EFSA's activities on antimicrobial resistance in the food chain: risk assessment and data collection

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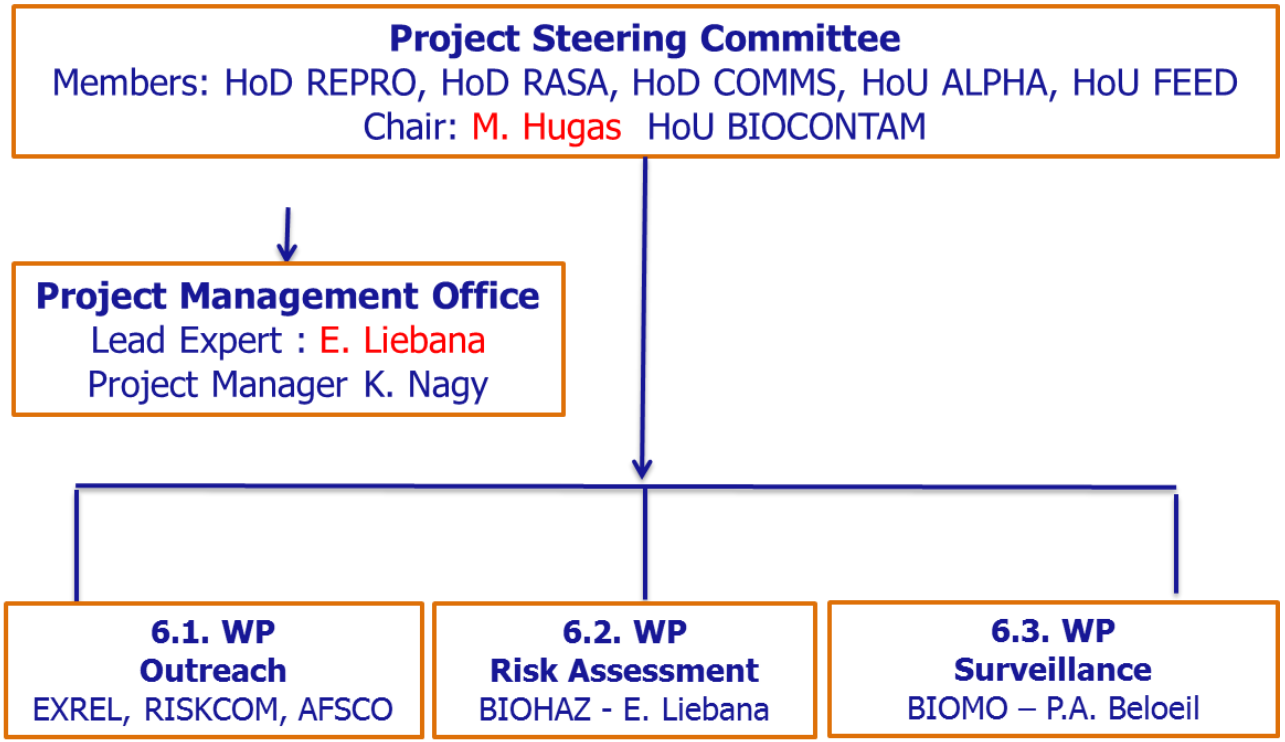
efsa
European Food Safety Authority

www.efsa.europa.eu

AMR EFSA'S UMBRELLA PROJECT

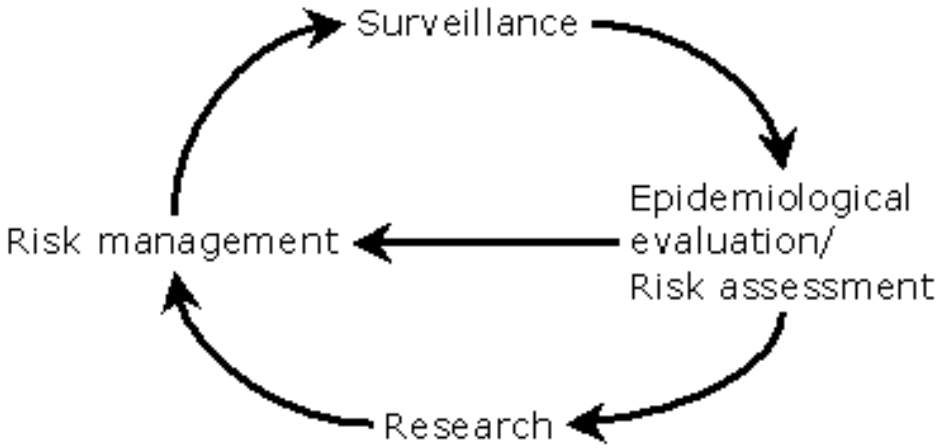
- EFSA established umbrella project for the coordination of AMR activities in EFSA to support risk managers

- BIOCONTAM Unit is the responsible for the coordinaton of the project. BIOHAZ Panel is the lead Panel on the topic.



WP MONITORING & SURVEILLANCE

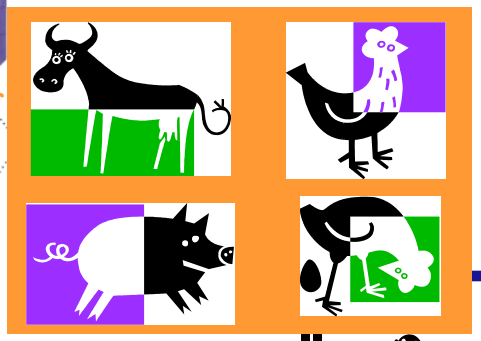
- To detect **emergence**, and to understand **dissemination** of AMR.
- To provide data relevant for **risk assessment**
- To plan **interventions** and measure their effects.



European Union Summary Report on AMR

- EU Member States
- Other European countries

Mandatory



ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

TESSY database

Zoonoses Data Collection + Data Collection Framework

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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

2014 EU SUMMARY REPORT ON AMR …

… in a nutshell!

- New legislation successfully implemented by MSs
  - Enlarged scope of AMR monitoring
  - Specific focus on **poultry populations** in 2014
- Frequent resistance to Fluoroquinolones observed
- Low resistance to other CIAs
- Low co-resistance to CIAs
- Low occurrence of ESBL/AmpC producers
- No carbapenemase producers detected
- Transferable resistance to colistin recently reported

MARKED VARIATIONS…

… between *Salmonella* serovars

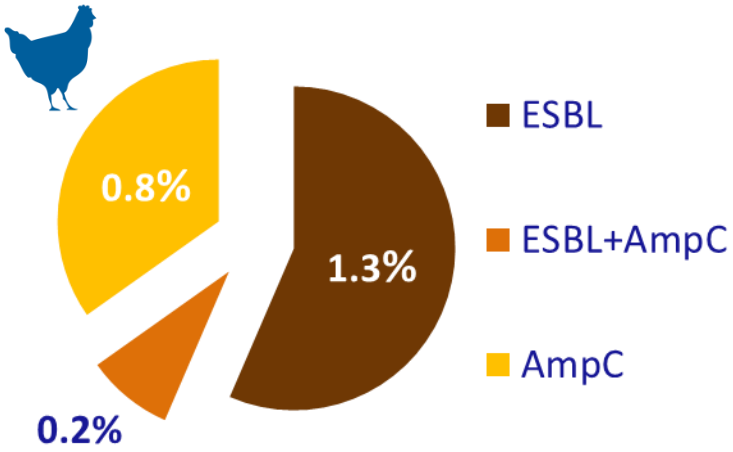
- *S*. Infantis and *S*. Kentucky …
  - … contribute significantly to the overall numbers of multi-resistant *Salmonella*
  - … both display high-level resistance to **Cip**

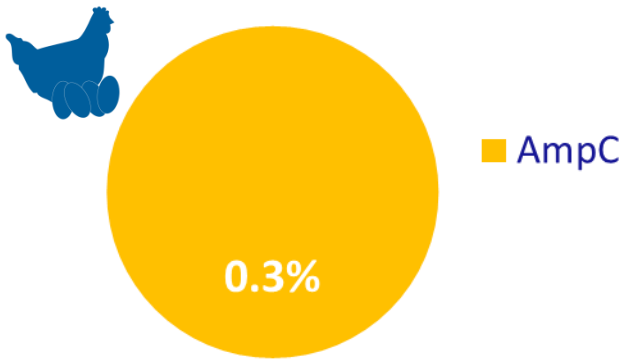
… between reporting countries

- Higher resistance …
  in Eastern and Southern Europe …

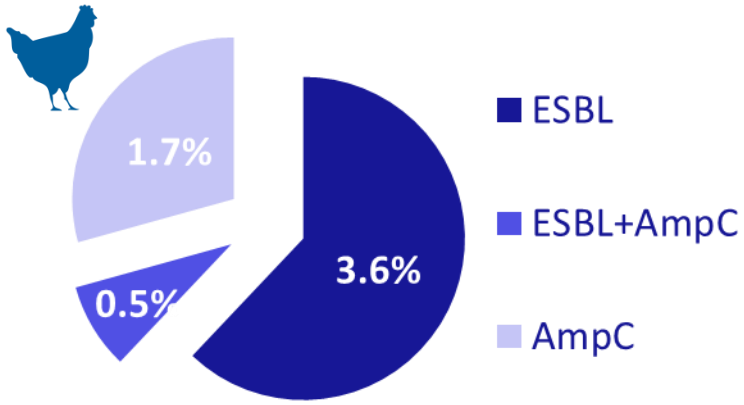
PHENOTYPIC CHARACTERISATION
3RD-GEN CEPHALOSPORIN RESISTANCE

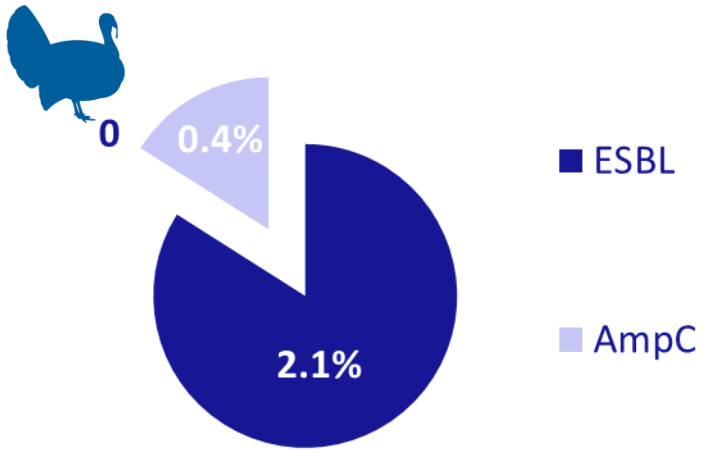
Salmonella spp.





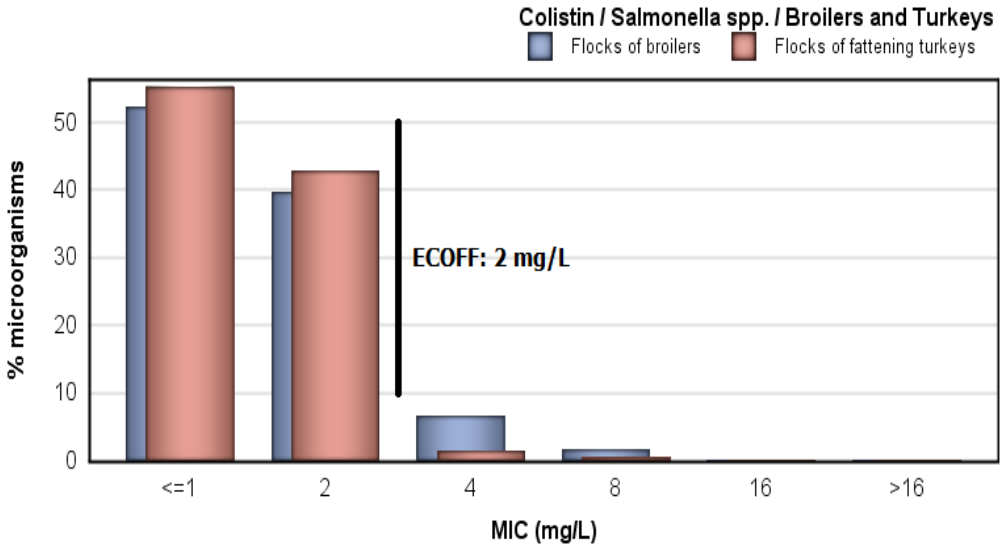
E. coli

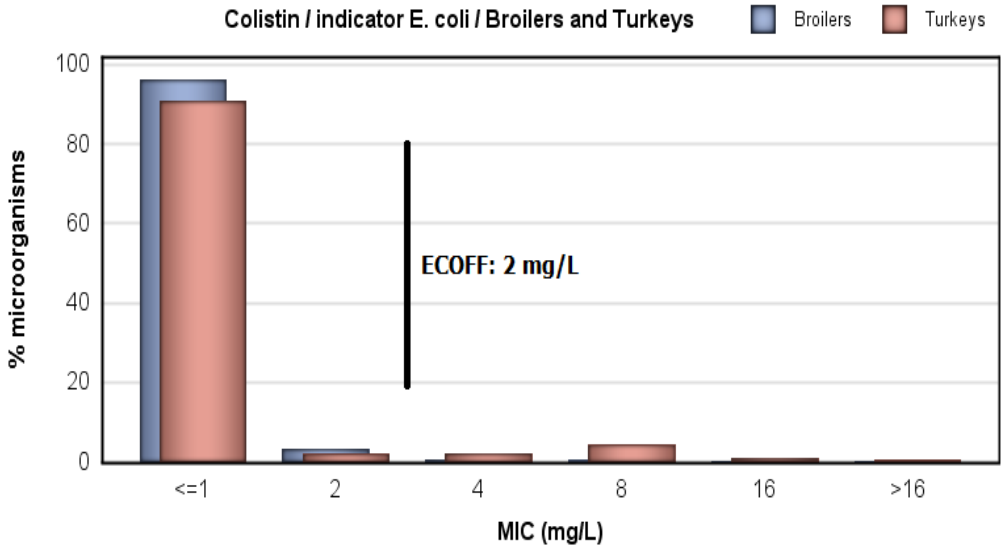




Low occurrence of ESBL/AmpC producers!

RESISTANCE TO COLISTIN IN *SALMONELLA* AND *E. COLI*





- A number of colistin-R isolates have undergone further testing at the EURL or at MS level, for the presence of *mcr-1* gene.
- More detailed data are going to be available later this year.
- EMA is currently working on an update of its 2013 advice on the use of colistin in animals.

PLAN OF ANALYSIS THE 2015 EUSR ON AMR

- Focus of the year: fattening pigs and veal calves
- Voluntary data may be included, if enough

  - Occurrence of resistance
  - Temporal trends
  - Multi-drug resistance
  - Co-resistance to CIAs
  - Routine monitoring of ESBL/AmpC/CP producers
  - *Specific monitoring* of ESBL/AmpC producers

Analysis of antimicrobial use and resistance (JIACRA)

- Collaboration between: ECDC, EFSA and EMA: First **Joint Scientific Report published in Jan 2015**
- Analysis of the relationship between consumption of antimicrobials and the occurrence of AMR in humans and animals in the EU

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EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

European Antimicrobial Resistance Surveillance Network (**EARS-Net**)

European Surveillance of Antimicrobial Consumption Network (**ESAC-Net**)

efsa
European Food Safety Authority

Network on Zoonoses Data Collection

EU Summary Report on AMR in zoonotic and indicator bacteria from humans, animals and food

EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

European Surveillance of Veterinary Antimicrobial Consumption (**ESVAC**)

SELECTED RESULTS

	Total consumption (mg/kg of estimated biomass)
Humans	116.4 mg/kg (range: 56.7 – 175.8 mg/kg)
Animals	144.0 mg/kg (range: 3.8 – 396.5 mg/kg)

15/26 countries: consumption for animals < consumption for humans
3/26 countries: consumptions were similar for animals and humans
8/26 countries: consumption for animals > consumption for humans

CONSUMPTION (FP- ANIMALS) AND RESISTANCE (HUMAN BACTERIA)

- **Cephs:** no association.
- **Fluoroquinolones:** positive association for *E. coli* (but not for *Salmonella* and *Campylobacter)*.
- **Macrolides:** positive association for *Campylobacter*.
- **Tetracyclines:** positive association for *Salmonella* and *Campylobacter*.

DISCUSSION POINTS FOR FUTURE ANALYSES

- Differences in current systems for collection of data on antimicrobial consumption and resistance in bacteria from human and animal sectors limit possibilities of direct comparison.

- To improve integrated analyses, more detailed and comprehensive data required. Factors such as antimicrobial consumption per animal species, resistance data from all countries, from relevant animal species and food, at a detailed level would be required.

- Other factors that would have to be considered are resistance to other antimicrobials (co-selection), travel and imports of meat.

WP RISK ASSESSMENT

- Some history of key mandates over the last 10 years
- On-going mandates:

✓ Joint EFSA and EMA scientific opinion on measures to reduce the need to use antimicrobial agents in animal husbandry in the EU and the resulting impacts on food safety. RONAFA. (EFSA-Q-2015-00216)

✓ The risk for the development of AMR due to feeding calves with milk containing residues of antibiotics (EFSA-Q-2015-00611)

✓ Collaboration on a request to EMA for an update of the 2013 advice on the impact on public health and animal health of the use of antibiotics in animals (colistin)

Food as a vehicle for antimicrobial resistance (Self-task BIOHAZ Panel). 2007-2008.

- The exposure to AMR bacteria via food is difficult to determine.
- The role of food in the transfer of R genes is insufficiently studied.
- Foodborne bacteria (pathogens and commensals) display an increasing and diverse range of resistance to CIA.
- Any further spread of resistance among bacteria in foods is likely to have an influence on human exposure.

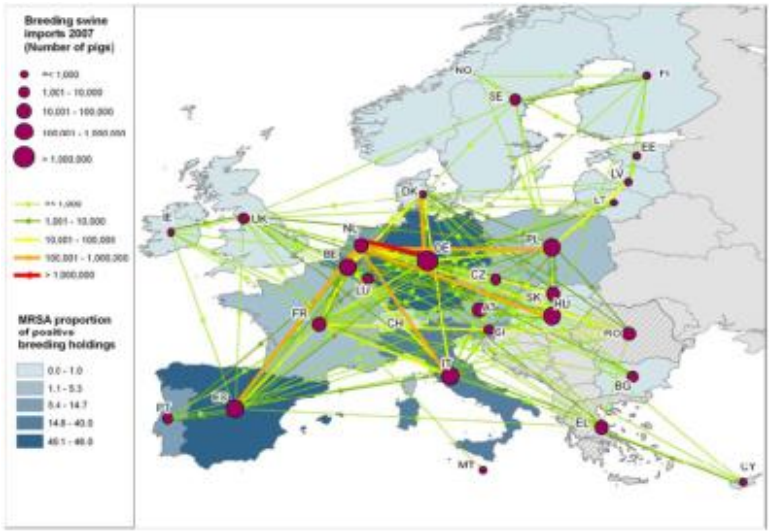
AMR focused on zoonotic infections. Joint Opinion – Nov. 2009

- AMR increased in recent years: more difficult to treat infections
- Combinations regarded as of major concern for public health in the EU
  - *Salmonella: (fluoro-)*quinolone and cephalosporins
  - *Campylobacter: (fluoro-)*quinolone, and macrolides
- Use of antimicrobials considered the main factor in the emergence of AMR
- Disparity in AMR levels in the MSs makes difficult to have a single strategy to fight the problem. There are needs:
  - to strengthen monitoring activities
  - to develop new antimicrobials
  - to develop new strategies to combat the spread of AMR
  - to promote prudent use

Public health significance of MRSA in animals and food : Mitigation measures - June 2009

- Primary reservoirs: pigs, veal calves, and broilers.
- Most important transmission route: contact with live animals and their environments.
- Animal movement and contacts are important factors for transmission.
- General control options (GHP, HACCP, GMP) on farms, slaughterhouses, and food production areas.
- MRSA in healthcare settings can be managed by screening and infection control measures.
- Transfer of MRSA from pets to humans is difficult to control. Basic hygiene measures are key.

EU-baseline survey in pigs illustrates clonal spreading through trade:



Public health risks of strains producing ESBL/AmpC in food and FP animals – July 2011

Risk factors for emergence, occurrence and spread of ESBL / AmpC

- The use of antimicrobials
  - Due to co-resistance, generic antimicrobial use is a risk factor

- An extensive trade of animals in the EU
  - ESBL/AmpC are common in the top of some production pyramids (e.g. poultry)

- Clonal spreading
  - ESBL-/AmpC-producing *E. coli* are disseminated in the poultry production chain through day-old grandparent chickens

Identification and ranking of possible control options

Measures to control emergence in food animals:

- to stop all uses of 3rd-4th gen. cephalosporins,
- or to restrict their use (only allowed under specific circumstances),
- to control off-label usage of cephalosporins
- to decrease total antimicrobial use (due to co-resistance)

Measures to control dissemination:

- Increased farm biosecurity
- Controls on animal trade (of carriers)
- Improving hygiene throughout the food chain

It is of high priority…:

- To reduce the selection pressure (use of Ab)
- To prevent vertical transmission from the top of the production pyramid.
- To prevent local recirculation within subsequent flocks

CARBAPENEMASES IN FOOD ANIMAL ECOSYSTEMS – December 2013

- Emerging and **highly sensitive** public health issue (last resort antimicrobials)
- Only a **few studies** have reported carbapenem-R bacteria in FP-animals, and **none** in food.
- Transmission through the food chain **very rarely reported**, but is considered likely if these emerge.
- Specific **targeted surveys** needed at EU level.
- **Measures** to prevent emergence and minimising further spread need to be taken now.

RONAFA

- EC mandate for a Joint EFSA-EMA scientific opinion on "measures to reduce the need to use antimicrobial agents in animal husbandry in the EU, and the resulting impacts on food safety"

- Deadline: 20 December 2016

- EFSA:
  - assigned to BIOHAZ Panel
  - involvement of AHAW and FEEDAP Panels

- Ad hoc WG of experts:
  - Co-chaired 1 EFSA and 1 EMA Chair
  - 6 experts EFSA – 6 experts EMA
  - Collaboration EFSA-EMA Secretariat

TERMS OF REFERENCE

ToR 1
Review current measures

ToR 2
Assess impact current measures

ToR 3
Review alternativemeasures

ToR 4
Assess impact alternative measures

ToR 5
Recommend options to reduce antimicrobial usage

Impact on:
- use of antimicrobials
- AMR in animals/food

NOT in humans

WASTE MILK MANDATE

- EC Mandate for an EFSA Scientific Opinion on the "**Risk for the Development of Antimicrobial Resistance (AMR) due to feeding of Calves with Milk containing Residues of Antibiotics**"

- Deadline: **31 December 2016**
- Assigned to BIOCONTAM (leading) and FEED Units
- BIOHAZ Panel (leading) and FEEDAP Panels involved
- Involvement of EMA in their areas of responsability
- *Ad hoc* WG of experts: 8 experts

TERMS OF REFERENCE

ToR1 Assess the risk for the **development of AMR** due to **feeding** on farm of **calves with colostrum** potentially **containing residues of antimicrobials**.

ToR2 Asses the risk for the **development of AMR** due to **feeding** on farm of **calves with milk of cows treated during lactation** with antibiotic and **milked during the withdrawal period**.

ToR3 Propose **possible options to mitigate the risk for the development AMR** derived from such practices if relevant.

WGS FOR FOOD SAFETY (AMR)

- EFSA Scientific Opinions
- Scientific Colloquium
- Procurement funding (Liseq)
- **EUSR-AMR support: EURL-Ref Testing**
  - **Correlation with phenotypic data**
  - **Detection of emerging mechanisms: ESBLs, carbepenemases, *mcr-1* (colistin-R)**
  - **Emerging resistance clones: *S.* Infantis, colistin-R *E.coli***
- **Advisory Board of EU funded projects (COMPARE, EFFORT)**
- **Thematic Grant funding**:
  - **ENGAGE: AMR Commensal *E. coli* and *Salmonella***
  - INNUENDO: VTEC, *Campylobacter, Yersinia, Salmonella*

WP OUTREACH

Communication tools to reach target audiences

- Press releases/news
- Media relations activities, *e.g.* pitching interviews, placing opinion pieces in selected publications
- Joint media relations activities with sister agencies
- EU insight survey on antimicrobial resistance
- Possible interviews (or feature stories) with experts
- Videos
- Twitter chats and overall social media promotion
- New infographics to present the results of the AMR report

TAKE HOME MESSAGES

- EFSA's role in detecting emerging risks in this area and to give prompt advice on these matters
- Importance of integrated approach with all players in the food chain: interagency collaboration.
- Importance of good and harmonised data monitoring systems both for resistance and consumption of antimicrobials
- EFSA's support to risk managers to decide on best strategies to apply and on possible control options.