Nursing’s Role in Antibiotic Stewardship

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Stratford Campus
About Kennedy Health

Established in 1965 as John F. Kennedy Memorial Hospital in Stratford, NJ.

Kennedy became a multi-hospital system with the purchase of the Cherry Hill Medical and Washington Memorial Hospital in 1980.

In 2011, expanded to include Kennedy Health Alliance, a group of primary and specialty care physicians.
About Kennedy Health

Employs over 4,000 associates.

Over 900 physicians.

607 licensed beds.

Averages 26,000 admissions yearly.

Averages 148,000 ER visits yearly.

Averages 20,000 surgeries yearly.

Averages 60,000 yearly home care visits.
Awards, Certifications & Accolades

- American College of Radiology
- NICHE Designated Hospital
- MBSAQIP
- Commission on Cancer
- THE LEAP FROG GROUP
- The Joint Commission
- NAPBC
- Top Work Places 2015
- Leadership Excellence
- HFAP
- 2016 Winners Circle
- Top Leadership Partner
Our Mission

Kennedy provides comprehensive quality healthcare in an academic setting where we are proud to serve patients, the community and each other.
Our Vision

To transform the healthcare experience for patients and their families through a culture of caring, quality, and innovation.
Our Core Values
The ‘Heart’ of Who We Are

Get to Know iHEART

**Integrity** - We are Honest and Trustworthy

**Humanity** – We are People Caring for People

**Excellence** – We Deliver a Superior Experience

**Acceptance** – We Promote Diverse Beliefs and Backgrounds

**Respect** – We Have a Culture of Mutual Respect

**Teamwork** – We Work Together in Everything We Do
Antibiotic Stewardship

Over use of antibiotics is on the rise throughout the country. This increased usage is now thought to be one of the contributing factors to antibiotic resistance acquired infections.
Antibiotic Stewardship

There are an alarming number of patients who remain on antibiotic therapy even after culture & sensitivity have been resulted as negative.
Antibiotic Stewardship

The joint commission is now involved. They will be requiring Antibiotic stewardship as part of their safety goals for 2017.
2017 Safety Goal

Prepublication Requirements

The Joint Commission has approved the following revisions for prepublication. While revised requirements are published in the semiannual updates to the print manuals (as well as in the online E-dition®), accredited organizations and paid subscribers can also view them in the monthly periodical The Joint Commission Perspectives®. To begin your subscription, call 877-223-6866 or visit http://www.jcrinc.com.

New Antimicrobial Stewardship Standard

Applicable to Hospitals and Critical Access Hospitals

Effective January 1, 2017

Medication Management (MM)

Standard MM.09.01.01
The [critical access] hospital has an antimicrobial stewardship program based on current scientific literature.

Elements of Performance for MM.09.01.01

1. Leaders establish antimicrobial stewardship as an organizational priority. (See also LD.01.03.01, EP 6)
   - Note: Examples of leadership commitment to an antimicrobial stewardship program are as follows:
     - Accountability documents
     - Budget plans
     - Infection prevention plans
     - Performance improvement plans
     - Strategic plans
     - Using the electronic health record to collect antimicrobial stewardship data

2. The [critical access] hospital educates staff and licensed independent practitioners involved in antimicrobial ordering, dispensing, administration, and monitoring about antimicrobial resistance and antimicrobial stewardship practices. Education occurs upon hire or granting of initial privileges and periodically thereafter, based on organizational need.

3. The [critical access] hospital educates patients, and their families, as needed, regarding the appropriate use of antimicrobial medications, including antibiotics. (For more information on patient education, refer to Standard PC.02.03.01)

4. The [critical access] hospital has an antimicrobial stewardship multidisciplinary team that includes the following members, when available in the setting:
   - Infectious disease physician
   - Infection preventionist(s)
   - Pharmacist(s)
   - Practitioner
   - Note 1: Part-time or consultant staff are acceptable as members of the antimicrobial stewardship multidisciplinary team.
   - Note 2: Telehealth staff are acceptable as members of the antimicrobial stewardship multidisciplinary team.

5. The [critical access] hospital’s antimicrobial stewardship program includes the following core elements:
   - Leadership commitment: Dedicated necessary human, financial, and information technology resources.
   - Accountability: Appointing a single leader responsible for program outcomes. Experience with successful programs shows that a physician leader is effective.
   - Drug expert: Appointing a single pharmacist leader responsible for working to improve antibiotic use.
   - Action: Implementing recommended actions, such as systemic evaluation of ongoing treatment need, after a set period of initial treatment (for example, “antibiotic time out” after 48 hours).
   - Tracking: Monitoring the antimicrobial stewardship program, which may include information on antibiotic prescribing and resistance patterns.
2017 Safety Goal

Prepublication Requirements continued
June 22, 2016

- Reporting: Regularly reporting information on the antimicrobial stewardship program, which may include information on antibiotic use and resistance, to doctors, nurses, and relevant staff.
- Education: Educating practitioners, staff, and patients on the antimicrobial program, which may include information about resistance and optimal prescribing. (See also IC.02.01.01, EP 1 and NPRS.07.03.01, EP 5)

Note: These core elements were cited from the Centers for Disease Control and Prevention’s Core Elements of Hospital Antimicrobial Stewardship Programs (http://www.cdc.gov/getsmart/healthcare/pdfhs/core-elements.pdf). The Joint Commission recommends that organizations use this document when designing their antimicrobial stewardship program.

6. The [critical access] hospital’s antimicrobial stewardship program uses organization-approved multidisciplinary protocols (for example, policies and procedures).

Note: Examples of protocols are as follows:
- Antibiotic Formulary Restrictions
- Assessment of Appropriateness of Antibiotics for Community-Acquired Pneumonia
- Assessment of Appropriateness of Antibiotics for Skin and Soft Tissue Infections
- Assessment of Appropriateness of Antibiotics for Urinary Tract Infections
- Care of the Patient with Clostridium difficile (c-diff)
- Guidelines for Antimicrobial Use in Adults
- Guidelines for Antimicrobial Use in Pediatrics
- Plan for Parenteral to Oral Antimicrobial Conversion
- Preauthorization Requirements for Specific Antimicrobials
- Use of Prophylactic Antibiotics

7. The [critical access] hospital collects, analyzes, and reports data on its antimicrobial stewardship program.

Note: Examples of topics to collect and analyze data on may include evaluation of the antimicrobial stewardship program, antimicrobial prescribing patterns, and antimicrobial resistance patterns.

8. The [critical access] hospital takes action on improvement opportunities identified in its antimicrobial stewardship program. (See also MM.05.01.01, EP 6)
Nurses Role

The literature supports that when nurses are given the knowledge related to the interruption of the Culture and Sensitivity results, as well as, having antibiotic knowledge the nurses can be the first line of defense in combating this problem.
Nurses Role

The overall goal in the implementation of the nurse interruption of culture & Sensitivity reports is to provide a standardized process for screening lab results, which may detect the possible unnecessary use of antibiotics.
Interruption of Culture & Sensitivity

When should you review your Culture & Sensitivity?
Step One: When C&S of urine, blood & sputum is sent the nurse will write the date in **RED on the SBAR**

Step Two: If the cultures are negative and the patient is on antibiotic’s check the chart. Was the sample sent after the antibiotic was started? Let the Doctors know the results when they are rounding.

Step Three: If result is positive follow current critical lab value policy and share information at shift change.

Step Four: The nurse will continue to check q shift for the sensitivity report. Keep in mind the report will take 48-72 hours to be completed.
Step Five: When the report is obtained the nurse will review the report.

Ask yourself these questions when reviewing the report.
Interruption of Culture & Sensitivity

- **S**= Sensitive (antibiotic is effective against bacteria)
- **R**=Resistant (antibiotic will NOT work against bacteria)
- **I**=intermediate (antibiotic will have difficulty working against bacteria)
Antibiotic Stewardship

Hold Antibiotics!!
Always Educate Your Patient’s

KEEP CALM AND EDUCATE
# Education

## Nursing Resource Page

**Announcing Internet Access for all Registered Nurses**

### SIGN-ON BONUS FOR OR:

We have implemented a $10,000 hire bonus for full-time and part-time hires. Must have a minimum of one year of Operating Room experience.

### SIGN-ON BONUS FOR ED:

We have implemented a $5,000 hire bonus for full time and $2,500 for part time hires. Must have a minimum of one year of Emergency Room experience.

## Referrals

**Referral Bonus for the OR and ED:**

The referral bonus is $1,500 for a full time referral and $1,000 for a part time referral. The Kennedy Associate will receive the bonus for the referral and hire of a nurse in the Operating Room or Emergency Department. This excludes Same Day Surgery, the Recovery Rooms, and the Surgical Center.

The referral bonus is payable at the end of the referred associate’s six months of employment. The most important part of this process is that the applicant MUST mention the name of the person who referred them when they are asked in the interview process. If they fail to do this, the Kennedy associate will not get the referral bonus.
Patient Education

Understanding Antibiotics

What are antibiotics?
Antibiotics are drugs that fight infections caused by bacteria. Antibiotics can save lives, but not all infections are treated with antibiotics. Protect you and your family by learning how to take antibiotics the right way.

Bacteria vs. Viruses
Bacteria and viruses are the two main types of germs that cause infections. Antibiotics work against bacteria, NOT against viruses. Antibiotics do not cure viruses, like the cold, cough, or the flu. Here is a chart of bacterial and viral infections.

<table>
<thead>
<tr>
<th>Bacterial Infections</th>
<th>Viral Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ear infections</td>
<td>Cold &amp; Flu</td>
</tr>
<tr>
<td>Severe sinus infections</td>
<td>Most coughs and bronchitis</td>
</tr>
<tr>
<td>Strep throat</td>
<td>Sore throats</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>Stomach flu</td>
</tr>
</tbody>
</table>

Bacteria Can Fight Back!
Antibiotics can attack bacterial infections, but they can also cause harm. If antibiotics are not used correctly, or used too often, they can cause drug-resistant germs. This means that not every antibiotic will work for you. This is called an antibiotic-resistant infection. If an antibiotic is used to treat a virus,
Bacteria Can Fight Back!
Antibiotics can attack bacterial infections, but they can also cause harm. If antibiotics are not used correctly, or used too often, they can cause drug-resistant germs. This means that not every antibiotic will work for you. This is called an antibiotic-resistant infection. If an antibiotic is used to treat a virus, when it should not be, this can cause more harm than good. Sometimes, rest, fluids, and over-the-counter products may be your best treatment options.

1. In certain situations, your doctor may believe that you do not need an antibiotic. Antibiotics are not effective in treating a virus like the flu or a cold. In those situations, do not insist on an antibiotic.
2. Talk with your healthcare provider about antibiotic resistance:
   - Ask whether an antibiotic will help you or not.
   - Ask what else you can do to feel better sooner.
3. Take an antibiotic exactly as the doctor tells you. Do not skip doses, even if you are feeling better. If treatment stops too soon, some bacteria may come back and cause another infection.
4. Do not save some of your antibiotic for the next time you get sick.
5. Do not take antibiotics prescribed for someone else. The antibiotic may not work for your infection. If you take the wrong medicine, the infection could get worse.

How can I get more information>
If you have additional questions related to antibiotics, talk to your doctor or pharmacist. Information is also available at the Centers for Disease Control (CDC) website: www.cdc.gov/getsmt.
Antibiotic Stewardship

The Doctor’s Role
Antibiotic Knowledge is weak amongst housestaff

Figure 1. Percentage of respondents who were “very confident” with their antimicrobial use. ICU indicates intensive care unit; asterisk, *P* < .05, first year vs upper level.
Antibiotic Stewardship in the Hospital

A Beginning

Initial antibiotic selection: an antibiotic for a bacterial infection that is strong enough to cover the possible bacteria that the patient has, without causing more harm.

- History
- Physical exam
- Cultures/studies
Antibiotic Stewardship in the Hospital

Middle

• When in the hospital, adjusting antibiotic after obtaining more information, and then the final antibiotic recommendation.

The End

• Sometimes, the process gets repeated (if sepsis occurs for the second time, but while already in the hospital).
# Antibiotic Stewardship Nursing

## Part One

### Patient Admission
- Triage and appropriate isolation
- Accurate allergy history
- Early and appropriate cultures
- Timely antibiotic initiation
- Medication Reconciliation

### Daily (24 h) clinical progress monitoring
- Progress monitor and report
- Preliminary micro results and antibiotic adjustment
- Antibiotic dosing and de-escalation
Antibiotic Stewardship
Nursing
Part Two

Patient safety and quality monitoring
- Adverse events
- Change in patient condition
- Final culture report and antibiotic adjustment
- Antibiotic resistance identification

Clinical progress/patient education/discharge
- IV to PO antibiotic, outpatient antibiotic therapy
- Patient education
- Length of stay
- Outpatient management, long-term care, readmission
Antimicrobial Stewardship: Admission through Discharge

**AT ADMISSION**
- Source of the infection
- Labs, cultures & studies
- Review old cultures
- Clarify antibiotic allergies
- Age/Cr/seizures/QTC
- Antimicrobial selection based on most likely source/pathogen(s)

**HOSPITAL COURSE**
- **Antibiotic Time-Out:**
  - Antimicrobial necessity
  - If NO infection, STOP
- De-escalate antimicrobials to most narrow spectrum based on culture results, if available
- Antimicrobial dose, duration, and stop date based on site of infection

**AT DISCHARGE**
- Medication Reconciliation
  - Assess necessity for antimicrobials, narrow spectrum, dose, duration, and stop date
  - If antimicrobials are no longer needed, STOP
- Counsel patient on taking antimicrobials as prescribed

Kennedy Health, CDiff Task Force, 2015

MK.520 - 05/2015
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Antibiotic Safe Guards
Antibiotic Stewardship

When a designated antibiotic order is placed in Soarian, this ‘hard stop’ comes up before the order can be signed. The provider has to click the Reason for Antibiotic box first...
Antibiotic Stewardship

An indication/Reason /Diagnosis pops up next. This is the list of diagnoses; provider can also enter free text.
Antibiotic Stewardship

48 Hour Reminder
Antibiotic Stewardship

All antibiotic orders must be reviewed at 48 hours for appropriateness

Select all that apply:
- Diagnosis Reviewed,
- C & S Reviewed,

Action taken:
- Antibiotics stopped,
- Antibiotics changed from IV to PO,
- Antibiotics changed based on culture,
- Antibiotics narrowed based on culture,
- Continue current antibiotics,
HOSPITAL COURSE

- Antibiotic Time-Out: Antimicrobial necessity
  - If NO infection, STOP

- De-escalate antimicrobials to most narrow spectrum based on culture results, if available

- Antimicrobial dose, duration, and stop date based on site of infection
Lets Talk Bugs
Cultures take time to incubate

<table>
<thead>
<tr>
<th></th>
<th>Blood culture’s</th>
<th>Sputum</th>
</tr>
</thead>
<tbody>
<tr>
<td>A urine culture</td>
<td>72 hours to finalize (sensitivity result)</td>
<td>A finalized culture takes 72 hours.</td>
</tr>
<tr>
<td>Blood culture’s</td>
<td>initial gram stain result takes 24-36 hours</td>
<td></td>
</tr>
<tr>
<td>Sputum</td>
<td></td>
<td>The final blood culture and sensitivity results take 72 hours.</td>
</tr>
</tbody>
</table>


Gram Negative vs. Gram Positive

Gram Negative = Thin (single-layered)

Gram Positive = Thick (multilayered)

Gram negative bacteria are more resistant against antibodies because of their impenetrable cell wall.
Aerobic vs Anaerobic Bacteria

Aerobics are able to use oxygen and anaerobic bacteria can sustain itself without the presence of oxygen.

Anaerobic can survive in places where there is less oxygen, such as human guts.

Aerobic bacteria cannot grow without an ample supply of oxygen.
Spherical

These are usually the simplest ones. Bacteria shaped like this are called *cocci* **Streptococcus** and **Staphylococcus**.
Rod shaped

These are known as *bacilli* this group is divided based on their ability to form spores

- Non-spore example; Listeria
- Spore forming example; Clostridium
Most Common
Gram Positive Aerobic Bacterium

- Staphylococci –MRSA, VRE, MSSA
- Streptococci pneumonia
- Enterococci
Gram Positive

Gram-positive bacilli

Clostridium difficile
**Clostridium difficile**

*Clostridium difficile* is a Gram-positive, spore-forming, anaerobic bacillus

*C. difficile* infection (CDI) ranges from mild diarrhea to severe complications such as pseudomembranous colitis, toxic megacolon, bowel perforation, sepsis, and death.
Infection verses Colonization

- **infected**: Active could be new onset or currently treating

- **Colonization**: Asymptomatic may acquire protection from progression to disease
Gram Negative

- Extended Spectrum Beta-Lactamases (ESBL)
- Pseudomonas aeruginosa
Gram Negative

Carbapenem-resistant Enterobacteriaceae (CRE)/Klebsiella pneumoniae Carbapenems (KPC)

The worst of the worst!!!!!!

Needs Contact Isolation
Treating The Bacteria

- *Acinetobacter baumannii*
- *Staphylococcus aureus (MRSA)*
- *Burkholderia cepacia*
- *Escherichia coli (E. coli)*
- *Mycobacterium tuberculosis*
- *Klebsiella pneumoniae*
• https://www.youtube.com/watch?v=znnp-lvj2ek
BioFire
The FilmArray BCID Panel
Simultaneous detection of 27 targets:

**Gram + Bacteria**
- Staphylococcus
- Staphylococcus aureus
- Streptococcus
- Streptococcus agalactiae
- Streptococcus pyogenes
- Streptococcus pneumoniae
- Enterococcus
- Listeria monocytogenes

**Gram - Bacteria**
- Klebsiella oxytoca
- Klebsiella pneumoniae
- Serratia
- Proteus
- Acinetobacter baumannii
- Haemophilus influenzae
- Neisseria meningitidis
- Pseudomonas aeruginosa
- Enterobacteriaceae
- Escherichia coli
- Enterobacter cloacae complex

**Fungi**
- Candida albicans
- Candida glabrata
- Candida krusei
- Candida parapsilosis
- Candida tropicalis

**Antibiotic Resistance**
- meca
- vanA / vanB
- KPC
Antibiotics
What is inappropriate use?

1. Unnecessary prescription of antibiotics, such as for viral infections or for prolonged prophylaxis.
2. Using broad-spectrum antibiotics when narrow-spectrum antibiotics are effective.
3. Prescribing too low or too high dose.
4. Continuing treatment for longer than necessary.
Classification of Antibiotics

Based on mode of Action
- Bacteriostatic
- Bactericidal

Based on their spectrum of action
- Broad-spectrum
- Narrow Spectrum
Broad-spectrum antibiotics

- **Broad-spectrum antibiotic AKA Empiric** – means an antibiotic broad enough to cover the possible types of bacteria the patient has.

- Initially, an antibiotic is broad enough to cover the possible bacteria involved (while we wait on the cultures to give us preliminary, updated, and final information).
Narrow Spectrum

**Narrow spectrum** have limited activity and are primarily only useful against particular species of microorganisms. (directed would be targeting a single or isolated pathogens)
Bactericidal Vs. Bacteriostatic

**Bactericidal**: it kills bacteria by inhibit cell wall synthesis

**Bacteriostatic** antibiotics slow their growth or reproduction of bacteria by interfering with bacterial protein production, DNA replication
Why does ID change antibiotics?

People can have infections with negative cultures

- However, if the culture has a pathogen(s), and if that is the cause of the sepsis, **antibiotics can be narrowed or de-escalated** if there are more narrow-spectrum options.
  - This means that the antibiotic targets the bacteria without killing off a ton of other bacteria.
Why does ID change antibiotics?

- Sometimes, the patient is already on a broad-spectrum antibiotic, but there is resistance, and if that is the cause of sepsis, antibiotics might need to be broadened out even more to match the culture and fight the infection.
  
  Broadening out antibiotic can occur before cultures are back.
Antimicrobial Stewardship: 
Admission through Discharge

**AT ADMISSION**
- Source of the infection
- Labs, cultures & studies
- Review old cultures
- Clarify antibiotic allergies
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Kennedy Health, CDiff Task Force, 2015
Antibiotic Stewardship

Let's talk about the specific antibiotics we use here at Kennedy Health.
Penicillin VK (oral) or G (IV)

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Does Not Cover</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>gram positive and anaerobes</td>
<td>Gram negative</td>
<td>Streptococcus pyogenes cellulitis, dental infections</td>
</tr>
<tr>
<td>Bactericidal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Amoxicillin or Ampicillin

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Does Not Cover</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad spectrum</td>
<td>NO PSEUDOMONAS COVERAGE</td>
<td>Covers strep and Drug of choice for enterococcus</td>
</tr>
<tr>
<td>Covers gram negatives</td>
<td>Very minimal anaerobic coverage</td>
<td></td>
</tr>
<tr>
<td>Bactericidal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


# Ampicillin/Sulbactam (Unasyn)

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Does not cover</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>gram positive, gram negative rods, and ANAEROBES</td>
<td><strong>MRSA, ESBL, KPC, <em>Pseudomonas aeruginosa</em></strong></td>
<td>aspiration pneumonia, UTI, intra-abdominal infection (community- mild/moderate), cellulitis (cat/dog/human bite), facial cellulitis of dental origin</td>
</tr>
<tr>
<td>Bactericidal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Piperacillin/Tazobactam (Zosyn)

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Does NOT cover</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>gram positive, gram negative rods (including <em>Pseudomonas aeruginosa</em>), and anaerobes Broad Spectrum Bactericidal</td>
<td>MRSA, Legionella, Mycoplasma, Acinetobacter and KPC</td>
<td>healthcare associated or hospital-acquired pneumonia, serious intra-abdominal infections from the community or hospital acquired</td>
</tr>
</tbody>
</table>

**Warning** it can worsen thrombocytopenia
# Cefazolin
*(Ancef)*

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Does NOT cover</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>strong gram positive coverage</td>
<td></td>
<td><em>NOT MRSA</em></td>
</tr>
<tr>
<td>very weak gram negative</td>
<td></td>
<td><em>cellulitis without MRSA risk factors, MSSA bacteremia/cellulitis,</em></td>
</tr>
<tr>
<td>rod coverage</td>
<td></td>
<td><em>surgical peri-operative prophylaxis</em></td>
</tr>
<tr>
<td>Bactericidal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broad Spectrum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The oral equivalent is cephalexin (Keflex)*
# Ceftriaxone (Rocephin)

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Does NOT cover</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram positive, good gram negative rod coverage, and very minimal anaerobic coverage</td>
<td><strong>MRSA, &amp; ESBL</strong></td>
<td>community-acquired pneumonia (with azithromycin, a macrolide), UTI, meningitis, others.</td>
</tr>
<tr>
<td>Coverage</td>
<td>Does NOT cover</td>
<td>Usage</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>weak gram positive but it covers MSSA, gram negative rods, <em>Pseudomonas aeruginosa</em> and anaerobes, Broad Spectrum Bactericidal</td>
<td><strong>MRSA, ESBL, KPC</strong></td>
<td>healthcare associated or hospital-acquired pneumonia, serious intra-abdominal infections from the community or hospital acquired.</td>
</tr>
</tbody>
</table>
Carbapenems e.g. Ertapenem (Invanz)

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Doesn’t cover</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>broad – gram positive, gram negative (including ESBL), and anaerobes. Broad Spectrum Bactericidal</td>
<td>pseudomonas</td>
<td>extended-spectrum beta lactamase resistance (ESBL) UTI, mild-moderate community-acquired intra-abdominal infections</td>
</tr>
</tbody>
</table>

Do not administer Carbapenems to patients with serious PCN/cephalosporin/carbapenem allergy.

**ALSO BE AWARE**

**IT CAN**

Can lower the seizure threshold
Carbapenems

**Imipenem/Cilastatin** *(Primaxin)*

**Meropenem**

**Doripenem**, *

**Coverage**

- broad – gram positive, gram negative, including *Pseudomonas aeruginosa*, ESBL, and anaerobes.

**Usage**

- healthcare associated/hospital acquired pneumonia and very serious nosocomial infection

**ultra-broad-spectrum**
# Ciprofloxacin and Levofloxacin

Fluoroquinolones

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Avoid use</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad spectrum gram negative agents (including pseudomonas)</td>
<td>QT prolongation and seizure history</td>
<td>CAP and HCAP as an add on for double gram neg</td>
</tr>
</tbody>
</table>
Tigecycline (Tygacil)

<table>
<thead>
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<th>Coverage</th>
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<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>broad – gram positive (including MRSA, VRE), gram negative rods</td>
<td><em>Proteus mirabilis</em>, <em>Pseudomonas aeruginosa</em>, and</td>
<td>mild-moderate community acquired intra-abdominal infection, infections with MRSA, VRE, ESBL, CRE.</td>
</tr>
<tr>
<td>(including ESBL, CRE), atypicals, and anaerobes.</td>
<td>Providencia.</td>
<td></td>
</tr>
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<td></td>
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</tbody>
</table>
# Vancomycin

<table>
<thead>
<tr>
<th>Coverage</th>
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<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>gram positive cocci <em>Staphylococcus aureus</em>, MRSA, Streptococcus, and Enterococcus, with some gram positive anaerobes</td>
<td>any gram negatives</td>
<td>MRSA cellulitis, pneumonia, line-infection</td>
</tr>
</tbody>
</table>

With oral vancomycin, this is only used for severe *Clostridium difficile* infection. May also be used for refractory *Clostridium difficile* infection, not responsive to metronidazole (oral).
## Metronidazole (Flagyl)

<table>
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<tr>
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<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covers <strong>Only</strong> anaerobes, but includes <em>Clostridium difficile</em></td>
<td>anaerobic coverage with another antibiotic that covers gram negative</td>
</tr>
<tr>
<td></td>
<td>rods for intra-abdominal infections, wound infections, *Clostridium</td>
</tr>
<tr>
<td></td>
<td><em>difficile</em> infection</td>
</tr>
</tbody>
</table>

### Side-effects

- Disulfiram-like reaction – avoid alcohol during and 48 hours after.
- Very dark urine.
- Neurological: peripheral neuropathy (especially with prolonged use), seizures.
Antibiotic Stewardship

Case Studies
Case Studies

• Patient Background:
RP is a 68 year-old male who was admitted to the hospital from his long-term care facility after 1 week of dyspnea and cough. He was seen by a staff physician at the long-term care facility and was diagnosed with a COPD exacerbation. He was prescribed azithromycin, but has not improved after 3 days of antibiotics. He has a history of lipidemia, COPD, alcoholic cirrhosis, and HTN. He routinely takes lisinopril, has recently had a heavier reliance on his rescue albuterol inhaler.
Case Studies

He is transported to the ED vital signs
Temp 100
HR 90
RR 20
B/P 140/80
Pox 93% RA
Decreased lung sound lower lobe, chills, cough

- **Radiology**: Chest X-ray showed focal consolidation in the right lower lobe, suggestive of pneumonia
- Blood C&S negative after 24 hours
Case Studies

1. What is important information for this patient to be treated correctly?
2. Why is his C&S negative?
3. What if any action should the nurse take?
Case Study -2

54 year old patient was admitted on 2/20 with a cellulitis of abdomen due to an insulin pump site infection. Blood C&S was negative patient was started on Ancef x 3 days then bridged to Keflex p.o. and Discharged to home. 1 week later the patient returns to ED with the following;
Temp 101
HR 120
RR 30
Pox RA 92% (with no hx of respiratory issues)
Case Study -2

1. What is the focus of your assessment?
2. What treatment would you expect?

3. 24 hours later blood cultures are called as positive what is the nurses focus?
Case Study -2

- The patient is now placed on Vancomycin and final results of blood C&S are obtained. It is noted on the report that there is an R next to Vancomycin, what should the nurse do?
Any questions or concerns consult pharmacy
or
Nikunj Vyas
Tiger Text him
Questions


3. Olans, R., Olans, R., DeMaria, A., The Critical Role of the Staff Nurse in Antimicrobial Stewardship—Unrecognized, but Already There., Infectious Disease Society of America
