International Activities In Antimicrobial Resistance

Tom M Chiller MD MPHTM
Associate Director for Epidemiological Science
Division of Foodborne, Waterborne, and Environmental Diseases

Antibiotic Use and Resistance
Moving forward through shared stewardship
National Institute for Animal Agriculture
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“We are all connected by the food we eat, the water we drink, and the air we breathe.”

Dr. Tom Friedan, CDC Director
Antimicrobial Resistance: A Global Problem

- Antimicrobial resistance is a global problem that requires a global approach
  - Extensive movement of people, animals, and foods around the world
  - AR in any country is of global concern

- To better understand the problem and effectively address it, we need
  - Global surveillance to detect the emergence and spread of AR
  - International data sharing and harmonization
  - International cooperation to limit global spread
“Without urgent, coordinated action by many stakeholders, the world is headed for a post-antibiotic era, in which common infections and minor injuries which have been treatable for decades can once again kill.”

– Dr. Keiji Fukuda, WHO Assistant Director-General for Health Security
April 30, 2014
The Global Spread of Resistant *Salmonella*: Examples from NARMS

- Quinolone-resistant *Salmonella* Enteritidis associated with international travel
  - O’Donnell *et al.*, CID August 2014
- Ciprofloxacin-resistant *Salmonella* Kentucky in international travelers and foreign visitors
  - Rickert and Folster, EID May 2014
- NARMS described other resistant infections acquired abroad in several earlier studies
  - Non-Typhi *Salmonella* with ESBLs
  - Plasmid-mediated quinolone resistance in non-Typhi *Salmonella*
  - Quinolone-resistant typhoidal *Salmonella*
Salmonella Heidelberg in Québec
Ceftiofur resistance – 2003-2008

Cft R S. Heidelberg was common in poultry meat, but was not found in beef or pork

2005-2006: Poultry industry in Québec voluntarily halted use of ceftiofur in eggs

Dutil et al. 2010 EID 16: 48-54
Some Examples Around the World

- **Campylobacter** in Europe: Cipro resistance in
  - 52% of strains from humans
  - 50% of strains from poultry
  - 80% of strains from international travelers

- **Salmonella Typhimurium and Enteritidis** in eastern Africa
  - Recurrent outbreaks, sometimes nosocomial
  - Highly multi-resistant strains
  - Invasive infections with higher mortality (typhoid-like)

- **Taiwan: Salmonella Choleraesuis:**
  - Increase in human infections in late 1990’s
  - Resistant, up to 60% cipro R, some to ceftriaxone (CMY2)
  - Highly invasive, presenting with aortitis, septic shock
  - Related to epizootic in pigs with same organism

*WHO Campylobacter Consultation 2013*
2013 Kotloff Lancet; 2008 Gordon CID; 2011 Su EID;
Salmonella Kentucky in Africa/Asia/Europe

- Since 1960, Pasteur Institute tracking *Salmonella* Kentucky
  - First: infections in travelers from Tunisia
  - 1990’s: from Egypt
  - 2000’s: from India

- Progressive increase in resistance (since 1990’s)

- 2008: Appeared in Polish turkey flocks, meat and consumers

- Since then in turkey flocks and meat in Germany and France

- One genetic lineage: now R to ASSuTTmpGentCip, and sometimes has CMY2

LeHello 2013 Lancet Infectious Disease 13:652-679
Wasyl 2012 Food Research Int 45:958-961
Selected WHO Consultations and Meetings on Antimicrobial Resistance in the Food Chain (pre-2008)

- Medical Impact of the Use of Antimicrobials in Food Animals, 1997
- Global Principles for the Containment of Antimicrobial Resistance in Animals Intended for Food, 2000
- Monitoring Antimicrobial Usage in Food Animals for the Protection of Human Health, 2001
- Non-Human Antimicrobial Usage and Antimicrobial Resistance, 2003* and 2004*
- Antimicrobial Use in Aquaculture & Antimicrobial Resistance, 2006*
- Critically Important Antimicrobials, 2005 and 2007*

*Joint FAO/OIE/WHO meetings
WHO Advisory Group on Integrated Surveillance of Antimicrobial Resistance

- Established in December 2008
- Provides expert advice to WHO on
  - Containing food-related antimicrobial resistance
  - Promoting integrated surveillance of antimicrobial resistance and antimicrobial usage
AGISAR Participants

- Physicians
- Microbiologists
- Veterinarians
- Epidemiologists
- Participants from all 6 WHO regions
- Representatives from FAO, OIE, ECDC, EFSA
- Several NARMS scientists from CDC, FDA, and USDA have participated in AGISAR
AGISAR Subcommittees

- Antimicrobial Resistance Surveillance
- Antimicrobial Usage Monitoring
- Capacity Building and Pilot Projects
- Data Management
- Risk Communication
AGISAR Terms of Reference

- Support WHO activities on containment of resistance from food chain, including
  - **Capacity-building activities** related to integrated surveillance of antimicrobial resistance and usage
  - Selection of sentinel sites and design of integrated surveillance *pilot projects*
  - **WHO list of critically important antimicrobials** for human medicine
  - Implementation of **FAO/OIE/WHO joint activities**
Key AGISAR Activities

- Support WHO capacity-building activities
- Maintain and update the List of Critically Important Antimicrobials
- Develop guidance on integrated surveillance of antimicrobial resistance
National Programs and Pilot Projects

- National programs
  - Technical support to Brazil in 2013 and Mexico in 2014 for establishing national programs for integrated surveillance of antimicrobial resistance

- Pilot projects, 2011-2013
  - Africa (Burkina Faso, Senegal)
  - Asia (Cambodia, Vietnam, India)
  - Europe (Kosovo)
  - Middle East (Lebanon)
  - Latin America (Uruguay, Paraguay, Argentina, Venezuela, and Costa Rica)
AGISAR Partnerships with Global Foodborne Infections Network (GFN)

GFN is a network of institutions and individuals committed to

- Enhancing the capacity of countries to detect, control, and prevent foodborne and other enteric infections
- Promoting integrated, laboratory-based surveillance
- Fostering collaboration among human health, veterinary, food and other relevant sectors
List of Critically Important Antimicrobials

- First developed in 2005 by a WHO expert working group consultation
  - Updated regularly
  - Since 2009, revisions made by AGISAR
- Intended to help preserve the effectiveness of antimicrobials
- Reference to help formulate and prioritize risk assessment and risk management strategies for containing resistance due to antimicrobial use in humans and animals

http://www.who.int/foodborne_disease/resistance/cia/en/
Antimicrobial agents are ranked as:
- Critically important
- Highly important
- Important

Highest priority agents:
- Fluoroquinolones
- 3\textsuperscript{rd} and 4\textsuperscript{th} generation cephalosporins
- Macrolides
- Glycopeptides

Recommends that classes not currently used in food animals (such as carbapenems) and any new class developed for human therapy should not be used in animals or plants.
World Organisation for Animal Health (OIE)

- List of Antimicrobial Agents of Veterinary Importance
- Standards on prudent use of antimicrobials in terrestrial and aquatic animals
- Standards on monitoring antimicrobial use and resistance
- Held the first global conference on prudent use of antimicrobials in veterinary medicine in 2013
Guidance on Integrated Surveillance of Antimicrobial Resistance

- Important output of the 5-year strategic framework for AGISAR
- Provides basic information that countries need to establish programs for integrated surveillance of resistance
- Makes recommendations that facilitate global harmonization and data comparability
- NARMS scientists from CDC, FDA, and USDA helped draft the guidance

November 2013
Some Recent WHO Activities Related to Antimicrobial Resistance (AR)

- World Health Day—focus on AR, 2011
- Reports published
  - The Evolving Threat of AR: Options for Action, 2012
- Resolution on AR at World Health Assembly, May 2014
  - Urged governments to strengthen national actions and international collaborations to address resistance
  - Called on WHO to lead development of a draft global action plan
- WHO launched online consultation on the draft global action plan to combat AR, July 2014
WHO/FAO/OIE Collaboration

- Established a formal alliance to enhance global coordination of activities that address health risks at the animal-human-ecosystem interface

- Antimicrobial resistance was identified as 1 of 3 priority topics for joint action
  - Complex problem cannot be effectively addressed by one health sector alone
  - Human and animal health issue
Tackling Antibiotic Resistance from a Food Safety Perspective in Europe

- Published by WHO Regional Office for Europe in 2011
- Explains the problem and options for prevention and containment of antibiotic resistance in the food chain
- Primarily intended for policy-makers and people working in the public health, agriculture, food production and veterinary sectors
Transatlantic Taskforce on Antimicrobial Resistance: TATFAR

- Constituted in 2009 with the goal of improving cooperation between the US and the EU in AR
- Three key areas:
  - 1- appropriate therapeutic use of antimicrobial drugs in medical and veterinary communities
  - 2- prevention of healthcare- and community-associated drug-resistant infections
  - 3- strategies for improving the pipeline of new antimicrobial drugs
- Identified and adopted 17 recommendations
- The implementation through increased communication; regular meetings and joint workshops; and exchange of information and approaches, best practises and methodologies.
Concluding Comments

- Antimicrobial resistance is a complex global problem that requires a multi-sectoral and global approach
  - Strengthening global surveillance for resistance is critical
- WHO and other international organizations have prioritized addressing antimicrobial resistance
- US is working closely with international partners
  - To build international capacity for monitoring foodborne diseases and resistance in the food chain through initiatives such as GFN and AGISAR
  - To identify and investigate emerging resistance
  - To harmonize resistance testing and reporting to facilitate data sharing
For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov   Web: www.cdc.gov

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