Stopping the Threat of Anti-Microbial Resistance

President’s Council of Advisors on Science and Technology
National Academy of Sciences, Washington DC
September 12, 2013

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CDC strategic directions

Improve health security at home and around the world

Health Security

LEADING CAUSES OF DEATH

Better prevent the leading causes of illness, injury, disability, and death

Public Health-Health Care Collaboration

Strengthen public health/health care collaboration
Perfect storm of vulnerability

- Recombinant technologies
- Anthrax
- Intentional engineering of microbes
- Globalization of travel, food and medicines
- Rise of drug resistance
- Emergence and spread of new pathogens
- XDR TB
- CRE
- Food supply
- Avian flu
- HIV
Key strategies

• Prevent infections
• Track resistant infections
• Improve use of antibiotics (stewardship)
• Find new drugs
Carbapenem-resistant *Enterobacteriaceae* (CRE)

- Multidrug-resistant organisms, including CRE, pose a significant public health threat
  - Most common type of CRE is resistant to almost **ALL** antibiotics
  - New and frightening resistance patterns emerging
  - CRE has spread across US – found in one state in 2001, now spread to 38 states

Outbreaks show importance of long-term care, acute care, and nursing homes as source of HAIs in hospitals

- Regional prevention efforts effective in preventing infections (e.g., Chicago, Florida)
Enteric diseases becoming increasingly resistant to antibiotics

Salmonella Typhi (typhoid fever) resistance/partial resistance to ciprofloxacin

Campylobacter resistance to ciprofloxacin
Antimalarial artemisinin drug resistance is growing in South-East Asia

- Antimalarial ACT drug therapies increasingly ineffective
- No new drug class expected for >5 years
- Need for better control of malaria to
  - Prevent worsening drug resistance
  - Slow disease spread

WHO. Update on artemisinin resistance, April 2012. Circles represent data before November 2010; triangles data after November 2010.
MDR-TB is a global threat

Source: WHO. Rate among previously untreated patients.
Public health strategies can reduce resistance

- Immunization
- Infection control
- Protecting the food supply
- Antibiotic stewardship
- Outbreak detection and control
Rates of prescribing antibiotics vary widely among states

*Prescriptions per 1,000 population, 2010*

Antibiotic stewardship is an effective strategy to prevent AMR

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<thead>
<tr>
<th>Facility benefits</th>
<th>Antibiotic best practices</th>
<th>Antibiotic stewardship programs are a “win-win”</th>
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<tbody>
<tr>
<td>• Decrease antibiotic resistance</td>
<td>1. Ensure all orders have dose, duration, and indications</td>
<td>• A University of Maryland study showed one antibiotic stewardship program saved $17M over 8 years</td>
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<tr>
<td>• Decrease <em>C. difficile</em> infections</td>
<td>2. Get cultures before starting antibiotics</td>
<td>• Antibiotic stewardship helps improve patient care and shorten hospital stays</td>
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<td>• Decrease costs</td>
<td>3. Take an “antibiotic timeout,” reassessing antibiotics after 48-72 hours</td>
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Advanced Molecular Detection combines cutting-edge approaches

Traditional epidemiology + Genomic sequencing + Bioinformatics = Advanced Molecular Detection
Growth and decline of drug-resistant TB

NYC, 1955-2003

C. diff infections declined sharply after revision of antibiotics guidelines
University Hospital Lewisham, London, 2005-07

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