

Optimizing Environmental Hygiene: The Key to C. Difficile Control

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Consultant – Ecolab, Steris, ASHES
Pending Patent License - Ecolab

C. Difficile Disease Risk Factors

Avoid Colonization

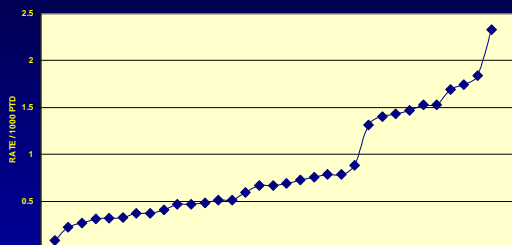
Healthy adults - 0-5%
Hospitalized adults - One Day - 3 %
One week - 20%
Four weeks - 50%
Hospital Workers - 15%

Avoid Precipitating Factors

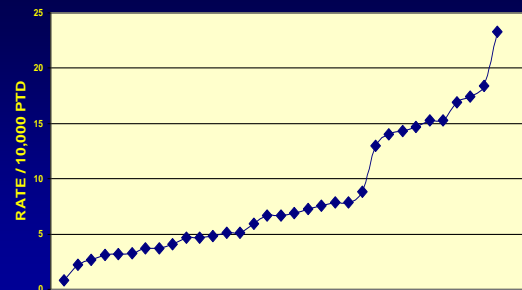
Antibiotic Exposure

Most associated with antibiotics which
alter anaerobic flora of colon - Clindamicin
Broad spectrum = More
Bactrim, Vancomycin – V. rare Aminoglycosides - No
All Hospitals are not the Same

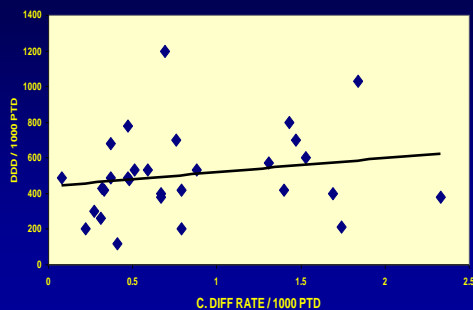
C Difficile Rates in 35 Hospitals



C Difficile Rates in 35 Hospitals



Does C. Diff Rate Reflect Antibiotic Use?



The CDC Recommends Two Approaches

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

THE JOURNAL OF INFECTIOUS DISEASES • VOL. 130, NO. 2 • AUGUST 1974
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Usage of Antibiotics in a General Hospital: Effect of Requiring Justification

John E. McGowan, Jr. and Maxwell Finland

From the Channing Thorndike Memorial Boston City Hospital, Harvard Medical School, Boston, Massachusetts

The amounts of certain antibiotics used at Boston City Hospital have been reviewed and correlated with the requirement for justification of their use. This mild restraint on the prescription of hospitalized patients appears to have substantially limited the use of potentially toxic or expensive agents, and removal of that restraint would be followed by an increase in use of those agents. Similar, related studies in other hospitals suggest that a similar program is effective and economical.

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

Philip Carling, MD; Teresa Fung, PharmD; Ann Kilian, RN; Norma Torres, PhD; Michael Barza, MD

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

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

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

Hospital	Cost (per year)
A	-35
B	-25
C	-15
D	-10
E	-5
F	5
G	10
H	15
I	18
J	20
K	22
L	25
M	30

ANTIBIOTIC COST PER 1000 PATIENT DAYS

MEAN = \$1400. CARNEY HOSPITAL = # 37

Was there any impact of the program on resistant organisms?

EMERGING INFECTIOUS DISEASES®

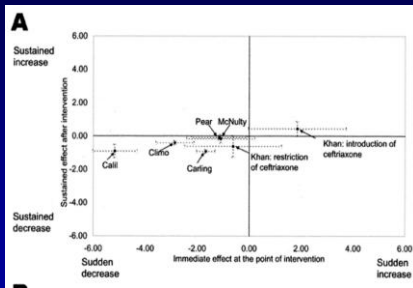
EID Online

Systematic Review of Antimicrobial Drug Prescribing in Hospitals

Peter Davey,¹ Erwin Brown,² Lynda Farnham,³ Roger Finch,⁴ Ian Gould,⁵ Alison Holmes,¹ Craig Ramsay,² Eric Taylor,⁶ Phil Wilson,⁷ and Mark Wootton⁸

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



Background: Epidemiology Risk Factors

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

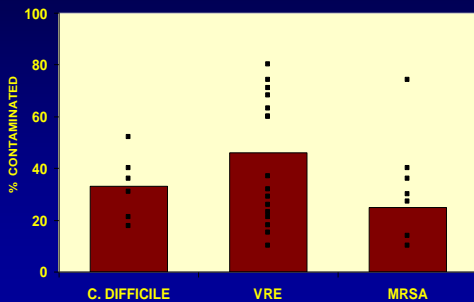
How contaminated is the hospital environment with *C. diff* ?

Contaminated Surfaces

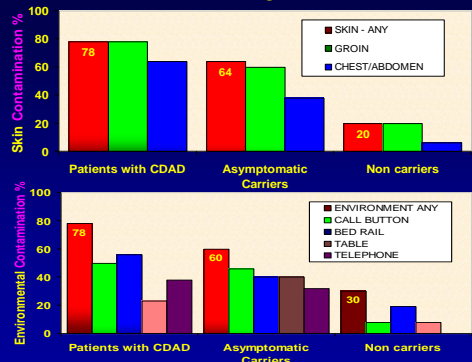
	VRE	MRSA	C. difficile
Bed Rails	+++++++	+	+++
Bed Table	+++++	+	
Door Knobs	++	++	+
Doors	+++	+	
Call Button	+++	+	++
Chair	++	+	++
Tray Table	+++	++	
Toilet Surface	+		++++
Sink Surface	+	+	+++
Bedpan Cleaner			+

Surface Contamination of Near-patient Environment

23 Studies

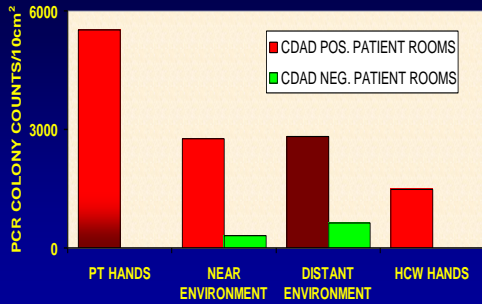


How does it get there?



Riggs M.etal. CID 2007;45:592

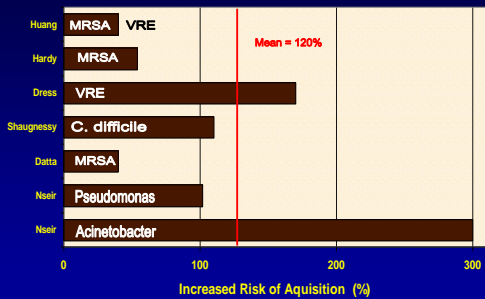
C. Difficile Environmental Contamination



Mutters R, et al. J Hosp Infect. 2009; 71: 43-48

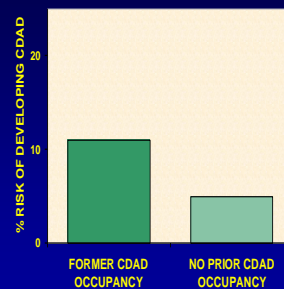
Can C. diff be transmitted from the environment to patients?

Increased acquisition risk from prior room occupant 8 studies as of September 2010



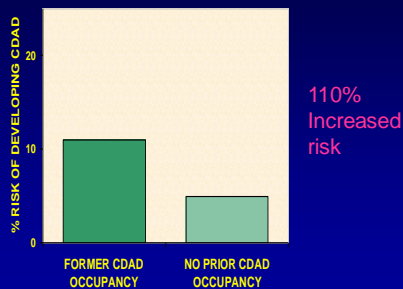
Two additional studies showed very significant risk without quantification - Martinez (VRE) and Wilks (Acinetobacter)

C. difficile Transmission to Prior Room Occupants



Shaugnessey et al. Abstract K-4194 IDSA / ICAAC, October 2008

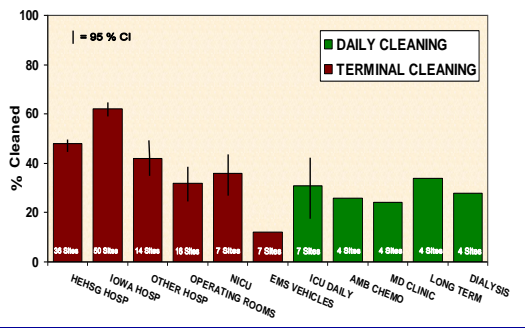
C. difficile Transmission to Prior Room Occupants



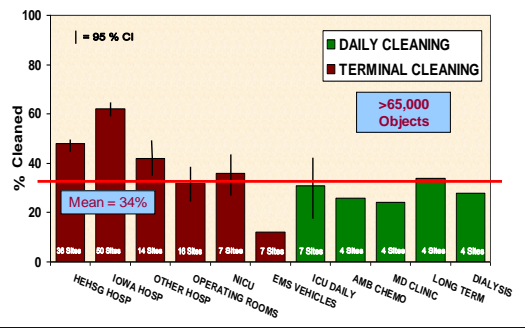
Shaugnessey et al. Abstract K-4194 IDSA / ICAAC, October 2008

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

Thoroughness of Environmental Cleaning

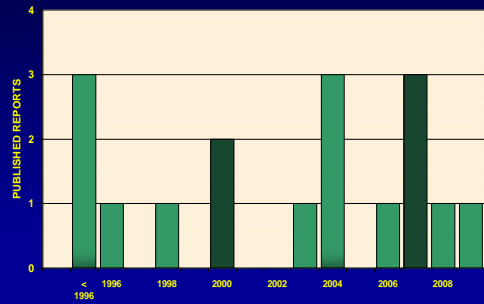


Thoroughness of Environmental Cleaning



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

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

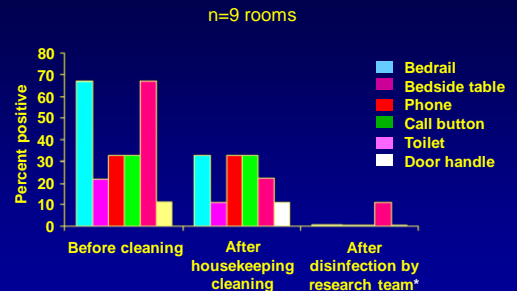


BMC Infectious Diseases

Research article
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

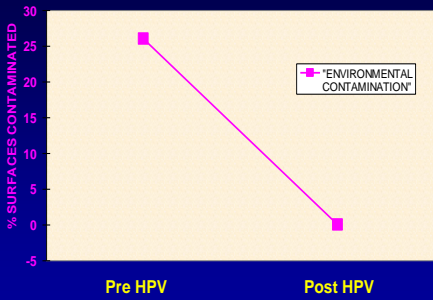
Methods:
 Culture based evaluation - Pre-intervention;
 - after routine terminal cleaning;
 - after terminal cleaning by the research staff;
 - following education of the ES staff and administrative interventions

Percentage of *C. difficile*-positive cultures



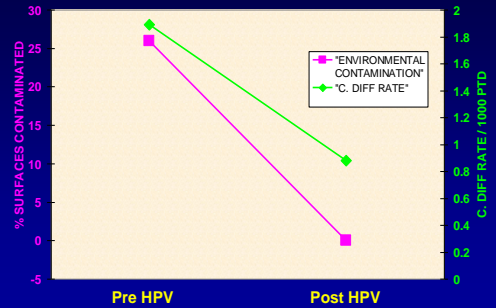
*Similar results found after ES cleaning following interventions
 Eckstein et al, BMC Infect Dis. 2007 Jun 21;7:61.

The impact of HP vapor on C. difficile



Boyce J et al. ICHE 2008

The impact of HP vapor on C. difficile



Boyce J et al. ICHE 2008

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.

Estimating the cost of HO - CDI

Excess length of stay (2000)

Depends on very high census

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Excess attributable cost (Duberke -2007)

We all Pay - \$5,800

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Calculated direct cost (2009)

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!

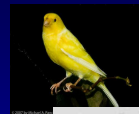


A final thought about C. diff
rates in hospitals

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



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



??

Thanks for inviting me !!



Questions – Comments?

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