

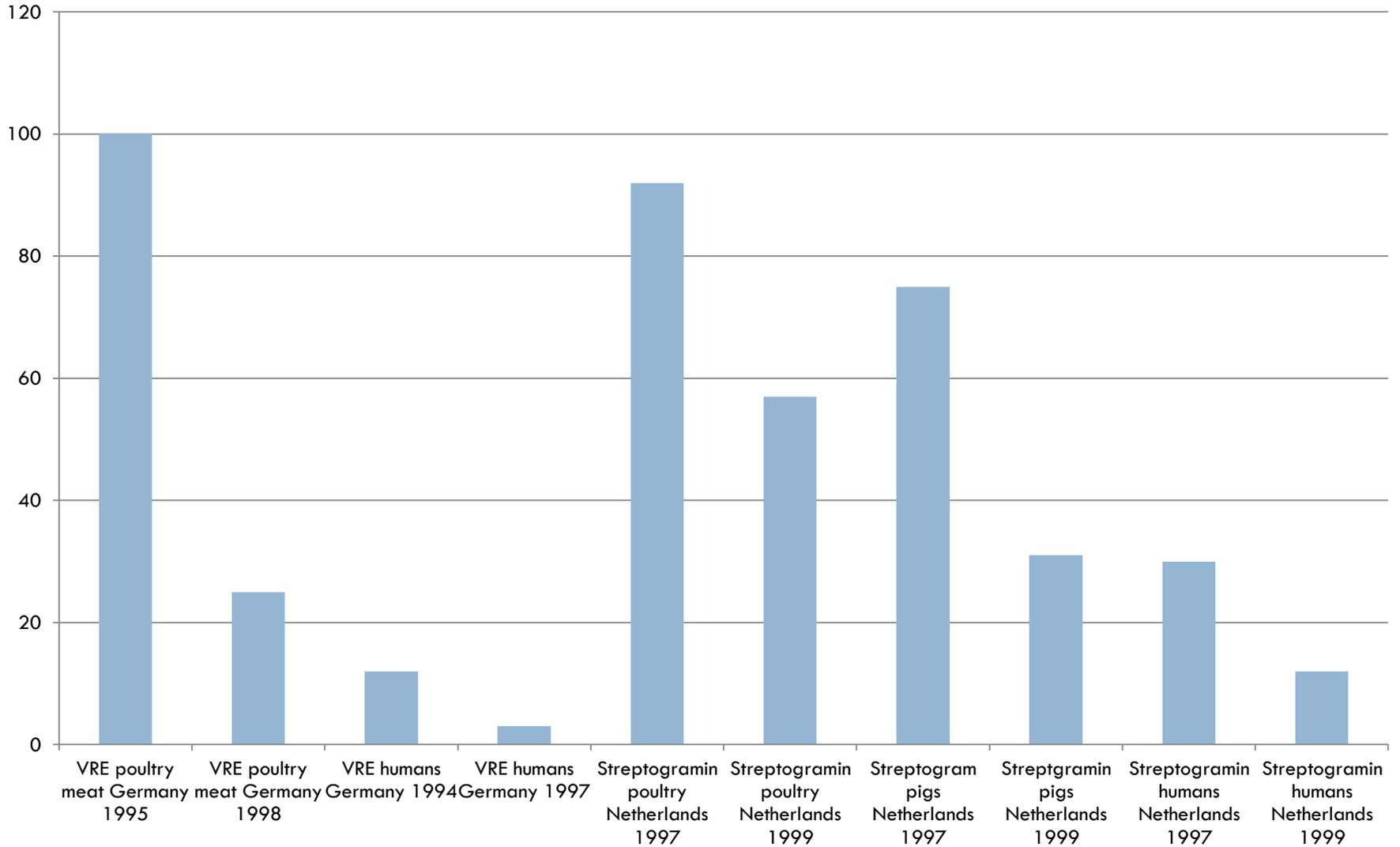
CUTTING FARM ANTIBIOTIC USE CAN BENEFIT PUBLIC HEALTH

Cóilín Nunan, Alliance to Save Our Antibiotics

Is there really a link between farm antibiotic use and resistance in human infections?

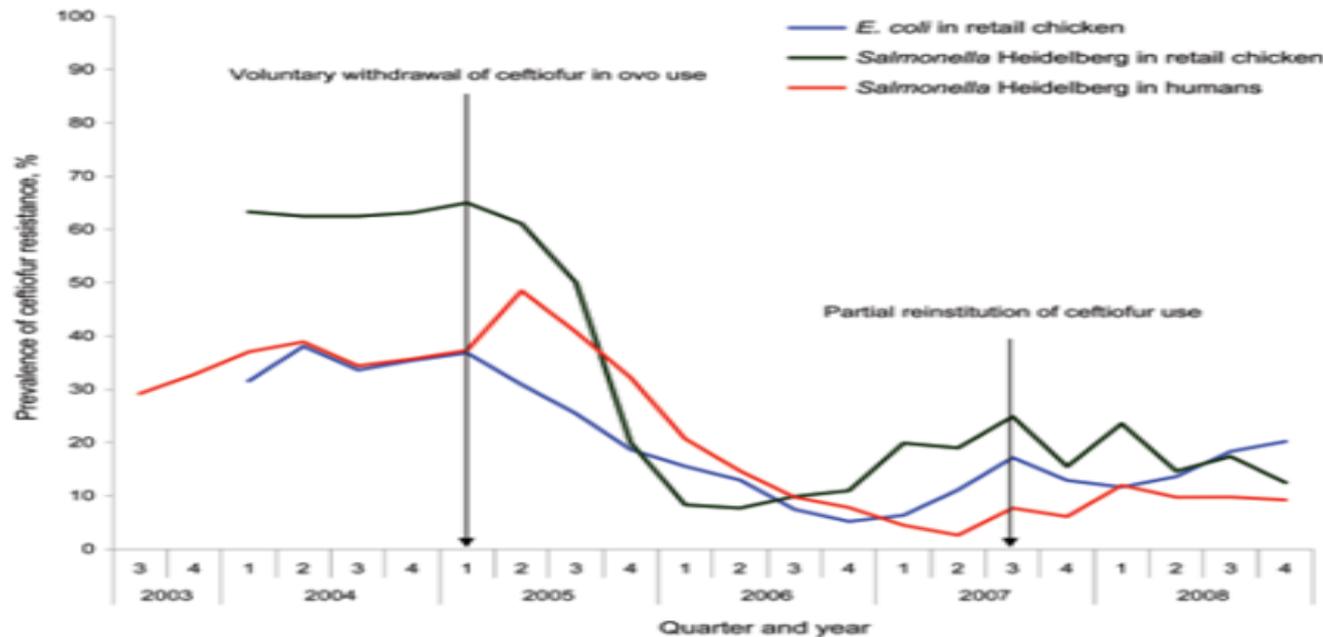
- Most scientific studies and reviews have concluded there is a link (O'Neill Review 2015), which is strong for *Campylobacter* and *Salmonella*. For *E.coli*, MRSA, enterococci and perhaps *Clostridium difficile* there is also a link, but human antibiotic use contributes a lot too.
- However, food, farming, veterinary and pharmaceutical industry representatives often claim that cuts in farm antibiotic use show no benefit for resistance in humans.
- There are many data gaps, but is there nevertheless evidence cuts in farm use work?

Falls in resistance in enterococci in animals and humans after growth promoters banned



Withdrawal of ceftiofur from hatcheries in Quebec

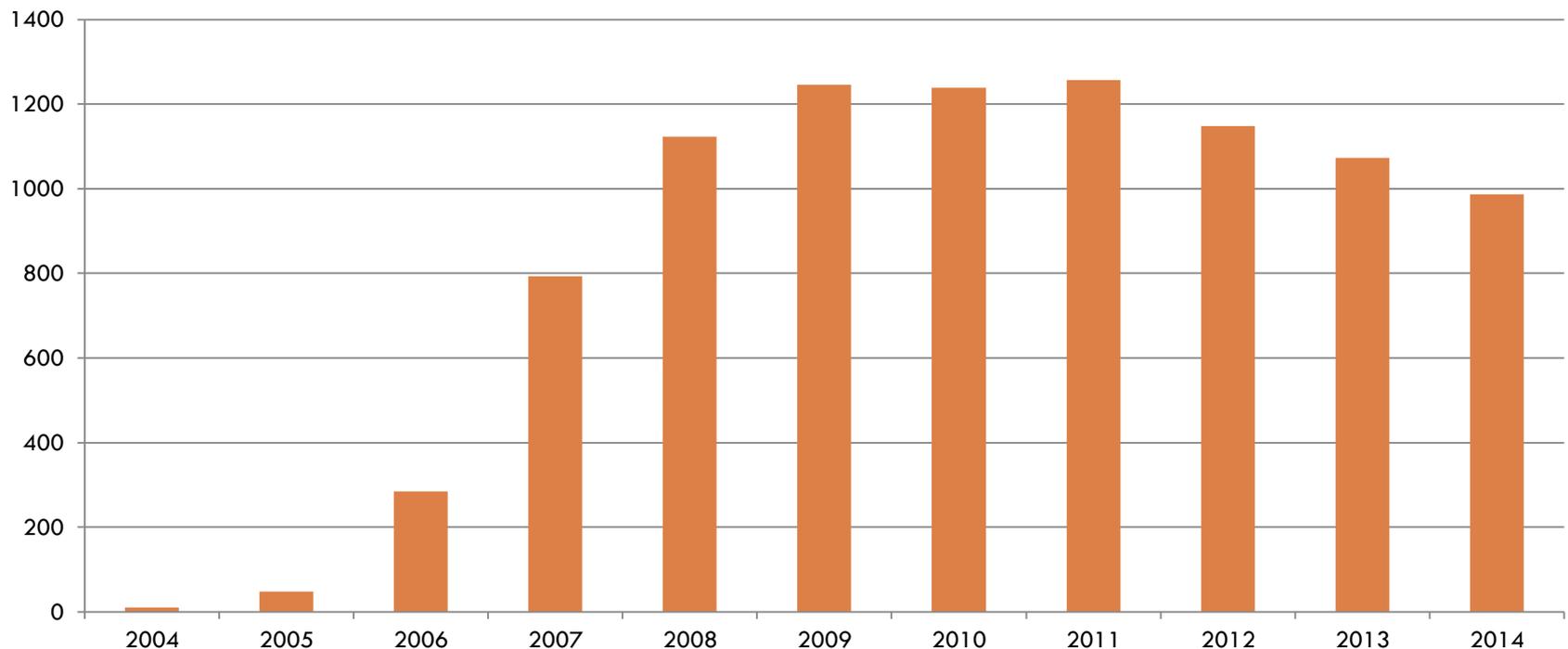
Voluntary ban on ceftiofur use in Québec hatcheries followed by partial re-introduction of the antibiotic led to large fall in resistance in chicken meat and in humans followed by smaller increase.



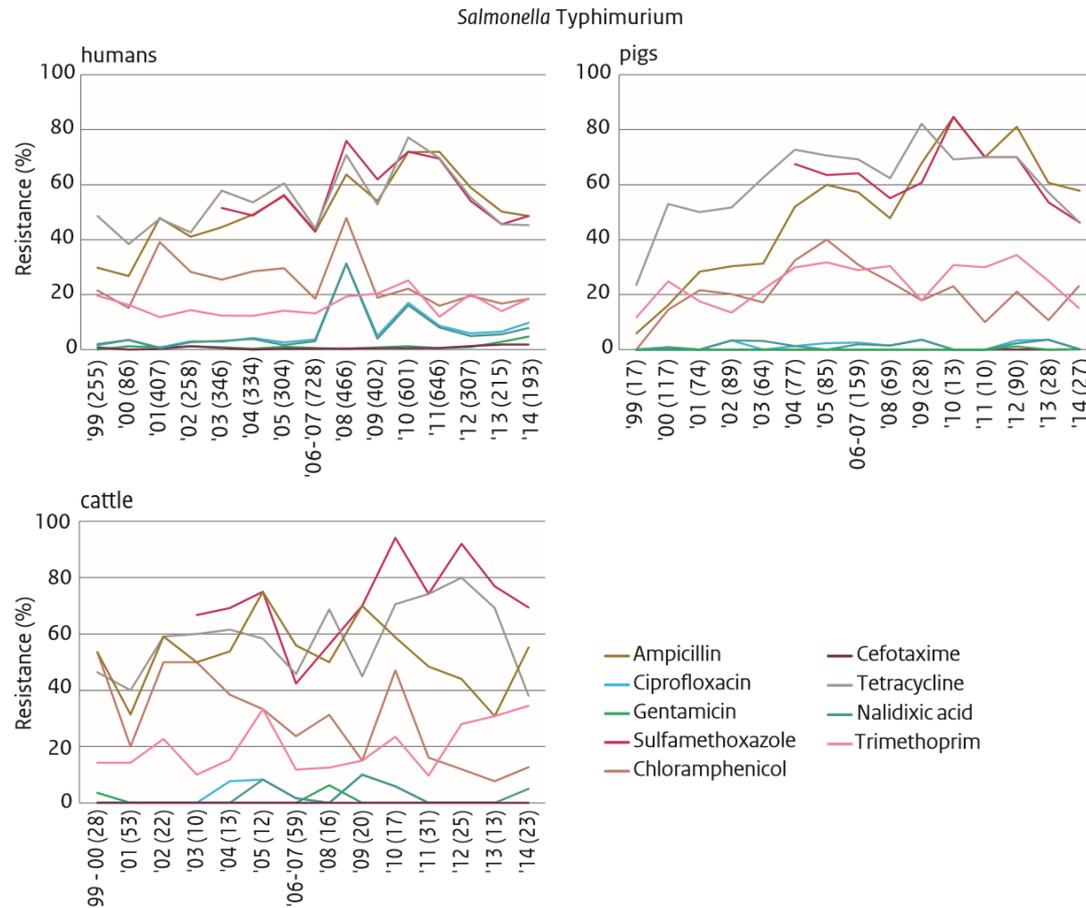
Dutil et al. 2010, Emerging Infectious Diseases

Human cases of LA-MRSA now falling in the Netherlands after cuts in farm antibiotic use

Large cuts in Dutch farm antibiotic use have reversed the trend of rapidly increasing numbers of human cases of livestock-associated MRSA



Resistance in Dutch human *Salmonella* had been increasing but is now falling (MARAN)



Incidence of poultry-associated ESBL E. coli in humans seems to be falling in the Netherlands

Trends in Extended Spectrum Beta-Lactamase (ESBL) Producing Enterobacteriaceae and ESBL Genes in a Dutch Teaching Hospital, Measured in 5 Yearly Point Prevalence Surveys (2010-2014)

Ina Willemsen^{1*}, Stijn Oome¹, Carlo Verhulst¹, Annika Petterson², Kees Verduin¹, Jan Kluytmans^{1,2,3}

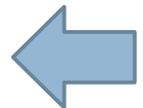
¹ Laboratory for Microbiology and Infection Control, Amphia Hospital, Breda, The Netherlands,

² Department of Medical Microbiology and Infection Control, VU University Medical Center, Amsterdam, The Netherlands, ³ Julius Center for Health Sciences and Primary Care, UMC Utrecht, Utrecht, the Netherlands

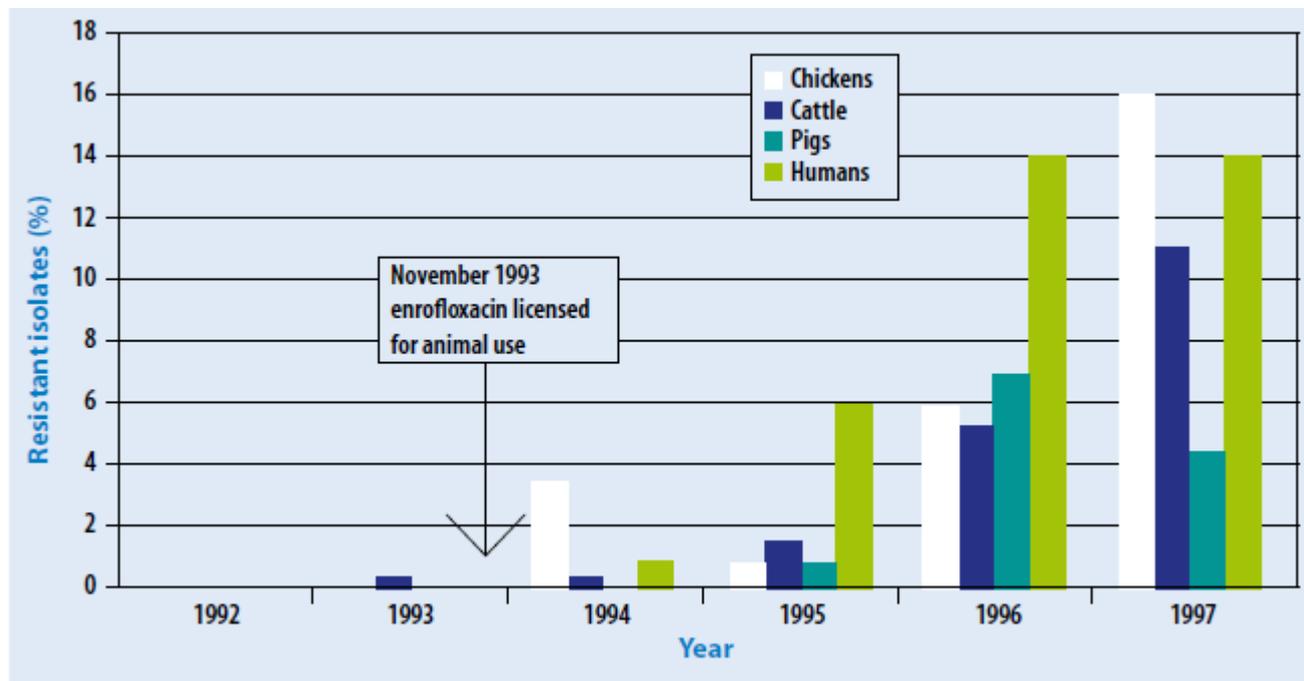
* iwillemsen@amphia.nl

Abstract

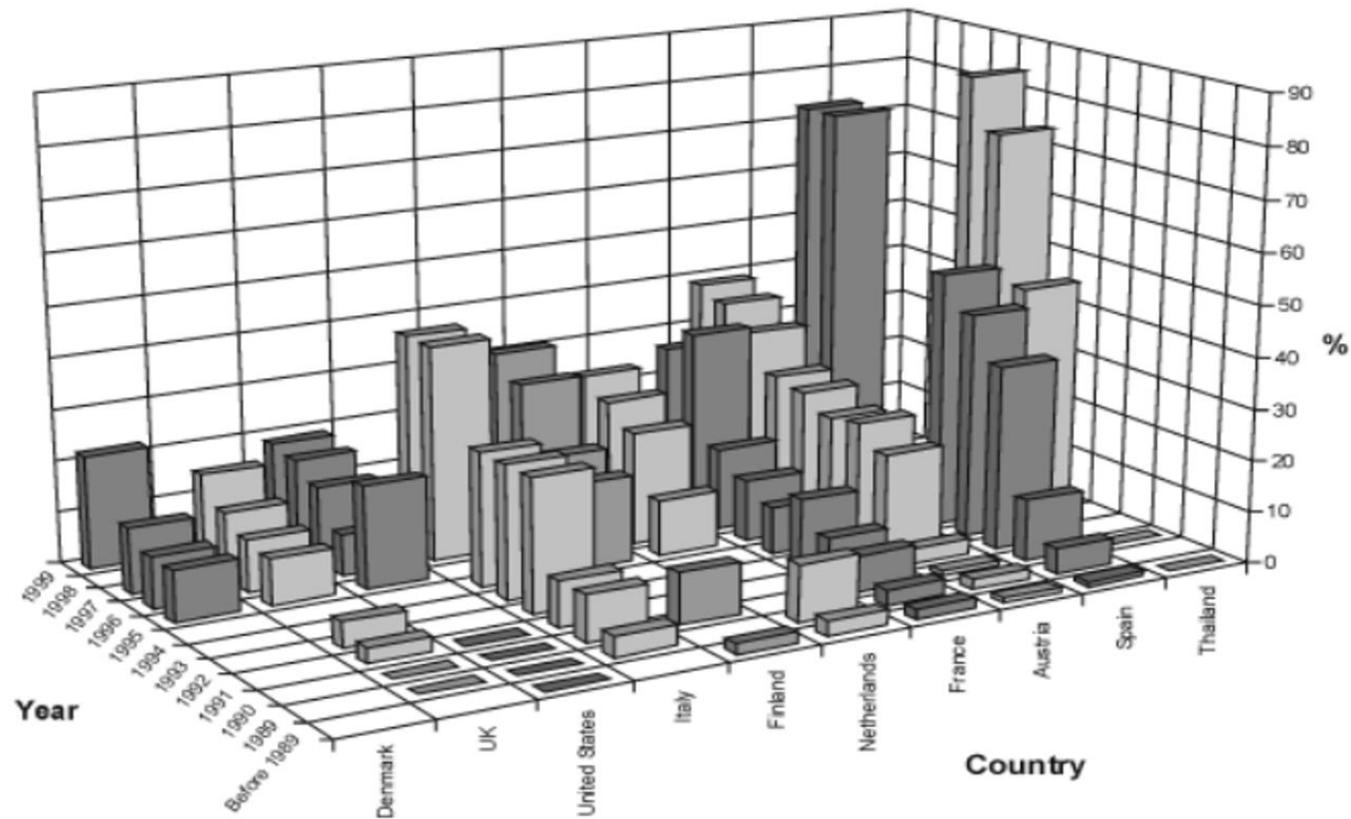
This paper describes the trends in prevalence of ESBL producing Enterobacteriaceae (ESBL-E) and ESBL genes, measured in five consecutive yearly Point Prevalence Surveys (PPS). All patients present in the hospital and in a day-care clinic (including patients on dialysis) on the day of the survey, were screened for perianal ESBL-E carriage. Perianal swabs were taken and cultured using an enrichment broth and a selective agar plate. Both phenotypic and genotypic methods were used to detect the production of ESBL, presence of ESBL-genes and clonal relatedness. Out of 2,695 patients, 135 (5.0%) were tested ESBL-E positive. The overall ESBL-E prevalence was stable over the years. Overall 5.2% of all ESBL-E were acquired by nosocomial transmission. A relative decrease of CTX-M-1-1-like ESBL genes (from 44 to 25%, $p = 0.026$) was observed, possibly related to the strong (>60%) decrease in antibiotic use in livestock in our country during the same period.



Introduction of fluoroquinolones to followed by emergence of resistance in *Salmonella typhimurium* DT104 in animals and humans (PHLS)



Emergence of fluoroquinolone resistance in human *Campylobacter* after fluoroquinolones licensed in farming (Enberg et al. 2001)



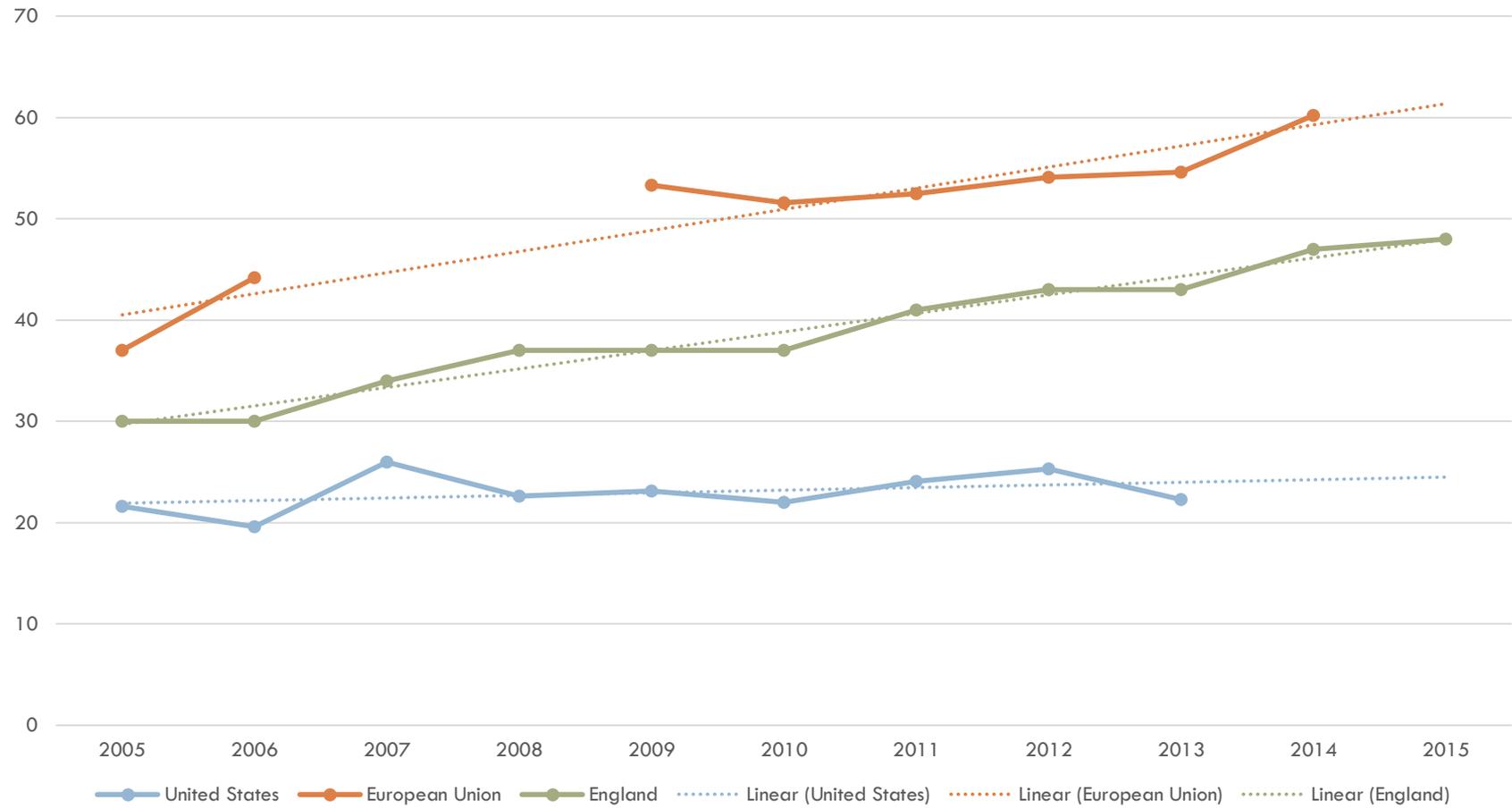
“In the USA, the fluoroquinolone enrofloxacin was banned in poultry in 2005. However, data shows that resistance in man has continued to rise”

The British Veterinary Association to House of Commons Science and Technology Committee, 2013

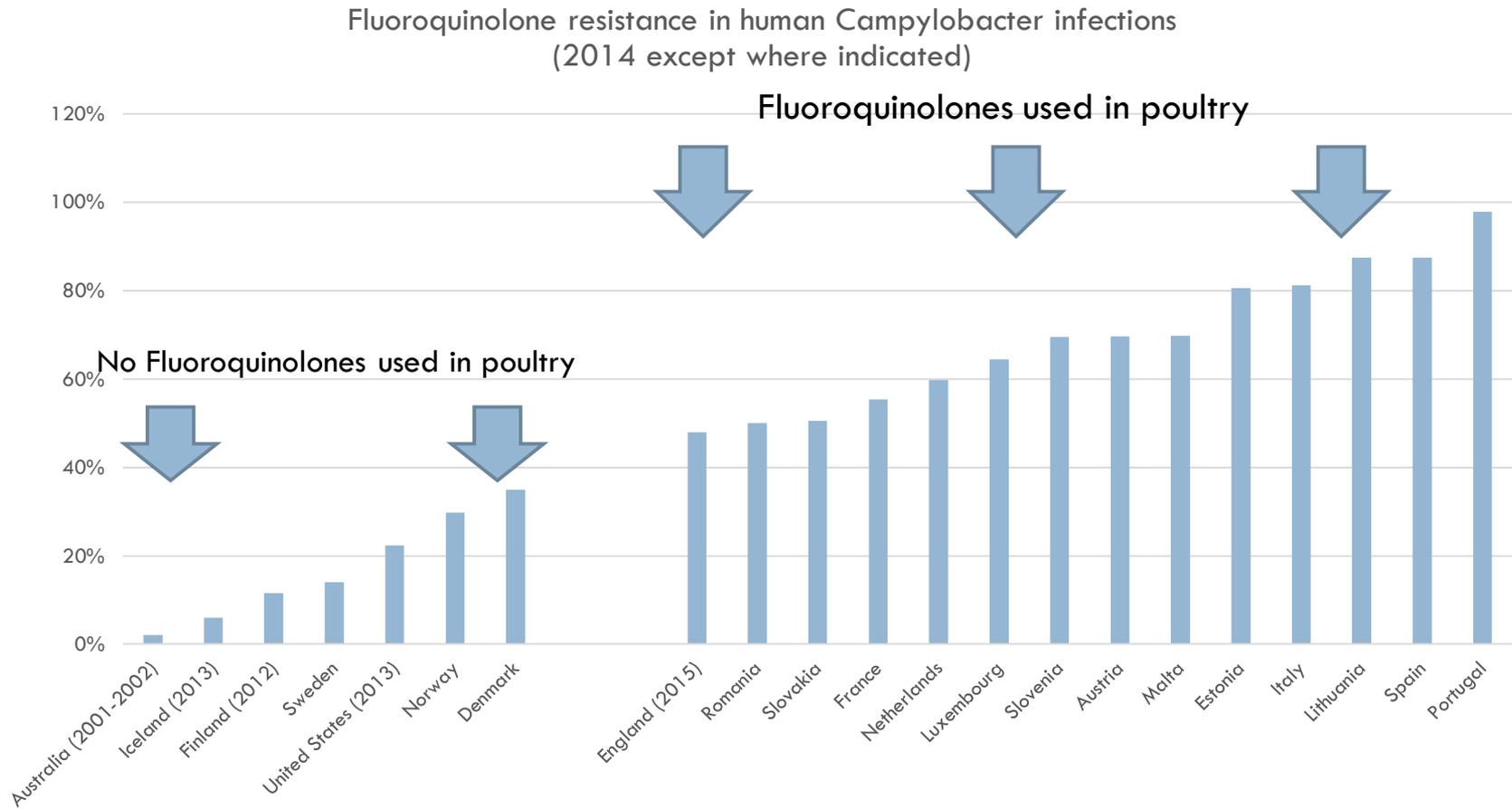
“The evidence – the data – shows that since they introduced the ban, resistance in man has continued to rise. Again, science would suggest that you have done one thing, but are not necessarily getting the result you hoped you were going to get”

RUMA to House of Commons Science and Technology Committee, 2013

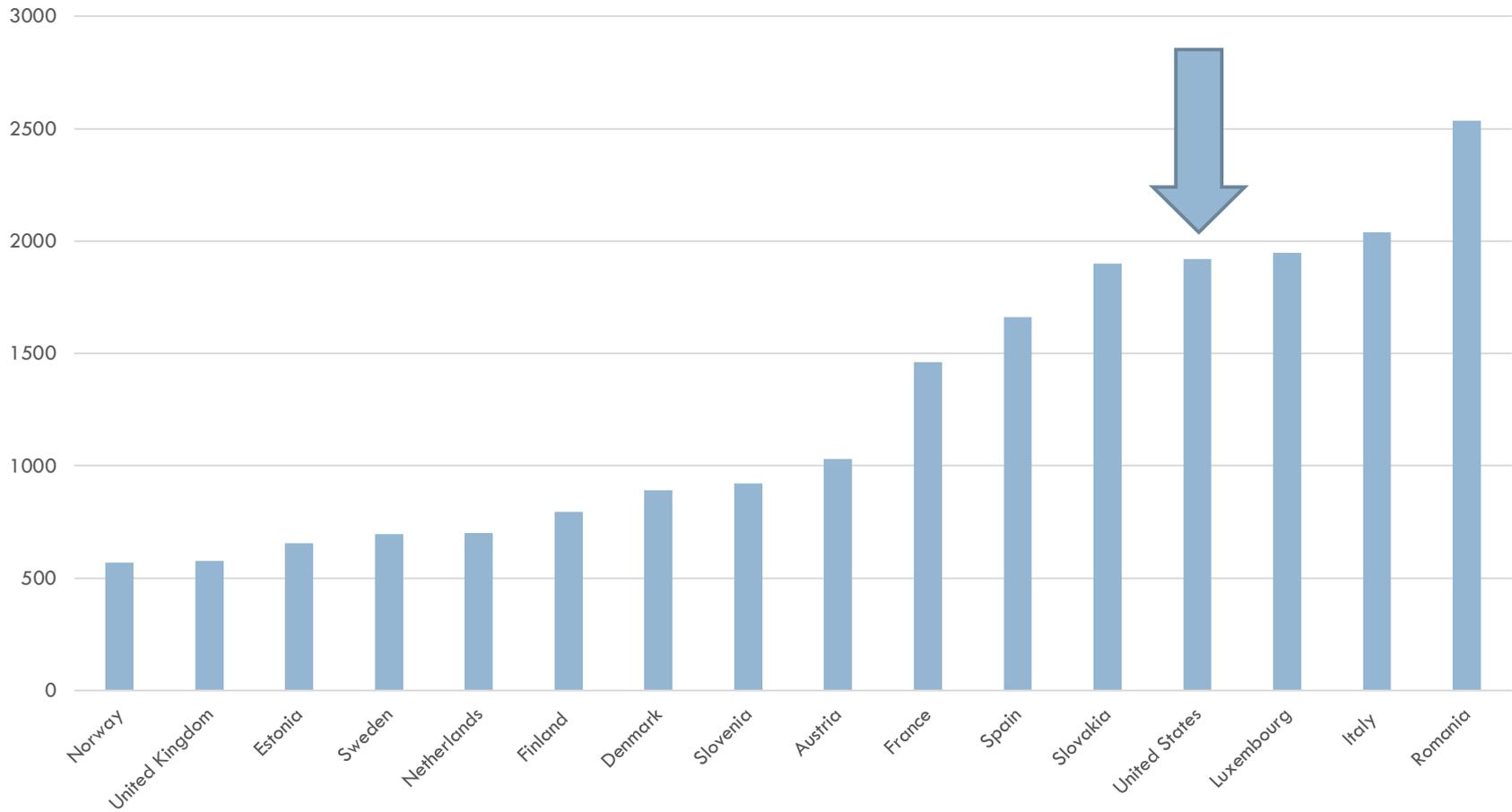
Large increase in resistance in EU since 2005 in contrast to the US



Countries with no fluoroquinolone use in poultry all have much lower levels of resistance in human *Campylobacter* infections



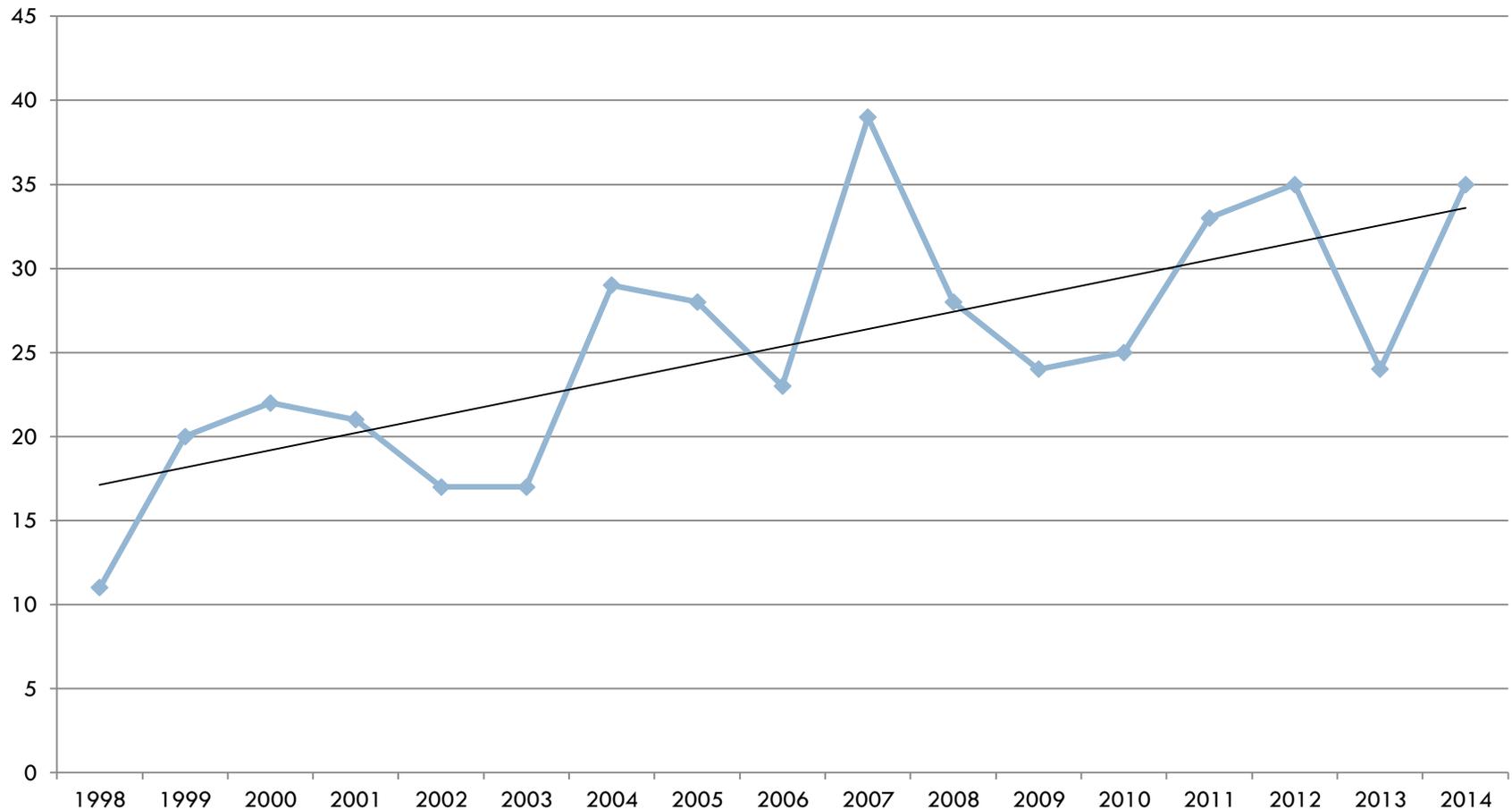
Quinolone use in humans in the US is very high in comparison with most European countries (source: IMS Health)



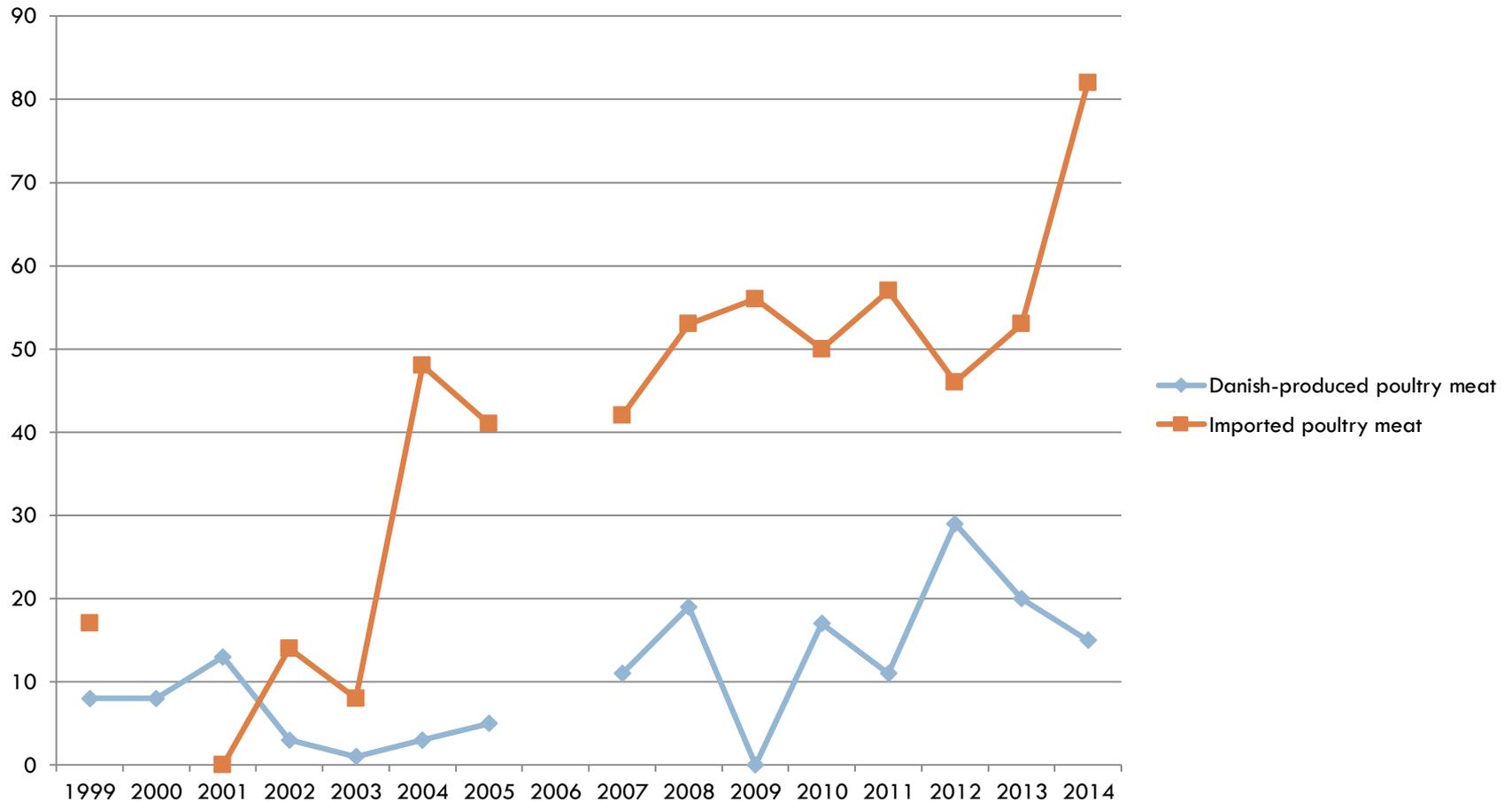
“We have to address the facts. I am sure the initiatives in Denmark were done with good intention – to reduce, hopefully, the incidence of resistance – but sadly that has not proven to be the case. The facts are now showing the opposite.”

NOAH to House of Commons Science and Technology Committee, 2013

Fluoroquinolone resistance in Danish human Campylobacter infections has gone up but why?

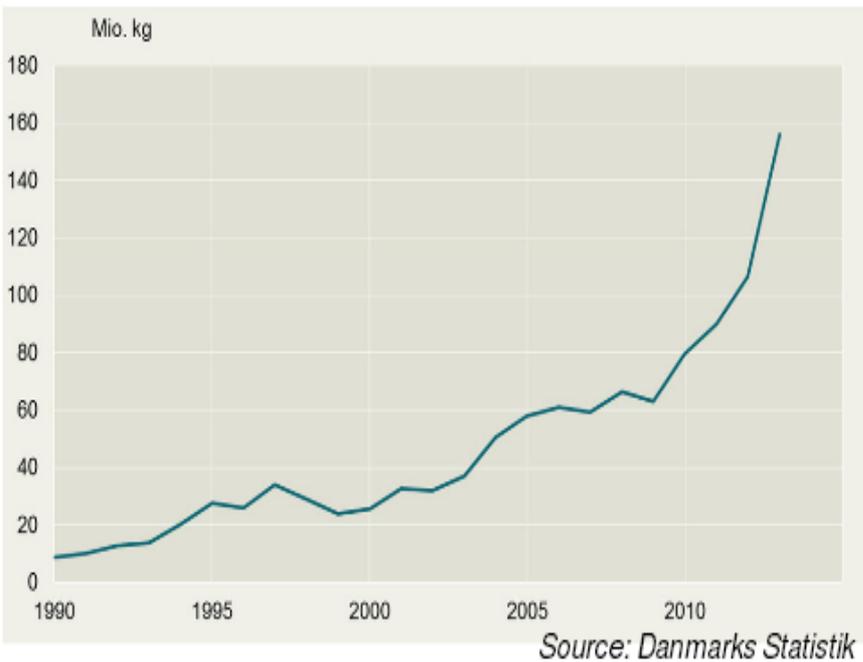


Danish authorities point to much higher resistance in imported poultry meat

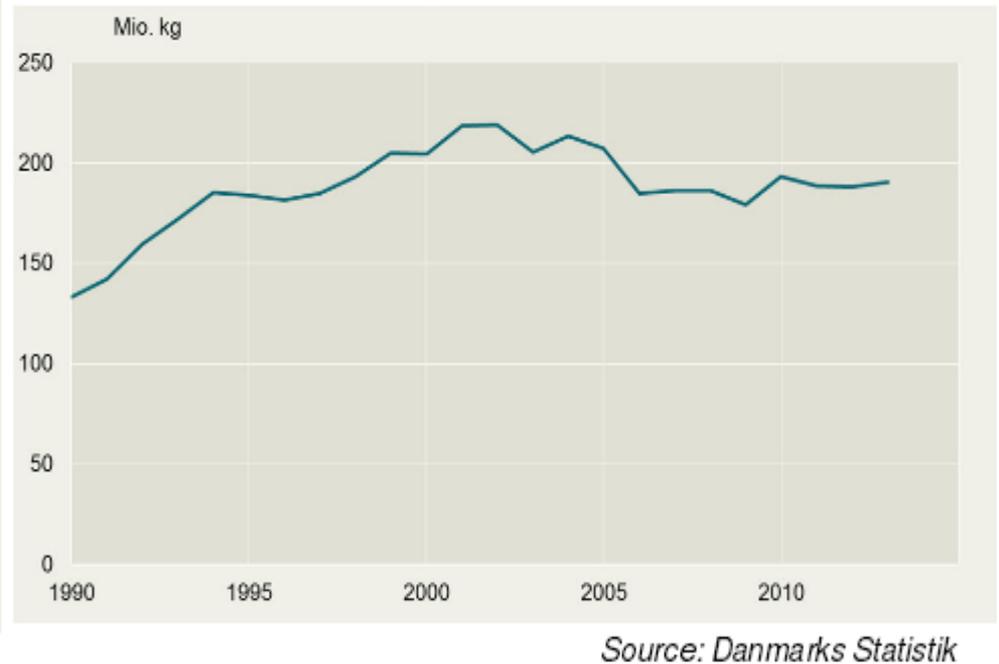


Large increases in importation of poultry meat to Denmark explains increasing resistance in human *Campylobacter*

Imports of poultry meat to Denmark [32]



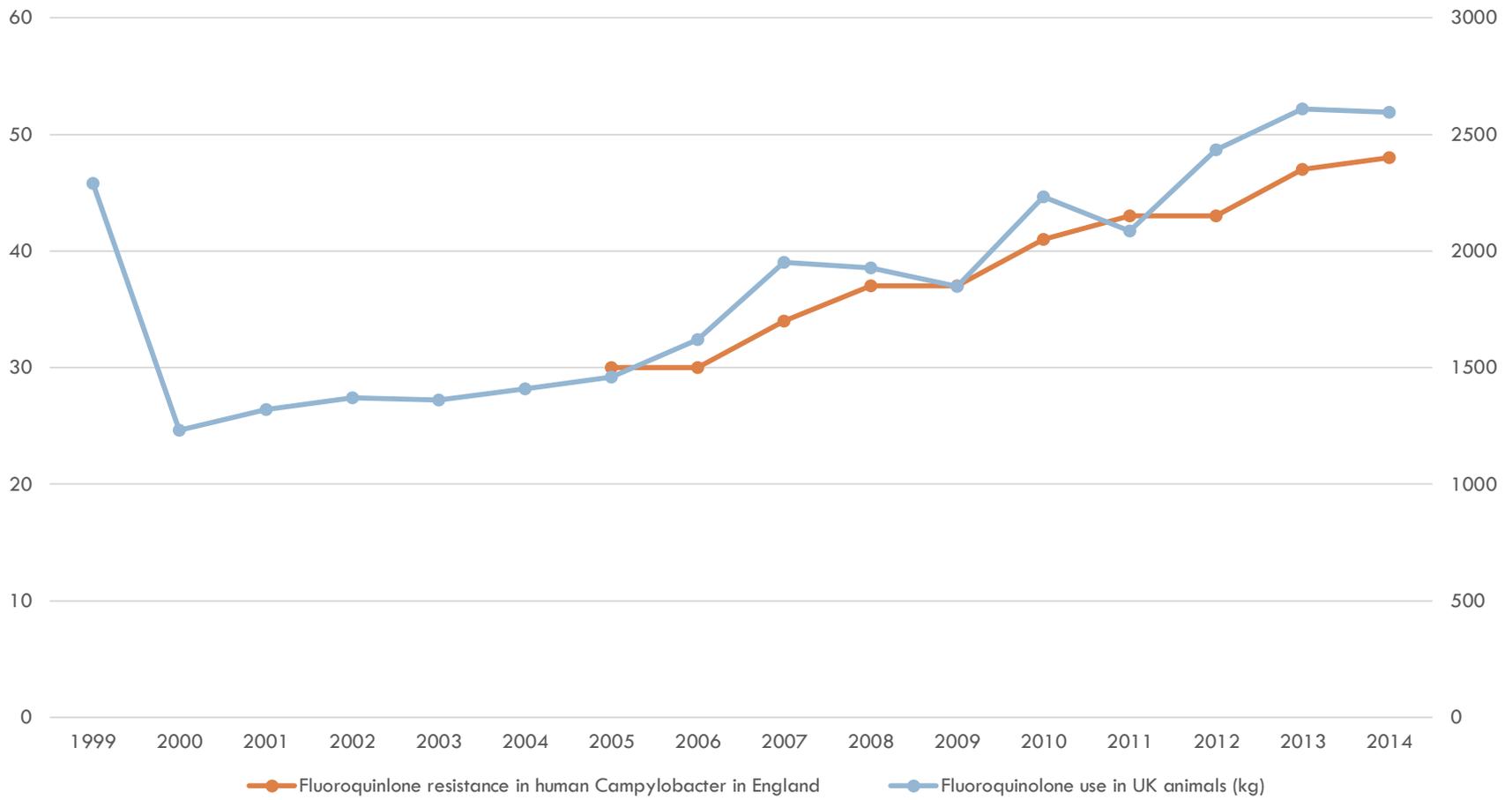
Production of poultry meat in Denmark [32]



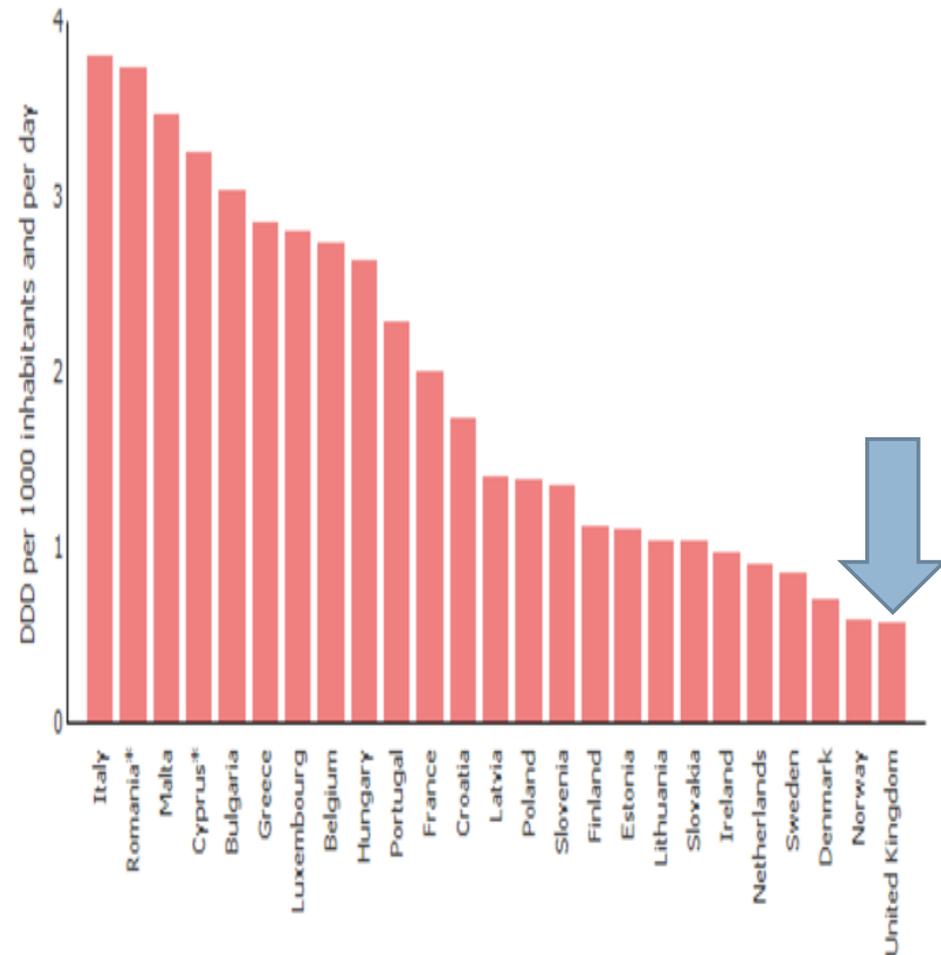
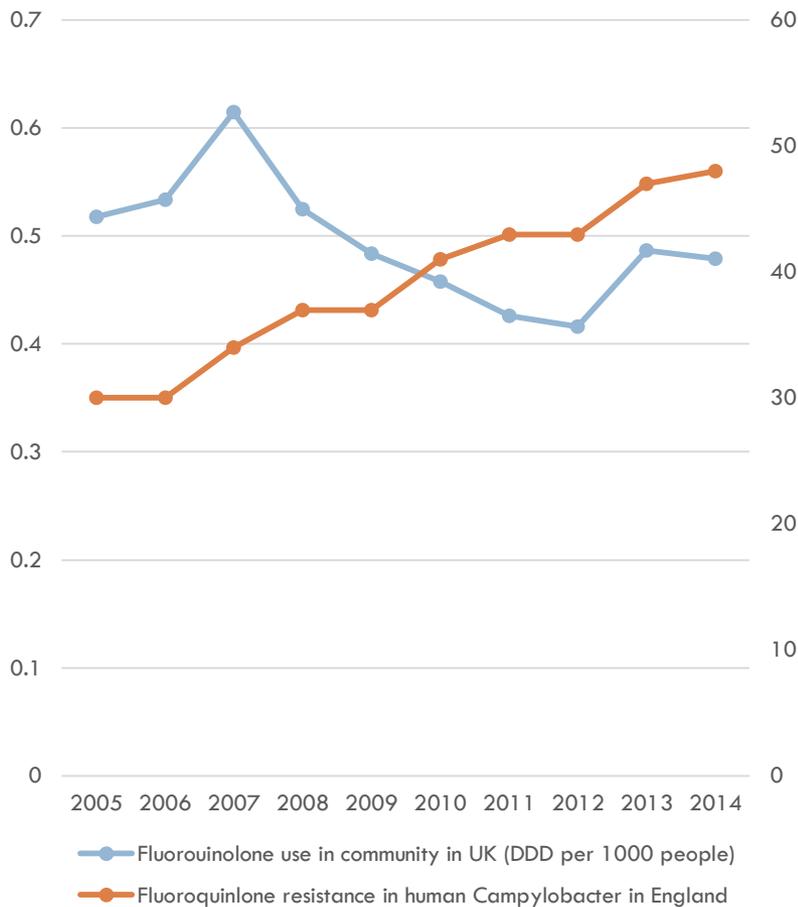
“Potent agents important to human medicine, such as the fluoroquinolones, deserve extreme economy of use in veterinary practice. It is right for large animals, and companion animals to receive such agents on an individual basis for short-term therapy; but mass medication of herds of pigs and flocks of poultry with such agents cannot be best practice from the point of view of human public health.”

House of Lords, Science and Technology Committee, 1998.

Farm use of fluoroquinolones has been increasing, despite House of Lords report, although BPC recently made cuts



Human use of fluoroquinolones has been cut and is lowest in Europe, but resistance increasing



“Given the high levels of resistance to fluoroquinolones in broilers and the assessment that a large proportion of human campylobacteriosis infections comes from handling, preparation and consumption of broiler meat, this is a compelling example of how AMR in food and animals may impact the availability of effective antimicrobial agents for treating severe human Campylobacter infections.”

EFSA and ECDC, February 2016.

Harmonised testing of *E. coli* from broilers shows Nordic countries have much lower resistance for all antibiotics

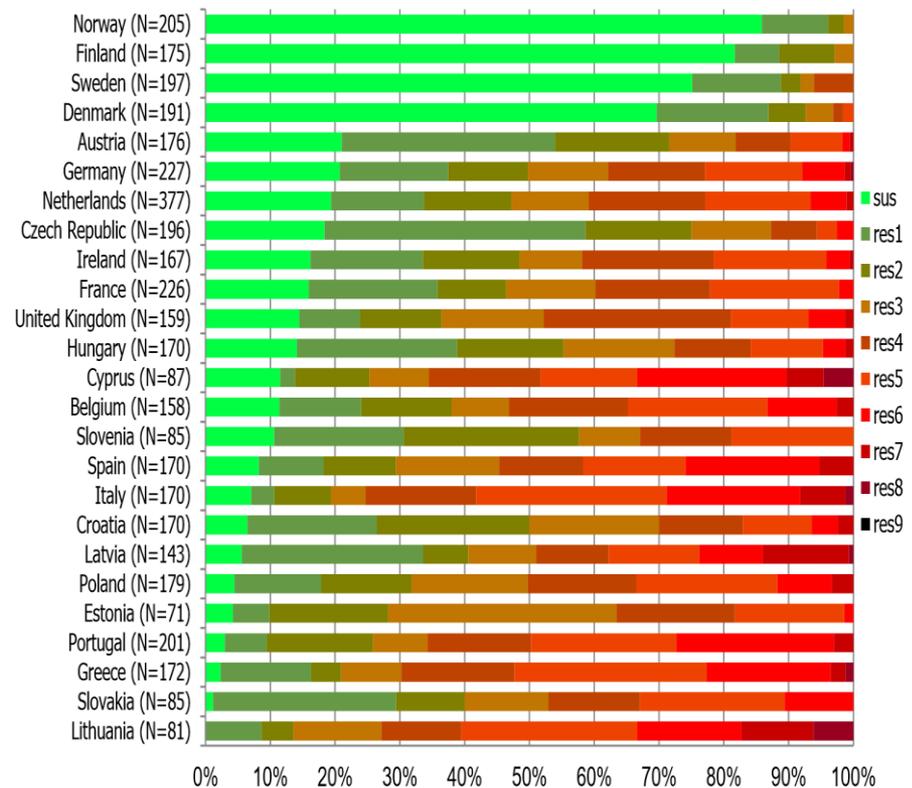
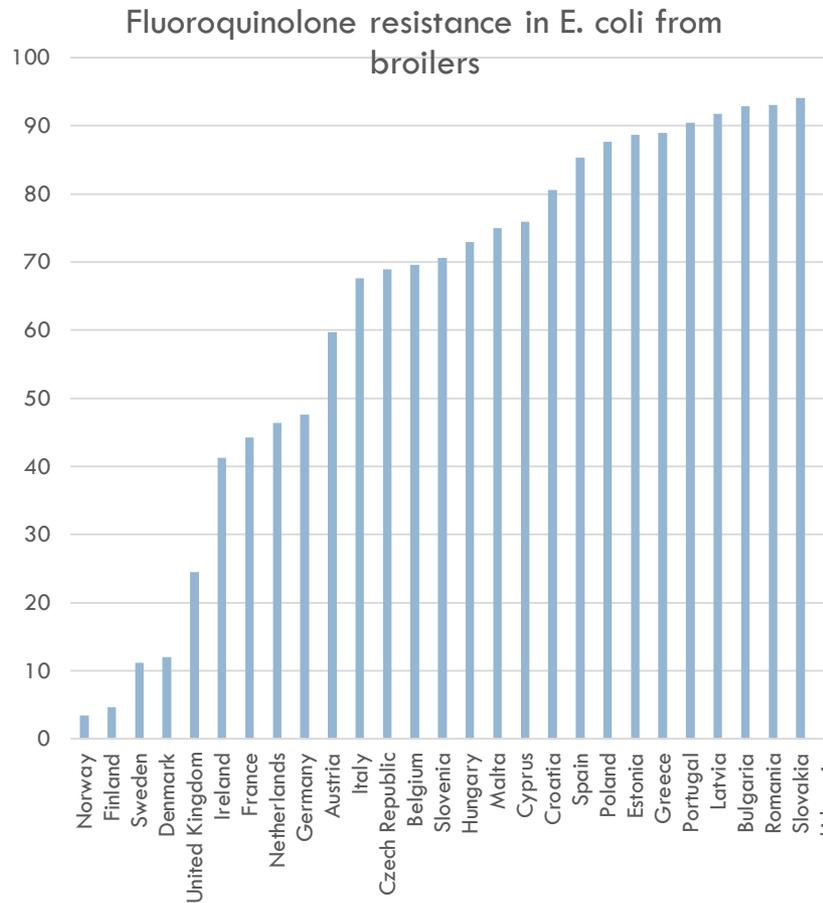


Figure 73: Frequency distribution of *Escherichia coli* isolates completely susceptible and resistant to one to twelve antimicrobials in broilers in reporting countries, 2014

Conclusion

- Actions to reduce farm antibiotic use generally have a positive effect on resistance in humans.
- Such actions can be partially, but not wholly, undermined by imports from countries that are not taking action.
- Evidence strongly suggests that using fluoroquinolones in poultry is having a direct effect on resistance in humans.
- Mass medication with fluoroquinolones should not be permitted. Use in poultry must end.