


Superbugs: Integration of an Antimicrobial Stewardship Program in Post Acute Care Settings

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PRESENTS ...

Superbugs: Integration of an Antimicrobial Stewardship Program in Post Acute Care Settings

1 Contact Hour


Participants must complete entire activity. No partial credit will be awarded
Participants must submit a post event evaluation form
There is no conflict of interest for any planner or presenter

This continuing nursing education activity was approved by the Montana Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation

Objectives

- Identify the common superbug threats found in Post Acute care and their impact to the resident
- Discuss the CDC Fundamental Elements of an Antibiotic Stewardship Program
- Review the necessary steps to successfully implement a cross-functional Stewardship Program

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Dr. Hudson Garrett



Dr. Hudson Garrett is currently employed as the Vice President, Clinical Affairs for PDI, and is responsible for the global clinical affairs program and also the Medical Science Liaison program for all divisions within the company. He is a recognized international infection prevention and control expert. He has completed the Johns Hopkins Fellows Program in Hospital Epidemiology and Infection Control, and the CDC Fundamentals of Healthcare Epidemiology program. He is board certified in family practice, critical care, vascular access, moderate sedation, and long term care. He is the President of the Vascular Access Certification Corporation, President of the Southeastern Chapter of the Infusion Nurses Society, and the Chairperson for the Research Committee for the Association for the Healthcare Environment.

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Correlations with CDAD

- Antibiotic exposure is the single most important risk factor for the development of *Clostridium difficile* associated disease (CDAD).
- Up to 85% of patients with CDAD have antibiotic exposure in the 28 days before infection¹

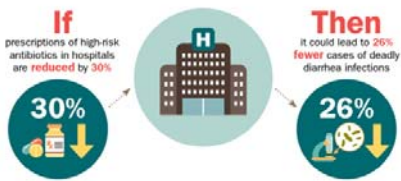


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Improvement is Possible

Antibiotic Rx for Hospitals
Proceed with Caution



SOURCE: CDC Vital Signs, March 2014. www.cdc.gov/vitalsigns.

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Protect patients from antibiotic-resistant infections.

Surgeries and single-use catheters help treat patients, but they can be pathways for bacteria to enter the body.

Bacteria can be spread when appropriate infection control actions are not taken.

Antibiotics save lives, but poor prescribing practices puts patients at risk.

Combine infection control actions with every patient to prevent infections in health care.

- Prevent infections from catheters and after surgery.
- Prevent bacteria from spreading.
- Improve antibiotic use.

SOURCE: CDC Vital Signs, March 2016

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Protect every patient every time.

Actions to prevent antibiotic-resistant infections in healthcare.

- Prevent infections from catheters and after surgery.**
 - Use catheters only when needed.
 - Follow recommendations for safer surgery and catheter insertion and care.
 - Remove catheters from patient as soon as they are no longer needed.
- Prevent bacteria from spreading.**
 - Improve hand hygiene.
 - Use gowns, gloves, and dedicated equipment for patients who have resistant bacteria.
 - Know about antibiotic-resistant MRSA in your hospital and facility for preventive action for prevention.
- Improve antibiotic use.**
 - Get cultures and start antibiotics promptly, especially in the case of sepsis.
 - Use culture to measure the need for antibiotics and stop antibiotic treatment as soon as they are no longer needed.
 - When antibiotics are necessary, use the appropriate antibiotic in the proper dosage, frequency, and duration.

Source: US Centers for Disease Control and Prevention

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Holistic View of Antibiotic Use


- Antibiotics are the only drug where use in one patient can impact the effectiveness in another.
- If everyone does not use antibiotics well, we will all suffer the consequences.
- Antibiotics are a shared resource, (and becoming a scarce resource).
- Using antibiotics properly is analogous to developing and maintaining good roads.

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CDC Core Elements of Hospital Antibiotic Stewardship Programs

- Leadership Commitment
- Accountability
- Drug Expertise
- Action
- Tracking
- Reporting
- Education

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Facilities work together to protect patients.

Common Approach *(Not enough)*


- Patients can be transferred back and forth from facilities for treatment without all the communication and necessary infection control actions in place.

Independent Efforts *(Still not enough)*


- Some facilities work independently to enhance infection control but are not often alerted to antibiotic-resistant or C. difficile germs coming from other facilities or outbreaks in the area.
- Lack of shared information from other facilities means that necessary infection control actions are not always taken and germs are spread to other patients.

Coordinated Approach *(Needed)*


- Public health departments track and alert health care facilities to antibiotic-resistant or C. difficile germs coming from other facilities and outbreaks in the area.
- Facilities and public health authorities share information and implement shared infection control actions to stop spread of germs from facility to facility.



Antibiotic Stewardship



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Changing Landscape of Healthcare

- **Growing populations at risk**
 - Immunocompromised individuals
 - Low birth weight, premature neonates
 - Transplant recipients on immunosuppressive therapy
 - Elderly & Patients with increased comorbidities
- **Special environments**
 - Intensive care and burn units
 - Long-term care, LTAC
 - Ambulatory surgery, endoscopy, and infusion services

Times are Changing



New issues today

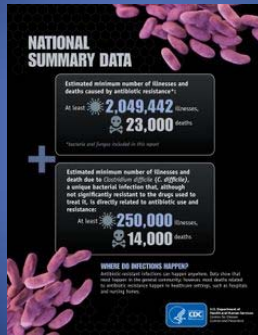
- Zika Virus
- Ebola virus
- Enterovirus D68
- Measles



Changing Landscape of Healthcare

- **Organizational factors affect HAI prevention**
 - Administrative policies
 - Antimicrobial utilization
 - Staffing
 - Education
- **Organism adaptation to its environment**
- **Increased prevalence of antimicrobial-resistant pathogens**

New CDC estimates



MDRO's are Epidemiologically Important Pathogens

Options for treatment are limited

MDRO's are associated with:

- Increased lengths of stay
- Increased costs
- Increased morbidity and mortality

Can be transmitted in healthcare facilities

Source: Centers for Disease Control and Prevention Guideline for Control of Multidrug-Resistant Organisms in Healthcare Settings, 2006.

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SUPER BUGS?

MRSA (Methicillin Resistant *Staph aureus*)

CRE (Carbapenem-Resistant Enterobacteriaceae)


ACINETOBACTER sp.

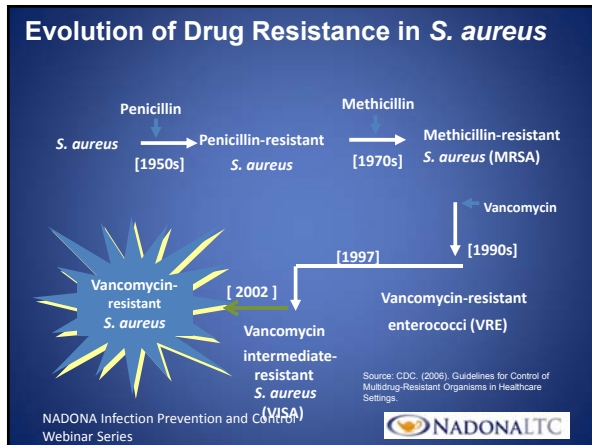
CDIFF (*Clostridium difficile*)

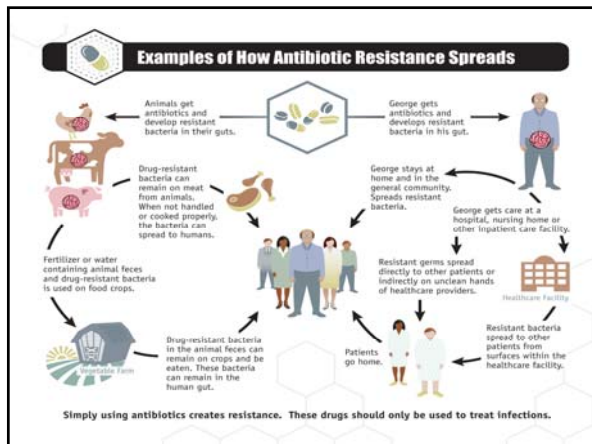
NOROVIRUS

CURRENT ORGANISMS OF CONCERN ??

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RISK OF TREATMENT FAILURE

VISA: Vancomycin Intermediate *S. aureus*
VRSA: Vancomycin Resistant *S. aureus*

Persons with VISA/VRSA typically have:

- Underlying health conditions (such as diabetes and kidney disease)
- Previous infections with MRSA
- Intravenous [IV] long term catheters
- Recent hospitalizations
- Recent/multiple exposure to Vancomycin and other antimicrobial agents

Treatment is much more difficult without the benefit of Vancomycin

Centers for Disease Control and Prevention Guideline for Control of Multidrug-Resistant Organisms in Healthcare Settings, 2008.

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TIME ABOVE THE MEAN INHIBITORY CONCENTRATION (MIC)

- THERAPEUTIC LEVELS OF DRUG
- PRESCRIBED TIME
- CORRECT DOSING FOR BODY WEIGHT

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ESBL and CRE

ESBL: Extended-Spectrum Beta Lactamase-Producing gram-negative bacteria

CRE: Carbapenem Resistant Enterobacteriaceae


Cause variety of infections:

- Pneumonia
- Bloodstream Infections
- Wound infections
- Resistant to many antibiotics and difficult to treat

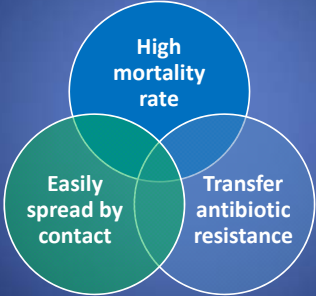


Source: APIC Text, Association for Professionals In Infection Control and Epidemiology, 2009.

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Why the hype on CRE?




High mortality rate

Easily spread by contact

Transfer antibiotic resistance

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ESBL

- Gram negative organisms that produce an enzyme called beta-lactamase that causes resistance to these antibiotics:
 - Penicillins
 - Cephalosporins (1st, 2nd, 3rd & 4th generation) (Keflex, cefepine)
 - Monobactams (Azactam)
 - One or more Carbapenem
- Can usually be treated with one of the Carbapenems:
 - Meropenem, Imipenem, Ertapenem, Doripenem
- Commonly isolated from:
 - abscesses, blood, catheter tips, lungs, sputum, peritoneal fluid
- Risk Factors include:
 - Recent surgery or instrumentation, admission to ICU, recent Abx therapy (esp. Beta lactams), prolonged hospital stay

Source: APIC Text, Association for Professionals In Infection Control and Epidemiology, 2009.


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CRE

- Gram negative organisms that produce one type of beta-lactamase enzyme called carbapenemase.
- Occurs typically in the Enterobacteriaceae family of bacteria
- Confers resistance to all currently available antibiotics, including Carbapenems
- Carbapenem Resistant Enterobacteriaceae
- Most common CRE is:
- **Klebsiella pneumoniae - KPC**

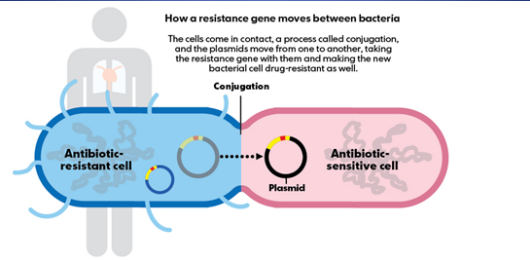
Source: CDC MMWR, Vol. 58 No. 10 3/20/09
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TRANSFER OF RESISTANCE

How a resistance gene moves between bacteria

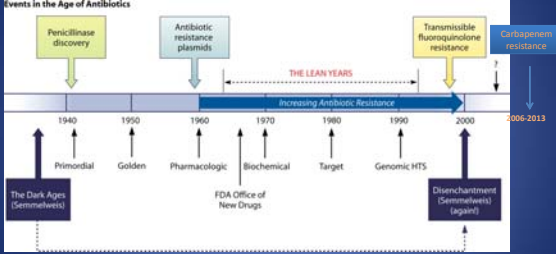
The cells come in contact, a process called conjugation, and the plasmids move from one to another, taking the resistance gene with them and making the new bacterial cell drug-resistant as well.



Source: www.naid.nih.gov
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History of antibiotic discovery and concomitant development of antibiotic resistance.



Davies J, and Davies D Microbiol. Mol. Biol. Rev. 2010;74:417-433

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ACINETOBACTER sp.

- Gram negative bacilli
- Found in water and soil
- Can live on healthy dry human skin
- Survive on surfaces for one month
- Infection can be a result of colonization
- Inherently resistant to most antibiotics
- Has a low virulence and does not typically cause infection
- Can cause pneumonia in vented patients



CDC. 2004. Acinetobacter Infections in Healthcare Settings. http://www.cdc.gov/ncidod/dhqp/ar_acinetobacter.html
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CLOSTRIDIUM DIFFICILE

- Anaerobic spore-forming bacteria in your intestines
- Normal bacteria in our intestines keep *C. diff* under control
- When antibiotics are taken, the levels of good bacteria are reduced and *C. diff* becomes prevalent



Centers for Disease Control and Prevention Guideline for Control of Multidrug-Resistant Organisms in Healthcare Settings, 2006.

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CLOSTRIDIUM DIFFICILE

- ***C. difficile* is the chief cause of health care-acquired infectious diarrhea**
- **Outbreaks reported in health care facilities and in the community caused by a new virulent strain of *C. difficile* throughout North America**
- **Spores survive long periods of time (5 months) in the environment and may be transmitted to others**

Source: APIC Guide to the Elimination of Clostridium difficile in Healthcare Settings, 2008.

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NOROVIRUS

- *Norovirus* is a small non-enveloped virus and is the most common agent of acute gastroenteritis causing outbreaks in areas of close contact.
- Symptoms of infection include fever, nausea, vomiting, cramping, malaise, & diarrhea
- Illness is typically self-limiting for 2-5 days
- Immunity after infection is strain-specific with limited duration of several weeks.

Source: APIC Guide to the Elimination of *Clostridium difficile* in Healthcare Settings, 2008.

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NOROVIRUS

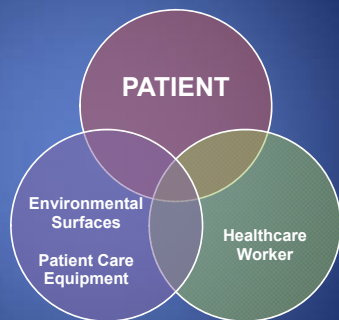
- Norovirus infection results from exposure to direct or indirect fecal contamination on fomites (surfaces), ingestion of contaminated food/water, or exposure to vomiting aerosols can readily cause infection.
- This small non-enveloped virus is difficult to kill with household cleaners and many disinfectants.
- This can lead to multiple and persisting outbreaks in close quarter community settings.

Source: APIC Guide to the Elimination of *Clostridium difficile* in Healthcare Settings, 2008.

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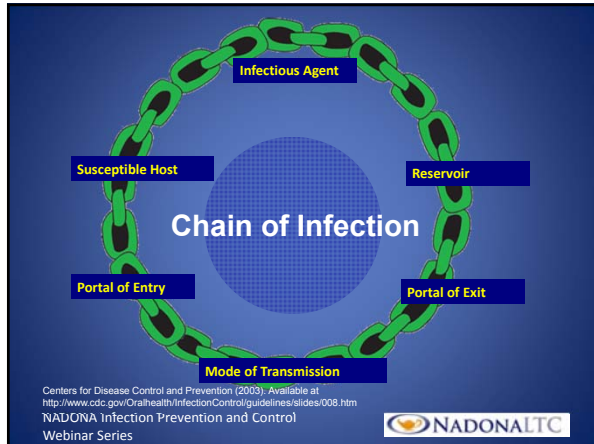


HOW DOES TRANSMISSION OCCUR?



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Hand Hygiene

- **Wash hands with soap and water:**
 - If visibly soiled with blood or other body fluids, before eating, after using the restroom, *C. difficile* infection
- **Use alcohol based hand sanitizer to decontaminate hands.**
 - Before direct patient contact, after contact with patient's intact skin (i.e., vitals, repositioning), after contact with objects in the patient's environment, after removing gloves
- **Patient and Visitor Hand Hygiene**
 - Educate the patient and provide access to hand hygiene
 - Educate families and other visitors, engage active participation

Source: Hand Hygiene Core-Supplemental Slides, Centers for Disease Control and Prevention, 2005.
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ENVIRONMENTAL DISINFECTION 

- Clean and disinfect surfaces and equipment that may be contaminated with pathogens
- Those that are in close proximity to the patient (e.g., bed rails, bedside tables, portable supply trays)
- Frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients or resident rooms).

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Surface disinfectant claims
& Use according to direction

LABEL CLAIMS

- Broad Spectrum for bacteria
- Viruses (non-enveloped and enveloped)
- Multi-Drug Resistant Organisms
- Pathogenic Fungi
- Bloodborne Pathogens (HIV, HBV, HCV)

DIRECTIONS FOR USE

- Concentration of the product (liquid dilution)
- Exposure time to disinfectant (contact time)
- Contact time stated by manufacturer for all organisms on label claim
- Nature of object to be cleaned/disinfected
- Temperature and relative humidity


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Contact Precautions

Everything in the room should be considered contaminated

- Appropriate barrier PPE for activities
- Remove PPE prior to leaving
- Hand hygiene after removing PPE
- Enter Clean / Leave Clean

Source: Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, Centers for Disease Control and Prevention, 2007.

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Monitoring and Compliance

- Develop Measures
 - Observation of adherence to protocols and practice, contact precautions, hand hygiene
 - New Infections
 - Organism prevalence
 - Microbiological Antibigrams Resistance Trends
- Collect Data
- Analyze Data
- Present Findings
- Develop strategies for improvement


Source: Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, Centers for Disease Control and Prevention, 2007.
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Team Collaboration toward changes and success

- Utilize a TEAM APPROACH
- Define your GOAL
- Work toward your END RESULT
- Celebrate your SUCCESS

Source: Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, Centers for Disease Control and Prevention, 2007.
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SUPER BUGS...

"Survival of the fittest"
Realize they are here to stay



- In the environment
- In all healthcare facilities
- In or on ourselves

Practice Prevention Methods

Culture change

“Many infections are inevitable;
some might be preventable”

↓

“Each infection is potentially preventable,
unless proven otherwise”

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Resources

- www.ahrq.gov
- www.cdc.gov/hai
- www.hhs.gov
- www.epa.gov
- www.fda.gov
- www.apic.org
- www.ahe.org

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Questions and Answers

- Whose Infection will you prevent when you return to your institution?
- How will you approach HAI prevention differently in LTCF's?
- Contact Information:
 - Email: Hudson.garrett@nadona.org
 - Visit www.nadona.org for more information

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