Levels of antimicrobial resistance in humans, food and animals

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Conference Combating Antimicrobial Resistance
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efsa
European Food Safety Authority

AMR MONITORING – WHY?

- To identify emerging resistance patterns
- To support risk assessment

- To monitor and assess temporal trends in AMR and AMC
- To contribute assessing the impact of antimicrobial use on resistance
- To plan targeted interventions
- To measure the effects of such interventions

European Union Summary Report on AMR (annually)

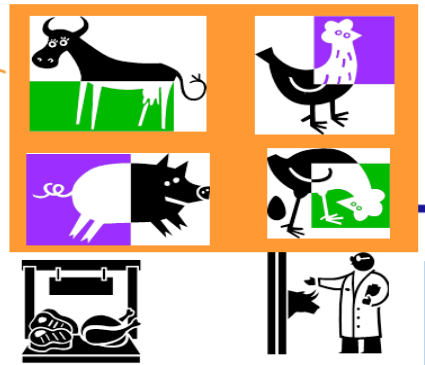
MS AUDITS: DG Santé

EURL-AR: EQAS

Every 2nd year on a rotating basis

- EU Member States
- Other European countries

Mandatory



TESSY database

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Network Zoonoses Data Collection + Data Collection Framework

efsa European Food Safety Authority

EURL-AR: Reference Testing Exercise

Human cases of food-borne infection:

- ***Salmonella***
- ***Campylobacter***

EU Summary Report on AMR

Zoonotic bacteria:

- ***Salmonella***
- ***Campylobacter***

Indicator bacteria:

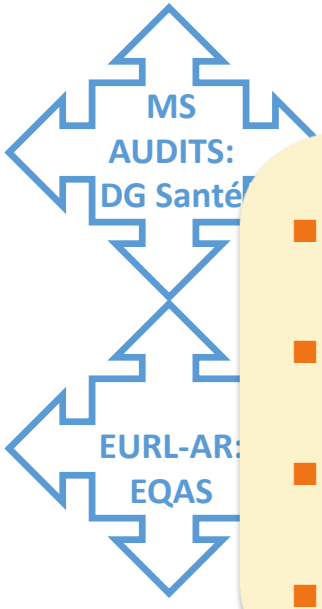
- ***E. coli (non-pathogenic)***
- ***E. faecium, E. faecalis***

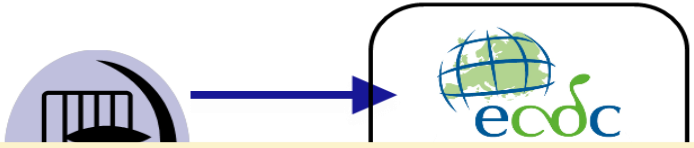
Other bacteria:

- **MRSA**

Article 7 and Annex IIB of Directive 2003/99/EC

European Union Summary Report on AMR (annually)



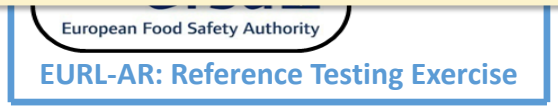


Human cases of food-borne infection:

- ***Salmonella***
- ***Campylobacter***

- Successful implementation of the new EU legislation
- Enlarged scope of AMR monitoring
- Improved comparability with AMR data in humans
- Enhanced representativeness and reliability of AMR data

Every 2nd ye… on a rotating basis



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- ***E. coli (non-pathogenic)***
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Other bacteria:
- **MRSA**

Article 7 and Annex IIB of Directive 2003/99/EC

RANDONMISED SAMPLING: STRATIFIED SAMPLING WITH PROPORTIONAL ALLOCATION

Two-stage stratified sampling

- 1st stage (strata)
- Proportional allocation
- 2nd stage (strata)
- Sample
- Over-time sample collection

Caeca at slaughter

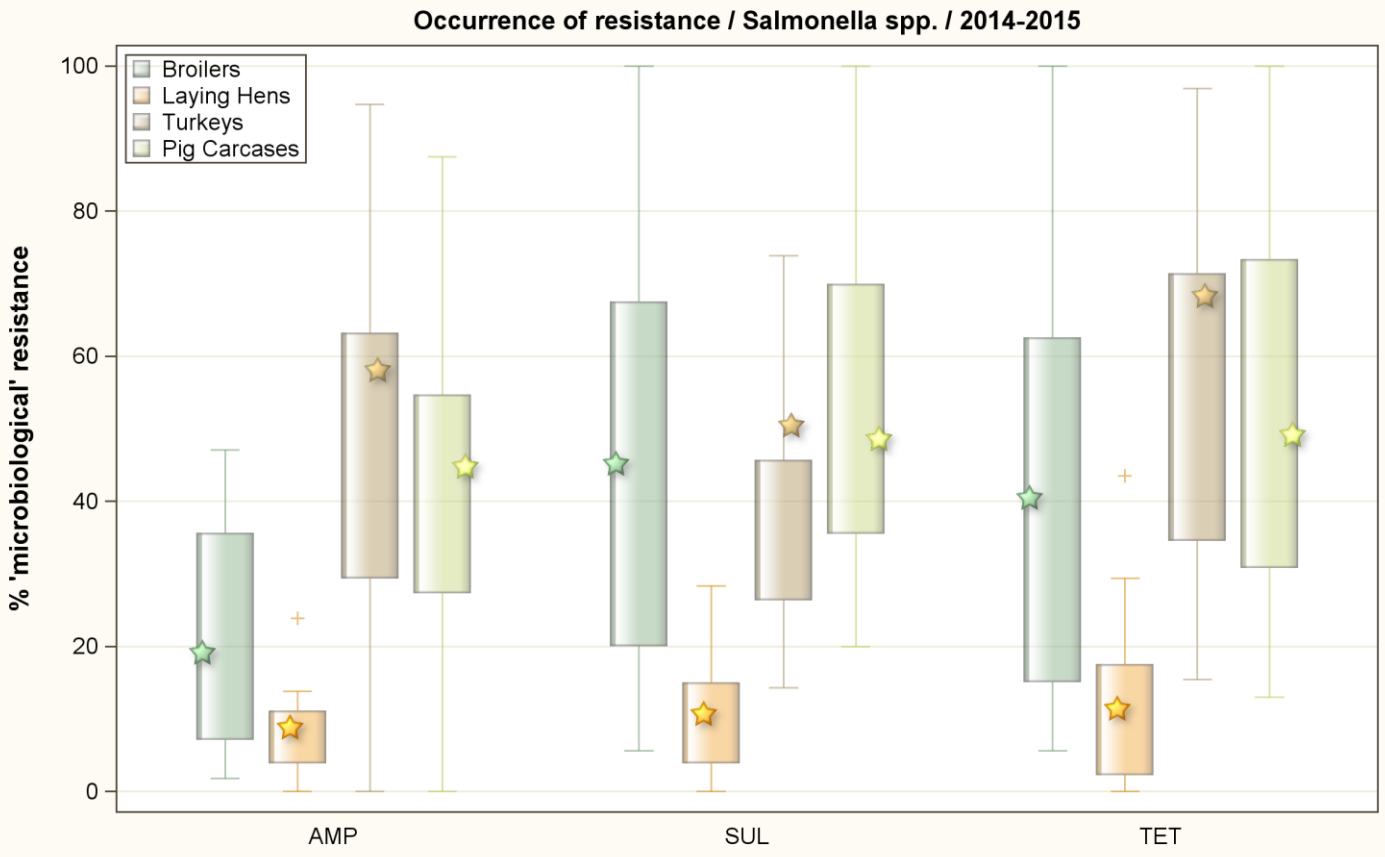
- Slaughterhouses (60% of national throughput)
- Sample size proportionate to the SH throughput
- Slaughter batches
- caecal sample(s) from distinct batches
- Even sampling every quarter of the year

Meat samples at retail

- NUTS 3 area
- Sample size proportionate to the area population
- Retailers
- 1 meat sample per retailer
- Even sampling every quarter of the year

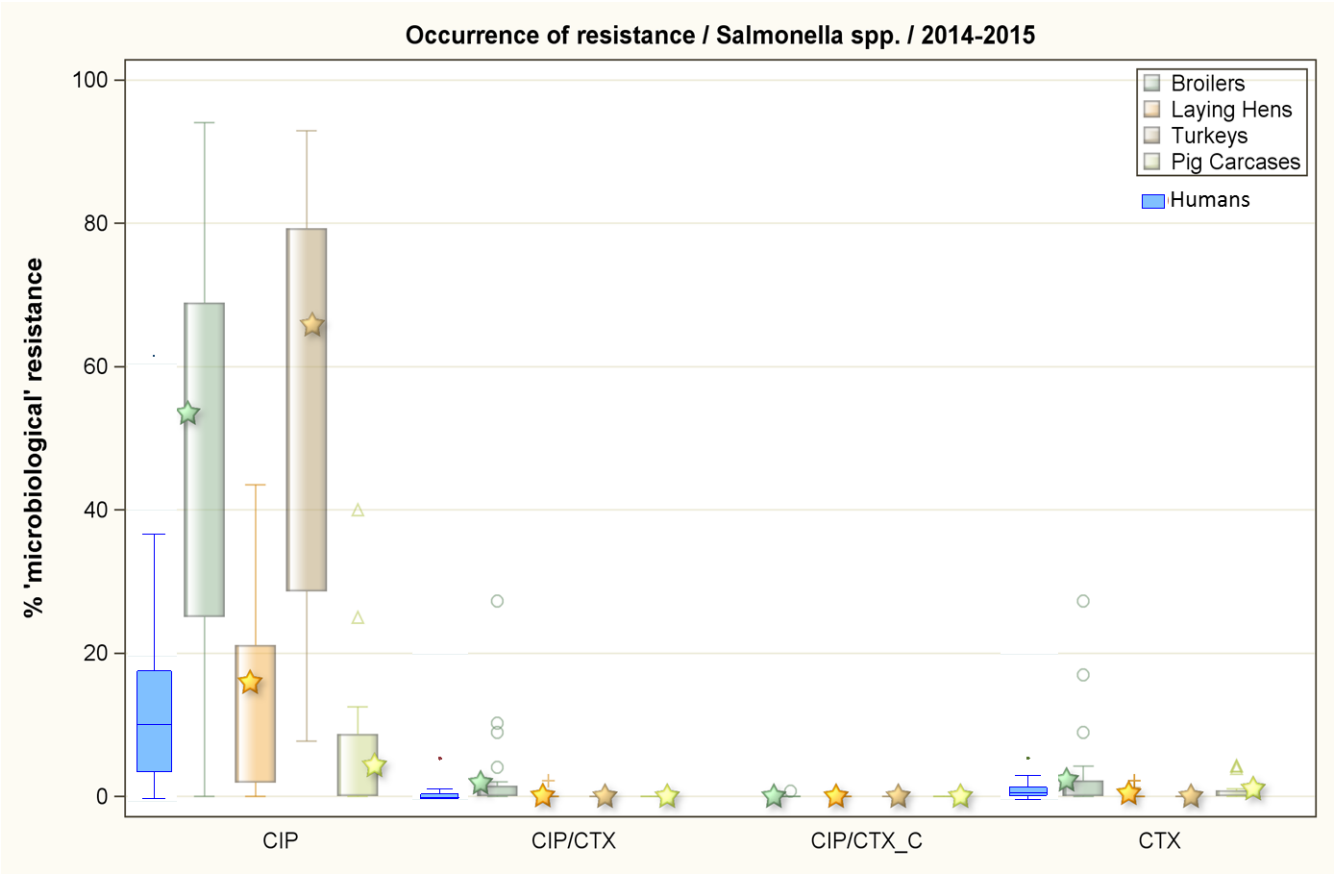
RESISTANCE IN *SALMONELLA* SPP. IN FOOD-PRODUCING ANIMALS

- Important resistance
- Marked variation between MSs
- Impact of the distribution of serovars



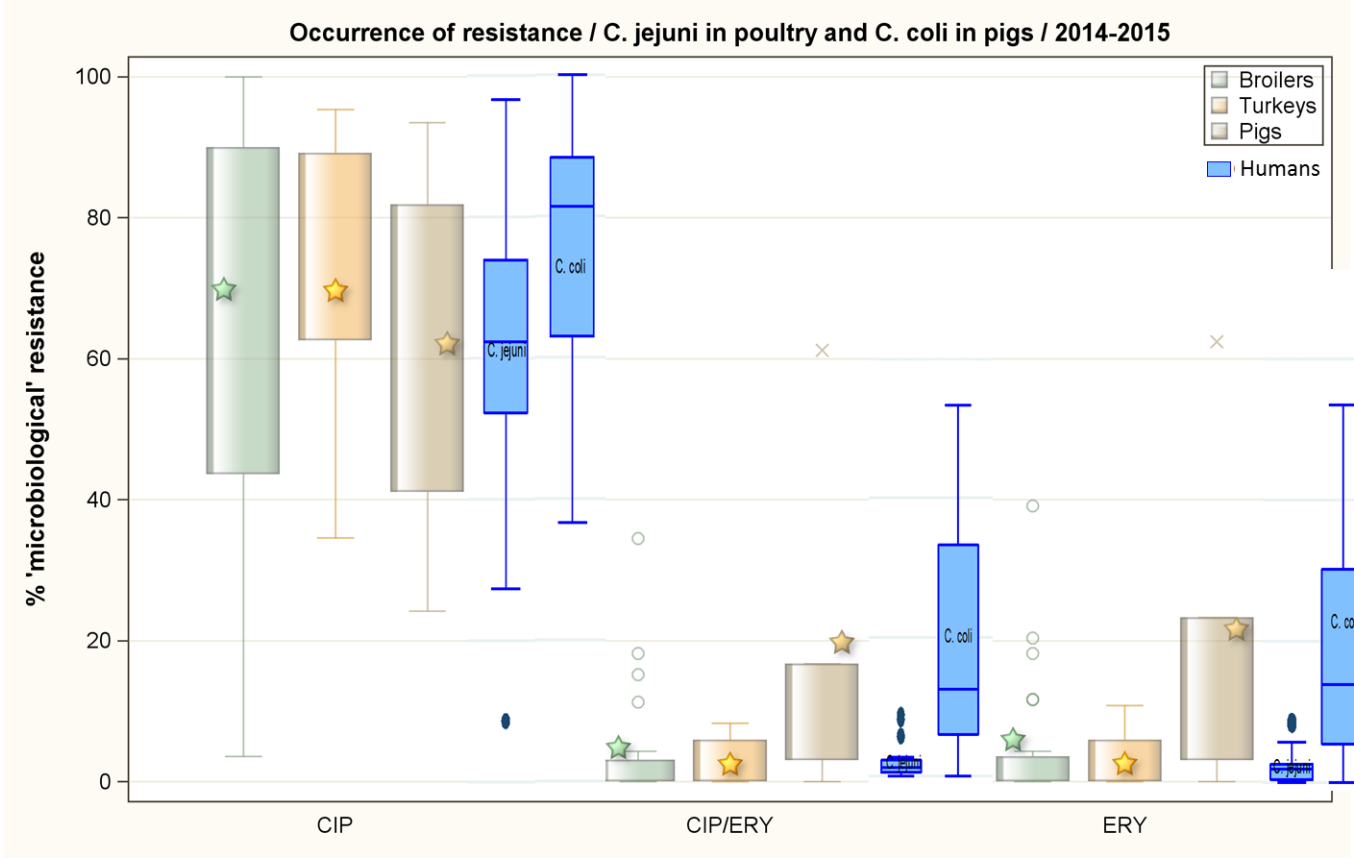
RESISTANCE TO CIAs IN *SALMONELLA* SPP.

- Important resistance to fluoroquinolones (CIP) in Broilers and Turkeys
- Very low resistance to C3G (CTX)
- Very low to no co-resistance to CIAs

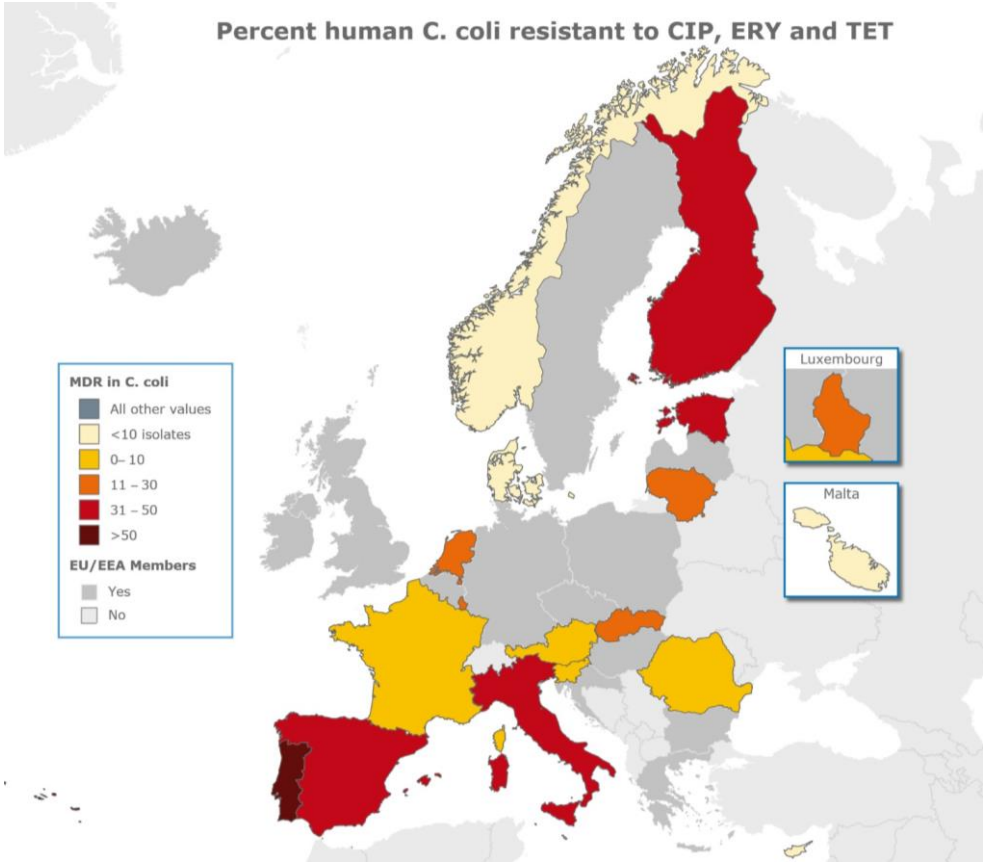


RESISTANCE TO CIAs IN *CAMPYLOBACTER*, 2014-2015

- *C. coli* is considered in pigs
- Important resistance to fluoroquinolones (CIP)
- Low resistance to macrolides (ERY)
- Low co-resistance to CIAs in poultry: there are outliers for broilers!

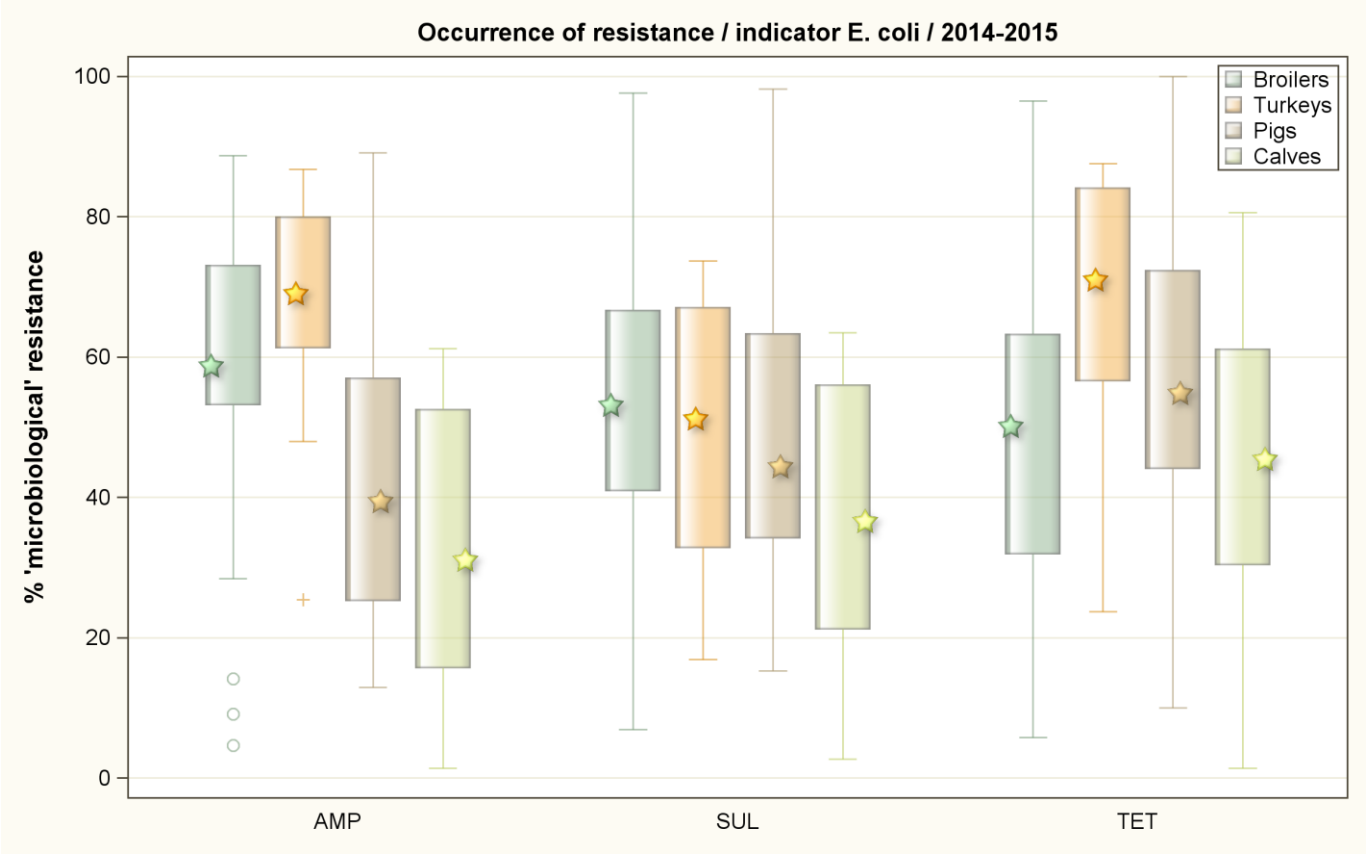


MULTIDRUG RESISTANCE IN *C. COLI* FROM HUMANS



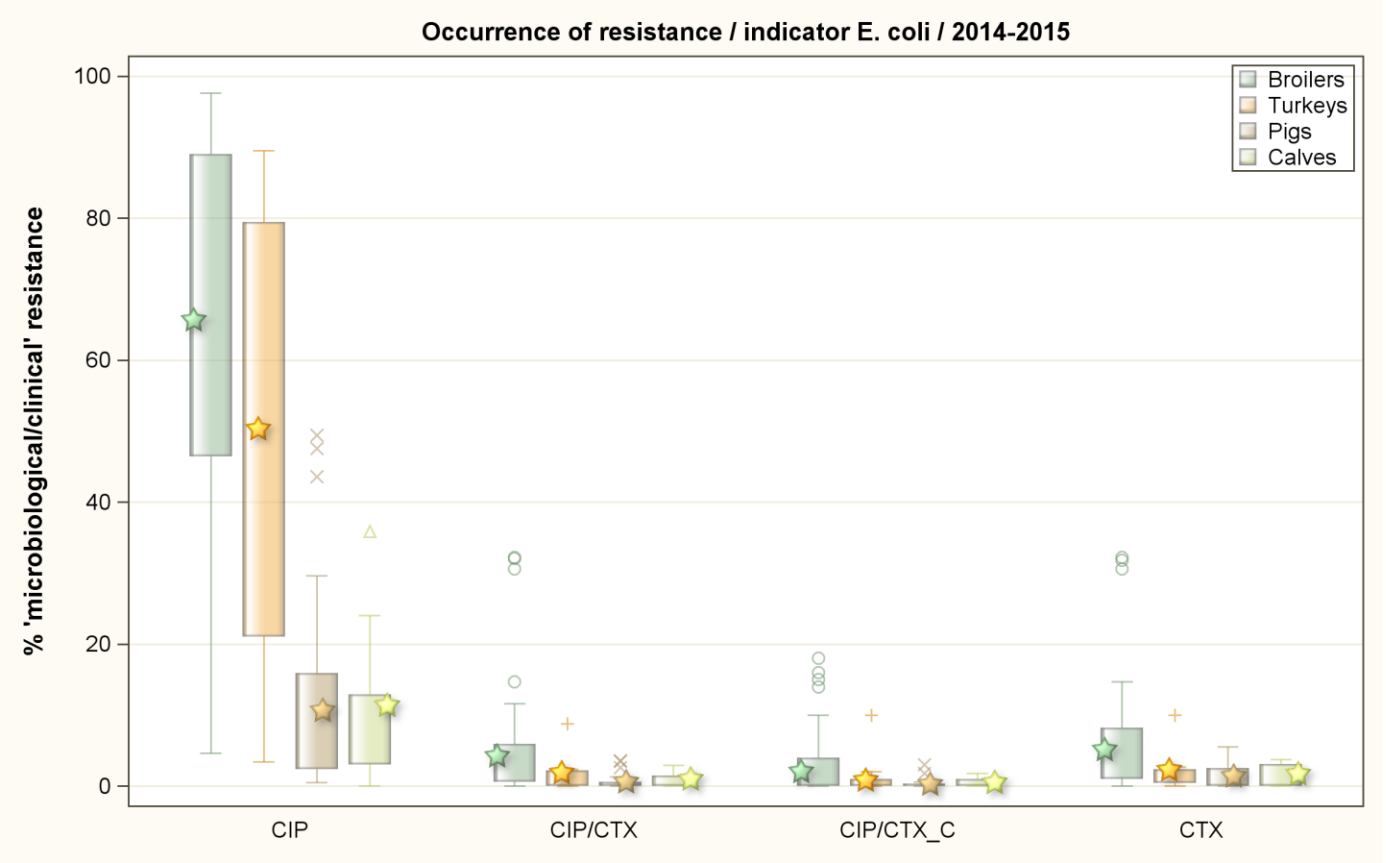
- All three antimicrobials (CIP, ERY, TET) are used for treatment of *Campylobacter* infections

RESISTANCE IN INDICATOR *E. COLI* IN FOOD PRODUCING ANIMALS



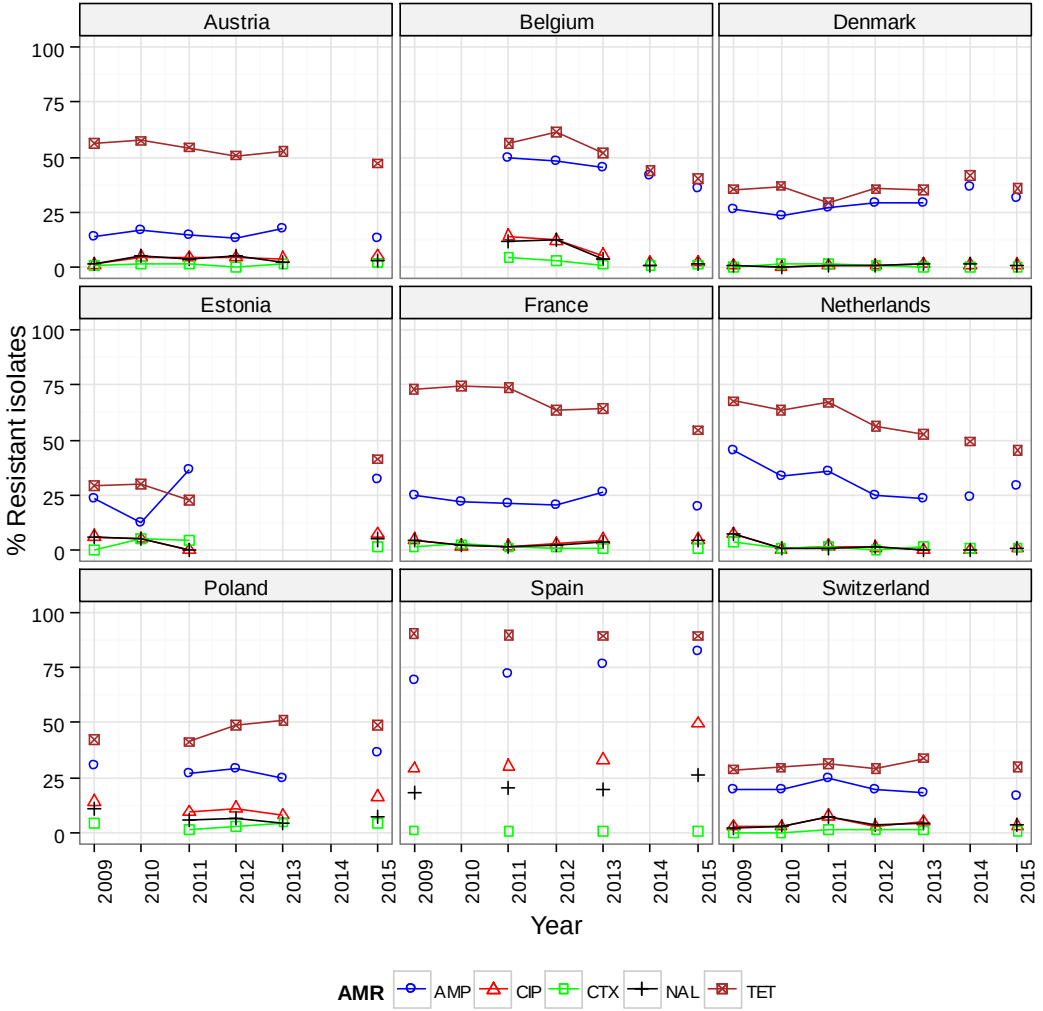
RESISTANCE TO CIAs IN INDICATOR *E. COLI*

- Important resistance to fluoroquinolones (CIP) in Broilers and Turkeys
- Very low resistance to 3rd-Gen. Ceph. (CTX)
- Very low co-resistance to CIAs: there are outliers for Broilers!



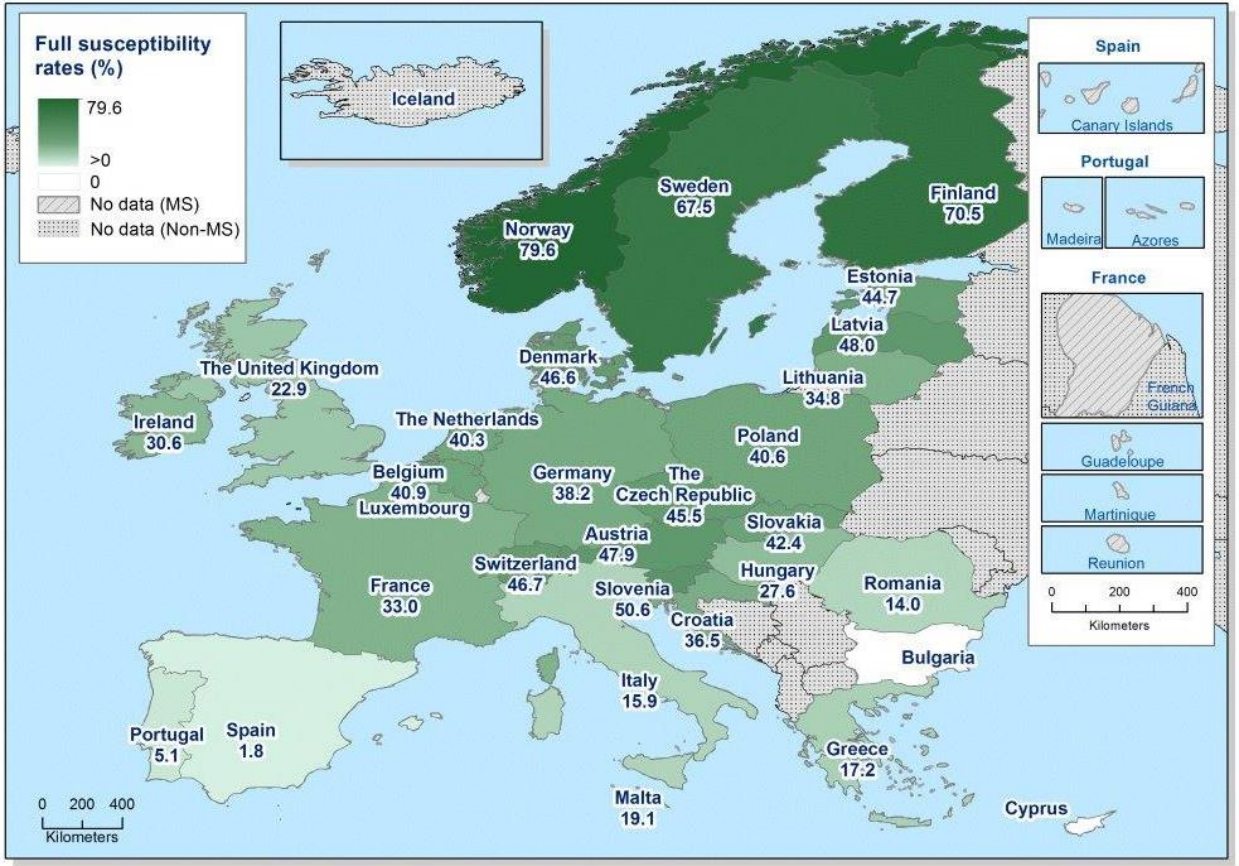
TRENDS

- Indicator *E. coli* from fattening pigs
- Decreasing trends in AMR observed in MSs where control programme is in place



COMPLETE SUSCEPTIBILITY IN INDICATOR *E. COLI* FROM PIGS (2015)

- North-South gradient
- Indirectly, it embraces the full resistance
- To be compared with overall AMC data

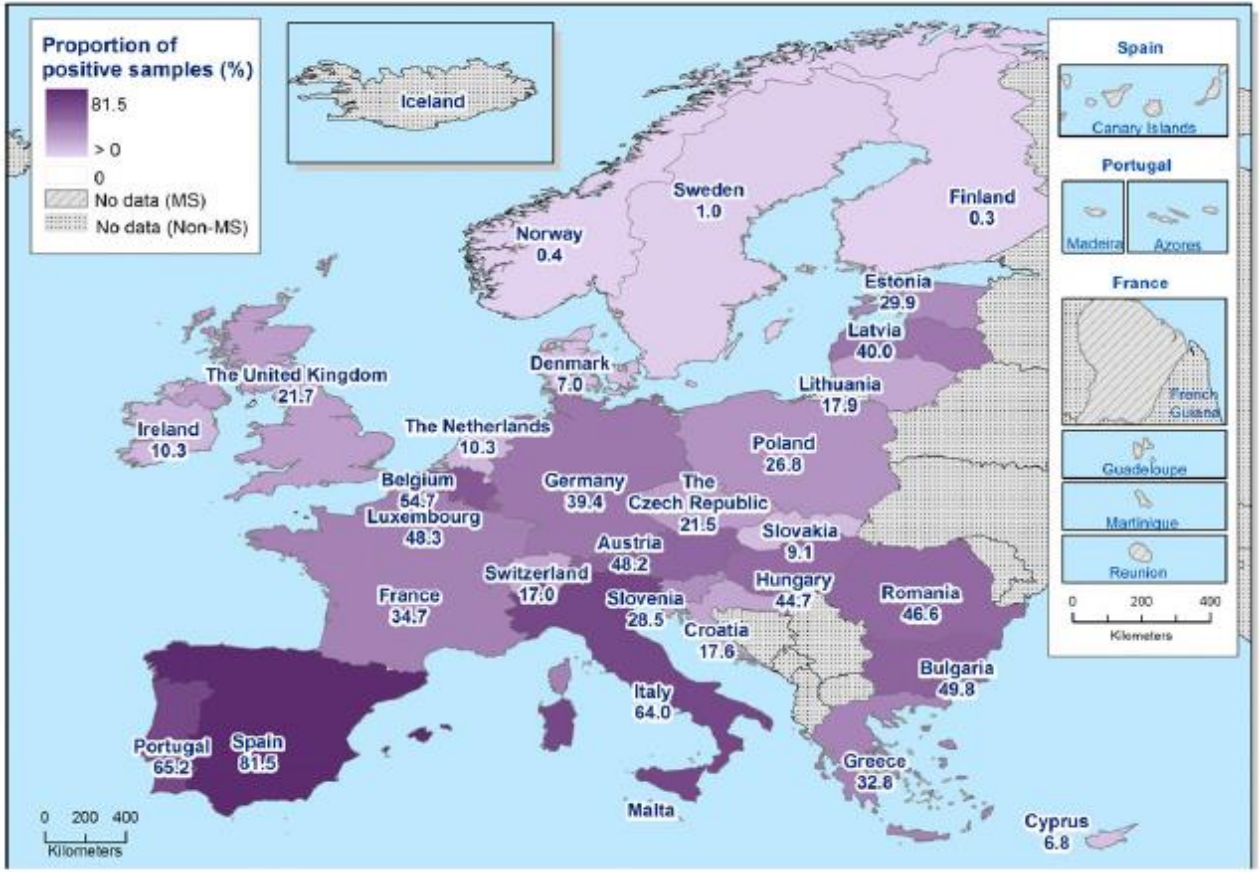


ESBL-/AmpC-producing *E. coli* - 2015

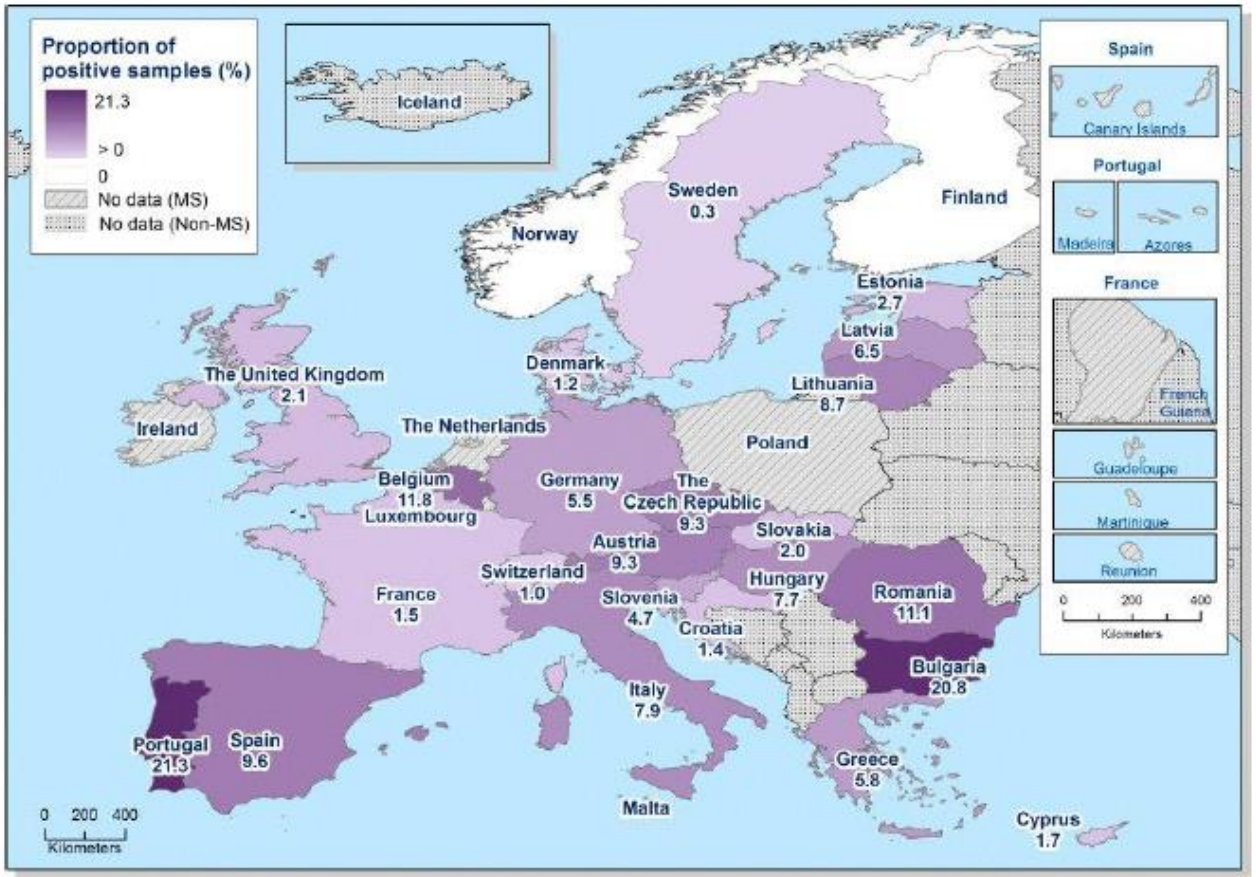
- **Prevalence** (in %)

	ESBL	AmpC	ESBL + AmpC
Fattening pigs	31.9	9.7	1.5
Veal Calves	36.8	4.8	2.0
Pork	7.0	2.3	0.4
Meat from bovines	5.0	1.8	0.3

ESBL PREVALENCE IN PIGS



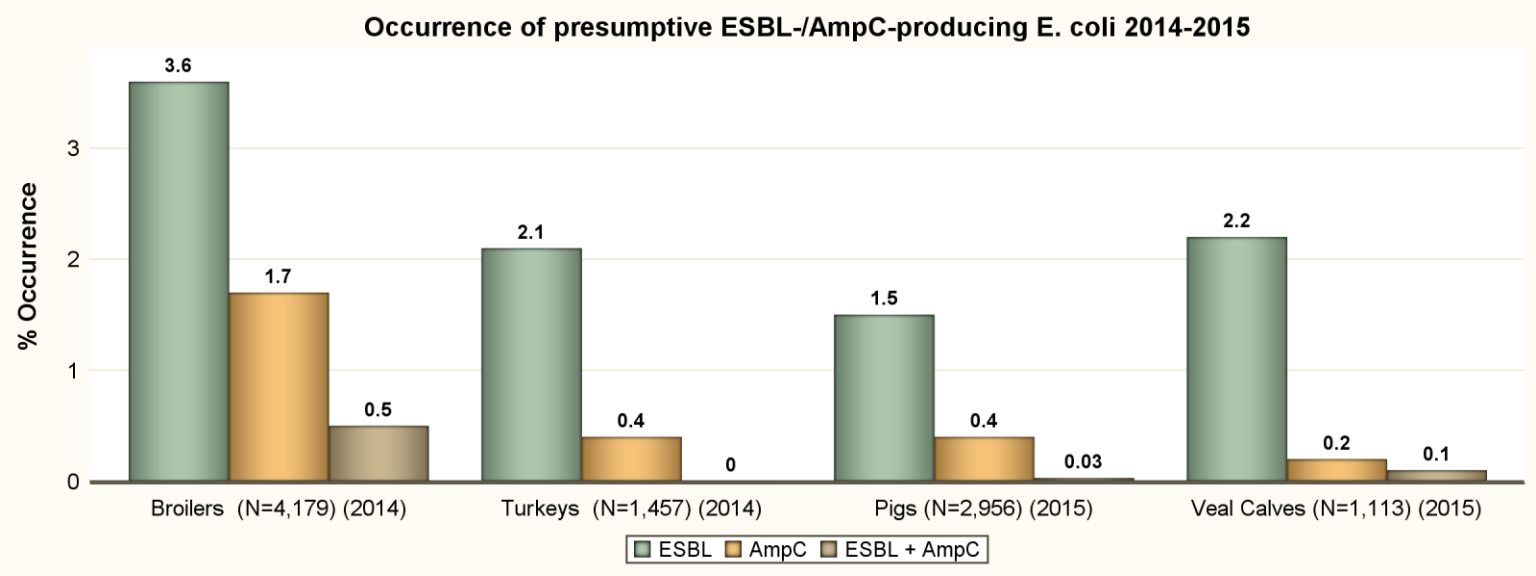
ESBL PREVALENCE IN MEAT FROM PIGS



3RD-GENERATION CEPHALOSPORIN RESISTANCE

Indicator *E. coli* 2014 - 2015

- Presumptive ESBL/AmpC producers



RESISTANCE TO CARBAPENEMS

- **Specific monitoring of carbapenemase-producing *E. coli***
  - Meat from pigs: 8 MSs – 1,833 samples
  - Fattening pigs: 10 MSs – 2,584 samples
  - Meat from bovines: 8 MSs - 1,818 samples
  - Bovine animals: 3 MSs – 682 samples
  - Calves: 2 MSs – 516 samples

➢ **No positive results detected …**

- **Other monitoring**
  - Two single isolates carbapenemase-producing *E. coli* detected in the pig sector in 2 MSs in 2015

OVERVIEW OF AMR IN THE EU

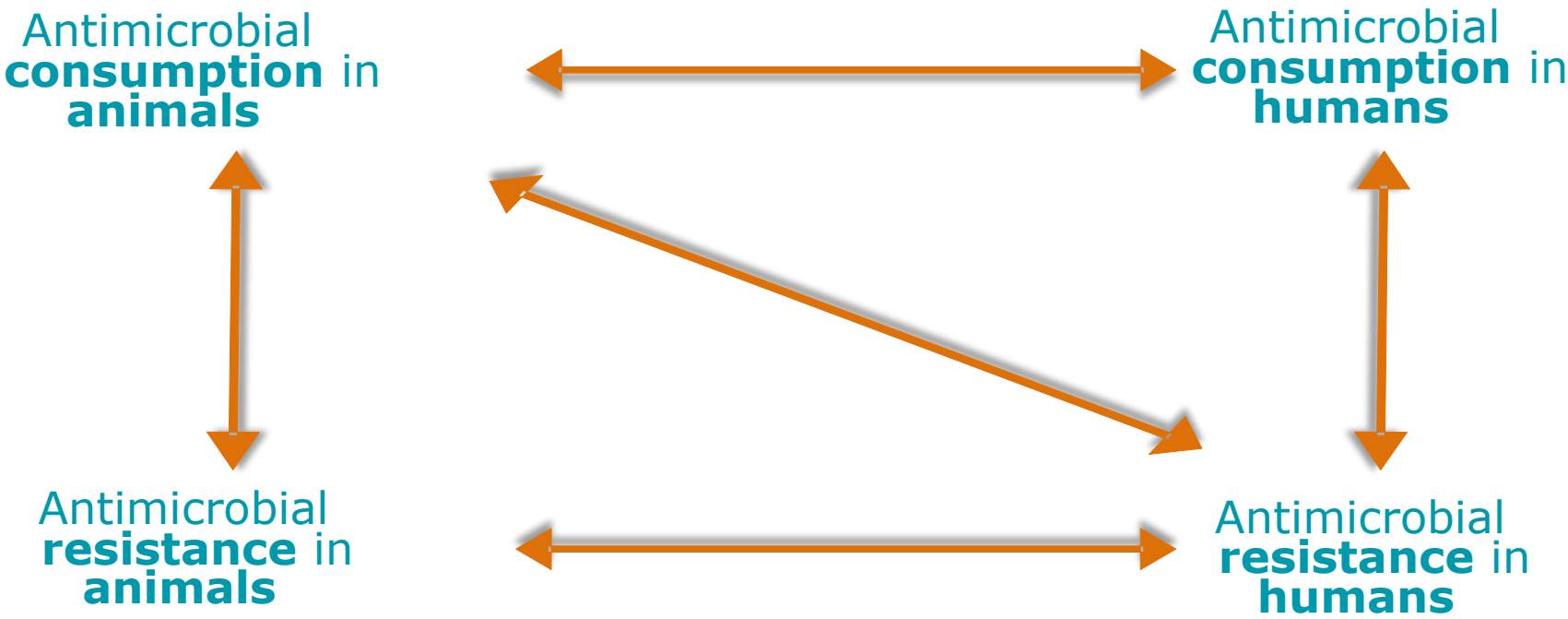
- New legislation successfully implemented by MSs
- Enlarged scope of AMR monitoring
- More comparable and reliable data
- Frequent resistance to Fluoroquinolones observed
- Low resistance to other Critically Important Antimicrobials
- Low occurrence of ESBL/AmpC producers
- Prevalence of ESBL/AmpC-producing *E. coli* assessed in 2015
- Carbapenemase producers detected in pig sector in 2015

Continually evolving threat from emerging AMR: There is a need to review the data collected, interpret the findings and assess trends.

CONTENTS OF THE 2ND JIACRA REPORT

- Description of existing monitoring/surveillance systems
- Analysis of surveillance data referring to 2013, 2014 and 2015 from the EU MSs, IS, NO and CH to assess the relationship between antimicrobial consumption (AMC) and antimicrobial resistance (AMR) in animals and humans
- Conclusions and recommendations based on the results of logistic regression and multivariate analysis

POTENTIAL RELATIONSHIPS INVESTIGATED



THANK YOU FOR YOUR ATTENTION !

- Any questions?

- The 2015 EUSR on AMR is available on EFSA and ECDC websites

  - http://ecdc.europa.eu/en/publications/Publications/antimicrobial-resistance-zoonotic-bacteria-humans-animals-food-EU-summary-report-2017.pdf

  - https://www.efsa.europa.eu/en/press/news/170222