

UChicago 2023 Summer Institute *Beyond the Headlines* Lesson Plan

Misuse and Overuse of Antibiotics – Global Perspectives
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I. Plan Your Lesson

<p>What is the current event and/or pressing issue you are exploring in your classroom and why?</p> <p>Antibiotic-resistant bacteria</p> <p>What are some of the systemic practices that drive this issue and/or event?</p> <p>Misuse and overuse of antibiotics</p>	<p>Find 2 to 5 articles on the Pulitzer Center website that align with this story. Your articles should capture stories in East Asia or the Middle East:</p> <p>A Global Crisis in the Making: Super-resistant Bacteria, Medical Tourism and India's Poor Pulitzer Center</p> <p>India's Super-Resistant Bacteria: "Everybody Is Hell Scared" Pulitzer Center</p> <p>Sonia Shah on Super-Resistant Bacteria, Medical Tourism and India's Poor Pulitzer Center</p> <p>Antibiotic-resistant NDM-1 Is Undermining India's Medical Sector Pulitzer Center</p> <p>Mumbai: A Prime Breeding Ground for Drug Resistant Infections Pulitzer Center</p> <p><i>Additional Background for Comparative Perspectives:</i></p> <p>Addressing Inappropriate Antibiotic Prescribing in China (National Library of Medicine)</p> <p>How China Could Choke EU Supply of Medicines (Politico)</p>
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II. Get Familiar with *Beyond the Headlines*

Review the five unique lesson plans in the [Beyond the Headlines Lesson Series](#) and notice the sequence of the lesson plans:

1. Warm-up
2. Introduce the current event
3. Explore systemic issues through underreported stories: List the underreported stories you have found on the Pulitzer Center website
4. Discuss: Craft discussion questions that encourage students to
 - a. Understand
 - b. Connect
 - c. Evaluate
 - d. Act
5. Extension Activity

Lesson Plan Template

Directions: Use the table to craft your lesson plan.

Objectives (3 - 5)	
<p>Warm Up <i>Students make personal connections and/or activate prior knowledge of a theme, event, or idea using multimedia sources and/or statistics</i></p>	<p>I will be starting with a 3-minute video as a warm-up introduction to the subject of antibiotic-resistance.</p> <p>Do students have similar stories of “hidden” unnoticed pandemics?</p> <p>What might be the reason? What are the human practices that lead to such looming disasters?</p> <p><i>Video Resource:</i> Meet Journalist Sonia Shah: Super-Resistant Bacteria, Medical Tourism and India's Poor</p>
Introducing the Lesson	
<p>Key Terms <i>Identify words that are central to the issues being discussed and the reporting student will read.</i></p>	<p><i>Antibiotics, antibiotic-resistance, bacteria, bacterial infection, superbug, medical tourism, broad-spectrum, pathogen, carbapenem, gram-positive, gram-negative, strain, species, genus, pandemic, NDM-1, TDR-TB</i></p>

<p>Current Event <i>Succinctly describe the event or topic and provide context for that event by unpacking the interconnected, systemic issues that have driven that event.</i></p>	<p>Two major antibiotics-resistant bacteria originated first in New Delhi and Mumbai, respectively. The introduction of resistance took place due to lack of regulation of antibiotics prescription in India. The spread of resistance to other bacteria and patients in other parts of the world took place due to what became known as medical tourism. What can be the solution?</p> <p>Antibiotic-resistant NDM-1 Is Undermining India's Medical Sector Pulitzer Center</p> <p>Mumbai: A Prime Breeding Ground for Drug Resistant Infections Pulitzer Center</p>
<p>Pause to Process Emotions <i>Craft some questions or prompts to help students take a moment to process their emotions in community with one another.</i></p>	<ul style="list-style-type: none"> • What is the effect locally? Globally? • Why specifically India? • Research if such events take place in China. • In other parts of the world? • Developed or developing countries? • What are the bad practices in India and China that helped increase antibiotic resistance? • Any good practices? • Any common practices between the two most populated countries on earth? • Is the large population a risk factor?

<p style="text-align: center;">Pulitzer Center Reporting</p>	
<p>Underreported Story 1</p>	<p>Title: A Global Crisis in the Making: Super-resistant Bacteria, Medical Tourism and India's Poor</p> <p>Summary: People are visiting India specifically to seek medical treatment that is cheaper and more accessible. These humans turned out to be the superbug carriers spreading antibiotic-resistant pathogens to the rest of the world.</p>

<p>Underreported Story 2</p>	<p>Title: India's Super-Resistant Bacteria: "Everybody Is Hell Scared"</p> <p>Summary: Antibiotics-resistance is on the rise in India. One of them is known as NDM-1 spread originally from the city of New Delhi to the many countries in the world via patients seeking treatment in India. The measures to contain this pandemic are not sufficient at many levels. This article discusses these failures.</p>
<p>Underreported Story 3</p>	<p>Title: Antibiotic-resistant NDM-1 Is Undermining India's Medical Sector</p> <p>Summary: "In India, antibiotic use is virtually unregulated". This article focuses on the pharmaceutical industry reluctance to treat antibiotics-resistant infections with newly developed antibiotics.</p>
<p>Underreported Story 4</p>	<p>Title: Mumbai: A Prime Breeding Ground for Drug Resistant Infections</p> <p>Summary: This article discusses the resistance of tuberculosis-causing bacteria and the failure of private vs. public health sector to mitigate this health crisis.</p>

<p style="text-align: center;">Discussion Questions</p>	
<p>Understanding the story <i>Write 2 -3 comprehension questions.</i></p>	<p>What characteristics distinguished patients who did medical tourism?</p> <p>What are the most frequently resisted antibiotics in India? What might be the mechanism of resistance?</p> <p>Based on the articles you read, how can you alleviate this pandemic of antibiotic resistance without asking pharmaceuticals to develop a brand-new antibiotic for you?</p>

<p>Connecting to the story</p> <p><i>Write 2 - 3 questions that help student connect with the experiences of people most impacted by the issues in the articles.</i></p>	<p>Do you find any relationship between NDM-1 and DTR-TB?</p> <p>Developing a new antibiotic that can counter NDM-1 or TDR-TB might not solve the problem in the long run. Do you (dis)agree? Why?</p>
<p>Evaluating the story</p> <p><i>Write 2-3 questions that encourages students to connect the story to their understanding of a systemic issue and/or highlight underreported elements of a larger issue.</i></p>	<p>Do you think that NDM-1 affected only the poor in India?</p> <p>What are the reasons that made the Indian government ignore the NDM-1 spread?</p>
<p>Acting on the story</p> <p><i>Write 2-3 questions that inspire students to follow curiosities and/or list solutions to problems described in the story.</i></p>	<p>How do bacteria develop resistance to antibiotics?</p> <p>Develop two methods to overcome the global problem of antibiotics resistance.</p>

<p style="text-align: center;">Extension Activities</p>	
<p>Extension Activity 1</p>	<p>To understand the scope of the problem of antibiotic resistance on a global scale watch the talk by Maryn McKenna: What do we do when antibiotics don't work any more? TED Talk</p> <p><i>Students will discuss issues raised in talk and answer 10-question quiz.</i></p>
<p>Extension Activity 2</p>	<p>Watch the video titled by Ramanan Laxminarayan: The coming crisis in antibiotics TED Talk</p> <p><i>Students will discuss issues raised in talk and answer 10-question quiz.</i></p>

Assessing Student Learning

In what ways do you plan to assess student learning through this lesson plan? (rubric, collecting and scoring discussion question-driven written responses, exit tickets, participation, etc.)

Discussion of specific points of the stories and talks and the students will answer quiz questions based on the articles and talks. We will then have a follow-up discussion regarding any incorrect quiz responses.

Plan for implementation

Describe your plan to teach this lesson; Provide the context and how it may align with your vision for instruction this academic year.

This project fits as an in-class activity before class entry into the chapter on chemotherapy in a general microbiology course. This activity can take 60-90 minutes of class time.