A microscopic view of bacteria, showing several rod-shaped cells in the foreground and a petri dish with a bacterial culture in the background. The image is rendered in shades of blue and green, giving it a scientific and clinical appearance.

WHO Guidance on Integrated Surveillance of Antimicrobial Resistance (WHO AGISAR)

Dr Rebecca Irwin

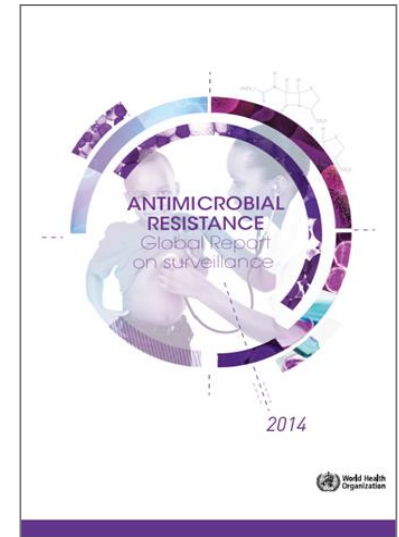
AGISAR Member

**Director, Canadian Integrated Program for Antimicrobial Resistance
Surveillance (CIPARS)**

Public Health Agency of Canada

AMR Global Report on Surveillance 2014

- accurate a picture as is presently possible of the magnitude of AMR and the current state of surveillance globally
- resistance to common bacteria has reached alarming levels in many parts of the world and that in some settings, few, if any, of the available treatments options remain effective for common infections.
- surveillance of AMR is neither coordinated nor harmonized and there are many gaps in information on bacteria of major public health importance



Key findings from the report

- Integrated surveillance systems would enable data comparison from food-producing animals, food products and humans
- Surveillance is hampered by lack of implemented global standards
- WHO is pursuing a multisectoral approach by collaborating with the FAO and OIE and other stakeholders



An integrated Surveillance System Data/Information for Action

- Prevalence of AMR in different reservoirs
- AMR trends over time
- Association between AMR and Use of antimicrobial agents
- Guide evidence-based policies and guidelines to control antimicrobial use in human and animals
- Identify and evaluate the effectiveness of interventions to contain the emergence and spread of resistant bacteria



Global Action Plan (GAP) Strategic Objectives

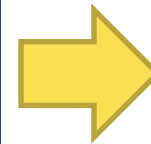
1. Improve awareness and understanding of AMR through education and training
2. **Strengthen knowledge and evidence base through surveillance and research**
3. Reduce the incidence of infection through effective hygiene and IPC measures
4. **Optimize the use of antimicrobial medicines in human and animal health**
5. Ensure sustainable investment through research and development



AGISAR supports Global Action Plan

- Containment of AMR from the food chain
 - Capacity building for integrated surveillance of AMR taking a One Health approach
 - WHO List of critically important antimicrobials (CIA list) for human medicine
 - FAO/OIE/WHO tripartite activities and Codex Alimentarius activities on AMR

AGISAR



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

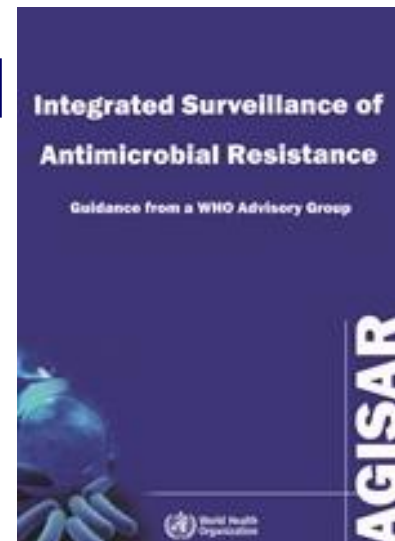
- Established in 2008
- Aims to minimize the public health impact of AMR associated with the use of antimicrobials in food animals
- Comprised of 36 internationally renowned experts in AMR in a broad range of disciplines (microbiologists from animal, food and human sectors; veterinarians; physicians; epidemiologists)
- New Terms of Reference for 2015-2019 agreed in June 2015 (right after the GAP adaptation) in order to support the GAP implementation



World Health
Organization

Integrated Surveillance of AMR

- WHO AGISAR guidance to assist countries and other stakeholders across one health continuum to establish and develop the integrated programs for surveillance of AMR and antimicrobial use
- 1st guidance was published in 2013
- Revised guidance published in early 2017



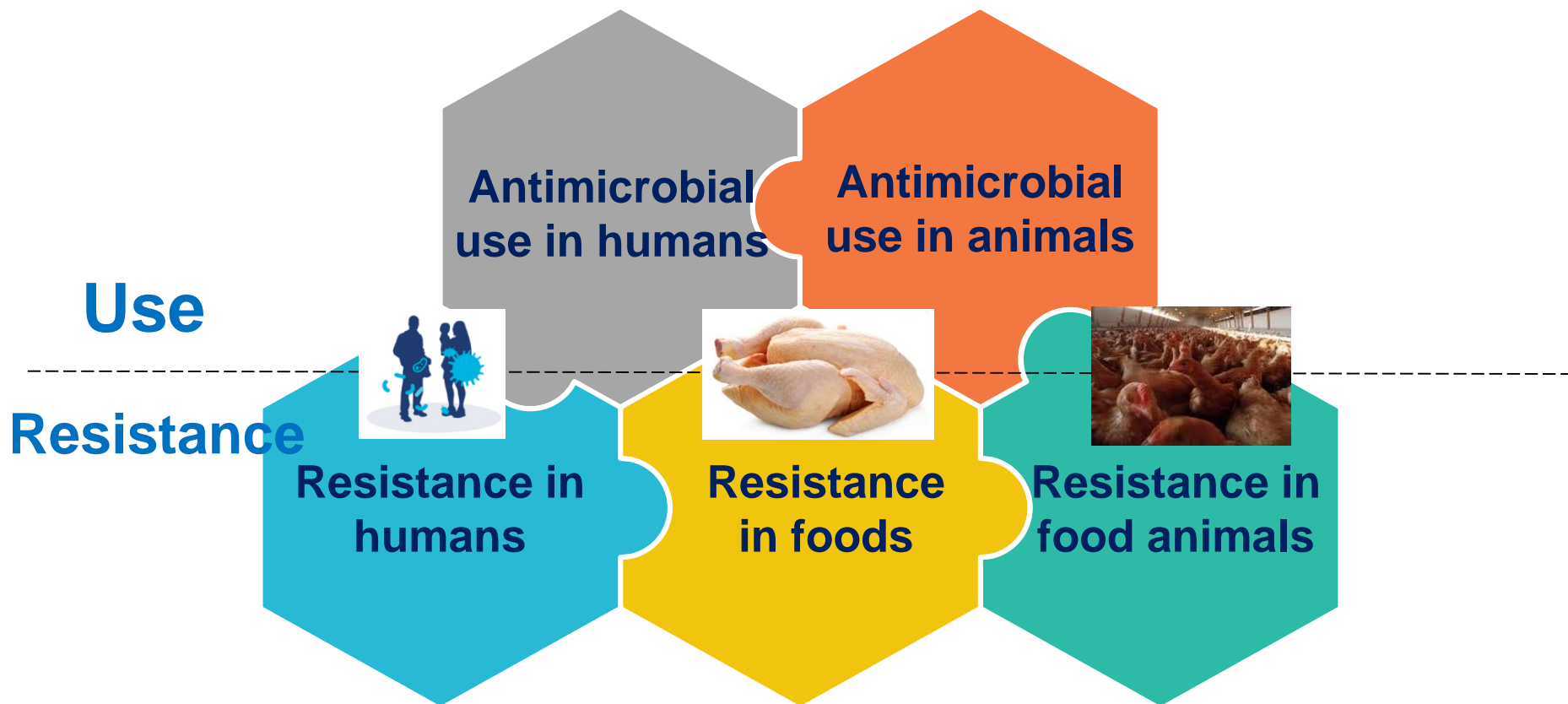
WHO Website: http://www.who.int/foodsafety/publications/agisar_guidance/en/

WHO-AGISAR Guidance

- Includes minimum requirements for integrated AMR surveillance
- Sets out guidelines and standards for laboratory methods and quality assurance
- Provides recommended standards for harmonized interpretive criteria
- Provides approaches for collection and reporting of AMU
- Proposes analysis and reporting methods that allow findings to be comparable within and between countries
- Provides examples from existing integrated surveillance programs



Building blocks for Integrated Surveillance of AMR



Integrated Surveillance of AMR

Components of AMR surveillance

- **Sample sources**
 - Specimens from humans, foods (retail meats), animals (intended for foods)
- **Target Bacteria**
 - *Salmonella*, *Campylobacter* spp., *Escherichia coli*, *Enterococcus* ssp., etc
- **Sampling design**
 - Source, information, design, frequency
- **Laboratory Testing Methodology**
 - Bacterial culture, isolate identification, standardized AST, quality control, recommended antimicrobials for surveillance, characterization
- **Data management, Analysis, Reporting**
 - Sample information, culture results, AST results, additional lab tests, software (WHONET)

Antimicrobial Use Surveillance in humans and animals

● Surveillance of antimicrobial (AB) use in humans

- National antimicrobial sales data
- Point prevalence surveys on antimicrobial use in hospitals
- Longitudinal surveys of antimicrobial use in hospitals or the community

● Surveillance of AB use in animals

- Surveillance of national antimicrobial sales data
- Surveillance of antimicrobial use by animal species at farm level

● Data management for surveillance of AB use

- Quantitative AB use
- Qualitative AB use

Steps towards integration

- Establishing governance
- Build a situation analysis
- Planning
- Plan activation
- Plan implementation
- Key success factors including confidentiality, transparency, effective partnership, validated approach

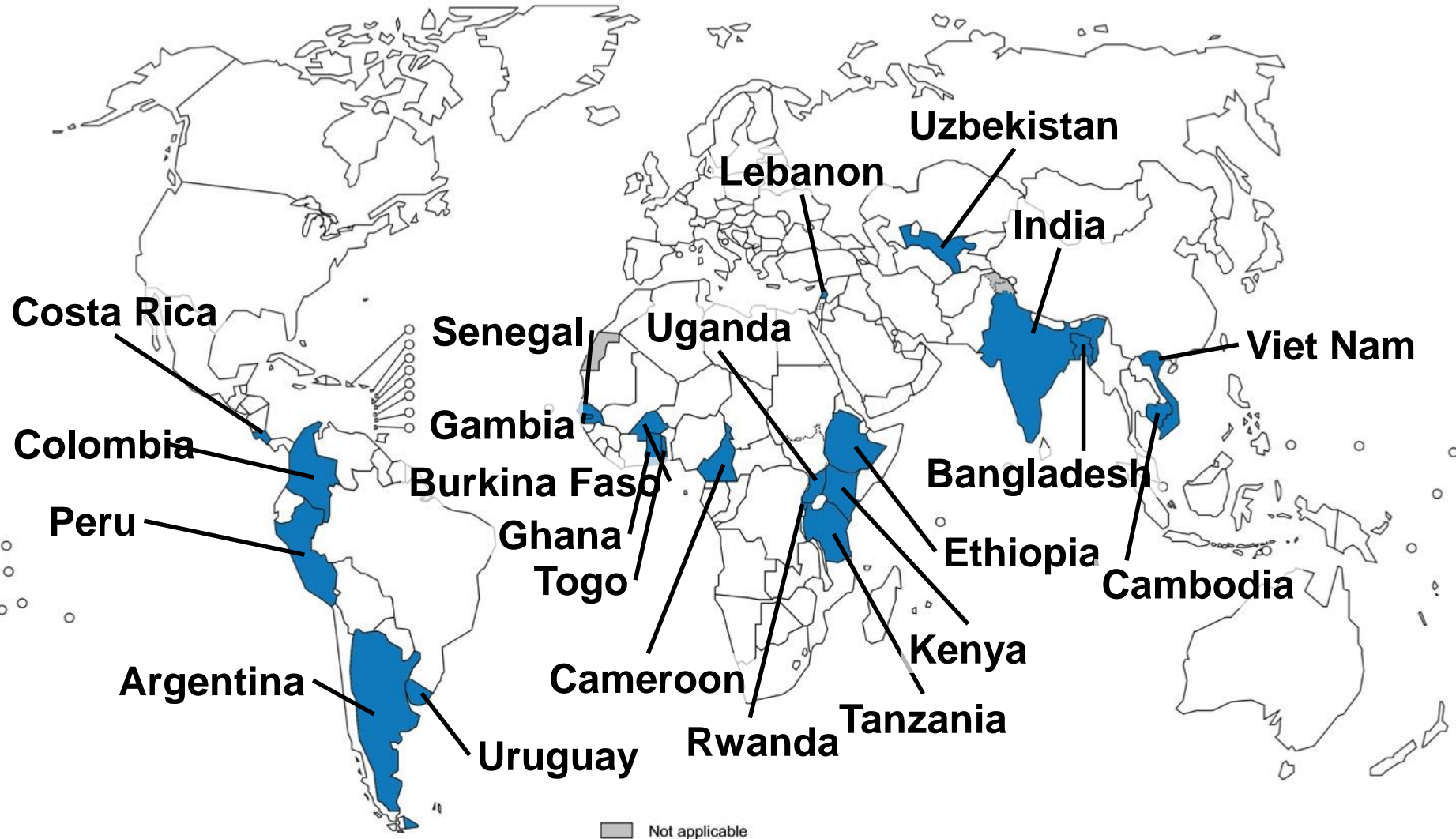


Benefits of integrated surveillance at the country level

- More accurate data to drive the development of specific policies at national level
- Linking usage and resistance data in different sectors
- Identification of AMR from the food chain as an issue (awareness raising)
- Detection of the emergence of new antimicrobial resistance threats
- Prioritization of AMR risks along the food chain (which sector? Which bacteria? which resistance? Which food?)
- Provision of a baseline against which to evaluate interventions



Possible to implement in LMICs



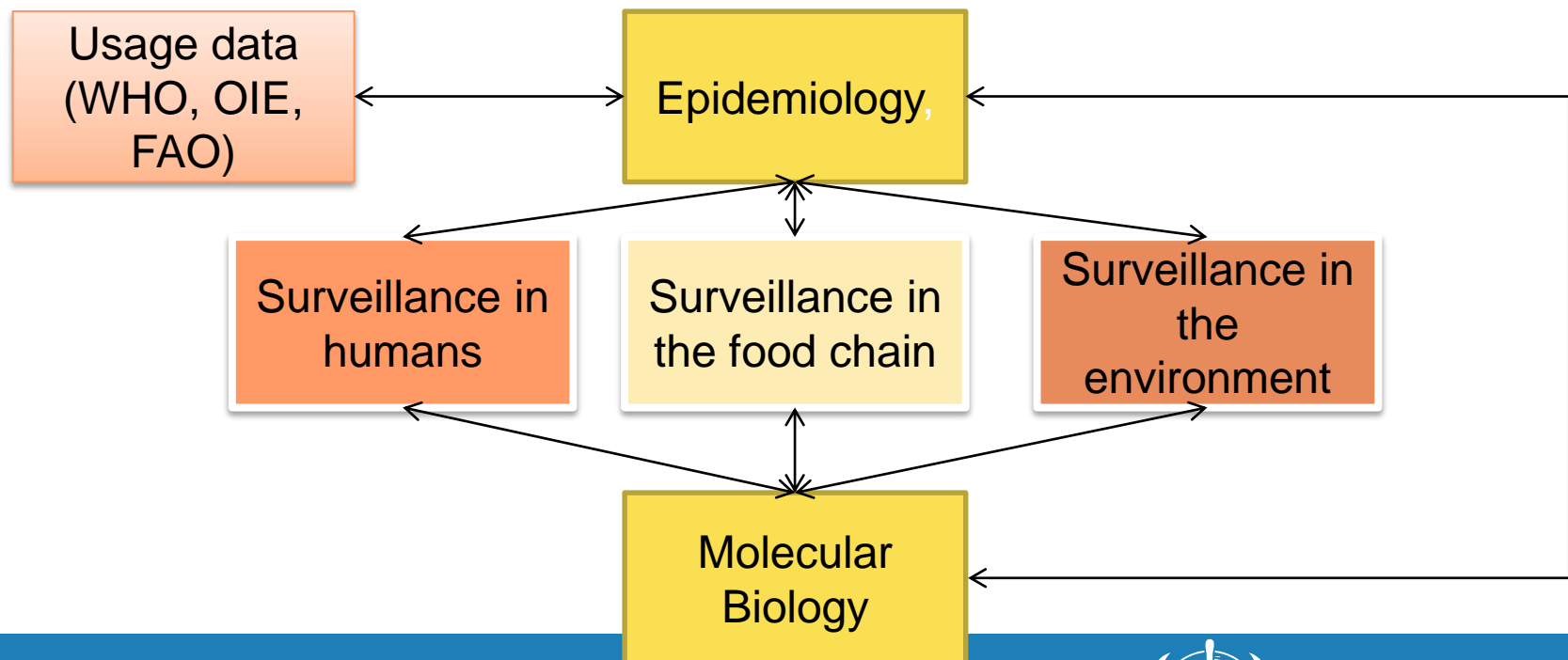
Gaps identified by AGISAR...

Important issues raised during discussions included:

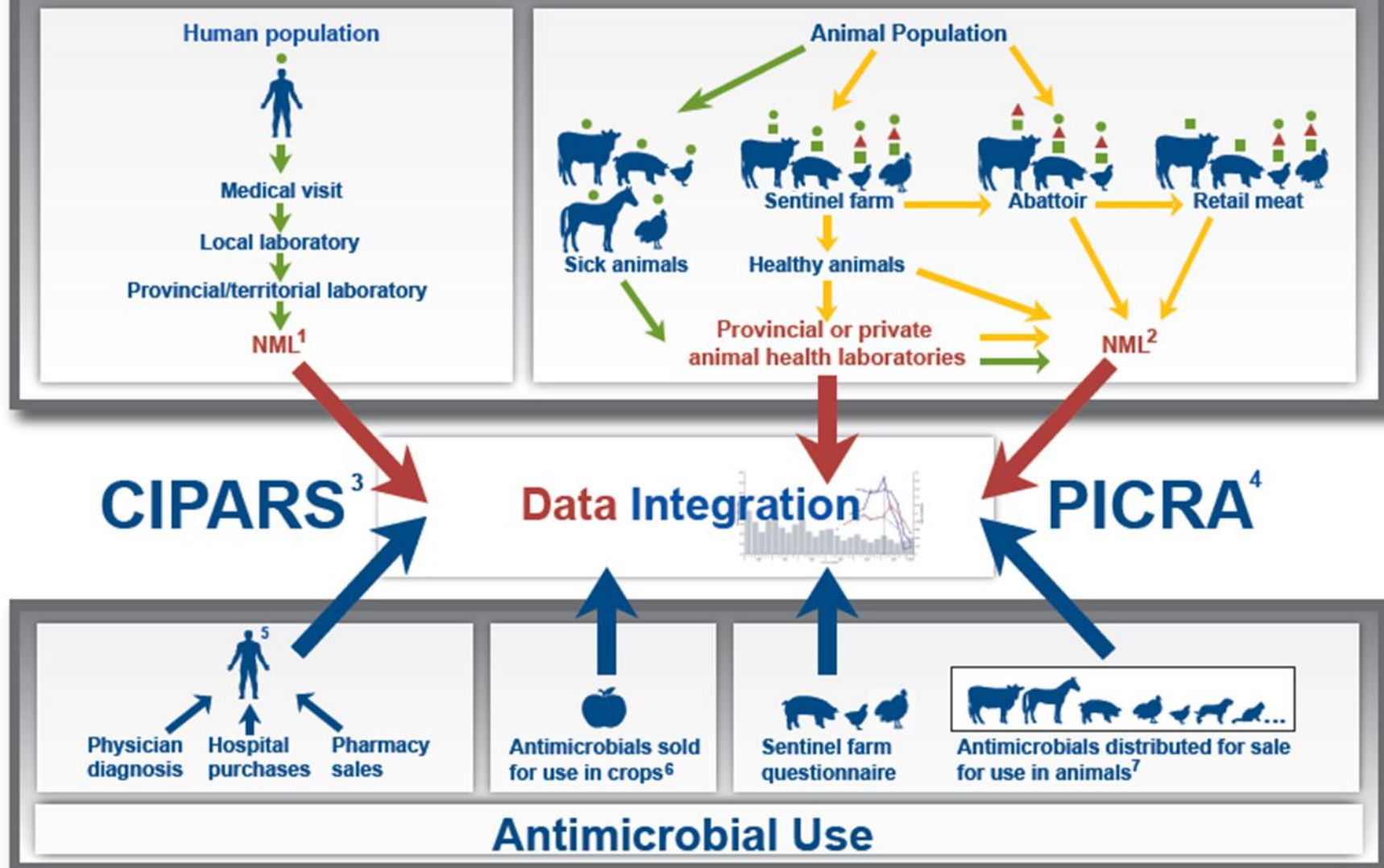
- ***Including all relevant sectors in integrated surveillance*** is required to understand the full picture. The role of water, sewage, and soil in maintaining resistant bacteria as a source for animals and people, as well as allowing for contact between different populations of resistant bacteria and possible transfer of genes, was repeatedly noted. Microorganisms from these sources need to be monitored, and contamination controlled. Similarly, antibiotic usage in crops and resistance in plant-derived foods would have to be included in any comprehensive, integrated surveillance plan.

AGISAR ESBL *E.coli* "Tricycle" project

- Development of a Global harmonized protocol on integrated surveillance of ESBL-producing *E.coli* in humans, the food chain and the environment ("*Tricycle Surveillance*")



Antimicrobial Resistance



¹ National Microbiology Laboratory, Winnipeg, Manitoba, Public Health Agency of Canada (PHAC)

² National Microbiology Laboratory, Guelph (Ontario) and Saint-Hyacinthe (Québec)

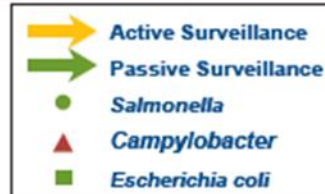
³ Canadian Integrated Program for Antimicrobial Resistance Surveillance, PHAC

⁴ Programme intégré canadien de surveillance de la résistance aux antimicrobiens, Agence de la santé publique du Canada

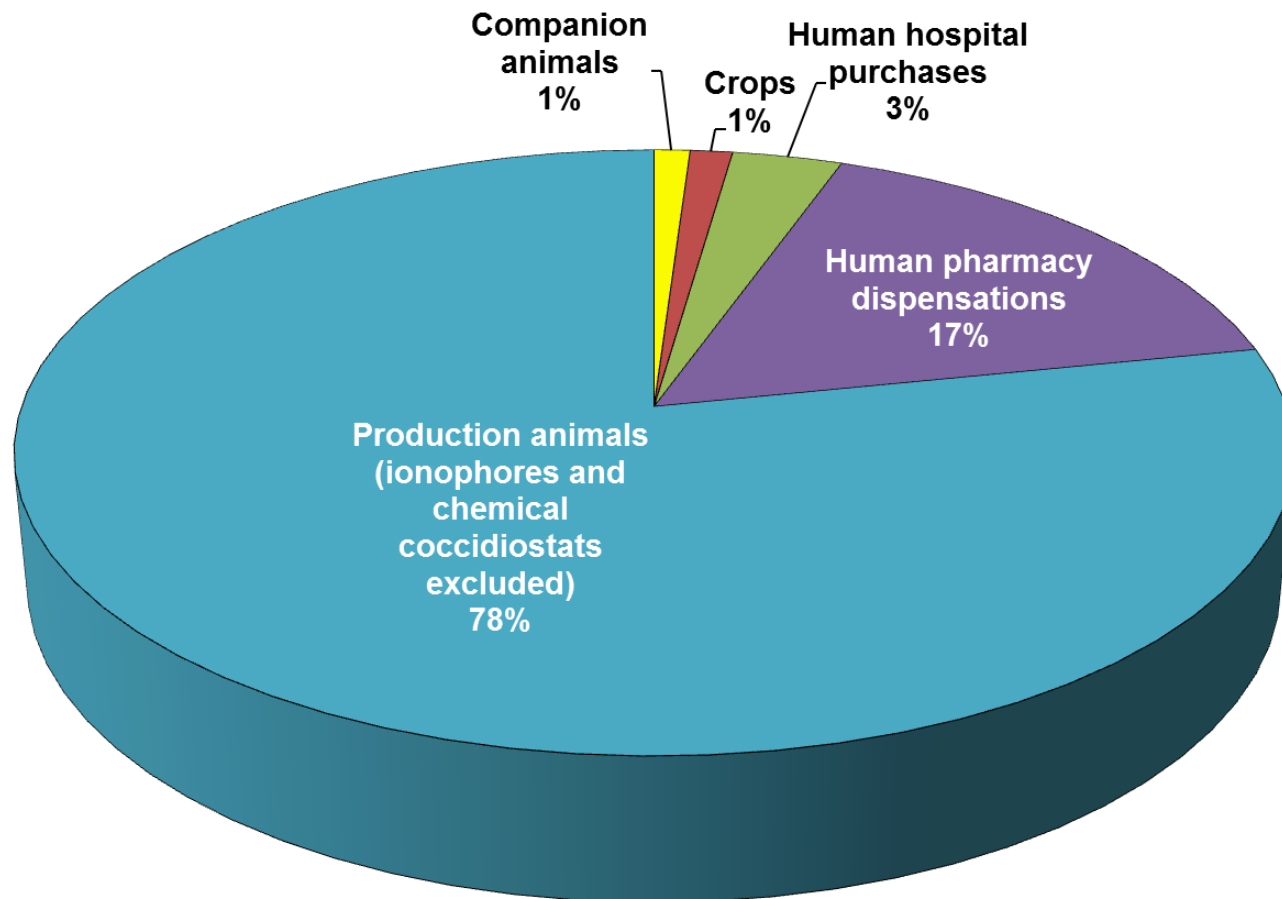
⁵ Canadian Antimicrobial Resistance Surveillance System (CARSS), PHAC

⁶ Pest Management Regulatory Agency, Health Canada

⁷ Canadian Animal Health Institute (CAHI)



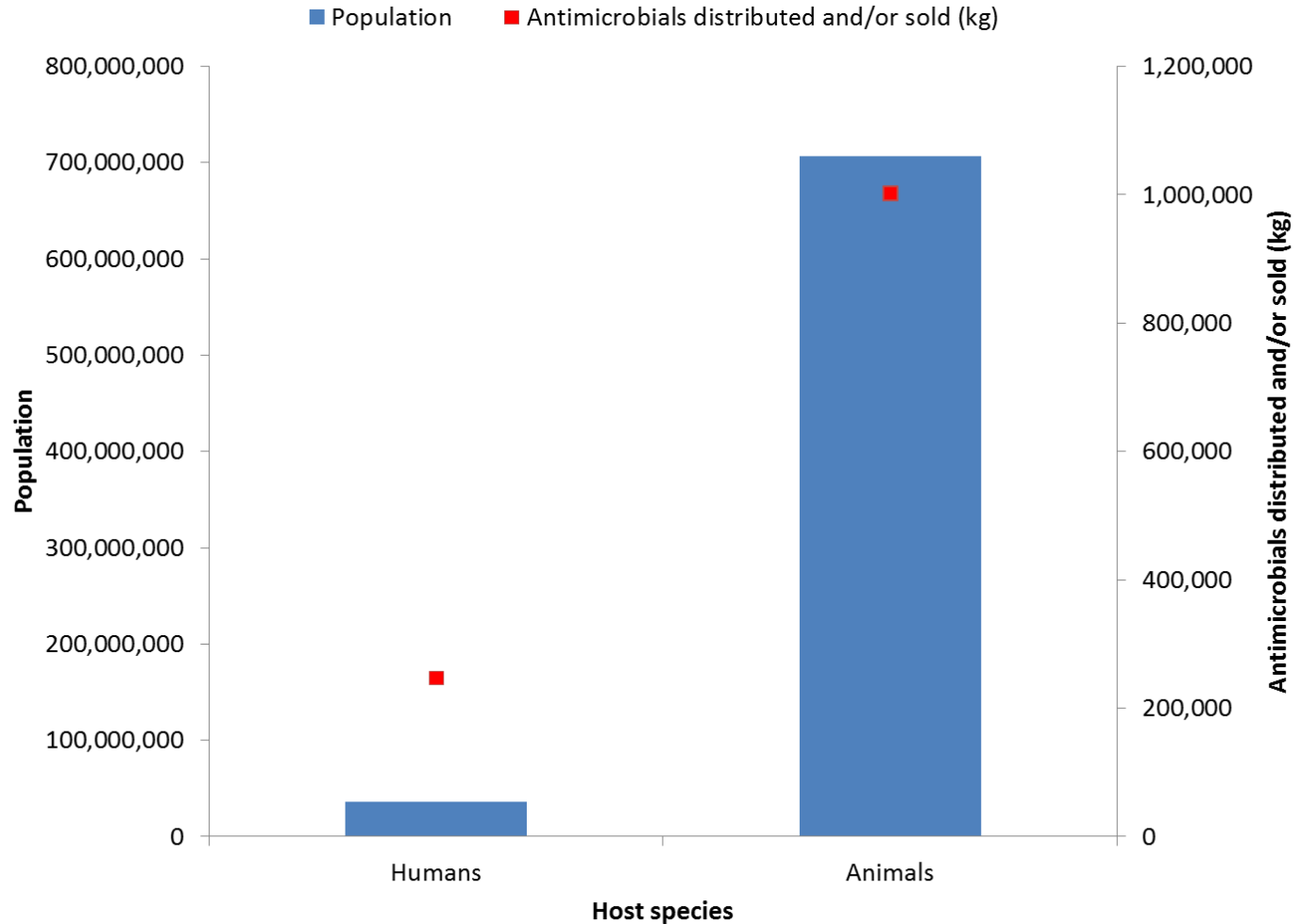
Proportion of antimicrobials sold/distributed (kg)



Animal distribution data currently does not account for quantities imported for own use or as active pharmaceutical ingredients for further compounding; hence are underestimates of total quantities used.

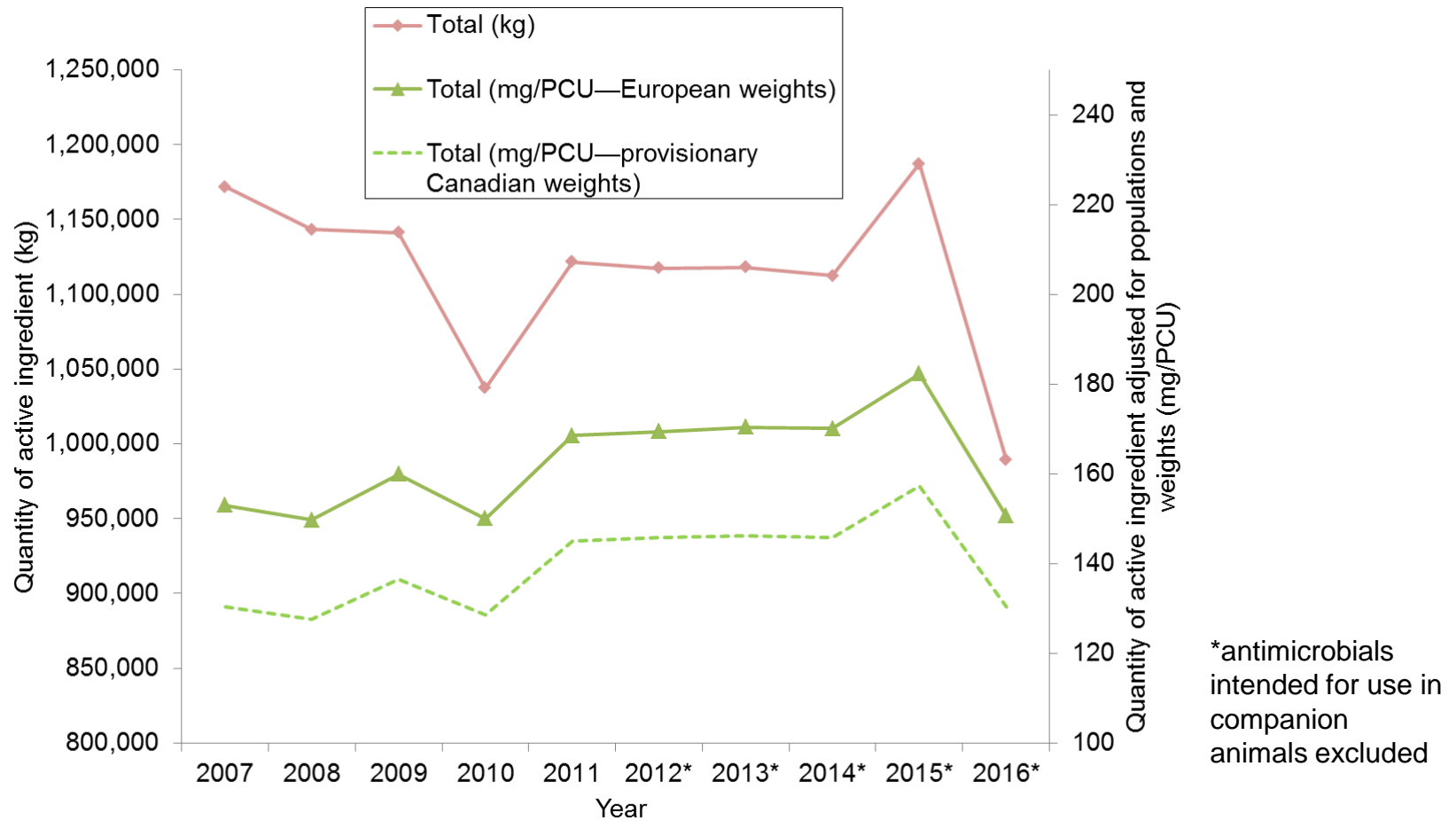
Quantities of antimicrobials distributed for sale standardized by population

~ 1.5 times more antimicrobials were distributed for use in animals than humans on a per kg host basis
 (European standard weights of animals)



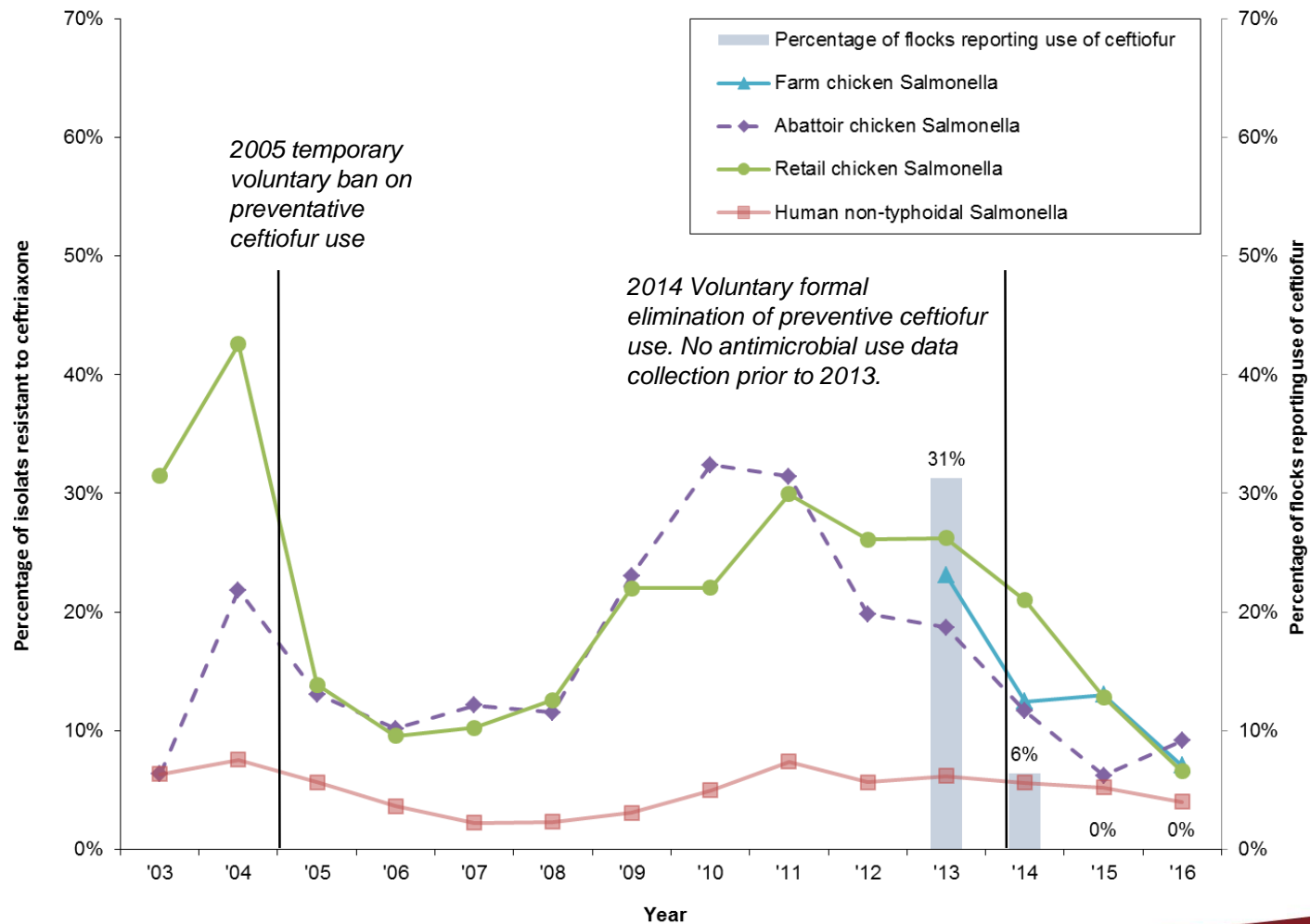
Animal distribution data does not include own use imports or active pharmaceutical ingredients used in compounding.

Quantities distributed for sale for use in production animals



Values do not include antimicrobials imported under the 'own use' provision or imported as active pharmaceutical ingredients used in compounding.

Reduction in reported use of ceftiofur on farm and changing resistance to ceftriaxone in *Salmonella* from humans and chicken



Thank you



7th Meeting of the AGISAR, 17-20 October 2016, USA