

Optimizing Environmental Hygiene: The Key to *C. difficile* Control

Dr. Phillip Carling, Boston University School of Medicine

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The Key to *C. difficile* Control**

Phillip C. Carling, M.D.
Boston University School of Medicine

Hosted by Paul Webber
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C. difficile Infection (CDI)

- The most common pathogen associated with HAIs in the U.S. currently – easily surpassing MRSA in frequency and mortality
- All CDI develops as a result of healthcare acquisition from another patient with CDI or colonization
- 7,200 patients a day in U.S. hospitals have CDI
- One patient every 4 minutes dies from CDI in a U.S. hospital

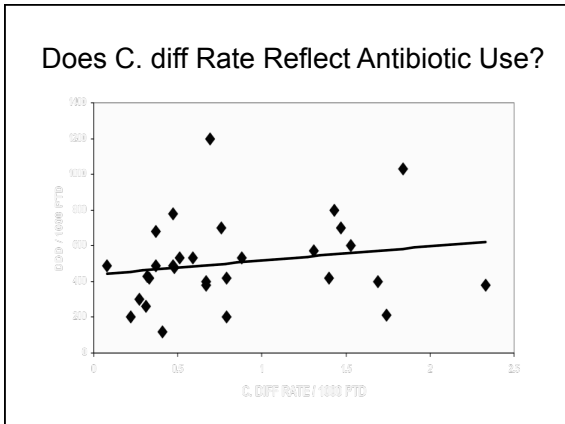
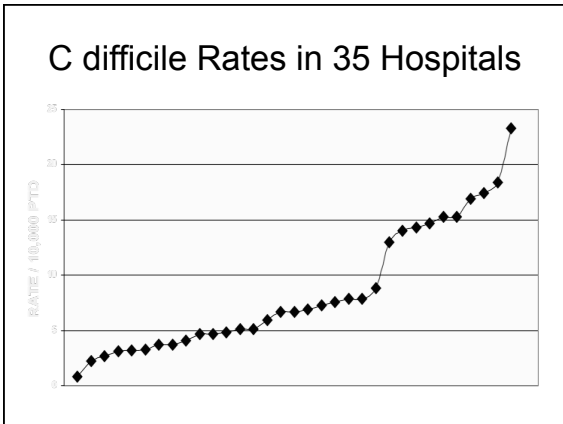
C. difficile Disease Risk Factors

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 - Clindamycin
- Broad spectrum = More
- Bactrim, Vancomycin – V. rare Aminoglycosides - No
- All Hospitals are not the Same

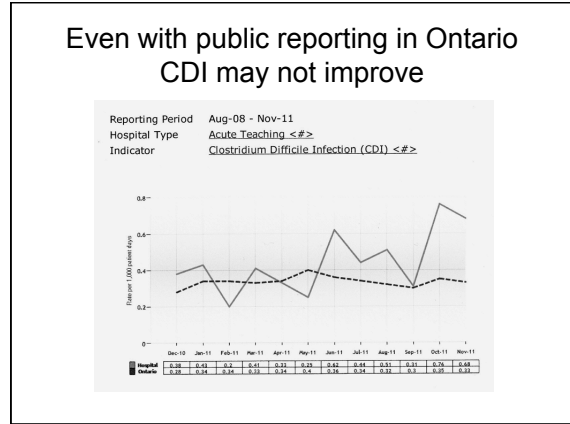
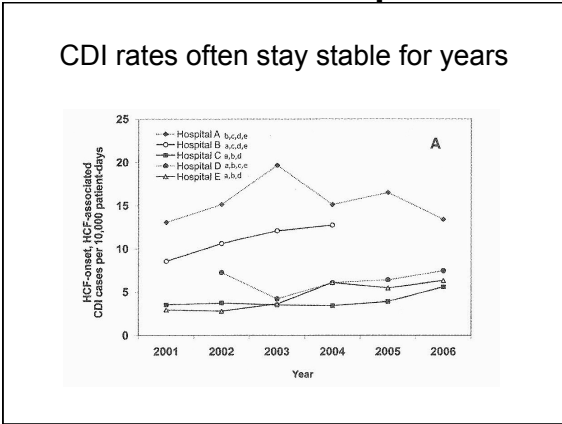


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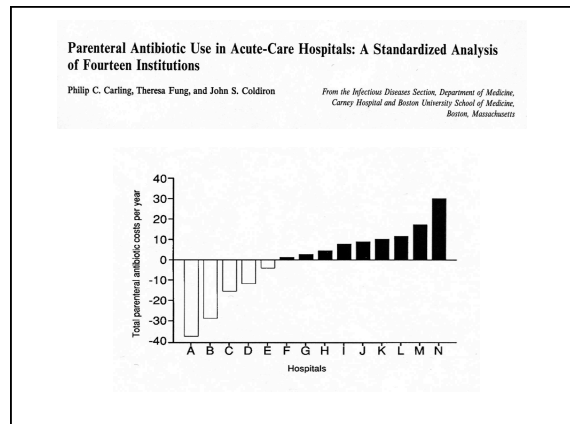
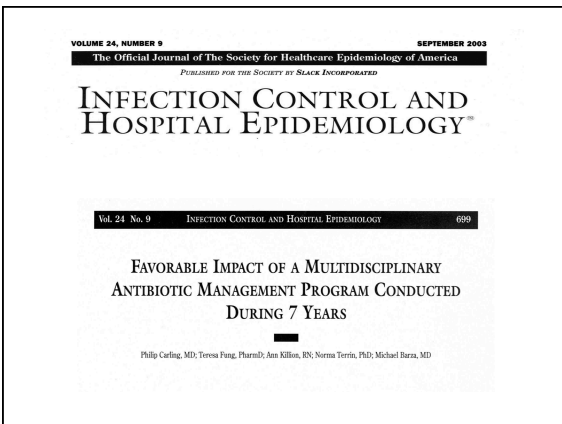
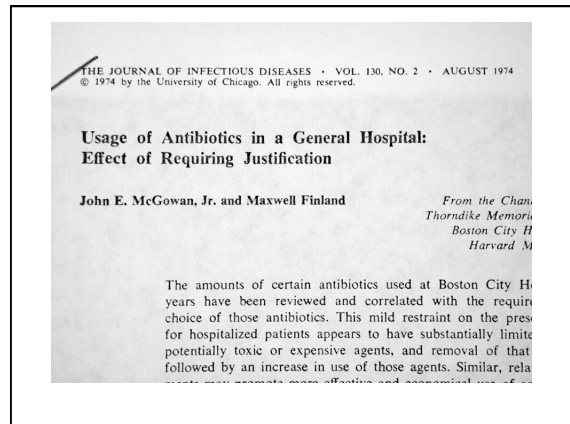
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The CDC Recommends Two Approaches

- 1. Prudent antibiotic use**
 - Provider Education
 - Antibiotic management programs
- 2. Preventing Transmission**

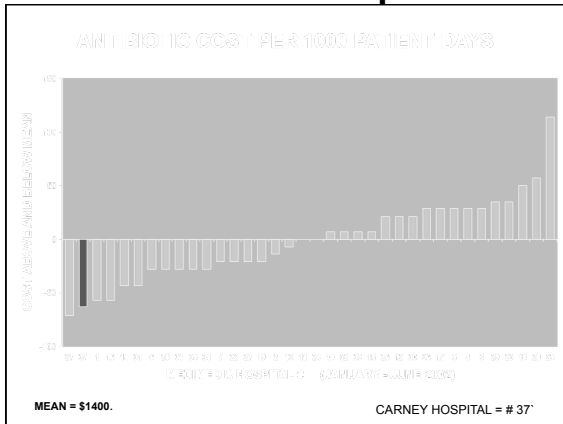


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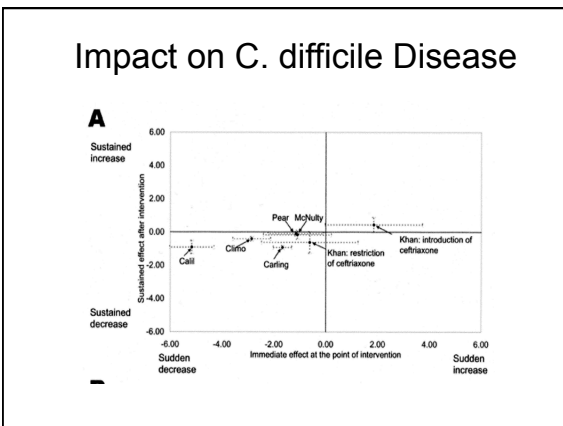
Was there any impact of the program on resistant organisms?

EMERGING INFECTIOUS DISEASES®
February 2006

Systematic Review of Antimicrobial Drug Prescribing in Hospitals

Peter Davy,[†] Erwin Brown,[‡] Lynda Fenelon,[§] Roger Finch,[¶] Ian Gould,^{**} Alison Holmes,^{††} Craig Ramsay,^{‡‡} Eric Taylor,^{§§} Phil Wilton,^{¶¶} and Mark Wilcox,^{###}

1980 – 2003 = 309 Studies
66 Studies had meaningful data analysis
16 Studies evaluated microbiologic outcomes
4 Studies – Favorable, 8 +/-, 4 ?/-



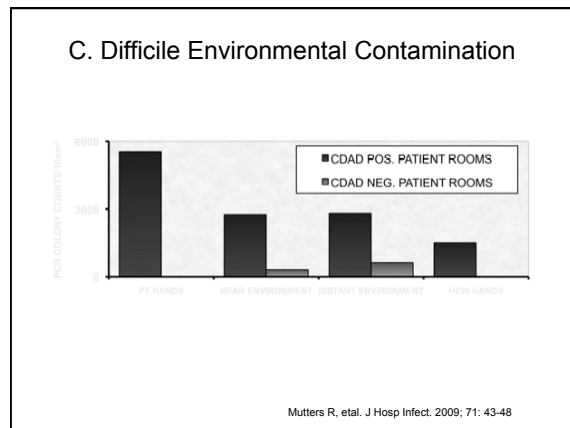
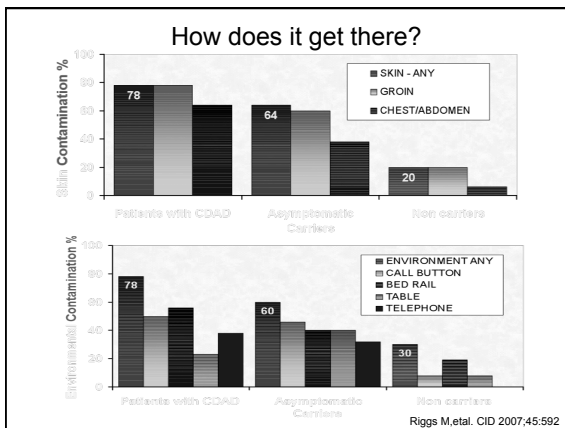
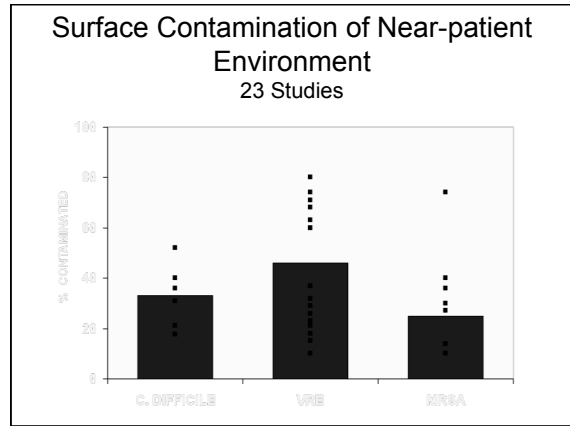
- ### Background: Epidemiology
- #### Risk Factors
- Antimicrobial exposure
 - Acquisition of *C. difficile*
 - Advanced age
 - Underlying illness
 - Immunosuppression
 - Tube feeds
 - ? Gastric acid suppression
- Main modifiable risk factors

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

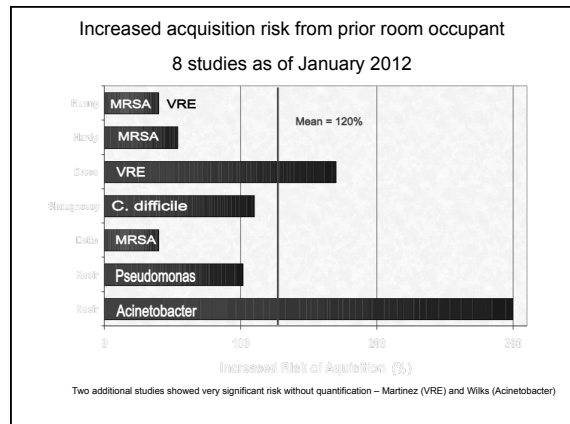
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Contaminated Surfaces			
	VRE	MRSA	C. difficile
Bed Rails	++++++	+	+++
Bed Table	++++++	+	
Door Knobs	++	++	+
Doors	+++	+	
Call Button	+++	+	++
Chair	++	+	++
Tray Table	+++	++	
Toilet Surface	+		++++
Sink Surface	+	+	+++
Bedpan Cleaner			+



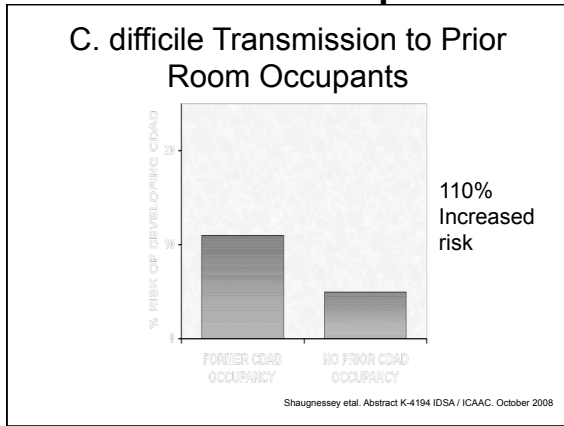
Can C. diff be transmitted from the environment to patients?



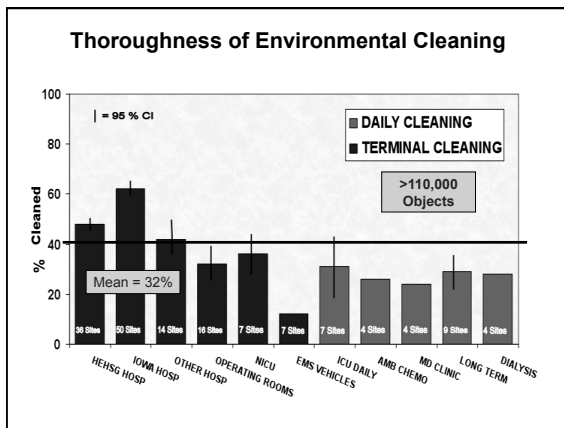
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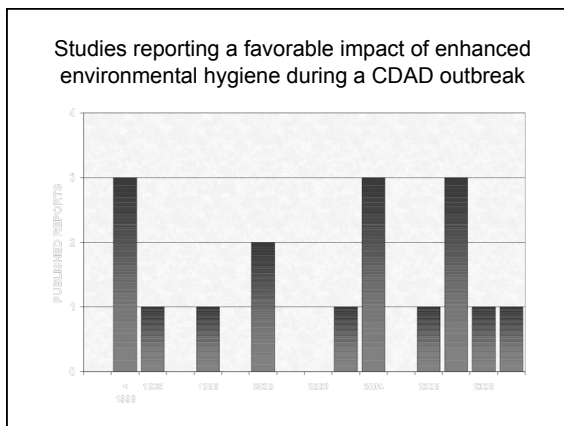
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Why is *C. difficile* being transmitted to susceptible patients in U.S. hospitals ?



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



BMC Infectious Diseases

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 Eckstein¹, Daniel A Adams¹, Elizabeth C Eckstein², Agam Rao³, Ajay K Sethi⁴, Gopala K Yadavalli¹ and Curtis J Donskey*¹

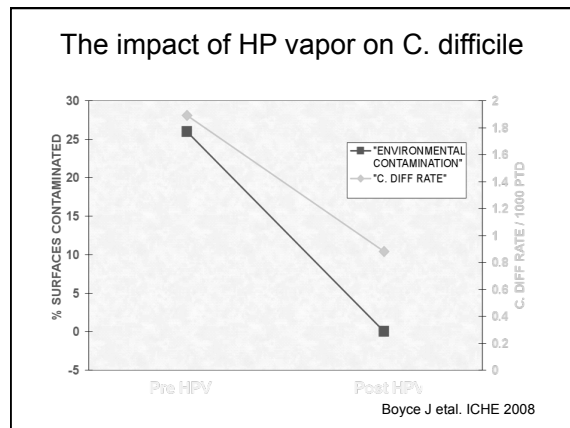
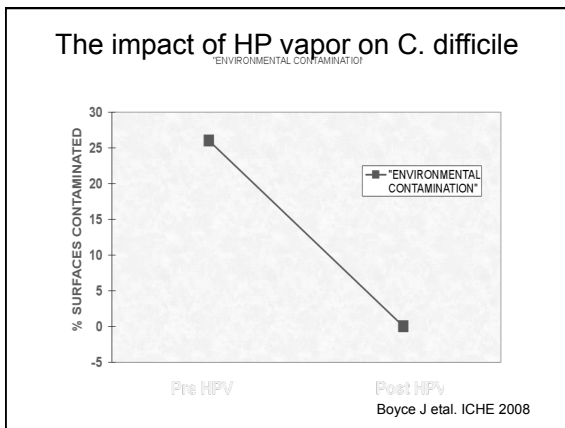
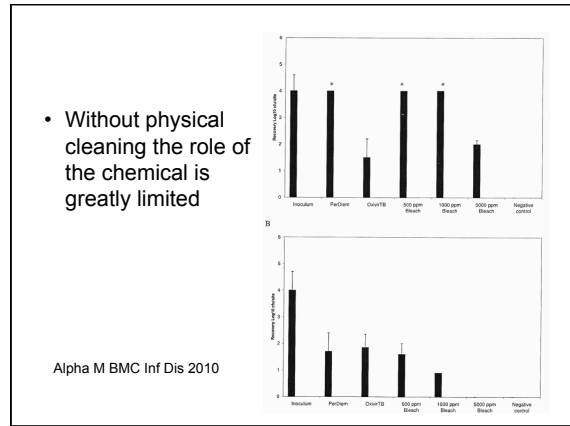
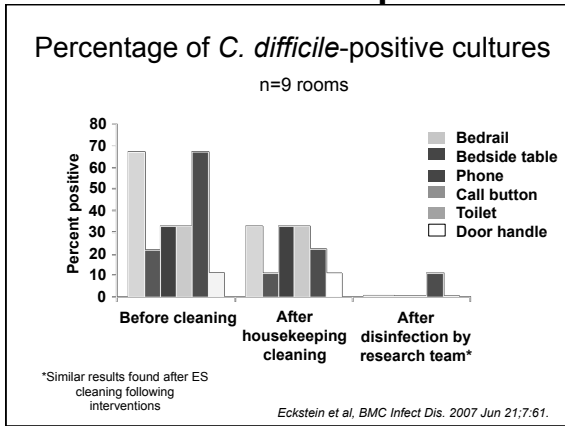
June 2007

Methods:

- Culture based evaluation - Pre-intervention;
- after routine terminal cleaning;
- after terminal cleaning by the research staff;
- following education of the ES staff and administrative interventions

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Can improved disinfection cleaning lead to decreased HO CDI??

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.

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Estimating the cost of HO - CDI

Excess length of stay (2000)
Depends on very high census

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We all Pay - \$5,800

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

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Attributable net loss per HO CDI case (2009)
Harvard / Cardinal Health – IDSA Meeting
270,000 admissions
Direct cost to the hospital - \$5400.


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

A black and white illustration of a man in a suit and cap standing on a sinking boat. The boat has a large dollar sign on its side and is tilted in the water. The man has his arms raised, one holding a coin. The background shows a stylized landscape with a tree and a sun.

A final thought about *C. diff* rates in hospitals



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With respect to environmental hygiene ...
 can C. diff rates serve as the



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Questions – Comments? → pcarling@cchcs.org

Coming Soon

- 26 January 12 **Infection Control Strategy for Multidrug-Resistant Gram Negative Bacilli**
 Speaker: Prof. Syed S. Sattar, Centre for Research on Environmental Microbiology, University of Ottawa
 Sponsor: Virox Technologies Inc (www.virox.com)
- 2 February 12 **The Role of Fomites in Disease Transmission in Public Environments**
 Speaker: Prof. Chuck Gerba, University of Arizona
 Sponsor: Virox Technologies Inc (www.virox.com)
- 7 February 12 *(British Teleclass)* **Surgical Site Infections – Advancing the Prevention Agenda**
 Speaker: Prof. Judith Tanner, De Montfort University, Leicester, UK

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