

Superbugs- *Shigella* in the US: A Case Study

Introduction:

Antibiotic resistance has grown in public health threat as previously known treatment methods become ineffective in handling common infections. Leading public health officials fear "the end... of antibiotics" as many strains of bacteria continue to become resistant to last-line defenses.¹ *Shigella*, a common gastrointestinal bacterial infection with around 100 million infections annually, has become increasingly resistant to antibiotics since 2013.^{2,3}

Facts of the Case:

From May to February of 2014-2015, multi-drug resistant (MDR) *Shigella* swept through 32 states in the United States (US), dominating large areas of Massachusetts, Pennsylvania, and California. Around 245 people were infected and 20% of these cases resulted in hospitalizations.³ While *Shigella* is a common bacterial infection with around 450,000 US infections annually, 17% of which are drug resistant^{2,4}, this specific strain was concerning as it was part of only 6% of strains resistant to the most common treatment method- ciprofloxacin.² Like many drug-resistant infections, those with weakened immune systems are highly susceptible to infection. *Shigella*; however, also disproportionately affects children, international travelers, and men who have sex with men due to its reservoir in the colon and intestines.^{2,3,4} This reservoir also makes it highly contagious and thus extremely dangerous when drug-resistant.³ The 2014-2015 outbreak was linked to travelers visiting Morocco, India, and the Dominican Republic; however, many of the infected had not traveled outside of the US indicating the strain's circulation within the country's borders.³ Luckily, many patients were able to be treated given the US's extensive healthcare system; however, globally MDR *Shigella* kills around 600,000 people annually.³ This outbreak demonstrates the overall threat of global drug resistance even in first-world countries like the US. Additionally, the growing danger of drug-resistant infections continues to take an economic toll on the US as well, with an estimated annual healthcare cost of at least 4.6 billion dollars⁵, 93 million of which goes directly to drug-resistant *Shigella*.²

Epidemiological Aspects of the Event:

The specific MDR *Shigella* outbreak of 2014-2015 was determined through hospitalization records of infections and testing making it a retrospective cohort study. Patient records were used to determine their infection status and causality was determined through contact tracing and questionnaires. Analytically, the outbreak was described by leading epidemiologist in the study, Anna Bowen, who detailed the long-term threat of MDR infections in the medical field should they continue to advance.³ Potential sources of bias in the outbreak report lie in the publisher, as it is reported in an NPR article rather than a scientific journal.³ While NPR is regarded as, for the most part, neutral in bias, it is expected that any source of media may hold a bias to benefit their appeal to the public. The author tries to mitigate this bias by quoting Bowen throughout the article and citing trusted governmental agencies like the CDC for validity. Additionally, limitations in the study involve the nature of the subject. Antibiotic resistance is generally considered a "taboo" subject in the medical field and thus hospitals tend to underreport infection rates not wanting to "cause public panic."⁶

Management of the Event:

The specific treatment methods and management of the 2014-2015 outbreak are not described in the article; however, it is noted that typical *Shigella* infections subside independently after around seven days.³ In cases of drug-resistant *Shigella*, alternative antibiotics are utilized to fight the infection, moving from all known oral treatments to IV treatments as a last resort.^{2,3} The

US as a whole has taken action in managing the global crisis of antibiotic resistance by strengthening detection methods in hospitals, improving restrictions and uses of antibiotics, and prioritizing research for new treatment methods and alternatives.⁷ Additionally, the creation of the Transatlantic Taskforce on Antimicrobial Resistance (TATFAR) has been a global effort to address the threat and limit future casualties.⁸

Communication of the Event

The article detailing the 2014-2015 outbreak is an NPR paper describing not only the intricacies of the outbreak but also quotes directly from the head of the study. Further research on the topic results in more notable news and media sources discussing the threat and implications of the outbreak during that time. Overall, from a media standpoint, I would say the coverage of the event was sufficient as different sources openly discussed the facts with the public. As mentioned previously, it is expected that there are some limitations in the data reporting itself from the hospitals; however, that does not fall within this specific communication of the event. Dr. Bowen was open with the interviewers and stressed the facts of the case while also describing the implications and methods of prevention that are needed for addressing similar infections in the future. This openness with the media and public is imperative in preventing further cases as it brings attention to the issue while also promoting methods of prevention and education. From a national standpoint, the US is doing an adequate job at communicating the threat of MDR infections to the public with the annual publication of the Antibiotic Resistance Threats Report; however, more can be done to bring the information to the general public.⁷

Summary

The infection and spread of the multi-drug resistant *Shigella* strain around the US in 2014-2015 indicates the dangers of MDR infections on a global scale. To combat similar outbreaks in the future, it is crucial that we, as a global power, dedicate proper resources to research and prevention methods internationally for antimicrobial-resistant infections. Finally, communication and education on the dangers of these infections must improve if the public health community aims to stop these threats in the future.

References:

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