

STRATEGIC PLAN TO COMBAT ANTIMICROBIAL RESISTANCE IN NEW JERSEY

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BACKGROUND

Public Health Importance

Antimicrobial resistance (AR) has been recognized since the discovery of penicillin in the 1940s. However, only recently has widespread use—and abuse—of antibiotics been recognized as a public health problem with potentially devastating consequences. Selection pressure resulting from antibiotic use has led to the rapid evolution of bacteria that are immune to the killing effects characteristic of what were previously referred to as “miracle drugs.” In fact, sensational headlines in the media suggest that we could be returning to a “preantibiotic era,” in which many of the antimicrobial agents that are currently effective at treating certain infections will no longer work. Diseases from childhood ear infections to tuberculosis, gonorrhea and malaria are more difficult to treat than they were just a decade ago and getting harder to treat all the time.

AR is especially a problem in health-care settings. Each year, nearly 2 million patients in the United States acquire an infection in a hospital. Of those patients, about 90,000 die as a result of their infection, according to the Centers for Disease Control and Prevention (CDC). More than 70 percent of the bacteria that cause hospital-acquired infections are resistant to at least one of the drugs most commonly used to treat them. Infections caused by antimicrobial-resistant bacteria result in increased morbidity and mortality for those affected and drive up healthcare costs as well.

Globalization has hastened the spread of infectious diseases around the world and has contributed to the complexity of combating AR—globally, nationally and in New Jersey.

This view is shared by the World Health Organization, the Institute of Medicine, CDC, the National Institute of Allergy and Infectious Diseases, the American Society of Microbiology, and other professional organizations, and has been reported in scientific and medical journals. An estimated 1.4 billion people travel by air every year, according to a 2003 study by the United Nations Economic and Social Council. As we have seen with severe acute respiratory syndrome (SARS) and the threat of a flu pandemic resulting from avian influenza, a new infectious agent carried by just a few of these travelers can spread quickly throughout the world.

However, despite the recent attempts to address the issue and realization that AR has tremendous public health importance, there are several signs that the problem is on the rise. For example, strains of *Staphylococcus aureus* resistant to methicillin (MRSA) are endemic in many U.S. hospitals. Once mainly a problem in healthcare settings, MRSA has made its way into the community. Outbreaks of MRSA have been reported among football players (both amateur and professional) and participants in other contact sports. It has also been responsible for large outbreaks of skin infections among inmates housed in correctional facilities across the country (who are eventually released into the community). There have even been several cases of young, previously healthy children developing community-associated MRSA (CA-MRSA) infections and dying within several hours of admission to a hospital. Also of grave concern is the report in 2002 of two health-care associated strains of MRSA resistant to vancomycin (one of the few antimicrobial agents currently on the market that is effective against health-care associated MRSA), in the United States. These cases were identified in two different states—Michigan and Pennsylvania—and occurred within approximately three months of each other.

The Economic Impact of Failing to Address AR:

There are costs and consequences on many levels associated with failing to address AR. These costs include lost time from work and school, recurrent hospitalizations and extended lengths of stay in healthcare facilities. For example, a study that examined the economic impact of MRSA on Canadian hospitals showed that patients infected with MRSA remained hospitalized, on average, 14 days longer than their noninfected counterparts. In the same study, the total attributable cost to treat MRSA infections was \$14,360 per patient, and the cost for isolation and management of colonized patients was \$1,363 per admission. A U.S. study found that vancomycin-resistant *Enterococcus* bacteremia was associated with an 18.1-day prolongation of hospital stay, a \$27,190 increase in hospital costs, and 29% attributable mortality as compared with vancomycin-susceptible *Enterococcus* bacteremia. Furthermore, the cost of inappropriate use of antibiotics—borne by hospitals, patients and society as a whole—is also alarming. According to David Howard of the Department of Health Policy and Management at Emory University in Atlanta, the cost of “resistance-induced antibiotic substitution” for ear infections is \$20 million a year in 1996 dollars.

Given the variety of ways in which AR can impact direct and indirect costs, it should be no surprise that the financial burden of AR is staggering. In fact, in its report assessing the impact of antibiotic-resistant bacteria, the Office of Technology Assessment cited a study that suggests the price tag may be as high as \$30 billion a year in the United States.

Lack of Research and Development (R&D) of New Antimicrobial Agents

As antimicrobial drugs increasingly lose their effectiveness, new medicines must be developed to treat drug-resistant infections. The slow pace of antibiotic R&D is also a major concern. Unfortunately, this slow pace is the result of several factors. Literature on the topic suggests that because antibiotics work so fast and well that the return on investment for manufacturers is a disincentive to research for new therapies. Another suggested reason is that in recent years drug manufacturers place more emphasis on so-called “blockbuster” drugs to treat chronic conditions or lifestyle issues, like medicines for lowering cholesterol or Viagra™. These drugs, which patients might use for many years, are more profitable for manufacturers than antibiotics which patients might use for only one to two weeks. Also, if resistant bacteria make antibiotics less effective in treating affected patients, then the drugs become less profitable to the manufacturer in the long term.

As evidence of the disincentive associated with antibiotic development, consider the following: There were more than 500 new drugs in development in this country in 2004; of these, only 5 were new antibiotics. Very few new antibiotics are on the horizon and some may not be released for 2 to 5 years. In 2002, out of the 89 new medications that emerged, not one was an antibiotic. Finally, only two new classes of antibiotics have been developed in the last 30 years.

Mission of New Jersey Department of Health and Senior Services (NJDHSS)

Part of the mission of NJDHSS is to “work to prevent disease, promote and protect well being at all life-stages and encourage informed choices that enrich quality of life for individuals and communities.” Controlling the emergence and spread of AR is an important part of the public trust that we have been given to protect the public. Educating the public about the problem of AR and working with the healthcare community to address this issue is in line with the mission of the Department of Health and Senior Services. As a result, NJDHSS has partnered with a variety of health-care organizations in the state to address this complex issue with the goal achieving yet another mission...

“To control the emergence and spread of antimicrobial-resistant organisms in New Jersey through partnership, strategic planning and education.”

A Strategic Plan to Combat AR - Summary

This *Strategic Plan to Combat Antimicrobial Resistance* was developed by a multidisciplinary task force on AR that was created in February 2005. The task force has

since been named NJ CAUSE, which stands for New Jersey Careful Antibiotic Use Strategies and Education. NJ CAUSE is led by NJDHSS and includes representation from a variety of public health and healthcare organizations.

The *Strategic Plan* reflects a broad-based approach to addressing the issue of AR. Input from NJ CAUSE membership was used in developing the plan. While some activities have already been initiated, successful implementation of future ones will require close collaboration with all of the partners currently represented on the NJ CAUSE Task Force and reaching out to other organizations that are currently not represented on NJ CAUSE. Action items of the plan will be implemented according to the availability of resources.

The *Strategic Plan* provides the basis for defining critical steps that should be taken to effectively address the enormous public health threat posed by AR. This document is meant to be a work in progress. As such, proposed activities may be modified as more information or resources become available. Since a major contributor to AR is inappropriate antimicrobial use, many activities described in this plan are meant to directly, or at least indirectly, curb inappropriate use.

The *Strategic Plan*, includes five focus areas: surveillance, education, laboratory issues, best practices/infection control guidance, and economics.

A summary of the top priority goals and action items in each focus area follows:

SURVEILLANCE

GOAL: IMPROVE SURVEILLANCE OF ANTIMICROBIAL-RESISTANT ORGANISMS THAT HAVE SUBSTANTIAL PUBLIC HEALTH IMPACT IN NEW JERSEY.

Action Items:

Focus statewide surveillance activities on the following antimicrobial resistant organisms:

- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Vancomycin-Intermediate/Resistant *Staphylococcus aureus* (VISA, VRSA)
- Vancomycin-resistant Enterococci (VRE)
- Drug-resistant *Streptococcus pneumoniae* (DRSP) (including penicillin-, macrolide-, and fluoroquinolone-resistant strains)
- Extended-spectrum beta-lactamase (ESBL)-producing *Klebsiella pneumoniae*

Create a method for re-evaluating the organisms under surveillance to ensure that emerging antimicrobial-resistant bacteria of clinical and epidemiologic importance are identified in a timely manner.

Develop an electronic, user-friendly system for reporting the targeted antimicrobial-resistant bacteria identified at acute-care facilities in New Jersey. (This system would replace the current paper-based system of reporting AR data.) Investigate whether NJDHSS's Communicable Disease Reporting and Surveillance System (CDRSS) can be modified to be used as such system.

Review antibiograms produced by NJ hospitals to determine the feasibility of aggregating the data contained therein into a statewide antibiogram.

Compare surveillance data obtained through the proposed electronic system with that obtained through an aggregated statewide antibiogram to assess whether the information collected through these methodologies are comparable. If data captured through these two systems is comparable, choose the method that offers the most timely and valid AR data in the least labor-intensive but most sustainable way.

Provide regular, timely AR data that is communicated to the appropriate stakeholders.

Once established, consider expanding reporting entities to include, in addition to acute-care facilities:

- Long-term care facilities
- Correctional facilities
- Long term acute care (LTAC) units
- Private practices
- Centers for Primary Healthcare
- Primary care and HIV Clinics
- Home health agencies

Obtain antibiotic usage data and link these with AR data in an effort to identify areas for targeted intervention.

Identify appropriate partners to develop a system for monitoring AR and antimicrobial use in the fields of agriculture and veterinary medicine.

EDUCATION

GOAL: PROMOTE APPROPRIATE ANTIBIOTIC USE THROUGH EDUCATIONAL ACTIVITIES AND MEASURES TO PREVENT INFECTION IN GENERAL

Action Items:

Identify funding sources from outside NJDHSS to support the educational activities.

Actively participate in CDC's Annual Conference on Antimicrobial Resistance Programs. Use this forum to identify what other states have done in terms of educating their

residents and healthcare community about AR, and determine what activities might be applied in New Jersey.

Distribute already developed CDC “Get Smart: Know When Antibiotics Work” materials to the lay public and healthcare providers to increase awareness about AR and promote appropriate antibiotic use.

Through the state's contracted advertising agency, explore airing of CDC’s “Get Smart: Know When Antibiotics Work” television and radio public service announcements.

Using the already established NJ CAUSE Task Force, identify representatives from organizations/agencies (e.g., professional medical societies such as the Medical Society of New Jersey, Infectious Diseases Society of New Jersey, and the NJ Chapter of the American College of Physicians) appropriate to include in a working group that would promote appropriate antibiotic use and assist in the development of AR-related educational activities. Target audiences for such promotion and educational activities would include, but not be limited to, healthcare providers.

Develop policies for evaluating physician prescribing practices and managing patients colonized with antimicrobial-resistant organisms that could be used by clinicians with administrative responsibilities, including medical directors of long-term care facilities.

Work with surrounding states and cities to share partners and resources committed to curbing the inappropriate use of antibiotics.

Increase awareness of AR and promote appropriate antibiotic use in the Hispanic/Latino community through the use of Spanish-language Get Smart materials. Maximize outreach efforts in this community through partnership with organizations that advocate for the well-being of the Hispanic/Latino population.

Reach out to NJDHSS’s Office of Minority and Multicultural Health to identify and partner with community organizations that serve other minority groups to increase awareness of AR and promote the appropriate antibiotic use in these communities.

Partner with public health students to perform community needs assessments to determine what information should be targeted to the above communities and develop the means by which the impact of proposed interventions can be objectively measured.

Update the newly created NJDHSS website for AR education with up-to-date lay-press and peer-reviewed journal articles about AR and links to Get Smart materials.

Continue to present information about AR at conferences where this topic would be appropriate for discussion (e.g., Antimicrobial Resistance Symposia, NJDHSS-sponsored Infectious Disease Summits).

Partner with members of the NJDHSS Handwashing Task Force to stress the importance of and promote good hand hygiene practice in a variety of community settings (e.g., daycare).

Assess the impact of the activities described above by monitoring responses to questions regarding antibiotics that have been requested for inclusion in New Jersey's Behavioral Risk Factor Surveillance System survey. (The questions requested for inclusion assess a respondent's knowledge, beliefs, and attitudes about antibiotics.)

Develop educational materials (e.g., pamphlets) targeting participants in contact sports that provide information about how to manage skin infections (especially those caused by MRSA) and steps to prevent their spread.

Encourage eligible persons to get influenza, pneumococcal, and other appropriate vaccinations through public service announcements and print media.

INFECTION CONTROL/BEST PRACTICES

GOAL: CONTROL THE EMERGENCE AND SPREAD OF ANTIMICROBIAL-RESISTANT ORGANISMS THROUGH APPROPRIATE USE OF ANTIMICROBIALS AND EFFECTIVE INFECTION CONTROL PRACTICES.

Determine practices and policies (i.e., antimicrobial stewardship, surveillance for antimicrobial-resistant bacteria, infection control) currently adopted by acute-care facilities to define what infection control activities are currently in use and where there might be areas for improvement.

Encourage institutions involved in all aspects of patient care to institute "best practices" that have been shown or are believed (by expert or consensus panels) to be effective in controlling the spread of antimicrobial-resistant organisms.

Develop a guidance document that promotes infection control practices, including CDC-recommended isolation precautions, that are evidence-based and/or recommended by professional organizations and committees that address infection control issues in healthcare settings (e.g., Association for Professionals in Infection Control and Epidemiology, Society for Healthcare Epidemiology of America, and Healthcare Infection Control Practices Advisory Committee). This document should not be limited to providing infection control guidance for use in acute-care settings, but should include guidance specific to other institutions involved in the continuum of care (ambulatory clinics, private practices, home-care, and long-term care).

Partner with professional societies (e.g., New Jersey chapters of APIC, the Medical Society of New Jersey, the Infectious Diseases Society of New Jersey, and the NJ Chapter of the American College of Physicians) to disseminate information about best practices.

Make above guidance document readily accessible (i.e., post it to the NJDHSS website) and alert interested parties to its existence (e.g., via a LINCIS message).

Assess public knowledge, attitudes, and beliefs with respect to antibiotic use practices through the addition of an “antibiotic use” module to the New Jersey Behavioral Risk Factor Surveillance System.

Based on the above findings, tailor messages and tools developed by CDC’s Get Smart: Know When Antibiotics Work Program to decrease public demand for antibiotics during situations in which they are not clinically indicated.

Utilize messages and tools developed by CDC’s Get Smart: Know When Antibiotics Work Program to assist healthcare providers in the management of clinical conditions for which antibiotics are thought to be over-prescribed (e.g., upper respiratory infections).

Alert healthcare facilities (whether acute or chronic) and the public about the availability of informational materials (e.g., posters, slide sets) developed by CDC’s 12-Step Campaign for Preventing Antimicrobial resistance in Healthcare Settings, as they become available, to encourage sound clinical practice.

Foster effective communication between various components of the healthcare system to ensure that healthcare providers have access to all information necessary to make appropriate patient management decisions (e.g., promote consistent and adequate completion of transfer forms that are intended to be used when patients are transferred between long-term care/assisted living facilities and acute care settings).

LABORATORY

GOAL: ENCOURAGE THE USE OF STANDARDIZED ANTIMICROBIAL SUSCEPTIBILITY TESTING (AST) METHODS ACCORDING TO EXPERT GUIDANCE TO IMPROVE ACCURACY OF RESULTS AND ABILITY TO COMPARE TRENDS ACROSS INSTITUTIONS.

Ensure that clinical laboratories in New Jersey perform AST according to established Clinical and Laboratory Standards Institute (CLSI) guidelines. Through the New Jersey Public Health and Environmental Laboratories (NJPHLE) and contingent on staff availability:

Develop and present a training program in AST and reporting to clinical laboratories using established methods and the most current CLSI guidelines.

Provide proficiency testing (PT) material for educational purposes, covering a reasonable range of reporting patterns, to assess procedural compliance, antibiotic appropriateness and accuracy of results.

Familiarize healthcare providers with the laboratory methods used to assess AR and provide healthcare providers with guidelines for interpretation of AR data.

ECONOMICS

GOAL: DEFINE THE ECONOMIC IMPACT OF AR. USE ECONOMIC ANALYSES TO EDUCATE HEALTHCARE PROVIDERS, HEALTHCARE EXECUTIVES, POLITICIANS AS WELL AS THE GENERAL PUBLIC ABOUT THE HIGH COSTS ASSOCIATED WITH INFECTIONS CAUSED BY ANTIMICROBIAL RESISTANT BACTERIA AND THE INAPPROPRIATE USE OF ANTIMICROBIALS.

Use available data to calculate the economic burden of AR in New Jersey and disseminate the information to pertinent stakeholders.

Provide support for effective antimicrobial stewardship programs by demonstrating the economic benefits associated with these programs.

Disseminate information on the economic burden resulting from increased morbidity and mortality associated with inappropriate antimicrobial use. (e.g., cost associated with *Clostridium difficile*-associated disease [CDAD]).

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