NEW YORK: A Summary of Select Antimicrobial Resistance Data

The U.S. Centers for Disease Control and Prevention (CDC) has defined the antimicrobial resistance problem as a "major blooming public health crisis."1 Drug resistant bacterial infections affect hundreds of thousands of Americans and cause tens of thousands of deaths each year. These infections are painful, difficult to treat, and this ‘silent epidemic’ costs the U.S. health care system many billions of dollars annually. And yet, an astoundingly diminutive amount of federal resources are being committed to address this staggering problem.

Antibiotic-resistant infections have become significant threats to citizens of NEW YORK:

Drug-resistant Staphylococcus aureus:

- Although primarily affecting ill people in hospitals, Methicillin-resistant Staphylococcus aureus (MRSA), a drug-resistant bacteria, are infecting a growing number of people in the community and outside hospitals, including healthy athletes and children. A recent study in the Journal of the American Medical Association demonstrates that MRSA alone infects more than 94,000 people and kills nearly 19,000 annually in the United States – more deaths than those caused by emphysema, HIV/AIDS, Parkinson’s disease, and homicide.2

- Hospitalizations for or complicated by MRSA infections cost nearly double that for non-MRSA stays – 14,000 for MRSA stays compared with $7,600 for non-MRSA stays. The average length of stay in the hospital for a patient with MRSA infection was more than double that for non-MRSA stays – 10.0 days versus 4.6 days.3

- From December 2005 through February 2006, all single patient isolates of S. aureus were gathered from 15 of the 16 hospitals in Brooklyn. A total of 1316 isolates of S. aureus were collected during the three-month surveillance study; 581 (44%) were found to be MRSA. The USA300 strain of CA-MRSA is emerging in Brooklyn. In this population-based study, urban regions with characteristics of lower socioeconomic status and with evidence of overcrowding appear to have a higher prevalence of this pathogen.4

Drug-resistant “gram negative” bacterial infections:

- Serious and life-threatening infections due to antibiotic resistant “gram negative” bacteria are on the rise across the United States. Gram negative bacteria primarily are differentiated from gram positive bacteria, like MRSA, by a cell wall that is particularly adept at preventing antibiotics from entering the bacteria. These infections, primarily acquired in hospitals and long term care settings, are

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1 Dr. Fred Tenover, quoted in “The Bacteria Fight Back” Science, July 18, 2008.
extremely difficult to treat and cause significant numbers of illnesses and deaths. Bacteria in this group include: \textit{Escherichia coli} (E. coli), \textit{Klebsiella pneumonia}, \textit{Pseudomonas aeruginosa}, and \textit{Acinetobacter}.

- In March 2009, CDC published guidelines for detection and control of \textit{E. coli} and \textit{Klebsiella} species with increasing resistance to a subclass of antibacterial drugs known as carbapenems. Carbapenems are among the most potent antibiotics currently available and are often considered the “last line of defense” in the treatment of antibiotic resistant bacteria. Studies have shown that the mortality rate from infections caused by carbapenem resistant \textit{Klebsiella} species is roughly 40%. CDC described this problem as “another in a series of worrisome public health developments regarding antimicrobial resistance among gram-negative bacteria [that] underscores the immediate need for aggressive detection and control strategies.”

- Noteworthy, these organisms are difficult to detect with the automated testing systems currently used in most hospital laboratories.\(^6\)

- Of critical importance, there are few to no approved antibacterial drugs currently available to treat many gram negative bacterial infections and few to no new drugs in the pipeline; drug discovery in this area is extremely difficult due to challenges in overcoming the gram negative bacteria’s cell wall.

Other antimicrobial resistance issues:

- \textit{Klebsiella pneumoniae} is the fourth most common cause of pneumonia in intensive care patients. Forty-five percent of \textit{K. pneumoniae} isolates sampled from 11 Brooklyn hospitals in the years 2002-2003 were resistant to cephalosporins – formerly the most reliable antibiotics for treating \textit{K. pneumoniae} infections. Strains are now appearing that are resistant to almost all antibiotics.\(^7\)

- \textit{K. pneumoniae} strains are rapidly emerging in New York City that are resistant to carbapenem antibiotics, the most powerful antibiotic class available. In recent years, they have achieved outbreak proportions in New York City. During the time of this study, two hospitals experienced rapid spread of carbapenem-resistant isolates involving 58 patients. These isolates are resistant to virtually all commonly used antibiotics, and control of their spread is crucial.\(^8\) Today, over 30% of \textit{K. pneumoniae} strains are resistant to most if not all available anti-infective agents in several hospitals in New York City. Like other multidrug resistant organisms, infections caused by this bacteria are associated with increased morbidity and mortality, increased duration of hospitalization, and increased cost of care.

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\(^5\) CDC MMWR “Guidance for Control of Infections with Carbapenem-Resistant or Carbapenemase-Producing \textit{Enterobacteriaceae} in Acute Care Facilities” March 20, 2009 / Vol. 58 / No. 10


\(^8\) \textit{ibid}
• **Clostridium difficile** (C. diff.) is spawning infections in hospitals in the U.S. and abroad that can lead to severe diarrhea, ruptured colons, perforated bowels, kidney failure, blood poisoning and death. It is a common cause of antibiotic-associated diarrhea, accounting for 15-25% of all episodes. CDC estimates there are 500,000 cases of C. diff. infection annually in the U.S., contributing to between 15,000 and 30,000 deaths. Elderly hospitalized patients are at especially high risk and mortality in these patients may exceed 10%. The disease is very difficult to treat and recurs in at least 20% of cases, even when treated appropriately. A new more virulent strain of this organism is spreading throughout the United States.

  o Deaths from C. diff. in New York have increased steadily over the past few years. There were 64 in 2000, 81 in 2001, 133 in 2002, 154 in 2003, 195 in 2004, and 314 in 2005.  

  o There were 24,628 hospital discharges in 2006 in New York that included C. diff. as a diagnosis, according to the Agency for Healthcare Research and Quality (AHRQ). The cost per C. diff. patient in a hospital is estimated by CDC to be at least $3,500, making the annual healthcare cost for C. diff. in New York nearly $86.2 million.

Public health laboratory capacity:

A key factor in New York’s ability to detect, monitor and control antimicrobial resistance is its public health laboratory capacity. Across the nation, increasing cases of antimicrobial resistance are currently swamping the ability of each state's public health laboratory to keep pace. There has been limited funding in the past for antibiotic resistance education programs and surveillance, and even this limited funding is on the decrease. Approximately only half of state public health labs can provide some basic resistance testing. Like many states, New York lacks the resources to test every pathogenic isolate for resistance to all available drugs. With only targeted surveillance efforts, it is possible that drug resistance may spread beyond local regions.

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9 CDC Wonder Death Certificate Data, cited in a July 28, 2008 communication to Senator Sherrod Brown

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