Overcoming Barriers to Antimicrobial Stewardship

New guidelines and core elements

Learning Objectives:

1) Establish common definitions of infectious and antibiotic stewardship terminology.
2) Define and review history of Transmission based precautions
3) Understand the differences between colonization and infection
4) Review a specific example – C-diff – do not do a “Test of Cure”
5) Isolate the Pathogen, not the Patient/Resident
6) Establishing an Antibiotic Stewardship Program / Abt transfer form
7) Pharmacy consultant’s, IP nurse and ID doctor’s role
8) The value of APIC/NVASP Membership – Hospitals, LTC facilities & Home Health Agencies must become a part of the solution.
The Island of Reno, Sparks and Carson City
The Island of Las Vegas & Henderson
The Island of Las Vegas
Las Vegas, Reno and Nevada is a small part of our World
We all live on an island. We come from different places. Some speak different languages. Others understand words differently.

So first we must define the problem.
And second we must establish a common language.
First let’s define the problem

Bacteria have become resistant to antibiotics
Defining the Problem

According to the CDC, "Each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections."
Defining the Problem

APIC (Association of Professionals in Infection Control) states; "Misuse and overuse of antimicrobials is one of the world’s most pressing public health problems. Infectious organisms adapt to the antimicrobials designed to kill them, making the drugs ineffective."
The superbug that doctors have been dreading just reached the U.S.

“For the first time, researchers found a person in the United States carrying bacteria resistant to antibiotics of last resort, an alarming development that the top U.S. public health official says could mean “the end of the road” for antibiotics.”
Empiric data shows Las Vegas has MDRO Acinetobacter strains resistant to all recently developed antibiotics - and they, too, are only sensitive to Colistin, an antibiotic first introduced in 1952. If Colistin resistance develops in Nevada’s Acinetobacter we now have another PDRO (Pan Drug Resistant Organism) immune to all antibiotics.
Before we can solve the problem
We must define our words
So we speak a common language
Universal Precautions:

Universal Precautions were initially developed in 1987 by the CDC. - The Precautions include recommendations for use of gloves, gowns, masks, and protective eyewear when contact with blood or body secretions containing blood is anticipated.

Standard Precautions

Standard precautions are meant to reduce the risk of transmission of bloodborne and other pathogens from both recognized and unrecognized sources. They are the basic level of infection control precautions which are to be used, as a minimum, in the care of all patients.

Hand hygiene is a major component of standard precautions, one of the most effective methods to prevent transmission of pathogens in health care.

Cite = http://www.who.int/csr/resources/publications/EPR_AM2_E7.pdf
Transmission Based Precautions

“These additional "Transmission Based Precautions" are used for patients known or suspected to be infected or colonized with epidemiologically important pathogens that can be transmitted by airborne or droplet transmission or by contact with dry skin or contaminated surfaces.” - CDC 1996

http://wonder.cdc.gov/wonder/prevguid/p0000419/p0000419.asp
UNIVERSAL vs. STANDARD PRECAUTIONS

• Universal Precautions
  – Specific to blood & body fluids visibly contaminated with blood
  – Applies to anyone regardless of infection status
  – Does not apply to all body excretions/secretions
  – Designed to reduce the risk of transmission of blood borne pathogens (OSHA Standard)

• Standard Precautions
  – Applies to all patients/residents
  – Applies to all moist body substances except sweat
  – Designed to reduce risk of transmission of microorganisms from recognized and unrecognized sources of infection in health care settings
Standard Precautions defined:

• Treat all blood & body fluids as though they carry an infectious disease.

• **Assume ALL** moist body substances is/are potentially infectious.

• Wear personal protective equipment (PPE) according to type of patient contact, **NOT** their diagnosis!
Standard Precautions

We Practice Standard Precautions by

• Washing hands for 15-20 seconds before & after each patient

• Wearing gloves for contact with non-intact skin, mucous membranes, or when contact with body fluids is likely:
  – Patient incontinent or urine/stool
  – Patient with open sores, rash, ulcers, burns
  – Patient requiring manipulation of dressings
  – Handling soiled surfaces/articles
Isolation

iˌso·la·tion, īsəˈlāSH(ə)n/ = noun

1. the process or fact of isolating or being isolated.
2. "the isolation of older people"
3. an instance of isolating something, especially a compound or microorganism.
4. denoting a hospital or ward for patients with contagious or infectious diseases.

https://www.google.com/?gws_rd=ssl#q=isolation
Breaking News:

'Clipboard Man' Appears to be Another Breach in Ebola Protocol

Contact Precautions

Question: Is Clipboard Man breaking contact precautions guidelines?
Transmission Based Precautions

**Transmission-based precautions** are additional infection control precautions in health care, and the latest routine infection prevention and control practices applied for patients who are known or suspected to be infected or colonized with infectious agents, including certain epidemiologically important pathogens.

Contact Precautions

Apply to patients with any of the following conditions and/or disease:
Presence of stool incontinence (may include patients with norovirus, rotavirus, or *Clostridium difficile*), draining wounds, uncontrolled secretions, pressure ulcers, or presence of draining body fluids
Presence of generalized rash or exanthems.

Perform hand hygiene before touching patient and prior to wearing gloves.

PPE use:
- Wear gloves when touching the patient and the patient’s immediate environment or belongings
- Wear a gown if substantial contact with the patient or their environment is anticipated

Droplet Precautions

Apply to patients known or suspected to be infected with a pathogen that can be transmitted by droplet route; these include, but are not limited to:

- Respiratory viruses (e.g., influenza, parainfluenza virus, adenovirus, respiratory syncytial virus, human metapneumovirus), Bordetella pertussis
- For first 24 hours of therapy: Neisseria meningitides, group A streptococcus

Airborne Precautions
(Negative Pressure Room *Only* for TB)

Apply to patients known or suspected to be infected with a pathogen that can be transmitted by airborne route; these include, but are not limited to:

- Tuberculosis
- Measles
- Chickenpox (until lesions are crusted over)
- Herpes zoster (Shingles) until lesions are crusted over

Antibiotics Cause C-diff

“Almost any antibiotic can lead to C. difficile intestinal disease. Diarrhea usually begins 4 to 9 days after the patient starts an antibiotic, but it can also develop up to 8 weeks after an antibiotic is discontinued (15). Generally, C. difficile disease is caused by genotypes and strains that are resistant to the precipitating antibiotic. Penicillins, the cephalosporins, and clindamycin are most apt to precipitate the disease (16). However, even vancomycin—which is effective in treating C. difficile disease—can cause the disease. This probably occurs because vancomycin suppresses both normal flora and the vegetative forms of C. difficile, but not its spores.”

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1325276/
Patients who are at high risk for C. Diff

- Currently are taking antibiotics or have recently taken them
- Have had gastrointestinal surgery or manipulation
- Have had a long length of stay in a healthcare setting
- Have a serious underlying illness
- Are immunocompromised
- Are of advanced age
C-diff

Type of Precautions – Contact

Time needed is the Duration of Illness

Discontinue antibiotics if appropriate. Do not share electronic thermometers, ensure consistent environmental cleaning and disinfection. Hypochlorite solutions may be required for cleaning if transmission continues. Handwashing with soap and water preferred because of the absence of sporicidal activity of alcohol in waterless antiseptic handrubs.

MANAGEMENT OF ACTIVE C-DIFF

• Private room or cohorting, for residents with diarrhea who are fecal incontinent or who cannot practice good hand washing.
• Contact precautions must be maintained while the resident has uncontained diarrhea.
• Hands should be washed frequently with soap and water. Alcohol-based hand gels and lotions are not effective.
• Use an EPA-approved disinfectant (bleach based) for all environmental cleaning.
C-diff

Recommendations:

5. Testing for C. difficile or its toxins should be performed only on diarrheal (unformed) stool, unless ileus due to C. difficile is suspected.

6. Testing of stool from asymptomatic patients is not clinically useful, including use as a test of cure. It is not recommended, except for epidemiological studies.”

"Because 10% or more of hospitalized patients may be colonized with C. difficile, evaluating a formed stool for the presence of the organism or its toxins can decrease the specificity of the diagnosis of CDI."

“Maintain contact precautions for the duration of diarrhea (C-III). - “Routine identification of asymptomatic carriers for infection control purposes is not recommended & treatment of such identified patients is not effective.

“Appropriate testing for the diagnosis of CDI includes submitting samples only of unformed stool. Additionally, no more than 1 stool sample should be obtained for routine testing during a diarrheal episode. **Stool should not be submitted for a test of cure.**”  

(emphasis added)
Isolate the pathogen, Not the patient!

Isolation has a negative impact on patient mental well-being & behavior, including higher scores for depression, anxiety and anger among isolated patients.

Healthcare staff spend less time with patients in isolation.

Patient satisfaction was adversely affected by isolation if patients were kept uninformed.

Patient safety was negatively affected, leading to an eight-fold increase in adverse events related to supportive care failures.

INAPPROPRIATE ANTIBIOTIC USE

Do not treat for colonization

• Testing positive for bacteria or fungi without evidence of infection is colonization.
• Yes, infections can develop from the bacteria or fungi the colonized the person has.
• Bacteria or fungi that colonize patients can be transmitted from one person to another by the hands of healthcare workers.

• Use Standard Precautions to prevent transmission of pathogens
INAPPROPRIATE ANTIBIOTIC USE

Do not treat for colonization

Assume ALL moist body substances are potentially infectious.

• Use Standard Precautions to prevent transmission of pathogens
Contact Precautions

Question: Is Clipboard Man breaking contact precaution guidelines?
Countries with Former Widespread Transmission and Current, Established Control Measures

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Cases (Suspected, Probable, and Confirmed)</th>
<th>Laboratory-Confirmed Cases</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea</td>
<td>3814</td>
<td>3358</td>
<td>2544</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>14124</td>
<td>8706</td>
<td>3956</td>
</tr>
<tr>
<td>Liberia</td>
<td>10678</td>
<td>3163</td>
<td>4810</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28616</strong></td>
<td><strong>15227</strong></td>
<td><strong>11310</strong></td>
</tr>
</tbody>
</table>

## Ebola deaths outside of Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Cases (Suspected, Probable, and Confirmed)</th>
<th>Laboratory-Confirmed Cases</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>20</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Senegal</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>United States</strong></td>
<td><strong>4</strong></td>
<td><strong>4</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td>Mali</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Italy</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
<td><strong>34</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

A New Jersey nurse in “isolation” after working with Ebola patients
Defining the Problem

According to the CDC, "Each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections."
“The damaging effects of antimicrobial resistance (AMR) are already manifesting themselves across the world. Antimicrobial-resistant infections currently claim at least 50,000 lives each year across Europe and the US alone, with many hundreds of thousands more dying in other areas of the world. But reliable estimates of the true burden are scarce.”

http://amr-review.org/
“Based on scenarios of rising drug resistance for six pathogens to 2050, we estimated that unless action is taken, the burden of deaths from AMR could balloon to 10 million lives each year by 2050, at a cumulative cost to global economic output of 100 trillion USD. On this basis, by 2050, the death toll could be a staggering one person every three seconds and each person in the world today will be more than 10,000 USD worse off.”

Based on United Nations report World Population Prospects: The 2015 Revision, 2015, which cites current world population of 7.3 billion and projected world population in 2050 of 9.7 billion.

Think Globally
Act Locally

Las Vegas, Reno and Nevada is a small part of our World
Please attach copies of latest culture reports with susceptibilities if available

<table>
<thead>
<tr>
<th>Name/Address of Sending Facility</th>
<th>Sending Unit</th>
<th>Phone</th>
<th>Fax #</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Sending Facility Contacts</th>
<th>Name</th>
<th>Phone</th>
<th>Fax #</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Case Manager/Admin/SW</th>
<th>Infection Prevention</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Attending Physician:</th>
<th>Infectious Disease Physician:</th>
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</table>

- Is the patient currently in transmission-based precautions (TBP)? [ ] NO [ ] YES
- Type of TBP (check all that apply): [ ] Contact [ ] Droplet [ ] Airborne [ ] Other: ____________________________
- Current or previous diagnosis of Sepsis? [ ] NO [ ] YES Approx date: ___/___/____

- Does patient currently have an infection, colonization or history of positive culture of a multidrug-resistant organism (MDRO) or other organism of epidemiological significance?:
  - Methicillin-resistant Staphylococcus aureus (MRSA)
  - Vancomycin-resistant Enterococcus (VRE)
  - Clostridium difficile (C Diff)
  - Acinetobacter, multidrug-resistant
  - E. coli, Klebsiella, Proteus etc. w/ Extended Spectrum B-Lactamase (ESBL/MDRO)
  - Carbapenem-resistant Enterobacteriaceae (CRE) or Pseudomonas
  - Other: ____________________________

- Does the patient currently have any of the following?:
  - Has the patient ever been diagnosed with active or latent TB? [ ] NO [ ] YES
  - Cough or requires suctioning
  - Diarrhea
  - Vomiting
  - Incontinence of urine or stool
  - Drainage (source)
  - Tracheostomy
  - Surgery in the last 90 days
  - Chest x-ray within the last 30 days (Required for ECF bed only)

- Is the patient currently on antimicrobial agents? [ ] NO [ ] YES

<table>
<thead>
<tr>
<th>Antimicrobial agent and dose</th>
<th>Treatment for:</th>
<th>Start Date</th>
<th>Anticipated Stop Date</th>
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</table>

- Pneumococcal Vaccination: Month/Year administered: ___/____
- Influenza Vaccine: Month/Year administered: ___/____

<table>
<thead>
<tr>
<th>Name and phone number of individual at receiving facility</th>
<th>Person completing form at time of transfer</th>
<th>Date/Time</th>
</tr>
</thead>
</table>
# C&S AND ANTIBIOTIC ORDER FORM

Resident Name__________________________________     Room ____________

Order for C&S of: Urine ☐ Sputum ☐ Stool ☐ Wound ☐ Blood ☐ Other __________________________ C&S result __________________

Antibiotic #1  Dose__________, Route__________, Duration__________

Antibiotic #2  Dose__________, Route__________, Duration__________

Antibiotic ordered for ____________________________________

Vital Signs  Temp_________   Pulse_________   Respiration__________   BP_________

## Symptoms

<table>
<thead>
<tr>
<th>Symptom</th>
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<tbody>
<tr>
<td>Cough/Congestion</td>
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<tr>
<td>New onset confusion</td>
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<tr>
<td>Diarrhea</td>
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<tr>
<td>Discharge from</td>
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<tr>
<td>Fever</td>
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<tr>
<td>Nausea/vomiting</td>
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<tr>
<td>Rigors</td>
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<tr>
<td>Urine symptoms</td>
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<tr>
<td>Pain</td>
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<tr>
<td>Skin Rash/Red</td>
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<tr>
<td>Sore Throat/redness</td>
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<tr>
<td>Swelling</td>
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<tr>
<td>Weakness/fatigue</td>
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<tr>
<td>New onset hypotension</td>
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<tr>
<td>Urgency</td>
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<td>Frequency</td>
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<tr>
<td>Hematuria</td>
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Other/describe:__________________________________________________________

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Consultant Pharmacists (& ID physicians and IP’s) are Key Partners in Guiding ARS

1) Provide Education about common antibiotics
2) Establish standards on laboratory testing to monitor adverse events & drug interaction
3) Ensure appropriate medication selection by reviewing abt prescriptions for dose, duration Indication and match with culture results
4) Provide summary reports on abt use, new abt starts and duration of therapy
5) Provide specific use reports for feedback & education
We must be partners and communicate with each other if we are to solve the problem of antibiotic resistance.
Resources

http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html
http://www.cdc.gov/longtermcare/
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3319407/
http://www.apic.org/For-Media/Announcements/Article?id=5ab82985-cbc9-4878-a1bc-fb6b0aec24eb
http://www.pewtrusts.org/~/media/assets/2016/04/apathtolowerantibioticstewardshipinpatientsettings.pdf
Resources

https://www.jointcommission.org/assets/1/6/HAP-CAH_Antimicrobial_Prepub.pdf
https://www.jointcommission.org/assets/1/6/NCC_Antimicrobial_Prepub.pdf
http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4378521/figure/f1-ptj4004277/
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4378521/