



# **Scientific Opinion on *Campylobacter* in broiler meat production: control options and performance objectives and/or targets at different stages of the food chain**

EFSA-Q-2009-233

**FAVV Symposium**

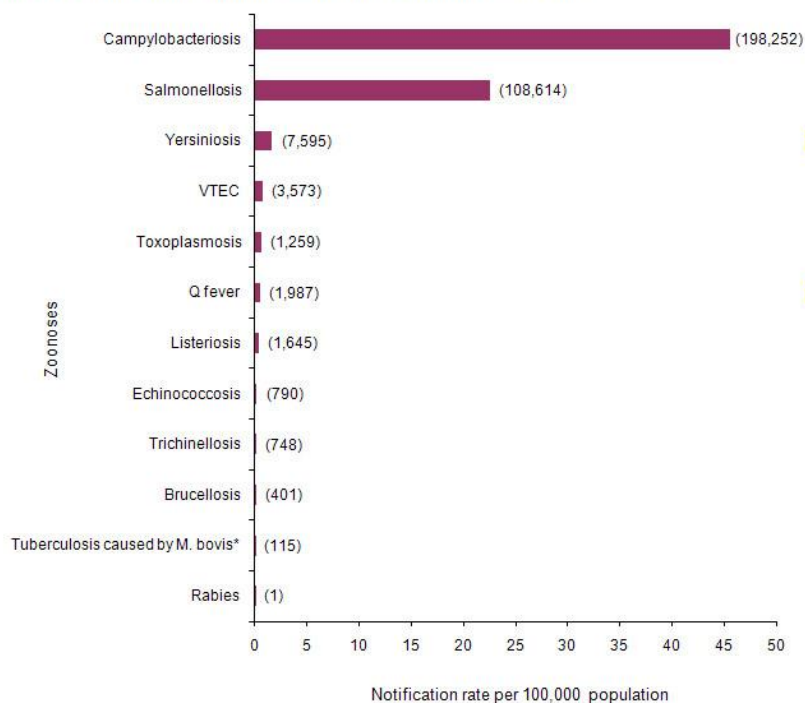
25 November 2011

Arie Havelaar for EFSA Panel on Biological Hazards

- Campylobacteriosis is the most frequently reported zoonosis in the EU
- Previous EFSA Opinion related to Campylobacter in animals and foodstuffs (January 2005)
- EU harmonised baseline survey on the prevalence and AMR of *Campylobacter* in broiler flocks and carcasses
- Legal basis to consider PO/targets (Reg. 2160/2003 – Reg. 852/2004 – Reg. 2073/2005)
- Commission requested EFSA advice (June 2008)

# Campylobacteriosis in the EU

Reported notification rates of zoonoses in confirmed human cases in the EU, 2009  
18/02/2011 5 (Fig SU1 changed rabies total to 1 in line with Pia's comments)

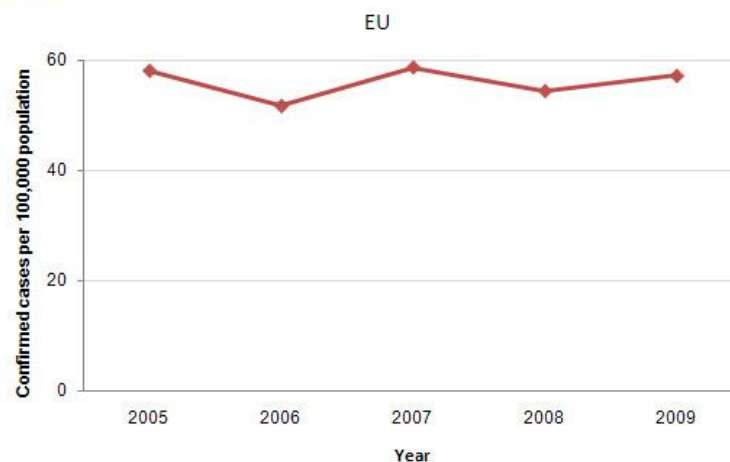


Note: Total number of confirmed cases is indicated at the end each column.

\* Data from 2008.

EFSA, ECDC: EU Summary Report 2009, EFSA Journal 2011;9(3):2090

Notification rates of reported confirmed cases of human campylobacteriosis in the EU, 2005 - 2009 (TESSy)

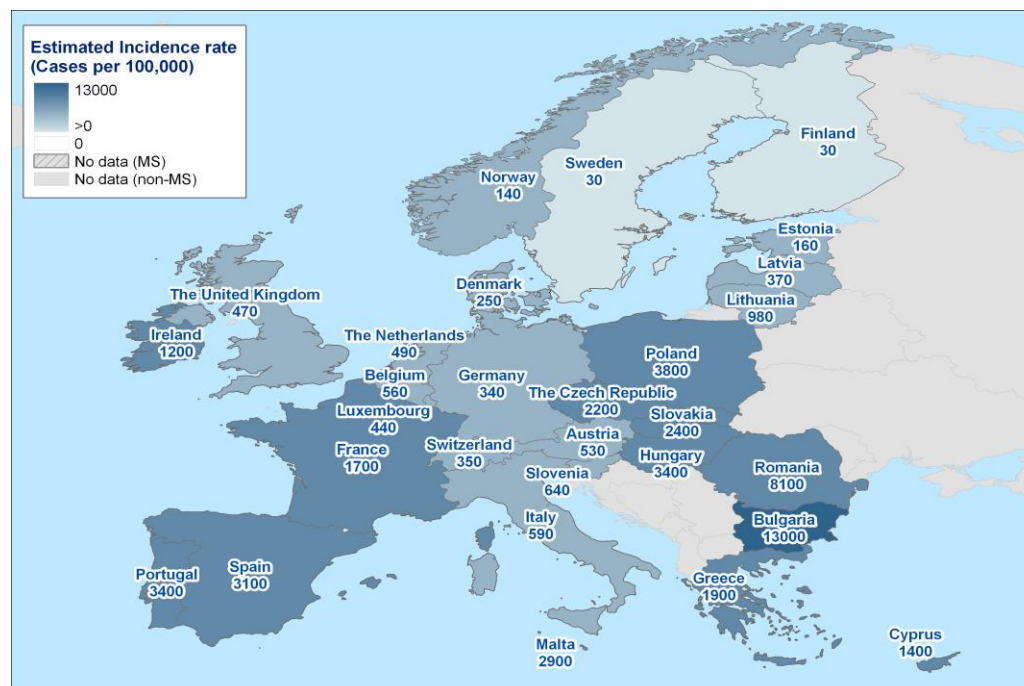


Source for EU trend: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Slovakia, Spain, Sweden, and the United Kingdom.

EFSA, ECDC: EU Summary Report 2009, EFSA Journal 2011;9(3):2090

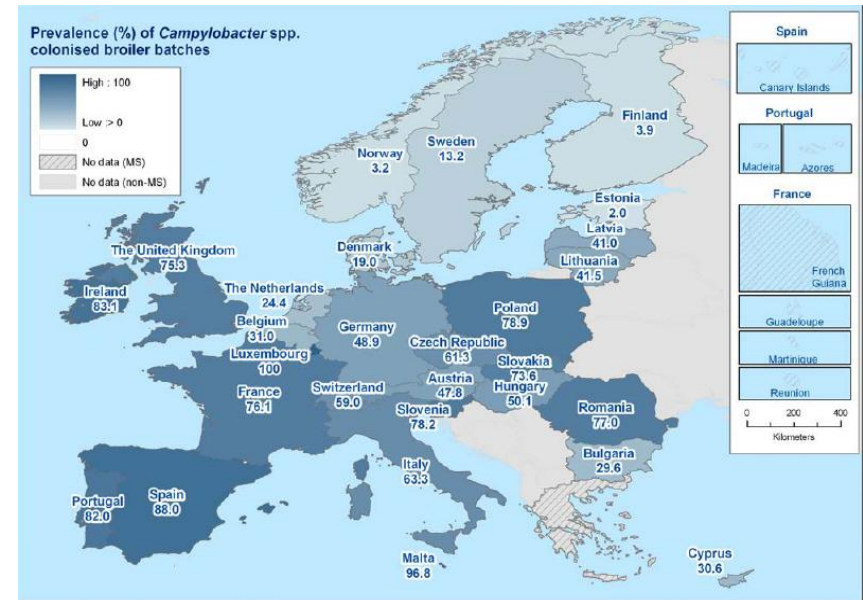
# Estimating the true incidence of campylobacteriosis in the EU

- Swedish travellers as sentinels
- Average risk:  
15.9 per 100,000 journeys
- Varies between 0.4 (Finland) to 180 (Bulgaria)
- Relative risk anchored to the Netherlands to estimate incidence in all EU MS
- Total incidence:  
9.2 million cases per year  
(1 per 50 inhabitants)
- Underreporting factor at EU level:  
47 (0.4 to 40,000)
- Estimated disease burden is 0.35 million DALYs per year and total annual costs are 2.4 billion €

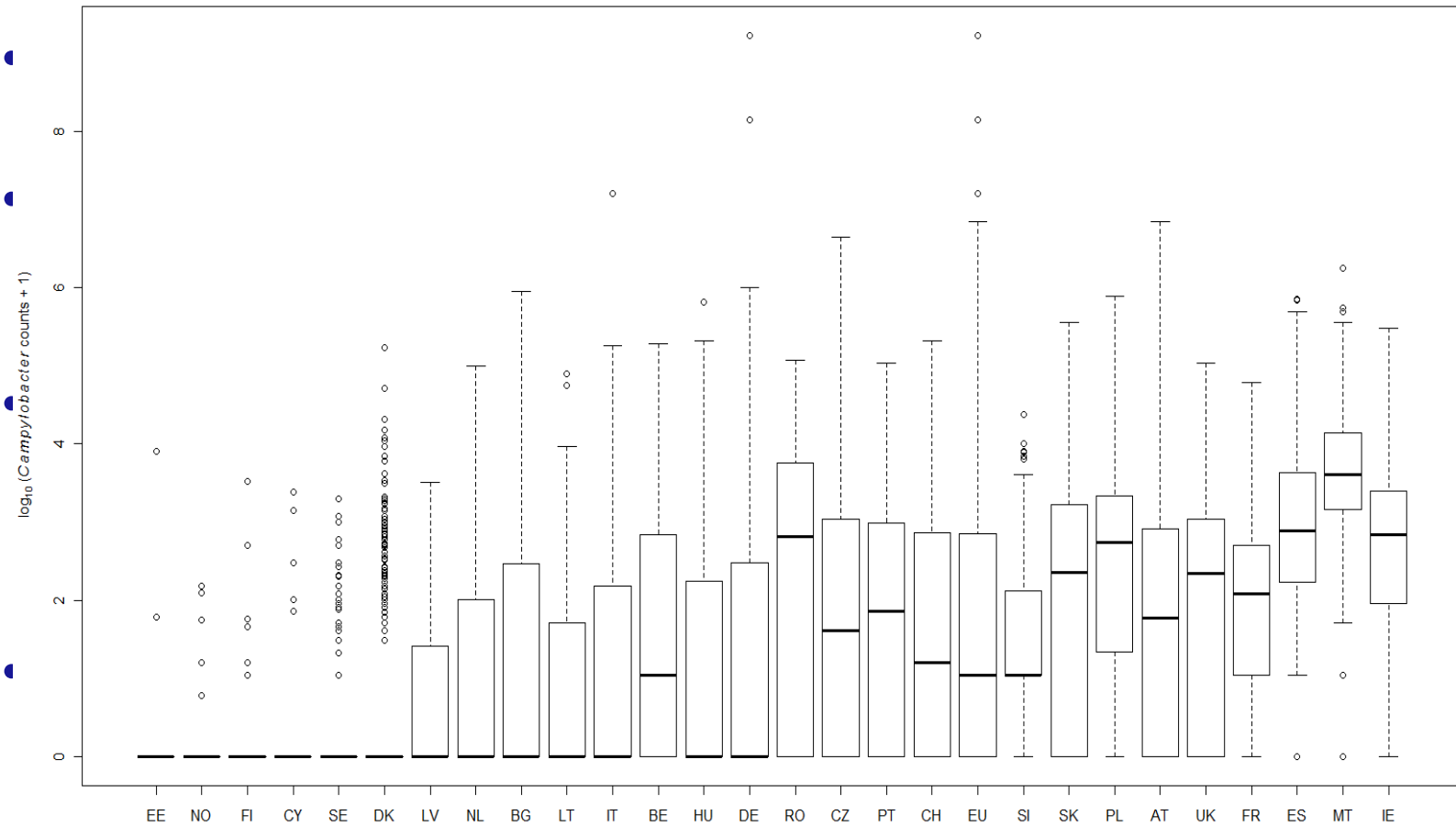


# EU Baseline study on *Campylobacter* in broiler batches and on broiler carcasses

- Carried out in 2008
- 10,132 broiler batches (a group of chickens raised together in one shed and slaughtered on one day) were sampled from 561 slaughterhouses
- From every batch one pooled sample from the caecal contents of 10 carcasses was examined for *Campylobacter*
- From the same batch, one carcass was collected after chilling from which the neck skin together with the breast skin was examined for the presence of *Campylobacter* as well as to determine the *Campylobacter* count



# Campylobacter enumeration on broiler carcasses



to /

- EFSA was requested to:
  - Assess the extent to which meat derived from broilers contributes to human campylobacteriosis at EU level. The importance may be expressed as a percentage of the total number of human campylobacteriosis cases.
  - Identify and rank the possible control options within the broiler meat production chain, taking into account the expected efficiency in reducing human campylobacteriosis [...]
  - Propose potential performance objectives and/or targets at different stages of the food chain in order to obtain e.g. 50% and 90% reductions of the prevalence of human campylobacteriosis in the EU caused by broiler meat consumption or cross-contamination [...]

## Question 1

ADOPTED Dec 09  
PUBLISHED Jan 2010

## Question 2

Adopted March 2011  
Published April 2011

The focus is on options to control *Campylobacter* in three steps of the food chain:

- i. In primary production;
- ii. During transportation and before slaughter;
- iii. At slaughter, dressing and processing.

Control options at retail or during preparation and handling of broiler meat are not discussed.

- Description of risk factors and interventions
  - based on literature review and EU baseline survey report
- Estimation of effect of interventions on human campylobacteriosis and ranking
  - based on quantitative model (CAMO)
- Description of advantages and disadvantages of potential interventions
  - based on expert opinion
  - time scale based on current availability of interventions

- Biosecurity
- Fly screens
- Discontinued thinning
- Reduction of slaughter age
- Reducing colonization
- Decontamination
- Scheduled slaughter

- Quantitative model developed by contractor (CAMO)\* + some modifications of DR model
- Data sources:
  - EU-wide baseline survey and CSR of 2008
  - Peer-reviewed literature
  - Expert opinion
- Intervention analysis run for four countries
- Output: relative reduction of human campylobacteriosis cases attributable to broiler meat

- Targets
  - Specific model (CamPrev):  
expected risk reduction if BFP reached a target of 50, 25, 10, 5, 1%, or 0%
- Microbiological criteria
  - Specific model (CAMC)
  - EU baseline survey data
  - The percentage of batches not complying with the criterion (BNMC) is calculated to evaluate the public health impact of a MC.

- “Models are to be used, but not to be believed” (Henri Theil)
- Local (slaughter-house) situation and practices not taken into account
- Unclear correlation between faecal or caecal samples, skin samples and meat products
- Diagnostic sensitivities of both tests varied significantly between Member States
- *Campylobacter* strains and variants were assumed to have identical properties
- Many data gaps
  - e.g. slaughterhouse variability, effect of interventions, consumer behaviour, does response, effects of immunity

## Based on results of QMRA based on data from four countries:

- 100% risk reduction by reduction of carcass concentration by  $> 6 \log_{10}$  units
  - Which can be achieved by **irradiation/cooking**
- More than 90% risk reduction by reduction of carcass concentrations by  $> 2 \log_{10}$  units,
  - which can be achieved by **freezing for 2-3 weeks** or reduction of the concentration in intestines at slaughter by  $> 3 \log$  units;
- 50-90% risk reduction by reduction of carcass concentrations by  $1-2 \log_{10}$  units,
  - which can be achieved by **freezing for 2-3 days, hot water or chemical carcass decontamination** with lactic acid, acidified sodium chlorite or trisodium phosphate

## Based on results of QMRA based on data from four countries:

- 50-90% risk reduction by an equivalent reduction of flock prevalence
  - **fly screens** (based on one MS)
- Up to 50% risk reduction by modifications of primary production,
  - **restriction of slaughter age** to a max 28 days (only indoor flocks)
  - **discontinued thinning.**
- The risk reduction associated with interventions in primary production is expected to vary considerably between MSs.

## Directly available interventions (from a technical point of view):

- Primary production
  - Restriction of slaughter age
  - Discontinuing thinning
- Reducing carcass concentration:
  - Freezing
  - Hot water carcass decontamination
  - Chemical decontamination

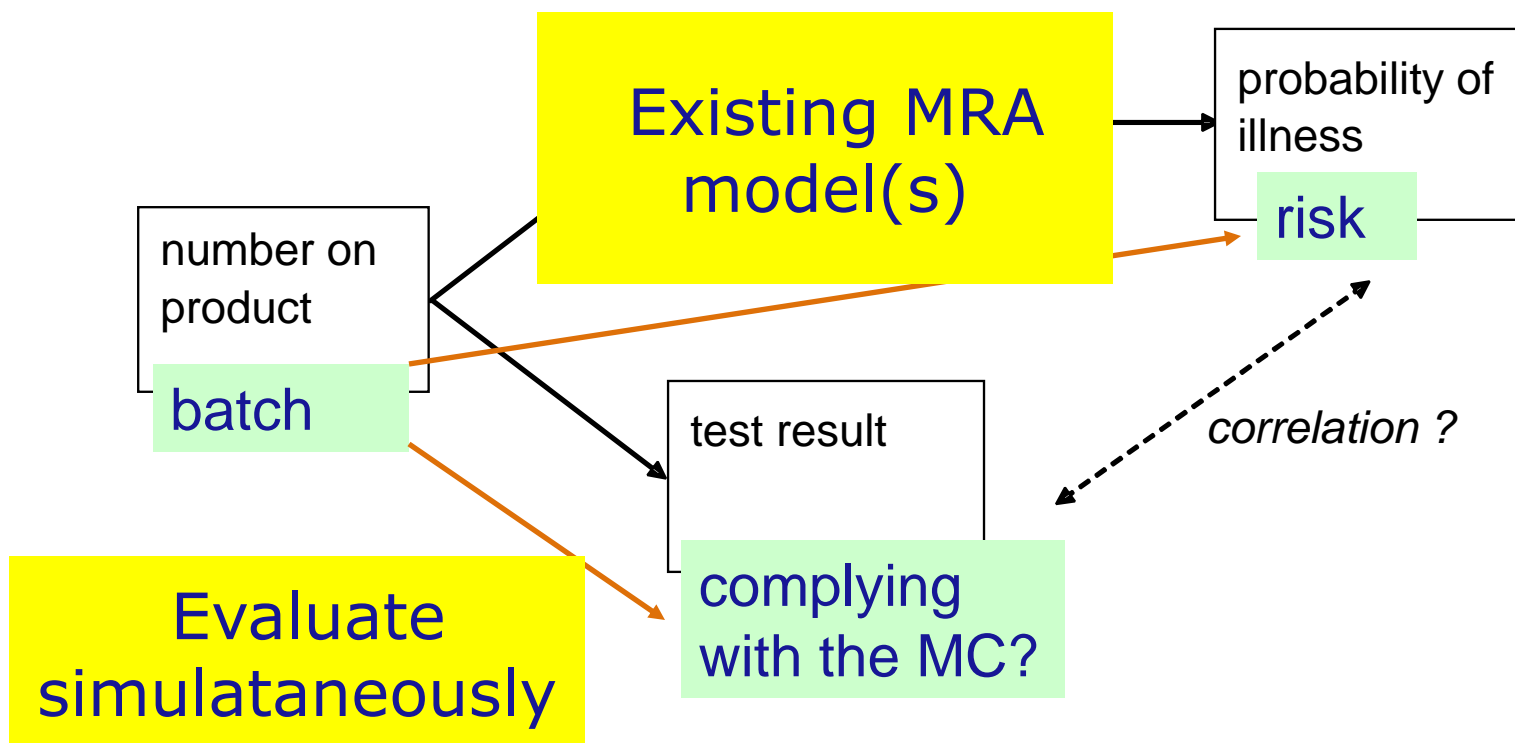
## Targets

- Achieving a target of **25% or 5% between-flock prevalence** is estimated to result in **50% and 90% reduction of public health risk** at the EU level, respectively.
- The realistic time period needed to obtain reductions will differ between countries.
- It is not realistic to consider targets for flocks with outdoor access.

# Microbiological criteria (CAC/GL 21 – 1997)

- A microbiological criterion consists of:
  - a statement concerning *thermophilic Campylobacter spp.* concern and/or their toxins/metabolites and the reason for that concern (see §5.1);
  - the analytical method for detection and/or quantification (see §5.2);
  - a plan defining the number of field units per 25 g neck/breast skin and the size of the analytical unit (see §6);
  - microbiological limits considered appropriate to the food at the specified point(s) of the food chain (see §5.3);
  - the number of analytical units that should conform to these limits.
- A microbiological criterion should also state:
  - the food to which the criterion applies;
  - the point(s) in the food chain where the criterion applies; and any actions to be taken when the criterion is not met.

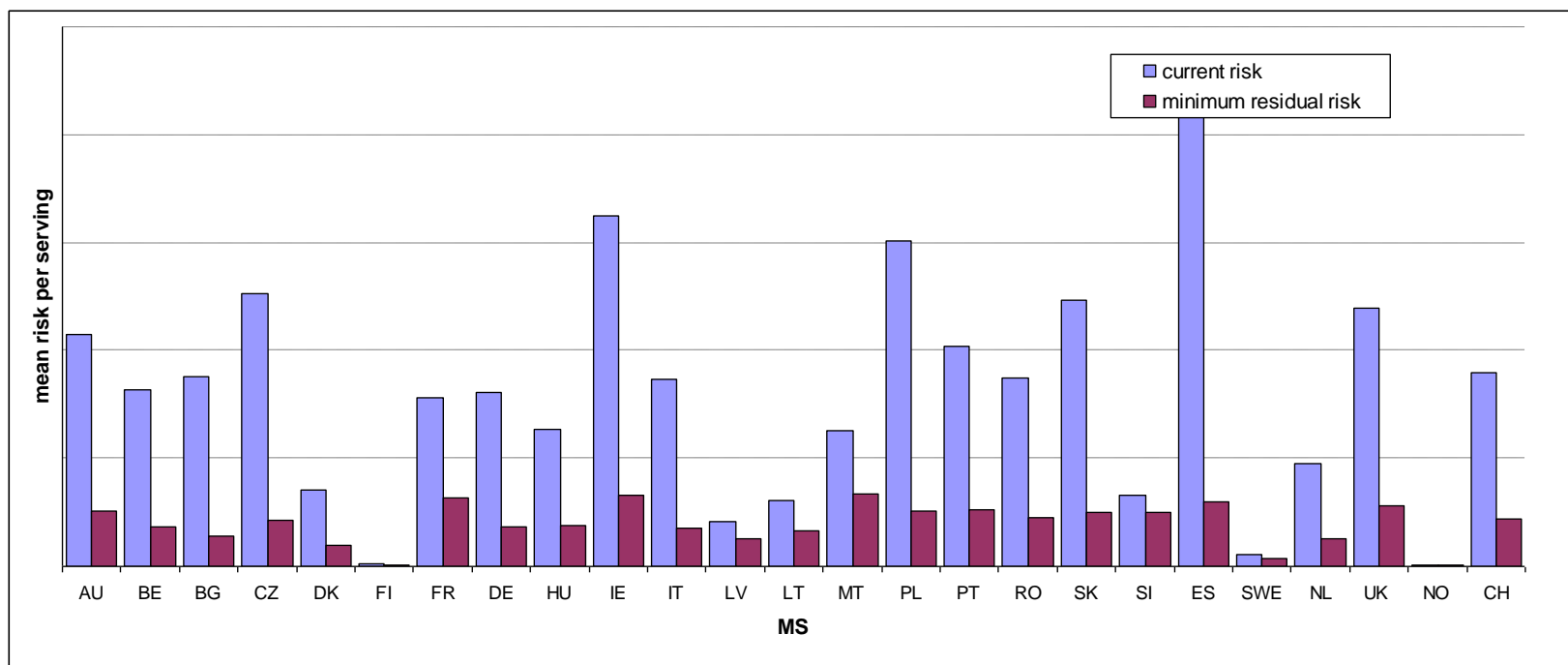
# Evaluation of risk based MCs



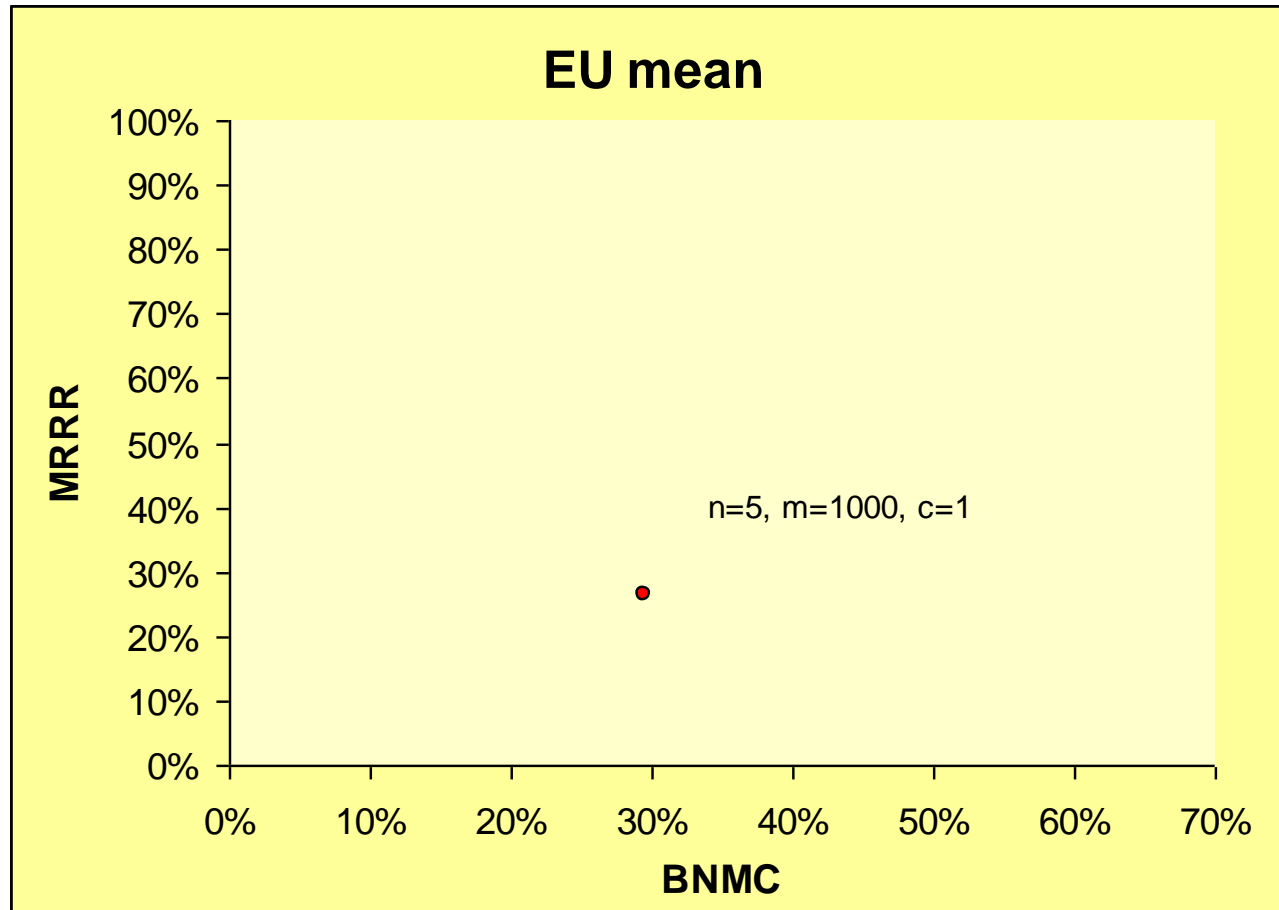
# Evaluation strategy for MC

- MC applicable to every individual batch
- Batch: broilers raised in the same flock and slaughtered on one day
- Current risk: human health risk from risk assessment
- Batches not complying with the MC (BNMC):
  - The % of batches that do not pass the test
- Minimum relative residual risk (MRRR):
  - Relative risk of food lots that comply with the MC
- MRRR if all BNMC are diverted from fresh meat chain
- Alternative risk management strategies not (yet) evaluated

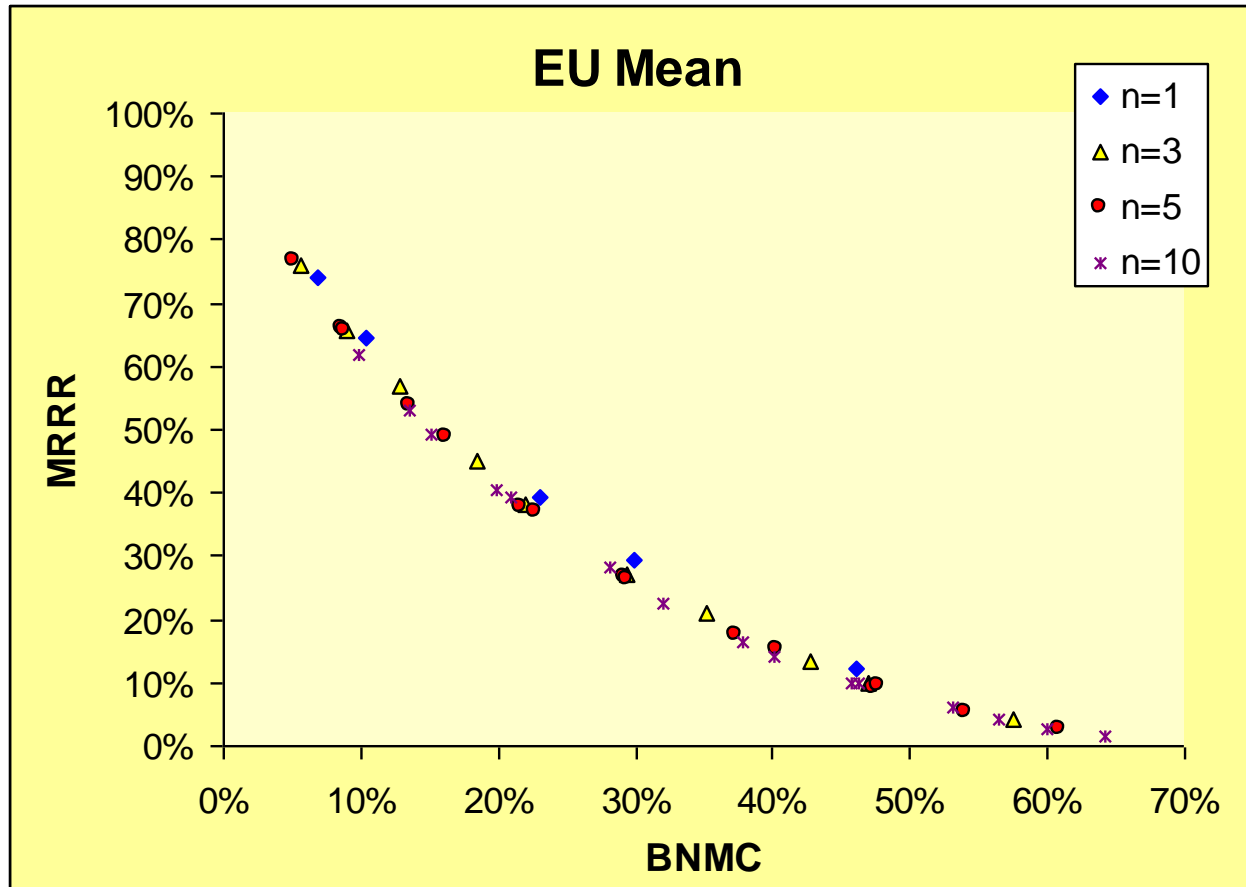
- Current risk and minimum residual risk with MC  
 $m=1000$ ,  $n=5$ ,  $c=1$



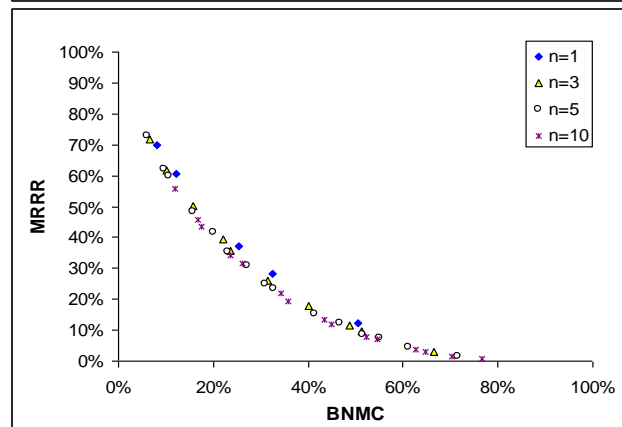
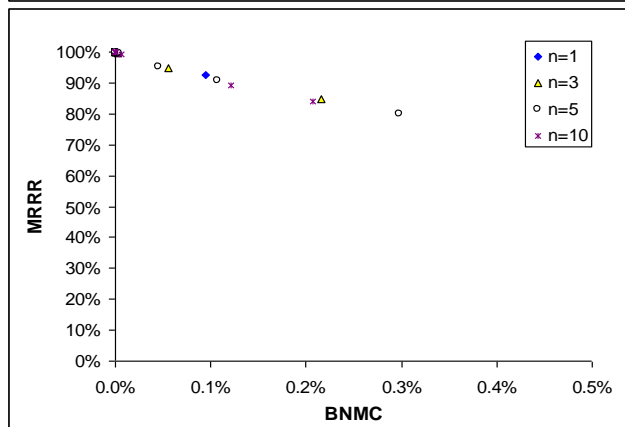
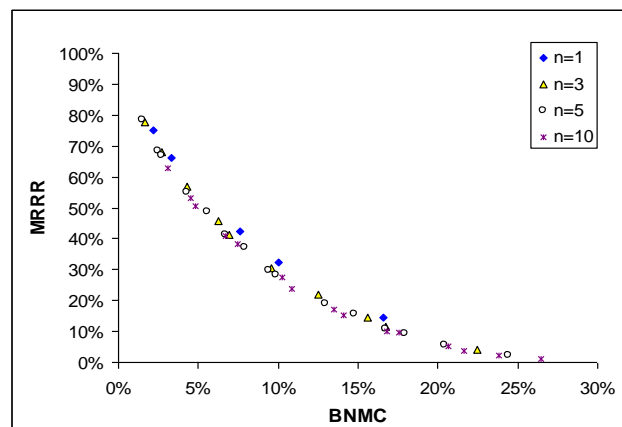
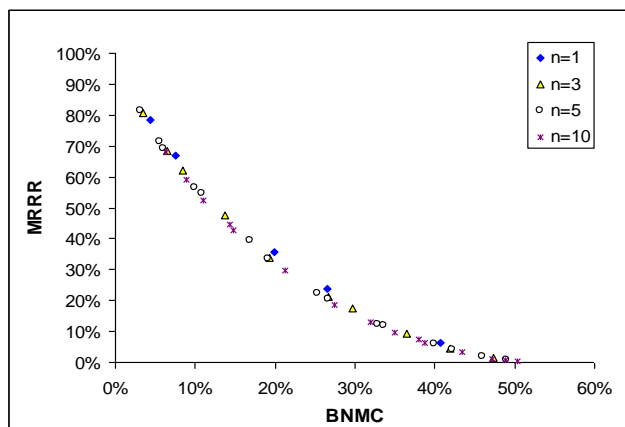
# Costs and Benefits of a MC



# Risk managers can decide upon the "best" microbiological criterion!



# Difference between MSs



## Microbiological criteria

- Theoretically, a **public health risk reduction > 50% or > 90%** at the EU level could be achieved if all batches that are sold as fresh meat would comply with microbiological criteria with a critical limit of **1000 or 500 CFU/gram** of neck and breast skin, respectively.
- Correspondingly, a total of **15% and 45%**, of all batches tested in the EU baseline survey of 2008, would **not comply** with these criteria.
- The public health benefits of setting microbiological criteria were evaluated using data from the 2008 EU baseline survey. These estimates are average values for the whole EU; the impact could be very different between MSs.

- Effective control options should be selected and verified under conditions where the application is intended to be used.
- This opinion has identified several data gaps and therefore generation of data in several areas should be encouraged:
  - Biosecurity interventions in primary production
  - Effect of improved slaughter-house hygiene and decontamination
  - Identify factors responsible for the variability of *Campylobacter* contamination among slaughter-houses in different MSs
  - Effective control options in outdoor production.
  - Consumer behaviour, dose response, and the effects of acquired immunity
  - Public health impact of other poultry (e.g. laying hens, turkeys)

**Thank You !!!**

**EFSA is committed to:**

**Excellence,  
Independency,  
Openness  
Responsiveness and  
Transparency**

**[www.efsa.europa.eu](http://www.efsa.europa.eu)**

**[@efsa.europa.eu](https://twitter.com/efsa_europa)**