We are the World: Collaboration is not Optional

Elizabeth D. Hermsen, PharmD, MBA, BCPS-AQ(ID), FIDP
Head, Global Antimicrobial Stewardship
Global Population Health
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Disclosures

• I am a compensated employee of Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Kenilworth, NJ, USA.

• The content of this presentation does not necessarily represent the opinions of Merck & Co., Inc.
Key Takeaways

- Antimicrobial resistance (AMR) is a significant problem
- Antimicrobial stewardship (AMS) is part of the solution
- Multi-sector stakeholder collaboration is necessary
We are the World

There comes a time when we heed a certain call
When the world must come together as one
There are people dying
And it's time to lend a hand to life
The greatest gift of all

We can't go on pretending day by day
That someone, somewhere will soon make a change

- Written by Michael Jackson & Lionel Ritchie
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Antimicrobial Resistance is Getting Attention

The Washington Post

Widening superbug outbreak raises questions for FDA, manufacturers

By Brady Dennis

By the time 16-year-old Aurora Young wound up at Ronald Reagan UCLA Medical Center in Los Angeles last October, she’d been wracked by excruciating stomach pain and vomiting that repeated daily.

Review calls for global fund to fight dangerous superbug

By Kate Kelland

LONDON, Feb 5 (Reuters) - A global push to find new antibiotics to treat bacterial infections has received a boost from the British government, but experts say more needs to be done.

"A lot of innovative thinking is happy. Those bright ideas need to be translated into effective tools," said Dr. Andrew Pollard, director of Oxford University's Jenner Institute.

Bloomberg Businessweek

Superbug Spread Reveals Thin Pipeline of Newest Antibiotics

Call to boost antibiotics funding to tackle 'growing crisis'

By James Cagigal

The United Nations has called for a surge in funding to fight antibiotic-resistant superbugs, which are threatening to make common infections deadly.

7 Questions You Probably Have About 'Superbugs,' Answered

By Nick Nolin

The National Institutes of Health says the threat of drug-resistant superbugs is real, and the agency is funding research to combat the problem.

U.S. Aims to Curtail Peril of Antibiotic Resistance

By Marjorie Bretton

WASHINGTON -- The Obama administration on Thursday announced new measures to combat the growing threat of antibiotic resistance, outlining a national strategy that includes actions for the development of new drugs, tighter restrictions on the use of antibiotics, and improvements in tracking the use of antibiotics and the microbes that are resistant to them.

The actions are the first major White House effort to confront a public health crisis that takes at least 23,000 lives a year, and many experts were pleased that a president had finally focused on the issue. But some said the strategy fell short in not recommending tougher measures against the overuse of antibiotics in agriculture, which, they argue, is a big part of the
Why is Antimicrobial Resistance Bad?

- Global scope
- On the rise
- Increases morbidity and mortality for patients
- Significant economic burden to society
- New antimicrobials are limited
Antimicrobial Use is a Key Driver of Antimicrobial Resistance

First clinical use

- Penicillin (1942)
- Ampicillin (1962)
- Cefotaxime (1979)
- Imipenem (1985)

First resistance

- Osteomyelitis due to penicillinase-producing *S. aureus* (1949)
- Description of TEM penicillinase (1966)
- Description of CTX-M (1990)
- First clinical ESBL (SHV-2) (1985)
- Carbapenemase from Enterobacteriaceae (1993)

What are you supposed to be?

An unfinished course of antibiotics.

I can lead to antibiotic resistance. Aren't I terrifying?!

And Beatrice was never invited to a Halloween party ever again.

Beatrice the Biologist
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Meeting the Challenge of Antimicrobial Resistance

- Speed up antimicrobial discovery and development
- Slow down the emergence of resistance
From the Ground Up

Antimicrobial Stewardship

Diagnosis & Surveillance

Infection Prevention

One Health Approach
Key Components of Antimicrobial Stewardship

Optimize outcomes while reducing risks of unintended consequences
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Why Should (Does) AMS Matter to Pharmaceutical Industry?

• Positive outcomes

• Improved molecule longevity

• Prevention of collateral portfolio damage

• Credibility
Merck Created an Antimicrobial Stewardship Council

**Executive Sponsor:** Executive Vice President & Chief Patient Officer, Strategic Communications, Global Public Policy, and Population Health

**Purpose:**
- Promote alignment and provide endorsement for AMS-related strategies and initiatives
- Facilitate AMS championship across participating functions
As a major multinational manufacturer of vaccines, anti-infectives and animal health-related products, Merck developed a One Merck Global Action Plan to demonstrate how the company is taking action to combat AMR.

- The Global Action Plan was developed through Merck’s cross-functional AMS Council.
Merck Promotes Human & Animal Health

- Infection Prevention
- Innovation
- Antimicrobial Stewardship
- Surveillance & Awareness
- Advocacy
Merck has a Corporate Antimicrobial Stewardship Vision

Merck will be known as a leader within the industry and sought-after partner within the broader healthcare community in advancing antimicrobial stewardship through education, implementation, research, and advocacy initiatives supporting patient-centered AMS with an emphasis on patient outcomes, population health, and value of care.
AMS Small Network Model Includes Human & Animal Health

- Advocacy
- Education
- Research
- Implementation

AMS Council

Global AM

MERCK INVENTING FOR LIFE
Pathway to Partnership

AMS Small Network Model
AMS Council
Examples

• Poultry Production Facility Visit
• Surveillance Workshop
• Publications Team

White House Forum on AMS June 2015
We are the World: Collaboration is not Optional

Let's realize that a change can only come
When we stand together as one

- Written by Michael Jackson & Lionel Ritchie
BACK-UP
To keep both humans and animals healthy and minimize antibiotic use, Merck commits to:

• Continue to invest in R&D for innovative vaccines and preventive options

• Develop and deliver vaccines that address global public health priorities, including heat-stable rotavirus and oral cholera vaccine candidates

• Promote the value of vaccination as a cost-effective intervention

• Build upon Merck Animal Health’s role as the world’s largest manufacturer of vaccines for animals by investing in new technology, such as RNA particle technologies, to address emerging diseases
To spur innovation and deliver critical new antimicrobial therapies, Merck commits to:

- Continue to drive innovation and deliver new antimicrobial treatment and prevention options
- Partner with governments and other stakeholders to develop new economic models that create a sustainable market
- Provide access to research tools and information and participate in collaborative efforts to advance early research
- Develop an access strategy for Merck’s portfolio
To promote antimicrobial stewardship, Merck commits to:

- Expand **AMS Program** from 521 hospitals in 26 countries to 1,000 hospitals in 40 countries by 2019.
- Create global network for **AMS training and support** with 11 Centers of Excellence.
- Support **education on AMS** for relevant Merck employees.
- Ensure **Merck manufacturing discharges** are meeting **Environmental Quality Criteria** and **facilities** are equipped with API-treatment technology to ensure that our wastewater meets internal standards.
- Explore **new value-based** contracting models with payers and providers.
- Develop **collaborations** in hospital and community settings.
- Scale up partnerships with **diagnostics companies**.
To improve global surveillance and drive awareness of AMR, Merck commits to:

- Expand surveillance program from 54 to 59 countries and from 192 to 222 sites
- Support government and public health initiatives to educate healthcare professionals and patients on the value and importance of appropriately using antibiotics
- Continue to support efforts to develop and implement national AMR action plans in support of the WHO Global Action Plan