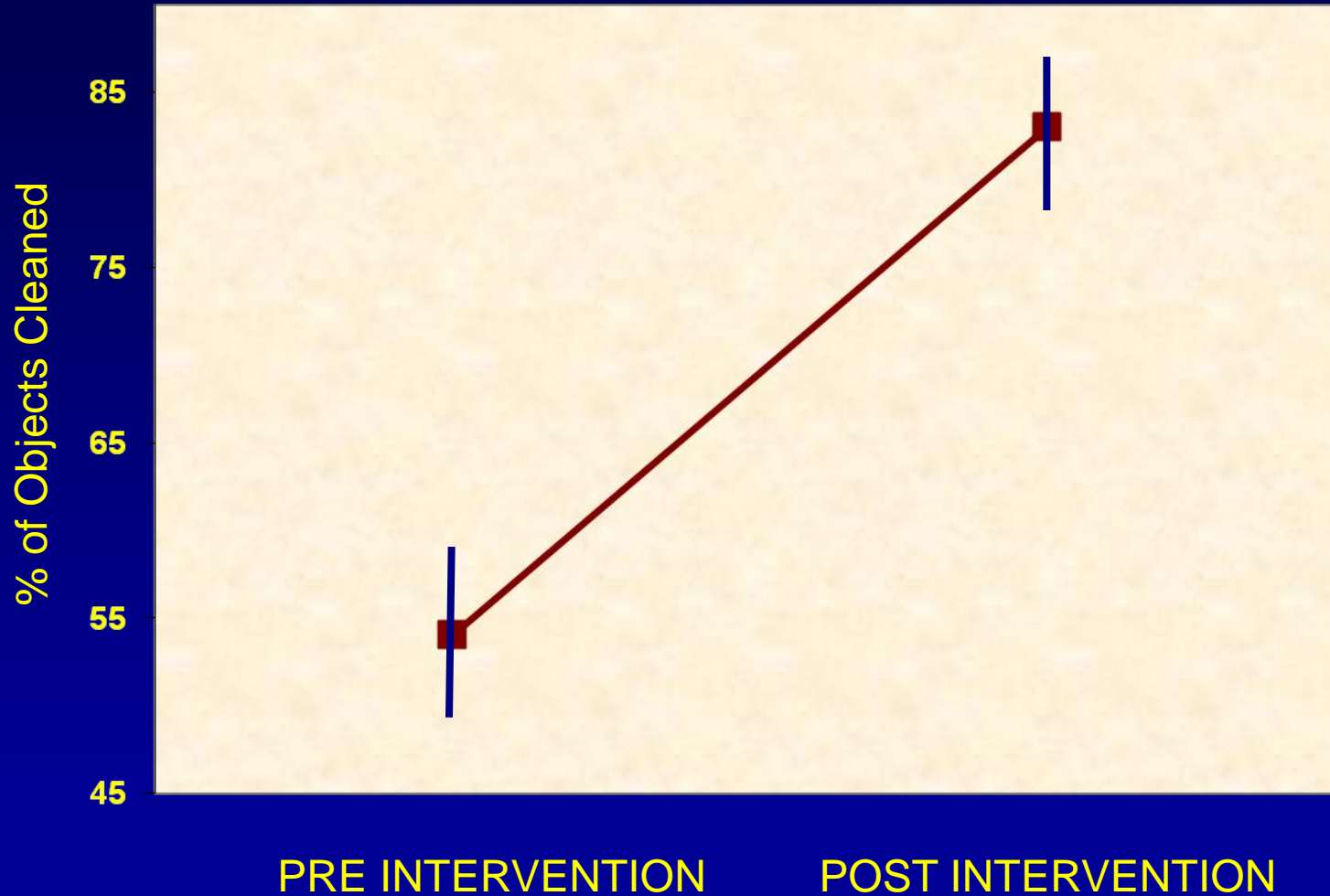
# Thoroughness of Environmental Cleaning



# Thoroughness of Environmental Cleaning



# Hospitals Environmental Hygiene Study Group 82 Hospital Results



Resource Neutral

P = <.0001



# New CDC Recommendations

“In view of the evidence that transmission of many healthcare acquired pathogens (HAPs) is related to contamination of near-patient surfaces and equipment, all hospitals are encouraged to develop programs to optimize the thoroughness of high touch surface cleaning as part of terminal room cleaning.”

**Options for Evaluating Environmental Cleaning**

**October 2010**

National Center for Emerging and Zoonotic Infectious Diseases

Division of Healthcare Quality Promotion





# New CDC Recommendations

Acute Care Hospitals should implement a:

## Level I Program:

Basic interventions to optimize disinfection, cleaning policies, procedures and ES staff education and Practice. When completed move to Level II Program

## Level II Program:

All elements of Level I + Objective monitoring

**Options for Evaluating Environmental Cleaning**

October 2010

National Center for Emerging and Zoonotic Infectious Diseases

Division of Healthcare Quality Promotion



Acute Care Hospitals should evaluate and monitor the thoroughness of terminal cleaning of at least the following high touch surfaces\*

\*Automated data collection spread sheets provided

**CDC Environmental Checklist for Monitoring Terminal Cleaning<sup>1</sup>**

<b>Date:</b>	
<b>Unit:</b>	
<b>Room Number:</b>	
<b>Initials of ES staff (optional):<sup>2</sup></b>	

**Evaluate the following priority sites for each patient room:**

<b>High-touch Room Surfaces<sup>3</sup></b>	<b>Cleaned</b>	<b>Not Cleaned</b>	<b>Not Present in Room</b>
Bed rails / controls			
Tray table			
IV pole (grab area)			
Call box / button			
Telephone			
Bedside table handle			
Chair			
Room sink			
Room light switch			
Room inner door knob			
Bathroom inner door knob / plate			
Bathroom light switch			
Bathroom handrails by toilet			
Bathroom sink			
Toilet seat			
Toilet flush handle			
Toilet bedpan cleaner			

**Evaluate the following additional sites if these equipment are present in the room:**

<b>High-touch Room Surfaces<sup>3</sup></b>	<b>Cleaned</b>	<b>Not Cleaned</b>	<b>Not Present in Room</b>
IV pump control			
Multi-module monitor controls			
Multi-module monitor touch screen			
Multi-module monitor cables			
Ventilator control panel			

**Mark the monitoring method used:**

- Direct observation       Fluorescent gel  
 Swab cultures               ATP system               Agar slide cultures

<sup>1</sup>Selection of detergents and disinfectants should be according to institutional policies and procedures

<sup>2</sup>Hospitals may choose to include identifiers of individual environmental services staff for feedback purposes.

<sup>3</sup>Sites most frequently contaminated and touched by patients and/or healthcare workers



# New CDC Recommendations

Web Link:

<http://www.cdc.gov/HAI/toolkits/Evaluating-Environmental-Cleaning.html>

**Options for Evaluating Environmental Cleaning**

October 2010

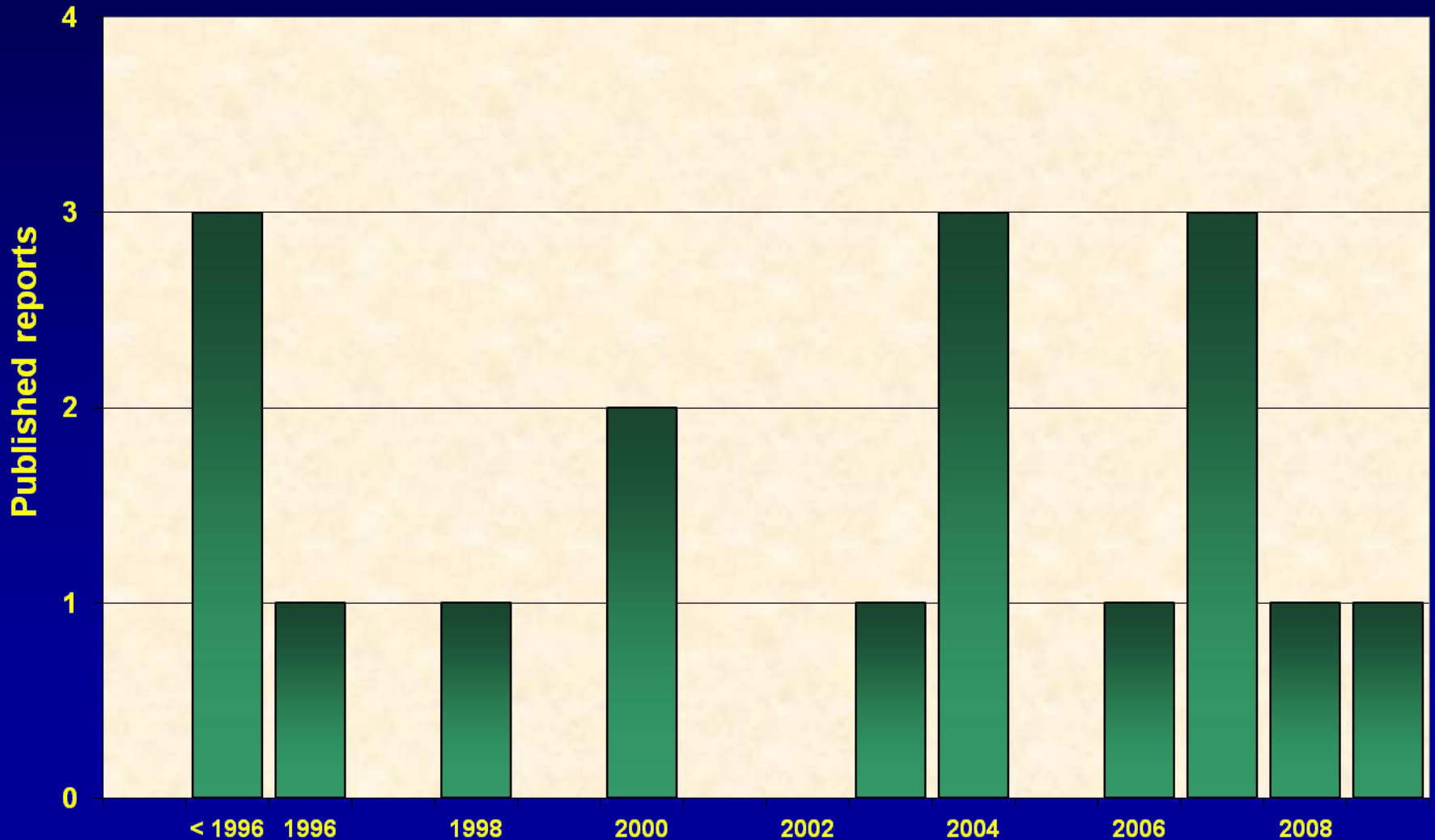
National Center for Emerging and Zoonotic Infectious Diseases

Division of Healthcare Quality Promotion



Can better cleaning favorably  
impact environmental  
contamination with *C. difficile*?

# Studies reporting a favorable impact of enhanced environmental hygiene during a CDAD outbreak



Research article

Open Access

## **Reduction of *Clostridium Difficile* and vancomycin-resistant *Enterococcus* contamination of environmental surfaces after an intervention to improve cleaning methods**

Brittany C Eckstein<sup>1</sup>, Daniel A Adams<sup>1</sup>, Elizabeth C Eckstein<sup>2</sup>, Agam Rao<sup>3</sup>,  
Ajay K Sethi<sup>4</sup>, Gopala K Yadavalli<sup>1</sup> and Curtis J Donskey\*<sup>1</sup>

June 2007

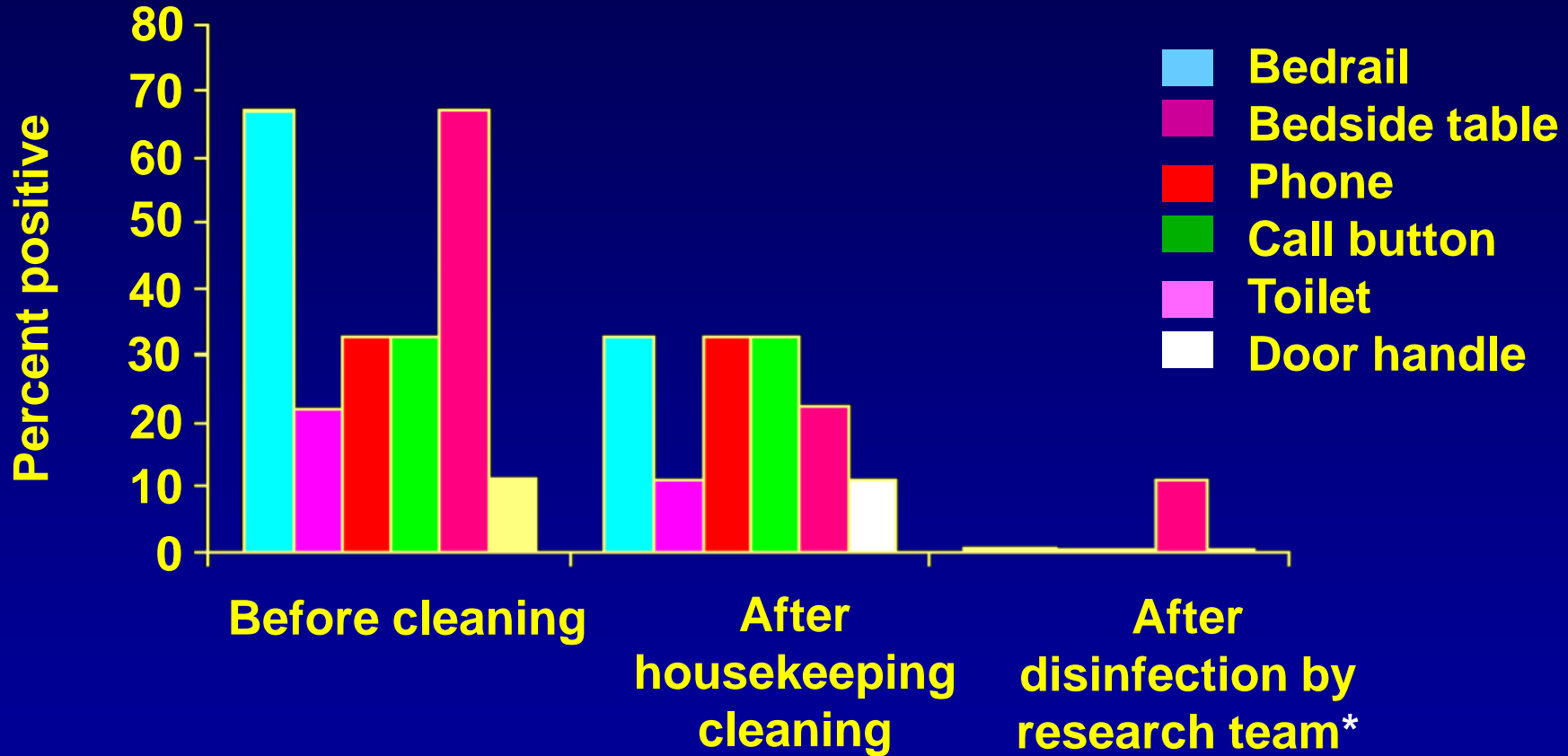
### Methods:

Culture based evaluation - Pre-intervention;

- after routine terminal cleaning;
- after terminal cleaning by the research staff;
- following **education** of Environmental Services (ES) staff and **administrative interventions**

# Percentage of *C. difficile*-positive cultures

n=9 rooms

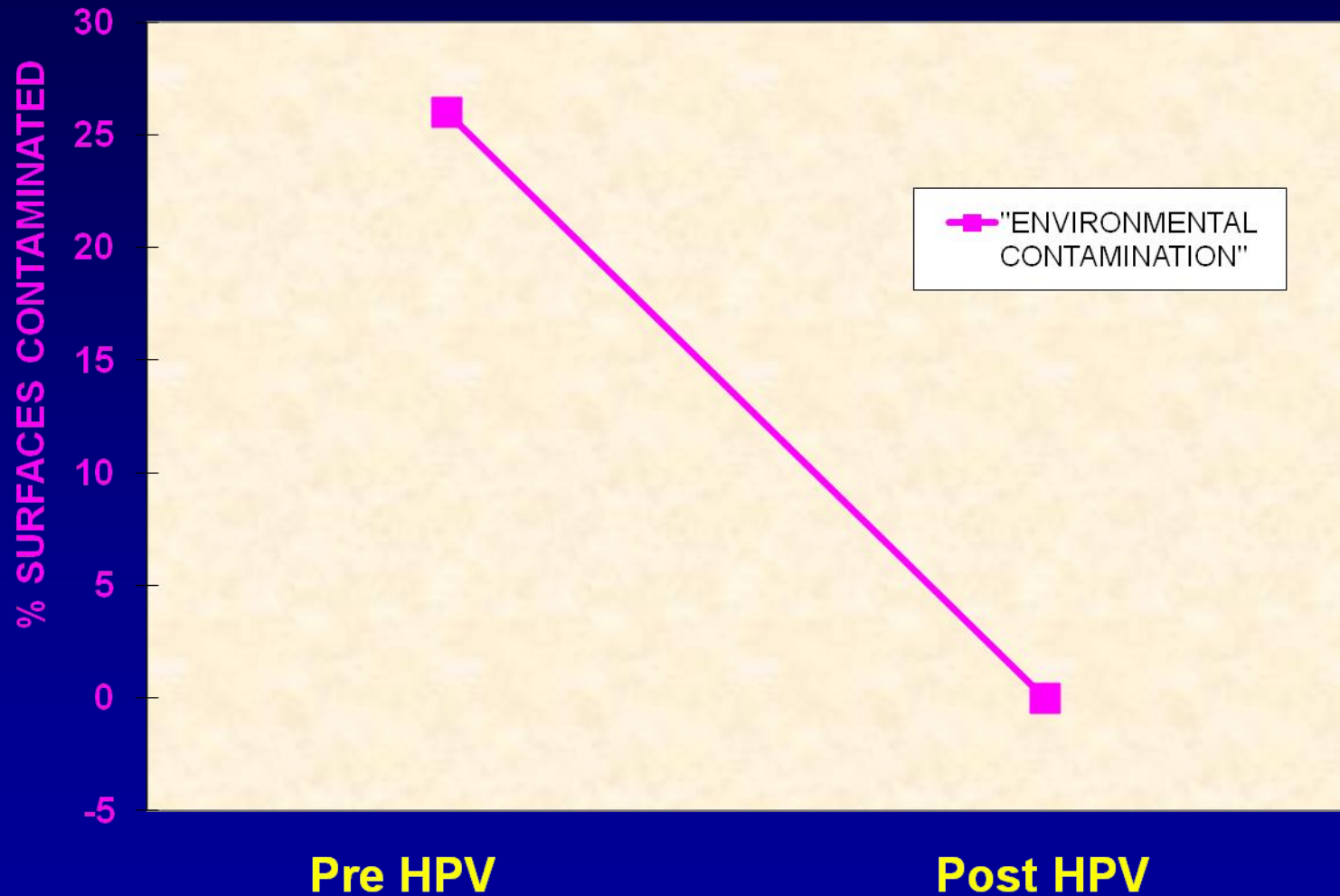


\*Similar results found after ES cleaning following interventions

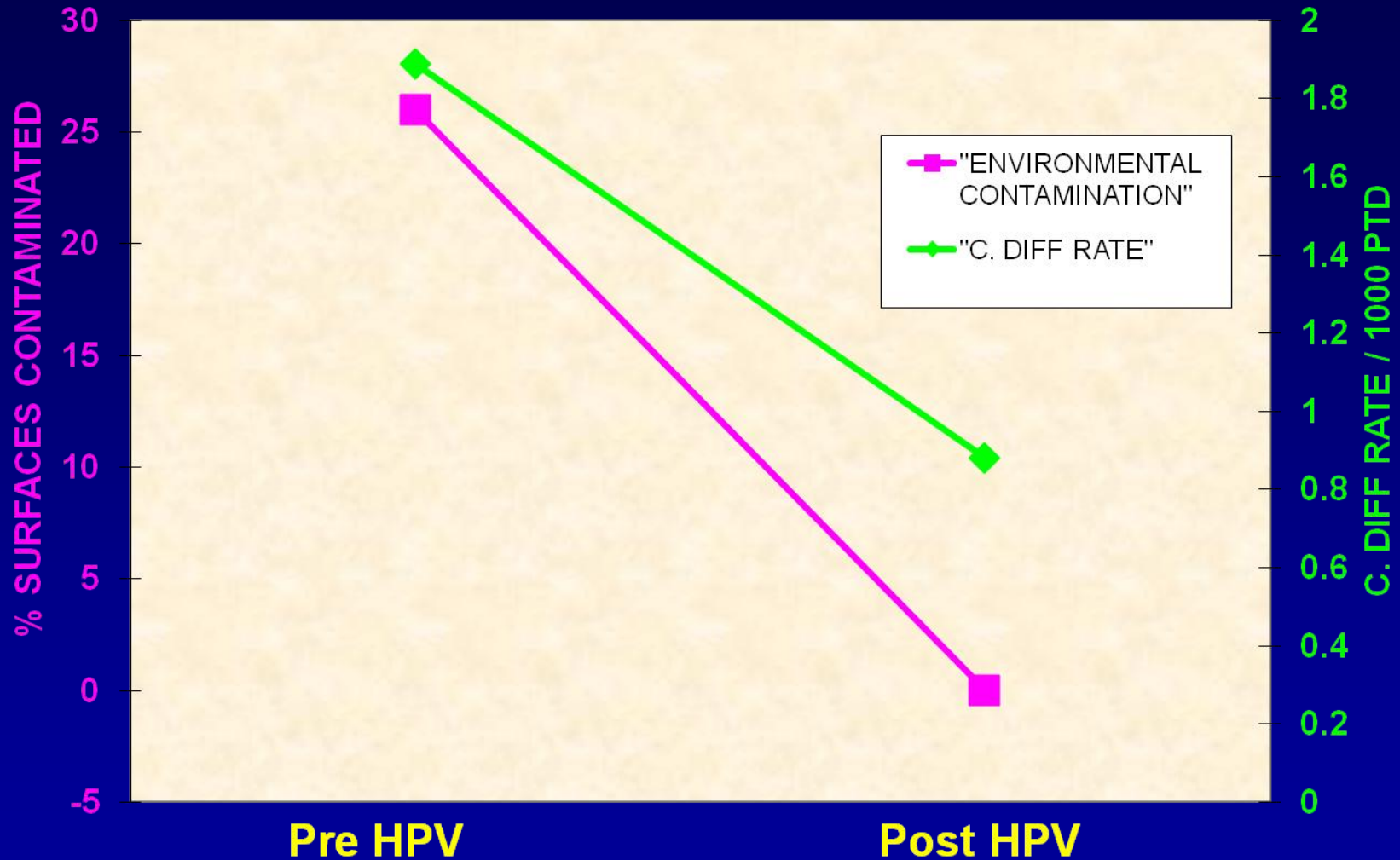
Can improved disinfection  
cleaning lead to decreased  
healthcare facility-onset (HO)  
CDI??



# The Impact of Hydrogen Peroxide Vapor (HPV) on *C. difficile*



# The impact of HPV on *C. difficile*



# Greater New York CDI Collaborative

- 40 Hospitals – New York area, 2007-2009
- Pre-intervention rate – 8.1/ 10,000 PtD
- Similar education, check sheet and self reporting of thoroughness of terminal cleaning. Glitter bug lotion uses for some teaching (not monitoring).
- 70% of Hospitals saw an average decrease of 26% in HO CDI (Mean for the system = 15%)

Source: Barbra Smith, RN CIC and Brian Koll, M.D. project Coordinators.  
APIC presentation.

Can we afford not to fix the  
CDI problem in U.S.  
hospitals?

# Estimating the cost of HO CDI

Excess length of stay (2000)

Depends on very high census

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One health system - not published \$22,000

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One health system – not published - \$22,000

Attributable net loss per HO CDI case (2009)

Harvard / Cardinal Health – IDSA Abstract

270,000 admissions

Direct cost to the hospital - \$5400.



No matter who is paying, or how much, healthcare facility-onset CDI is a serious hole in the bottom line of the boat!



Thanks for inviting me !!



Questions – Comments?

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