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Antibiotic Resistance

Rachel Balentine
Cedarville University, rbalentine@cedarville.edu

Kaitlyn Flint
Cedarville University, kaitlynflint@cedarville.edu

Aaron Motsinger
Cedarville University, ajmotsinger@cedarville.edu

Mitchell Webber
Cedarville University, mwebber@cedarville.edu

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Rachel Balentine, Katie Flint, Aaron Motsinger, and Mitchell Webber

Cedarville University School of Pharmacy

An Overview of Antibiotic Resistance

What is it?
- Ability of bacteria to resist the effects of an antibiotic.
- Occurs when bacteria change in a way that reduces the effectiveness of drugs, chemicals, or other agents designed to cure or prevent infections.
- Bacteria survive and continue to multiply, causing more harm.

Why is it important?
- Antibiotic-resistant (ABR) bacteria can be life-threatening.
- Most antibiotics are becoming useless when it comes to treating people with a life threatening disease.

How does it impact health?
- ABR bacteria is difficult to kill and costly to treat.
- They can cause once easily-treatable illnesses to become dangerous infections.
- Are easily transmittable and can potentially lead to death.

Health Indicators

Direct Impact

Recurring Illness
- As the number of resistant bacteria increases, the odds of becoming ill also increases.
- Bacterial infections last longer than they should.

Shortened Life Expectancy
- Prior to the development of antibiotics, any bacterial infection was lethal.
  - Now, ABR bacteria is just as lethal.
- It is estimated that by 2050 three hundred million deaths will have occurred worldwide.

Indirect Impact

Agriculture
- 80% of antibiotics used in the US are used in agriculture.
- Most of the food consumed contains antibiotics and can cause exposure to resistant bacteria.
  - It is standard practice to give animals antibiotics, even ones that are not sick.

The Impact of Antibiotic Resistance

How prevalent is it?
- 2 Million people in the U.S. infected with antibiotic-resistant (ABR) bacteria each year.
- 23,000 people die each year as a result of infections.
  - Additional deaths caused by complications
  - Most deaths in healthcare settings
- ABR infections can happen anywhere and to anyone.

Personal costs
- Decreased quality of life
- Sickness/death
- Continued use of non-effective antibiotics for an infection could lead to financial waste.

Community/Societal cost
- A breakdown of the community could occur as the public becomes more educated on this risk.
  - People may be less eager to participate as a community if they know how easily ABR bacteria can be transmitted.
- As bacteria continues to build up a resistance to antibiotics, the health of the community/society as a whole will suffer greatly, since more of the population will be susceptible to this ABR bacteria.
- Misuse and overuse of antibiotics increases infections and costs the U.S. healthcare system $20 billion/year.

Impact on Pharmacy

Impact on the Pharmacist's role
- There is extra pressure on the Pharmacist to properly counsel patients on over the counter antibiotics for symptoms that may not need antibiotics for treatment.
- Health care professionals need to be educated more on how to properly prescribe antibiotics.
  - Prescribe antibiotics only in diseases that require the aid of an antibiotic.

Impact on Pharmacy financially
- A big contributor to pharmaceutical success is the development of antibiotic drugs.
  - Promoting the use of antibiotics aids in backing research and studies.

  Halting antibiotic drug use and development may result in a loss in profit by pharmaceutical companies.

Working together
- Pharmacy is impacted if researchers, physicians and other health care providers cannot all work together to find a solution to the threat of antibiotic resistance.

ACPE 2016 Standards

ACPE Standard 11. Interprofessional Education: "The curriculum must prepare all students to provide entry level patient-centered care in a variety of practice settings as a contributing member of an interprofessional team. In the aggregate, team exposure must include prescribers, as well as other health professionals."

Cedarville University School of Pharmacy's Mission

The school of pharmacy develops exceptional pharmacy practitioners focused on meeting the physical, emotional, and spiritual needs of patients through servant leadership. The school pursues innovative, ethical solutions to health-related issues in diverse populations through collaborative teaching, research, and practice.

How Determinants of Health Contribute

Individual Behavior
- Individuals can increase the risk of antibiotic resistance by...
  - Using unneeded antibiotics
  - Taking antibiotics incorrectly

Health Services
- Providers must ensure that they are prescribing antibiotics correctly.
- 30% of prescribed antibiotics in the United States are unnecessary.

Physical Environment
- Many of the antibiotic resistant bacteria can be transmitted through food, agriculture or animals.

What Can We Do?

1. Improve Antibiotic Stewardship and Prescribing
- Pharmacists must educate patients on antibiotic resistance.
- Alternative methods for the common cold and viruses should be employed.
- Pharmacists can offer correct counsel on how to take antibiotics.
- Health care professionals are encouraged to educate other professionals on how to properly prescribe antibiotics.
  - Broad-spectrum antibiotics will kill a wider range of bacteria.
  - Narrow-spectrum antibiotics are more target-specific and reduce the potential for drug-resistance in the future.

2. Prevent the Spread of Resistance
- Encourage immunizations.
- Promote proper self-hygiene, such as the washing of hands.
- Safely prepare food in order to kill the antibiotic resistant bacteria developed in agricultural settings.

3. Track Antibiotic Resistance Patterns
- Record causes of infections and possible risk factors that would lead people to develop an antibiotic resistant infection.
- Apply this information and develop strategies to...
  - Prevent infections
  - Prevent the spread of antibiotic resistant bacteria

4. Develop New Antibiotics
- Antibiotic resistance occurs when bacteria "learn" how to defeat a certain group of antibiotics--it is critical that new antibiotics are constantly being introduced.
- Pharmaceutical research companies need to be given increased funding to pursue antibiotic research.
- Pharmaceutical research companies need to be persuaded to pursue research for the national health benefits, even if doing so is not as profitable
  - We need to make the public aware of the value of antibiotics so that research companies are more apt to pursue research.

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