Presentation from

2016 World Water Week in Stockholm

www.worldwaterweek.org

Antimicrobial Resistance

A One Health Challenge for Joint Action

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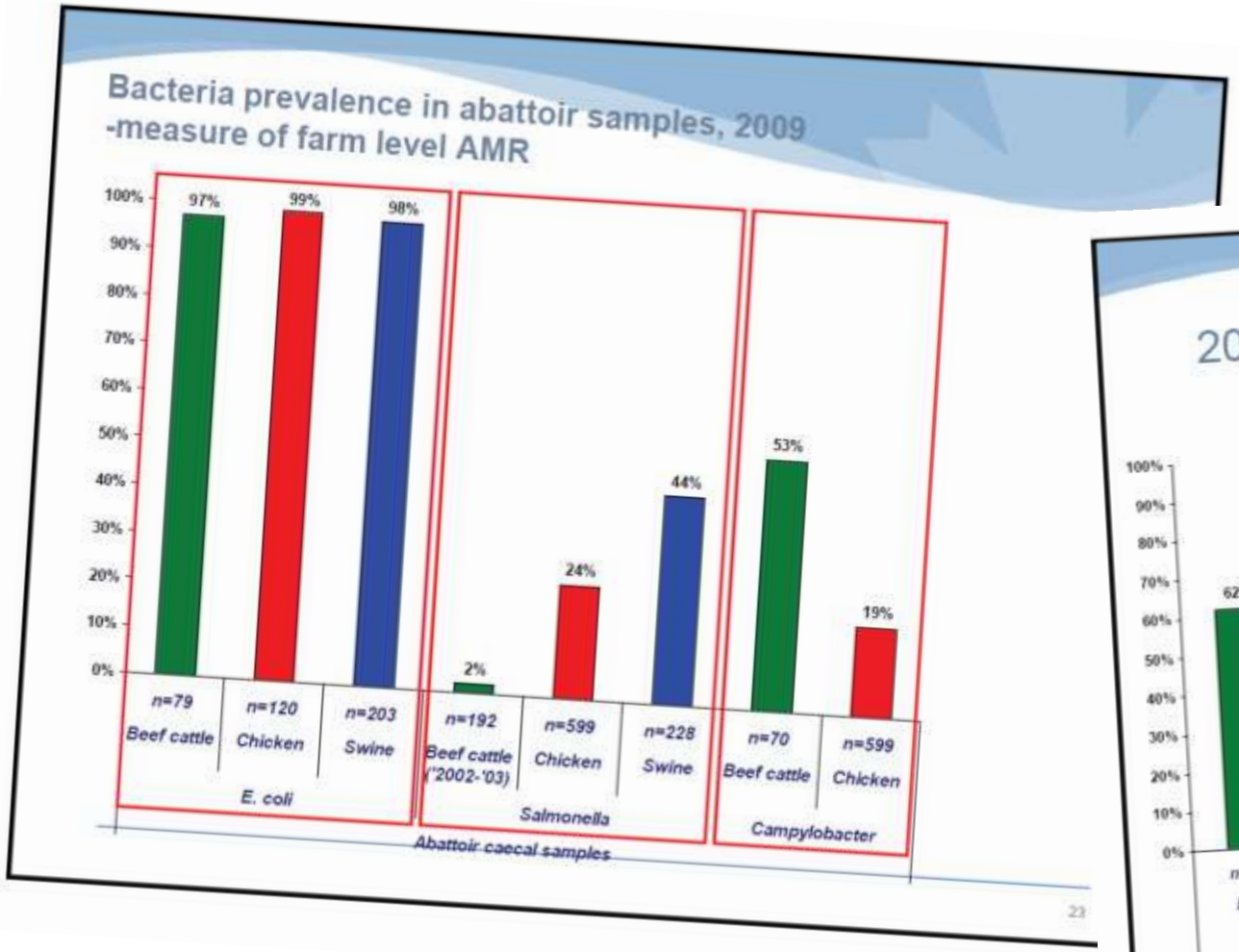
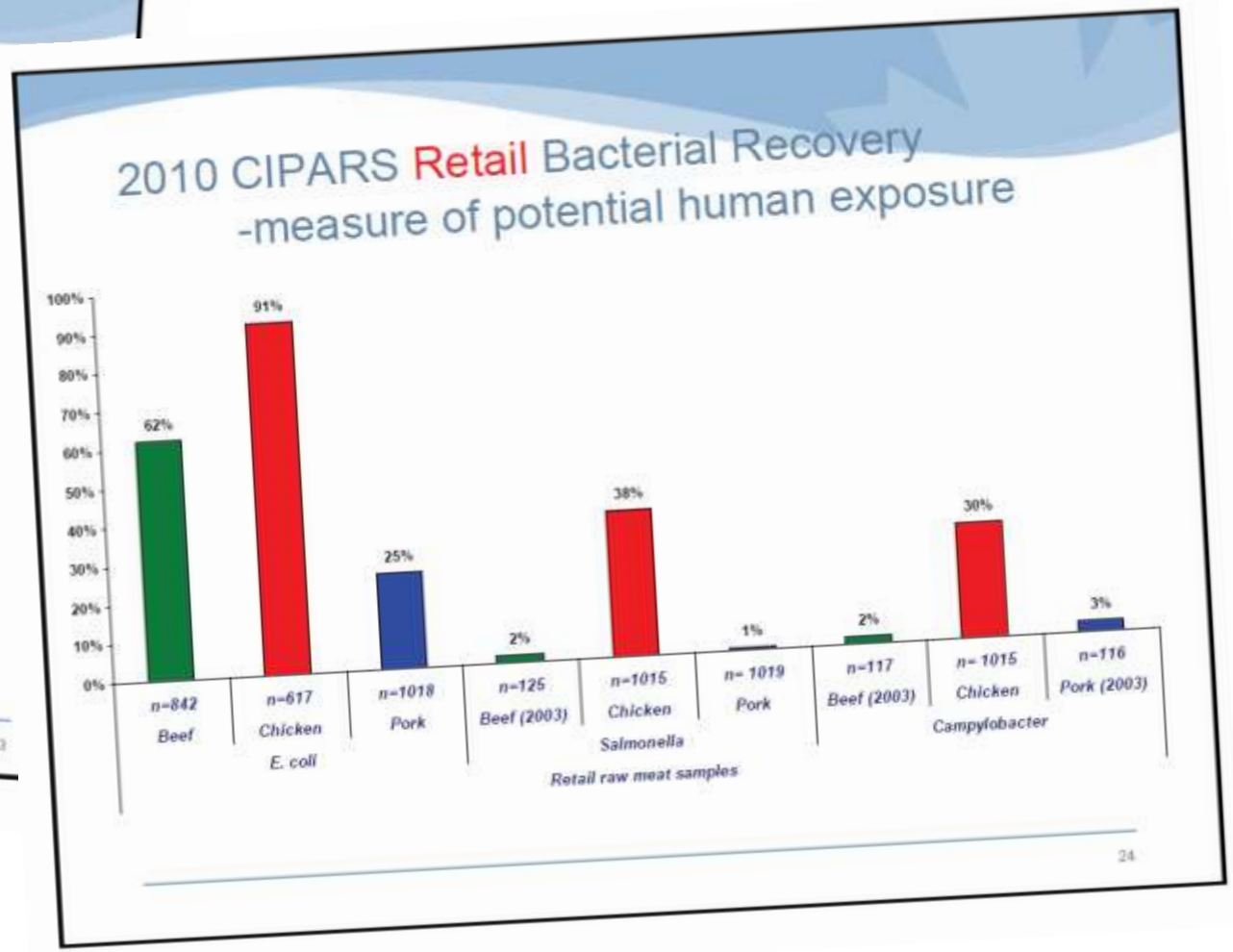
Chief Veterinary Officer

Food and Agriculture Organization of the United Nations

Stockholm, 29 August 2016

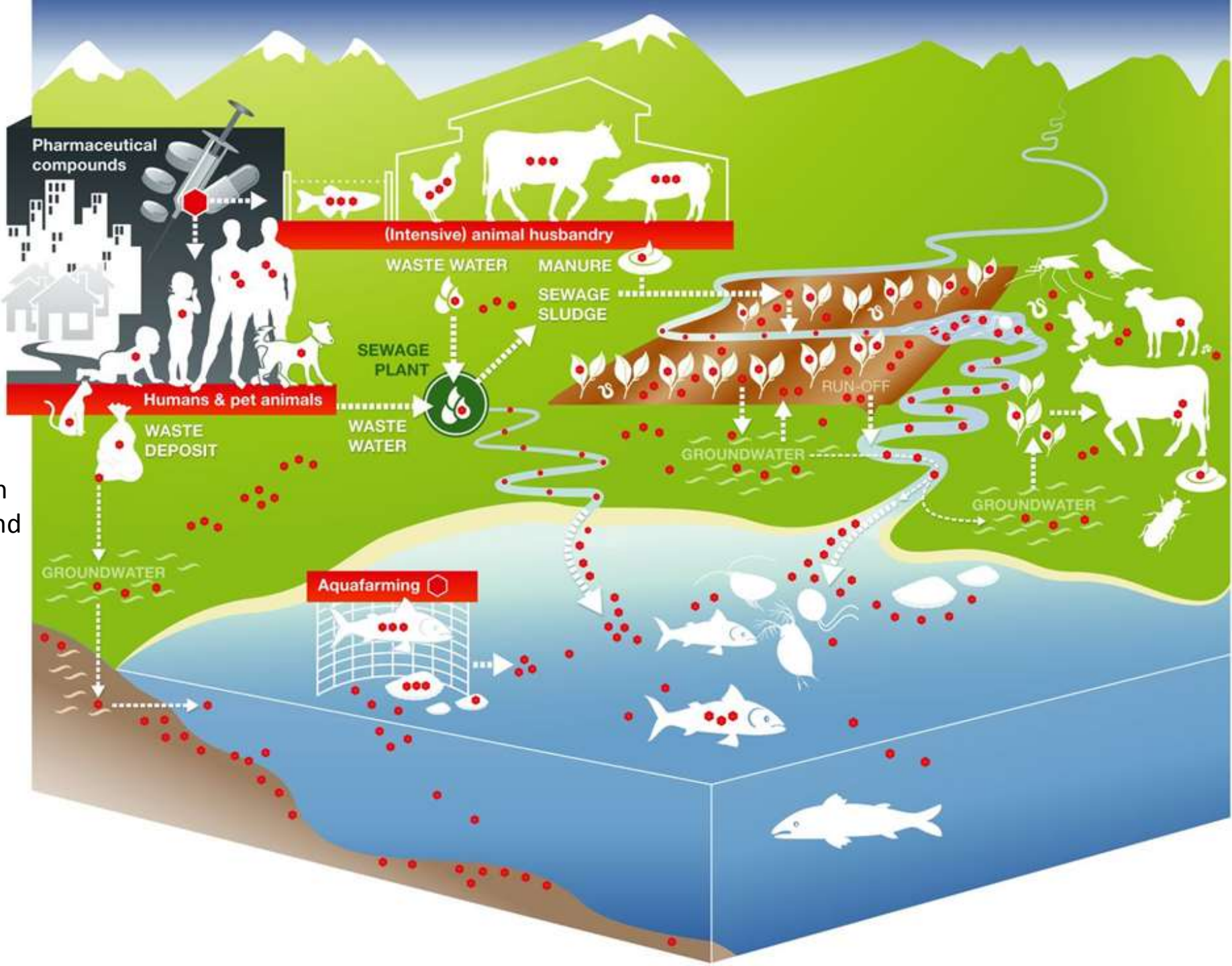
SIWI WORLD WATER WEEK



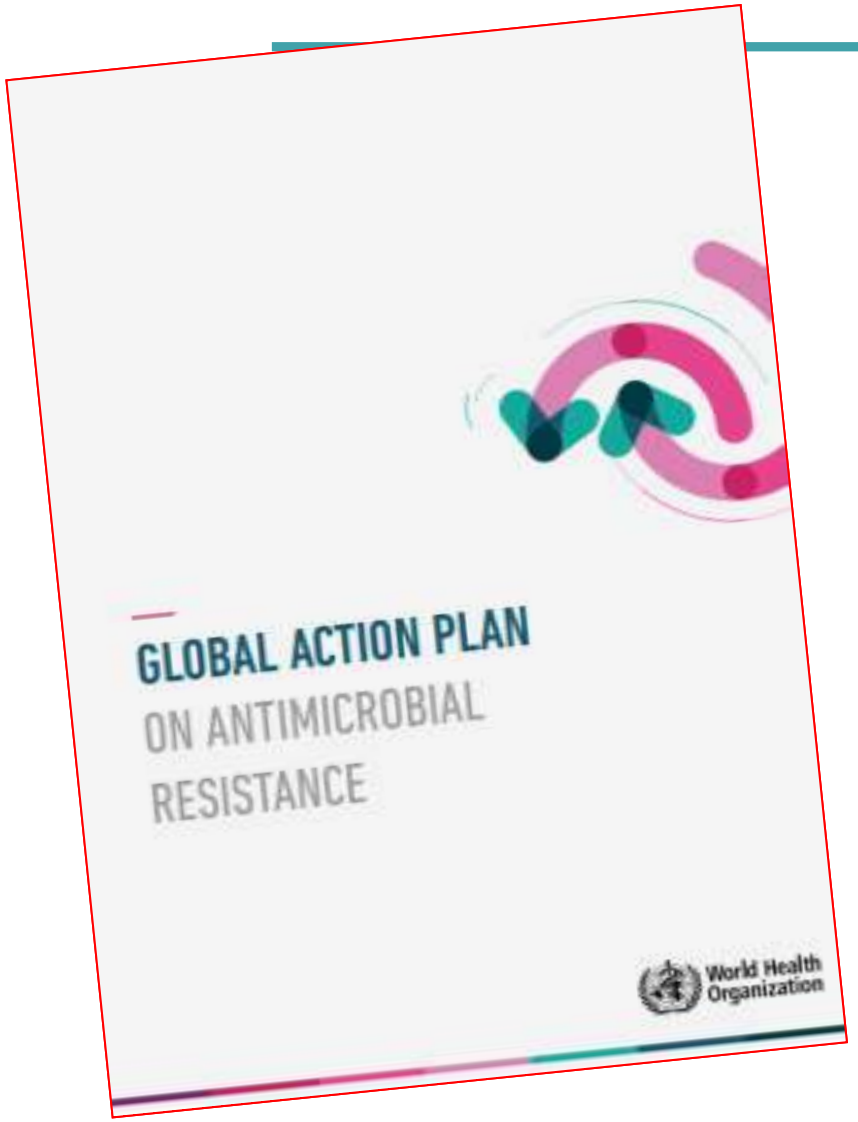


PHAC – Canada - Canadian Meat Council
Technical Symposium
Toronto 2011

Antimicrobial usage in humans, animals and agriculture, and resulting dispersion of antimicrobial residues into aquatic and terrestrial environments (●●)
(Berkner et al., 2014)



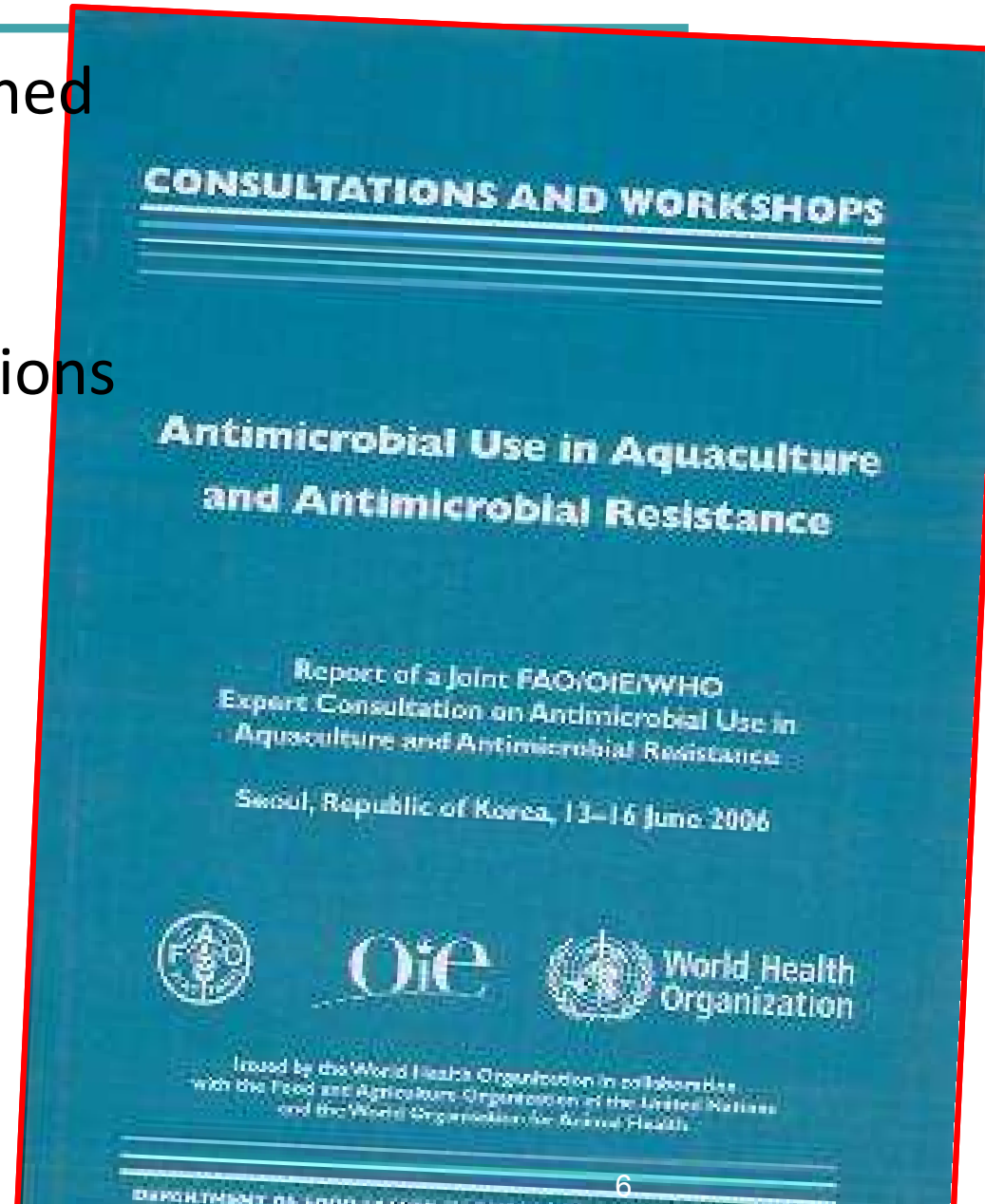
Global Action Plan on AMR
AMR: a Tripartite priority



- Major global public health threat
- Theme of the WHD 2011
- Global Action Plan on AMR
  - FAO and OIE contributions
  - Endorsed by WHA May 2015
- WHO, OIE and FAO Resolutions 2015
- FAO Action Plan on AMR (2015, 2016)
  - Presented to Governing Bodies

FAO/OIE/WHO work on AMR **since 1997**

- International collaboration established
  - **Codex Alimentarius**, (1963)
  - FAO, WHO and OIE
- > 20 expert meetings and consultations
- Roles
  - Codex and OIE: normative work
  - FAO and OIE: practical guidance and capacity building
  - WHO: raise public awareness, monitoring, leading the debate
- Publications



FAO-OIE-

pdates

World Health Organization

Health topics | Data | Media centre | Publications | Countries | Programmes | Governance | About WHO | Search

Food safety

- Food safety
- Areas of work
  - Foodborne diseases
  - Food hygiene
  - Food technologies
  - Microbiological risks
  - Chemical risks
  - International food standards (Codex Alimentarius)
  - INFOSAN
  - Antimicrobial resistance
  - Zoonoses and the environment
  - Nutrition and food security

FAO/OIE/WHO Tripartite Collaboration on AMR

Addressing the rising threat of AMR requires a holistic and multisectoral (One Health) approach because antimicrobials used to treat various infectious diseases in animals may be the same or be similar to those used in humans. Resistant bacteria arising either in humans, animals or the environment may spread from one to the other, and from one country to another. AMR does not recognize geographic or human/animal borders.

The WHO, the Food and Agriculture Organization (FAO) and the World Organisation for Animal Health (OIE) speak with one voice and take collective action to minimize the emergence and spread of AMR. The aim is to:

- Ensure that antimicrobial agents continue to be effective and useful to cure diseases in humans and animals
- Promote prudent and responsible use of antimicrobial agents
- Ensure global access to medicines of good quality

Key Documents

A FAO/OIE/WHO manual for developing national action antimicrobial resistance (Ver.1) (2016)

Share | Print

Related links

OIE work on AMR

FAO work on AMR

FAO/OIE/WHO tripartite collaboration

Key areas in GAP and NAP (2015-2016)

1. Improve awareness **and understanding of AMR**

- Risk communication
- Education

2. Strengthen knowledge through surveillance **and research**

- National AMR surveillance
- Laboratory capacities
- Research and development

3. Reduce the incidence of infection through effective hygiene **& IPC**

- IPC in health care
- Community level prevention
- Animal health: prevention and control

4. Optimize **the use of antimicrobial medicines in human & animal health**

- Access to qualified antimicrobial medicines, regulation, AMS
- Use in veterinary and agriculture

5. Ensure sustainable investment **through research & development**

- Measuring the burden of AMR
- Assessing investment needs
- Establishing procedures for participation

FAO Action Plan on AMR – addressing the **FAO AMR Resolution** and the **Global Action Plan**

1. Improve systems **awareness** and advocacy on AMR and related threats
2. Develop capacity for **surveillance** and monitoring of AMR and AMU in food and agriculture
3. Strengthen **governance** related to AMU in food and agriculture
4. Promote **good practices** in food and agricultural d the prudent use of antimicrobials

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AMR and One Health at FAO

FAO **AMR Working Group**

AGAH	**AGFF**	**FIAA**
AGAS	**AGFC**	**FIAM**
AGAL	**AGL**	**LEGN**
AGE	**AGPM**	**OCC**

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Codex

- **Main texts**:
  - *Code of Practice to **Minimize and Contain** Antimicrobial Resistance* (CAC/RCP 61-2005)
  - *Guidelines for **Risk Analysis** of Foodborne Antimicrobial Resistance* (CAC/GL 77-2011)
- **Other Codex texts relevant to AMR includes**:
  - *Code of Practice on **Good Animal Feeding*** (CAC/RCP 54-2004)
  - *General Principles of **Food Hygiene*** (CAC/RCP 1-1969)
  - Several Codes of hygienic practices for different commodities (e.g. milk and milk products, fish and fishery products)
- The 39th session of the Codex Alimentarius Commission (June 2016)

Legislation – Coherence - working at country level on animal, plant health and food safety legislation.

The work of the Development Law Service (LEGN)

www.fao.org/legal

Identification of legal elements and areas relevant for AMR and AMU

Recommendations to mainstream AMU-related obligations and responsibilities in the relevant legislation

Support to participatory processes for legal reform

LEGAL INFORMATION – FAOLEX (faolextfao.org/faolex)

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AMR and Food Safety: Key Messages for Countries

1. Improve overall coordination
2. Improve regulatory framework
3. Reduce the need for and promote prudent use of antibiotics
4. Improve surveillance
5. Advocate and communicate
6. Build capacity and provide training
7. Address knowledge gaps and research needs

1. Intersectoral Coordination / Collaboration

- National interdisciplinary cooperation
- National intersectoral collaboration
  - holistic strategy
  - action plan
  - intergovernmental steering committee or task force
- Formal mechanism between health and food/feed safety/veterinary authorities.
- Environment
- Private sector (pharmaceutical, food production)

2. Improved Regulatory Framework

- Reducing and eliminating antimicrobials /antibiotics for **growth promoters**
- Requiring that antibiotics be administered to animals only when prescribed by a **veterinarian**
- Requiring that antibiotics identified as **critically important** in human medicine only be used in food animals when justified *(i.e., fluoroquinolones* and *third/ fourth generation cephalosporins)*

4. Integrated Surveillance

- Establishing a surveillance system for the **use of antimicrobials food animals, in feed, and environment**
- Establishing an integrated (among public health, food and veterinary sectors) surveillance system to monitor **antimicrobial resistance in selected food-borne bacteria**

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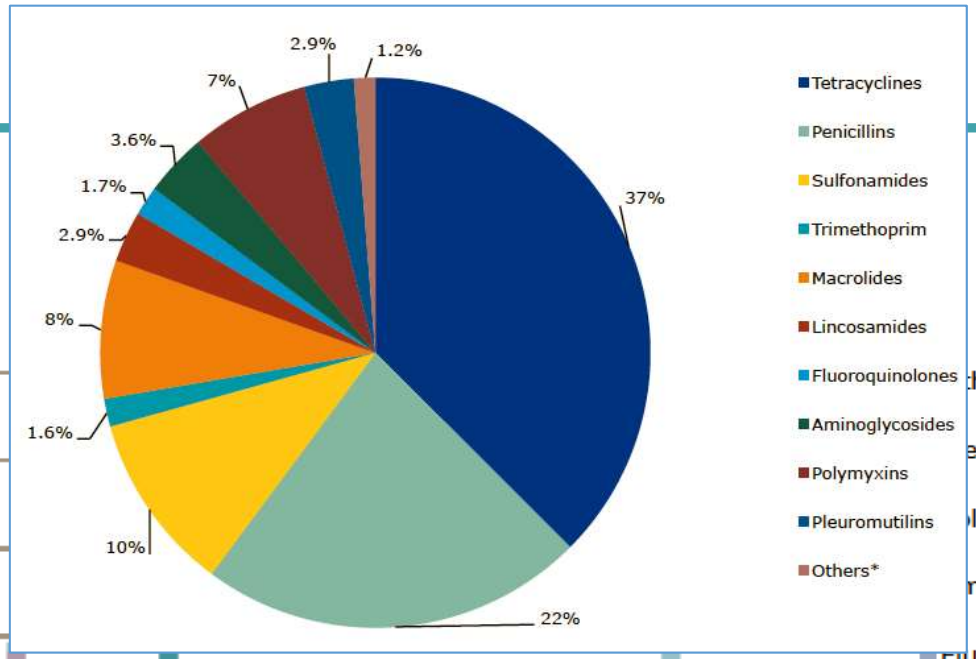
European Surveillance of Veterinary Antimicrobial Consumption (ESVAC)

- Project run by European Medicines Agency since 2010
- Harmonised approach for the collection and reporting of data on the **use of antimicrobial agents** in animals in Europe (EU/EEA).

ESVAC Data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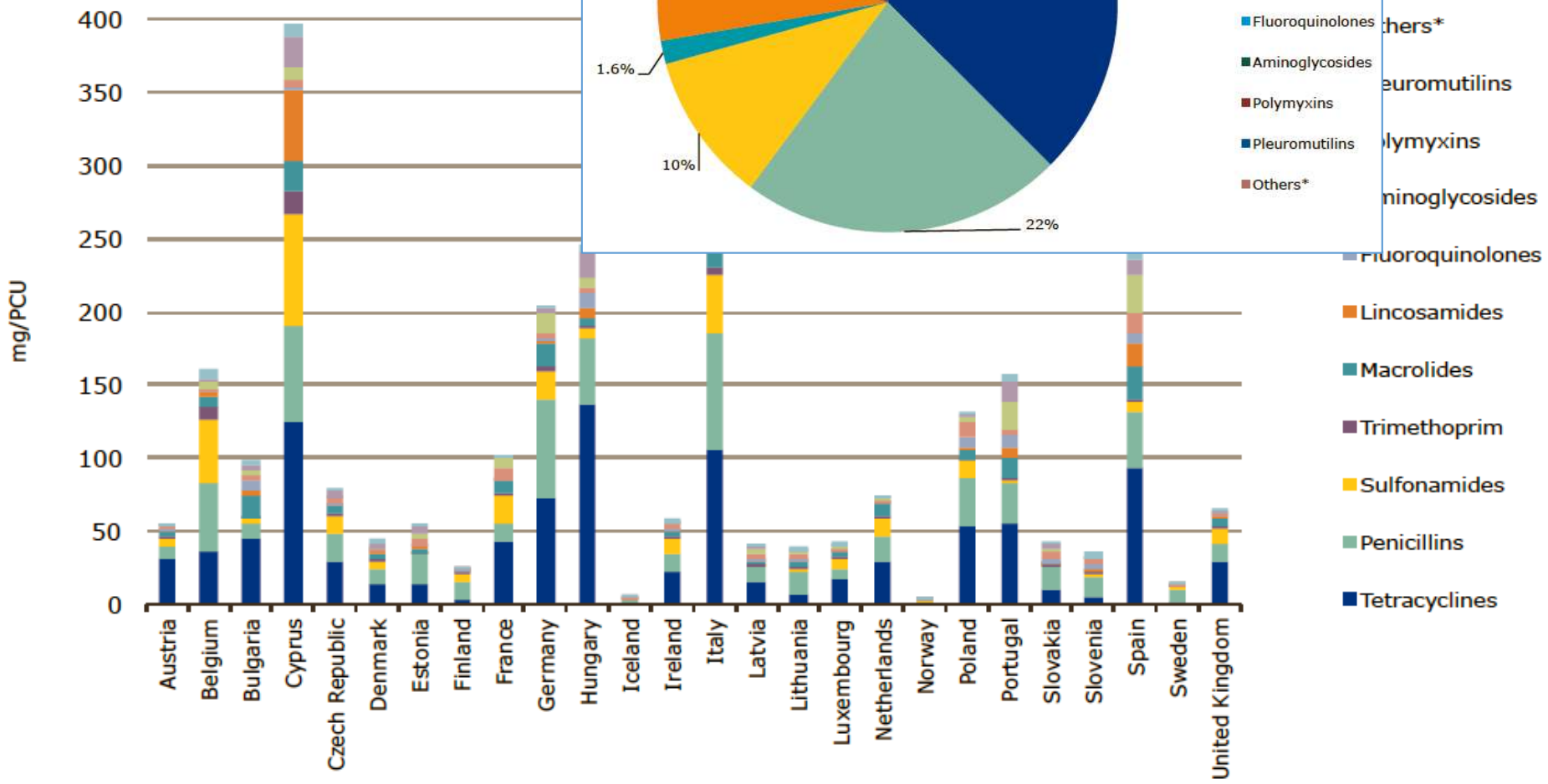
Polymyxins
Pleuromutilins
Others*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Spain
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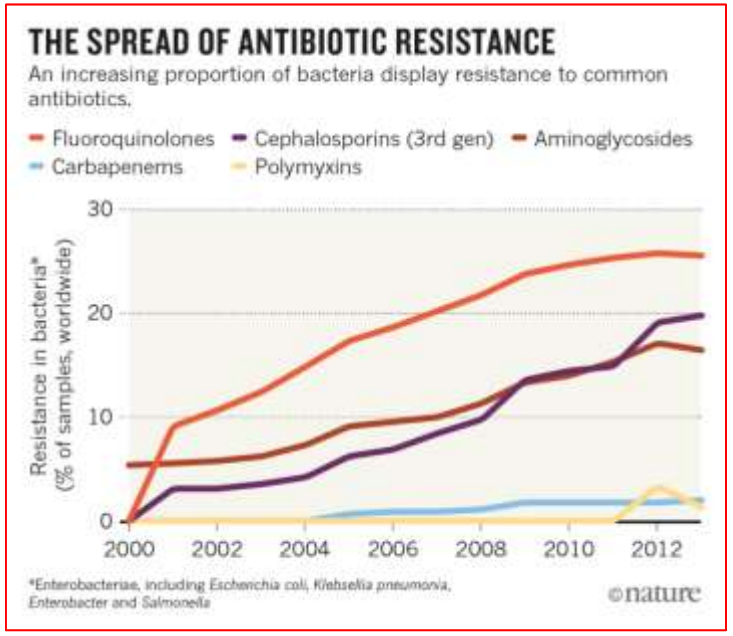
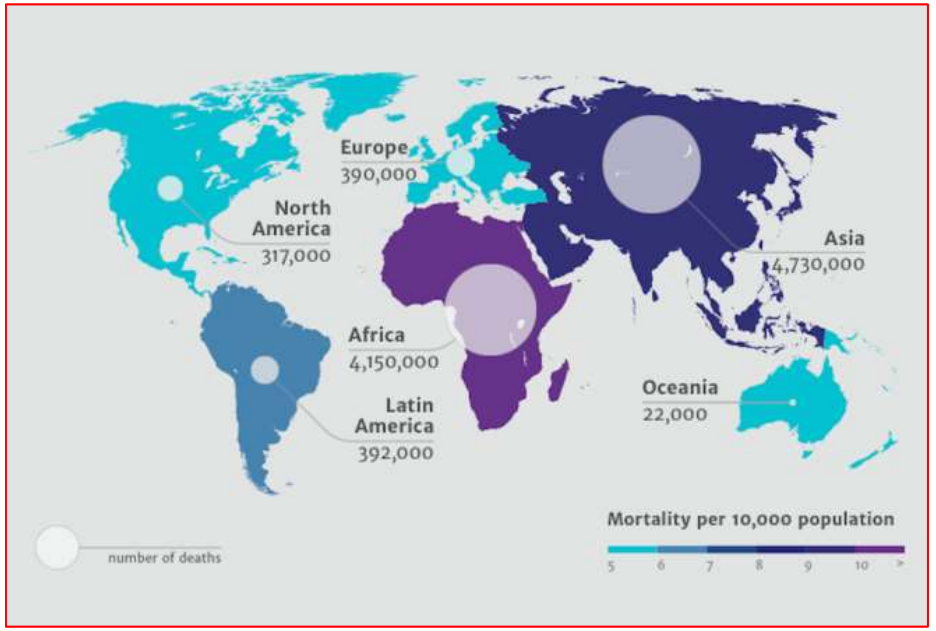
United Kingdom
Fluoroquinolones
Lincosamides
Macrolides
Trimethoprim
Sulfonamides
Penicillins
Tetracyclines

5. Advocacy and Communication

- Raise awareness of antibiotic resistance from a food safety / One Health perspective

- Prompt action that prevents the development and spread of antimicrobial resistance in the food chain





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6. Training and Capacity Building

- Develop guidelines on the prudent use of antibiotics in food animals
- Provide the training needed to implement them

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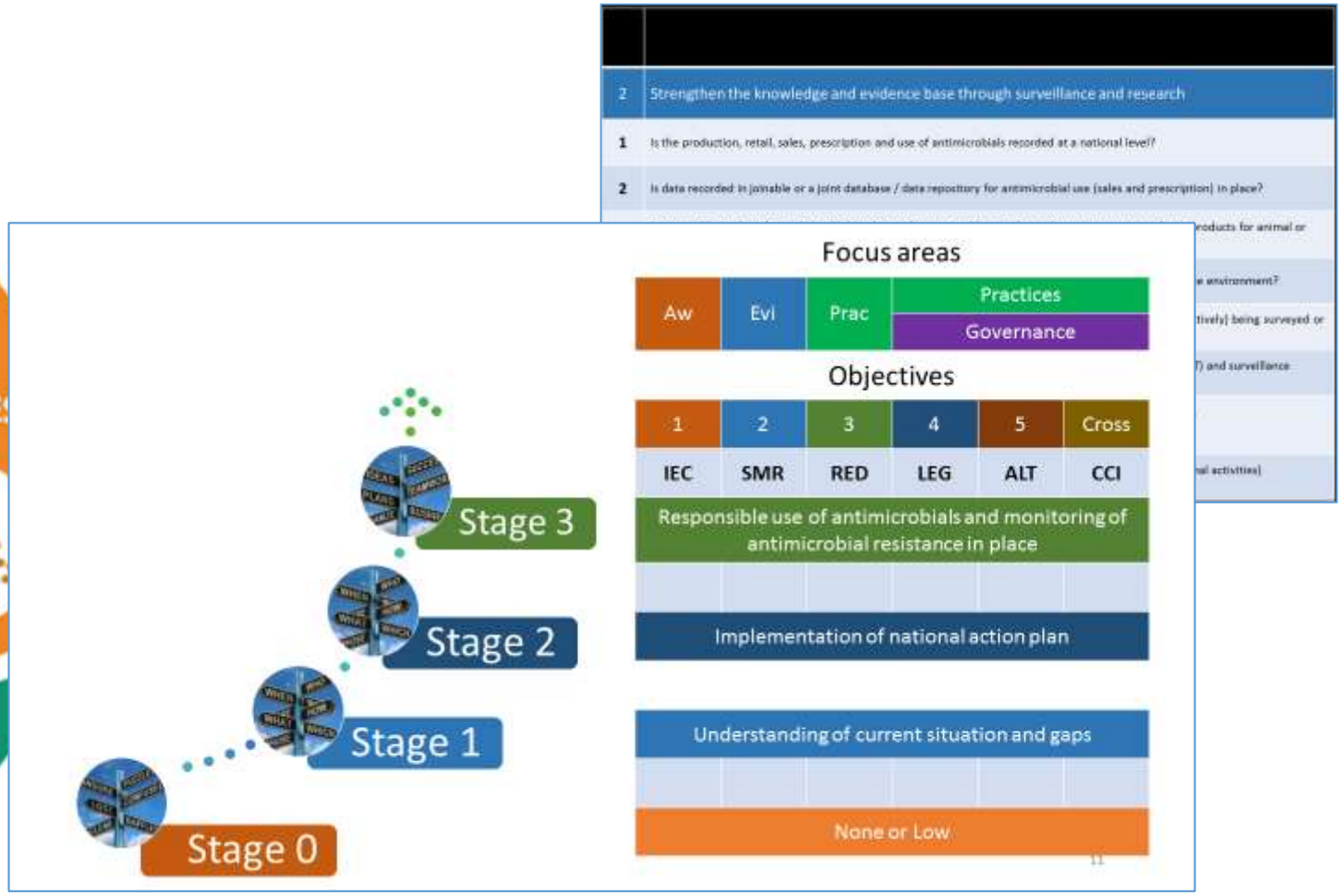
7. Opinion, Knowledge gaps and research needs

- Evidence vs. confounding results
  - Precautionary Principle / precautionary approach
  - Science based
- Food and Agriculture – contribution to the problem?
  - “Finger Pointing” – not helpful
  - 20% of the problem: 80% of the knowledge gap
- Studies to provide comparable data on antibiotic resistance and usage for risk assessment and risk management
- Strengthen research on the epidemiology of resistance
- Development of new antibiotics
- Alternative approaches to antibiotic therapy
- Vaccine development. improved vaccines, strengthened vaccinations regimes
- Point-of-care diagnostics - affordable

WHO Advisory Group on Integrated Surveillance of Antimicrobial Resistance (**AGISAR**)

- 2008
- Minimize the public health impact of AMR associated with the use of antimicrobials in food animals
- Comprised of 36 internationally specialists in AMR in a broad range of disciplines (microbiologists, veterinarians, physicians, epidemiologists)
- Support implementation of the Global Action Plan

Progressive Management Pathway to support countries with their National Action Plans on AMR



Science of the Total Environment 468–469 (2014) 813–820

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Short Communication

Transfer of antibiotic resistance plasmids in pure and activat
cultures in the presence of environmentally
representative micro-contaminant

Sungpyo Kim [a,*]
Yunchul Cho [f], S

HIGHLIGHTS

- Increased plasmid transfer
- Significant increase in plasm
- All pB10 plasmid received b

pharmaceuticals and
P. Verlicchi [a,*], M. Al

Science of the Total Environment 468–469 (2014) 1078–1085

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Antimicrobial resistant Escherichia coli in the municipal wastewater
ystem: Effec
Morris [b], Dearbhaile Morris [b], Martin Cormican [b], Enda Cummins [a,*]

Science of the Total Environment 430 (2012) 109–118

Contents lists available at SciVerse ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

on of the concentrations and distribution of
ental risk assessment
M. Petrovic [b,c], D. Barceló [c,d]

Studies (IDAEA), Spanish Council of Scientific Research (CSIC), Barcelona, Spain

north, Italy, on the effluent of two different
unicipal treatment plant of one of the
icals, belonging to twelve different
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ARTICLE

doi:10.1038/nature17672

Interconnected microbiomes and resistomes in low-income human

Erica C. Pehrsson[1*], Pablo Tsukayama[1*], Sanket Patel[1,2], Melissa Mejia-Bautista[1,3], Giordano Sosa-Soto[1,3], Karla M. Navarrete[1], Maritza Calderon[4], Lilia Cabrera[5], William Hoyos-Arango[3], M. Teresita Bertoli[3], Douglas E. Berg[6,7], Robert H. Gilman[4,5,8] & Gautam Dantas[1,2,6,9]

Antibiotic-resistant infections annually claim hundreds of thousands of lives worldwide. This problem is exacerbated by exchange of resistance genes between pathogens and benign microbes from diverse habitats. Mapping resistance gene dissemination between humans and their environment is a public health priority. Here we characterized the bacterial community structure and resistance exchange networks of hundreds of interconnected human faecal and environmental samples from two low-income Latin American communities. We found that resistomes across habitats are generally structured by bacterial phylogeny along ecological gradients, but identified key resistance genes that cross habitat boundaries and determined their association with mobile genetic elements. We also assessed the effectiveness of used excreta management strategies in reducing faecal bacteria and resistance genes in
low- and middle-income countries. Our results lay the foundation for
resistance gene dissemination across interconnected
population.

WATER RESEARCH 54 (2014) 327–336

Available online at www.sciencedirect.com

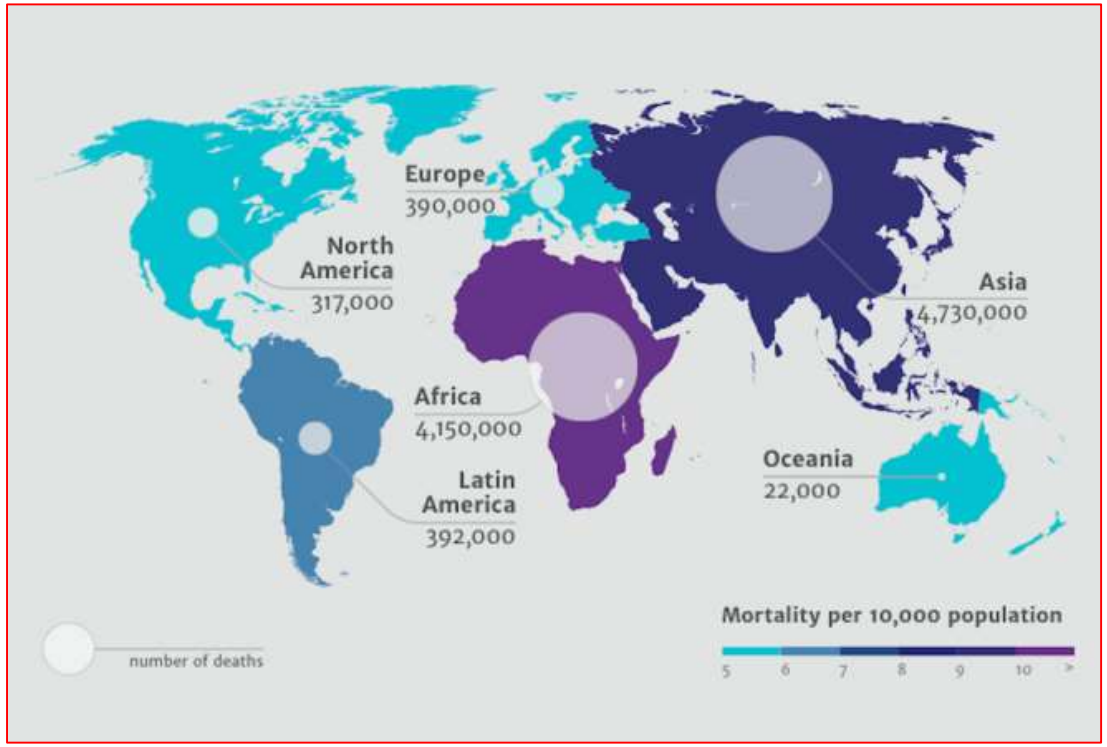
ScienceDirect

journal homepage: www.elsevier.com/locate/watres

WATER RESEARCH

Insights into the relationship between antimicrobial residues and bacterial populations in a hospital-urban plant system

Action for WWW and Environment ?



We need you

20 % of the problem??

80 % of the knowledge gap??

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www.fao.org/antimicrobial-resistance