

Campylobacter risk characterization. Consumer risk of poultry meat?

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(22.05.2015)

Outline

- **Poultry** consumption and Campylobacteriosis
- *Campylobacter* incidence
 - In the world
 - In the **European Union**
 - In **Finland**
- **Poultry** production and consumption
- **Modeling** of number of campylobacteriosis cases caused by poultry consumption in **Finland**
- **Cross-contamination**

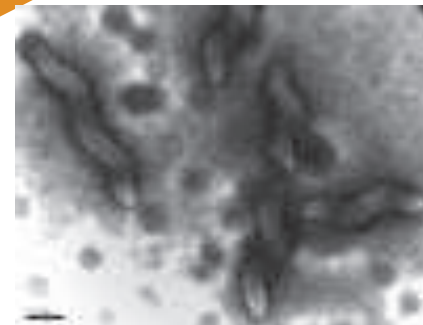
Schematic representation of the risk at consumer level



Undercooking

Cross-contamination

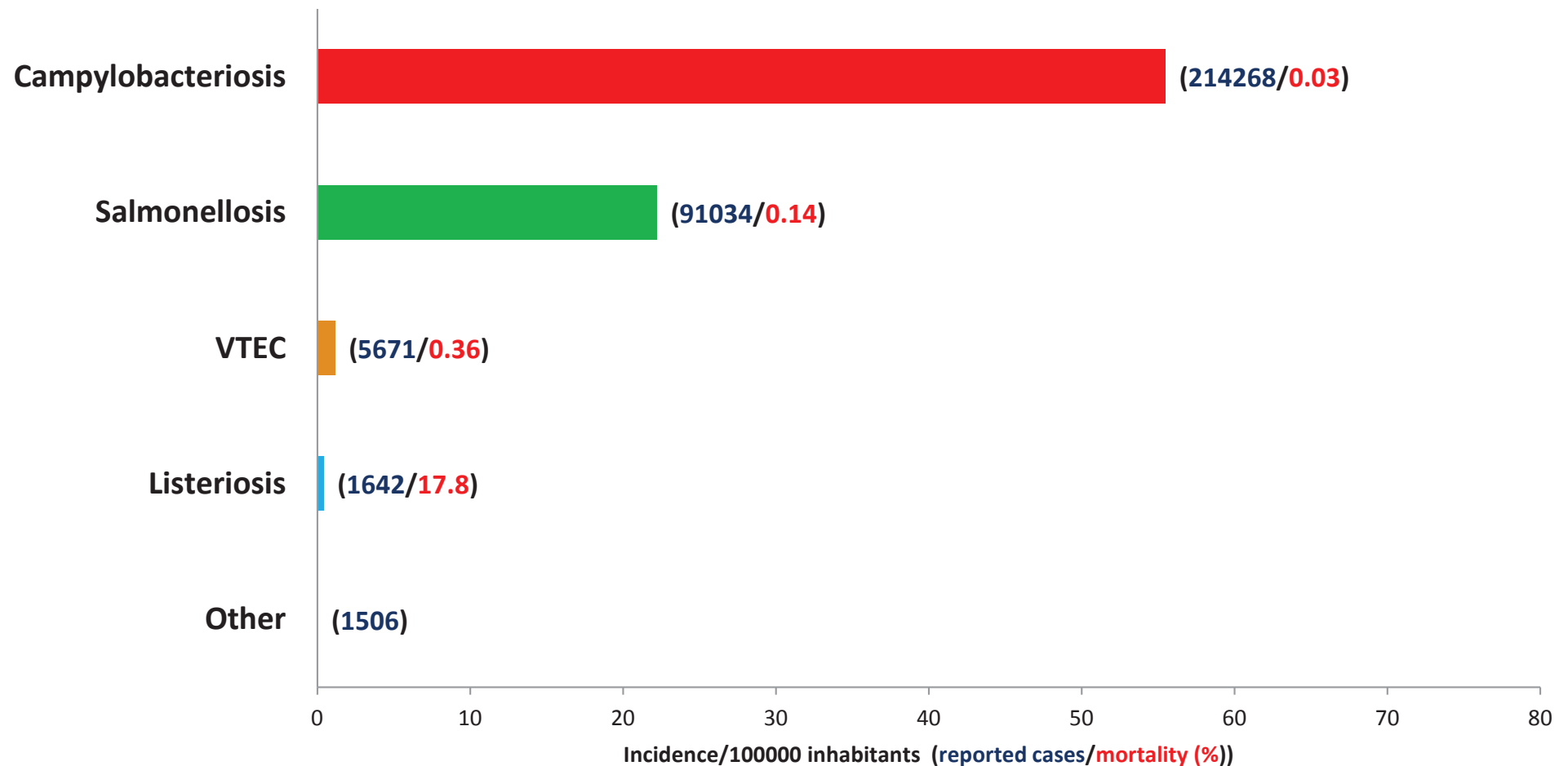
Exposure



Campylobacteriosis incidence in developing and developed countries

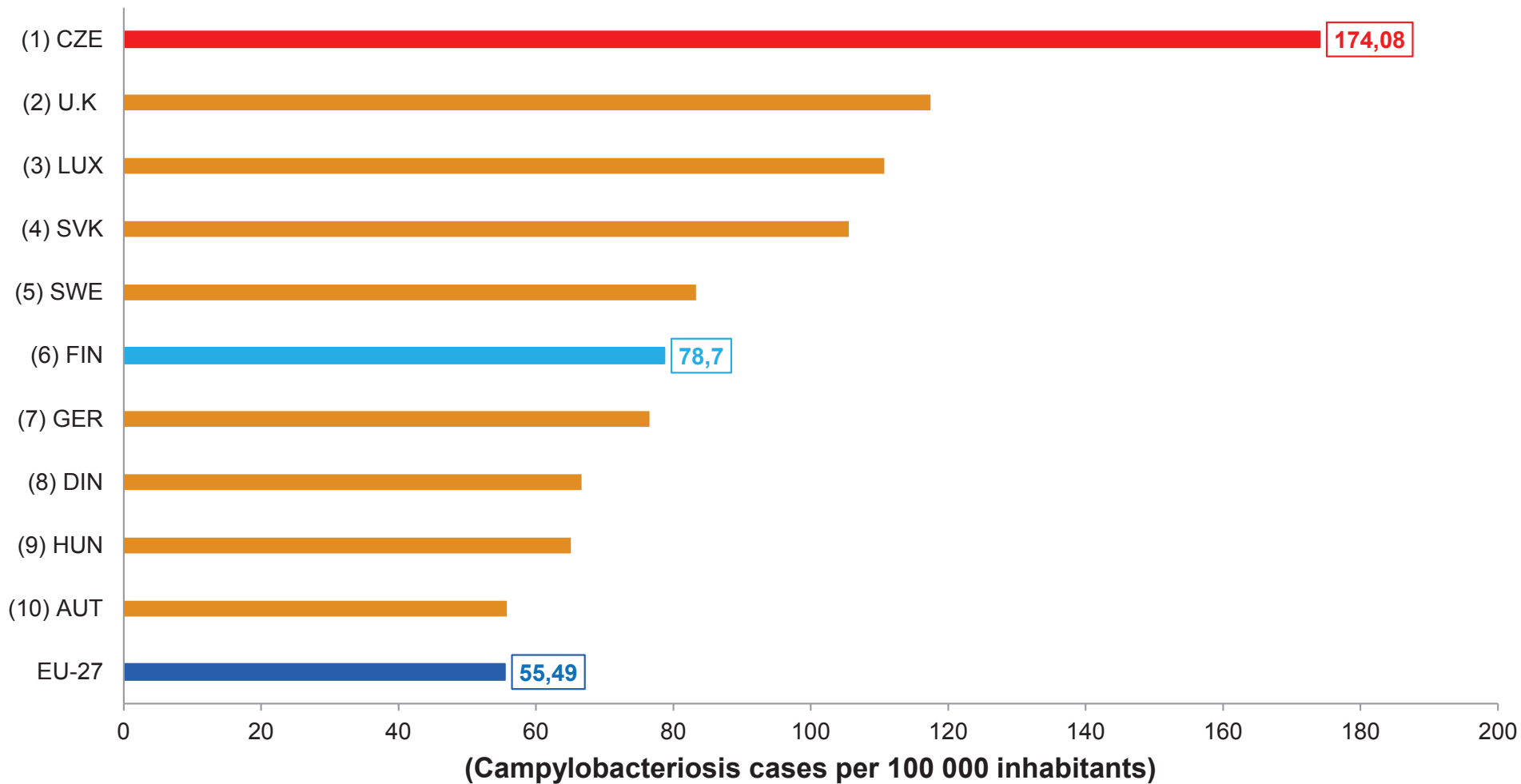
Incidence/100,000	Developing countries	Developed countries	EU-27	Finland
Children < 5 years	~50,000	300	200	21
General population	90	90	50	75

Reported notification rates of zoonoses in confirmed human cases in the EU-27 (2012)

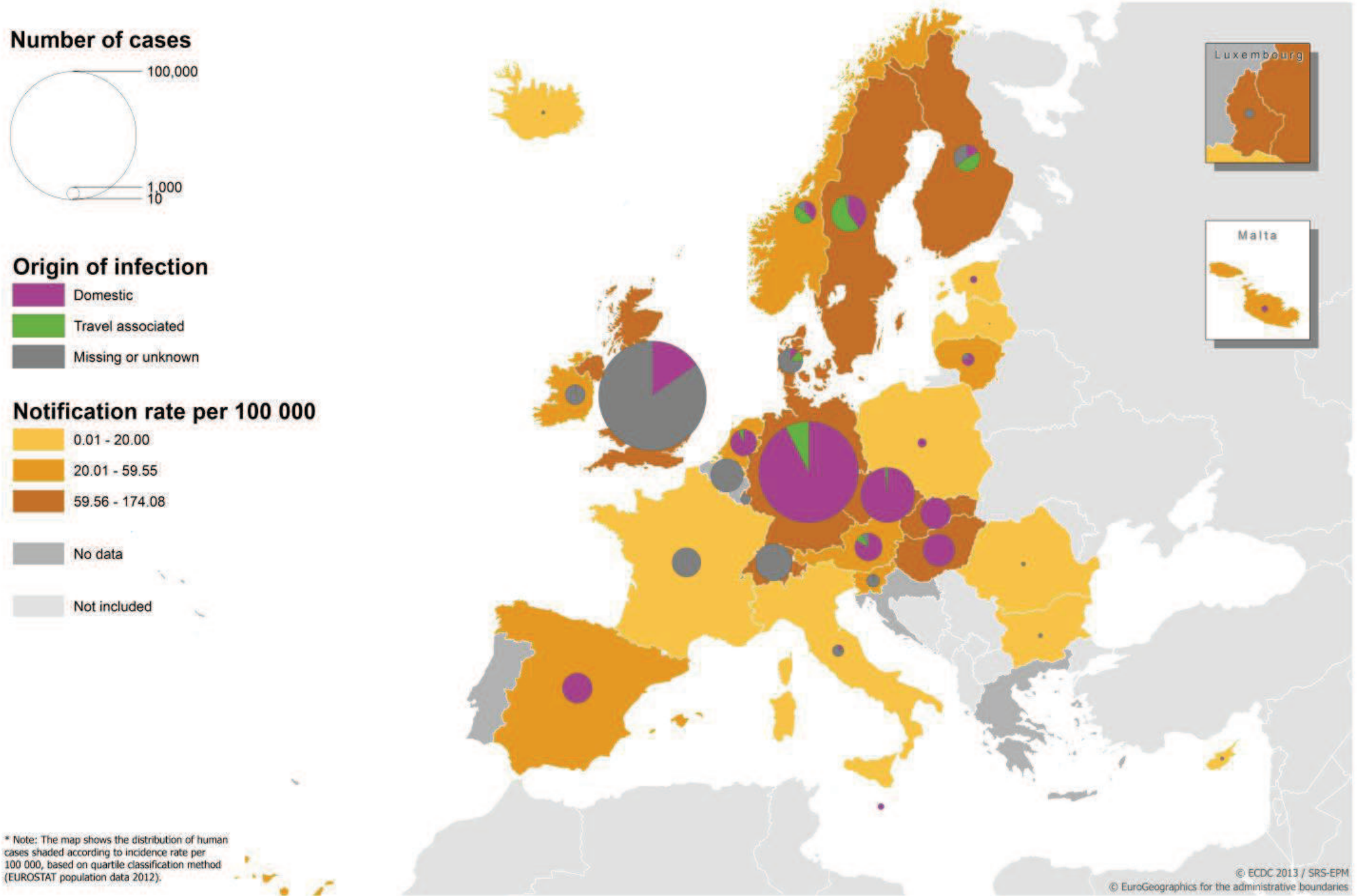


True number of cases is estimated to be about **9 millions** per year in EU

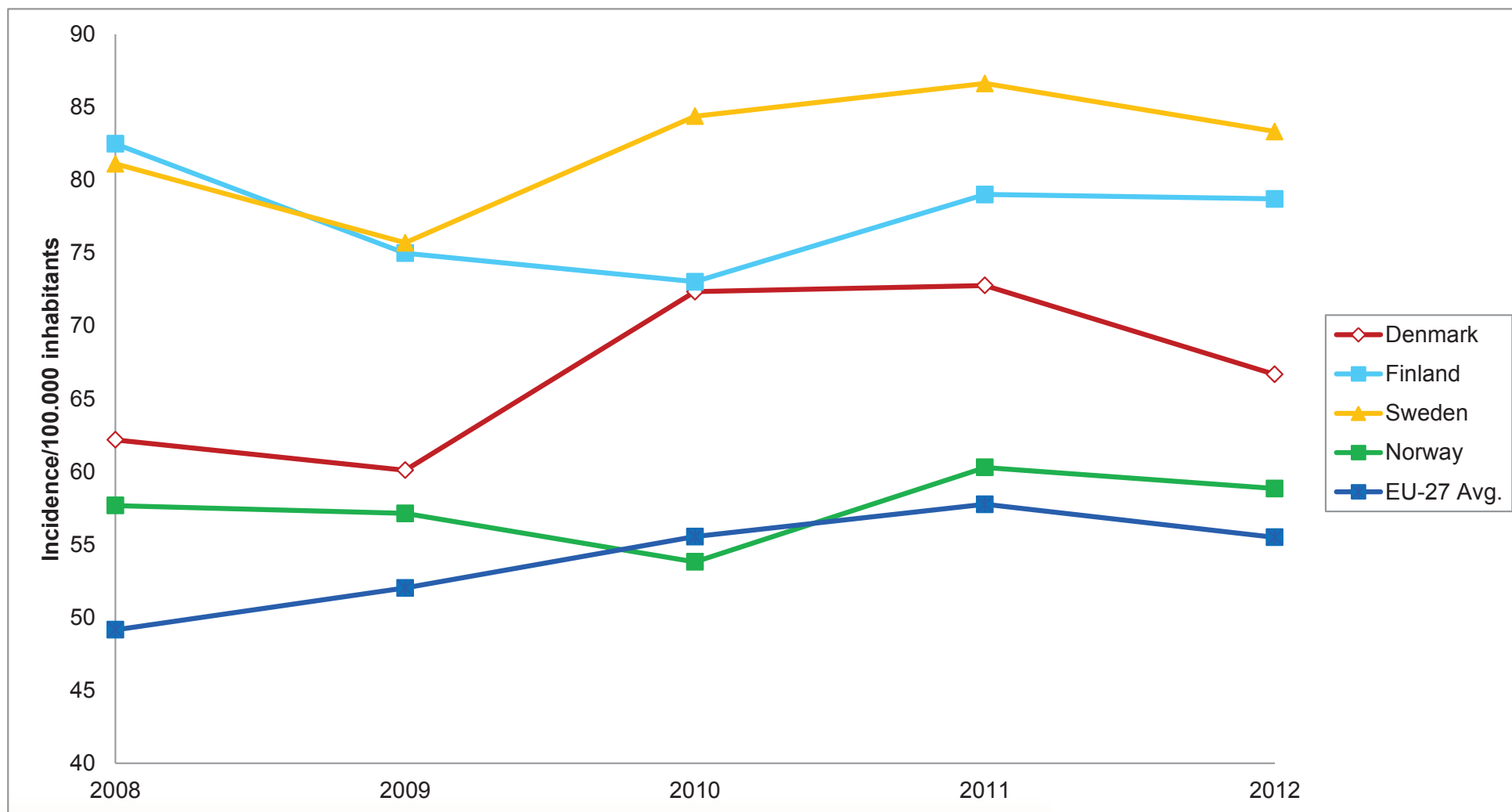
Campylobacteriosis incidence in the EU-27 (2012)



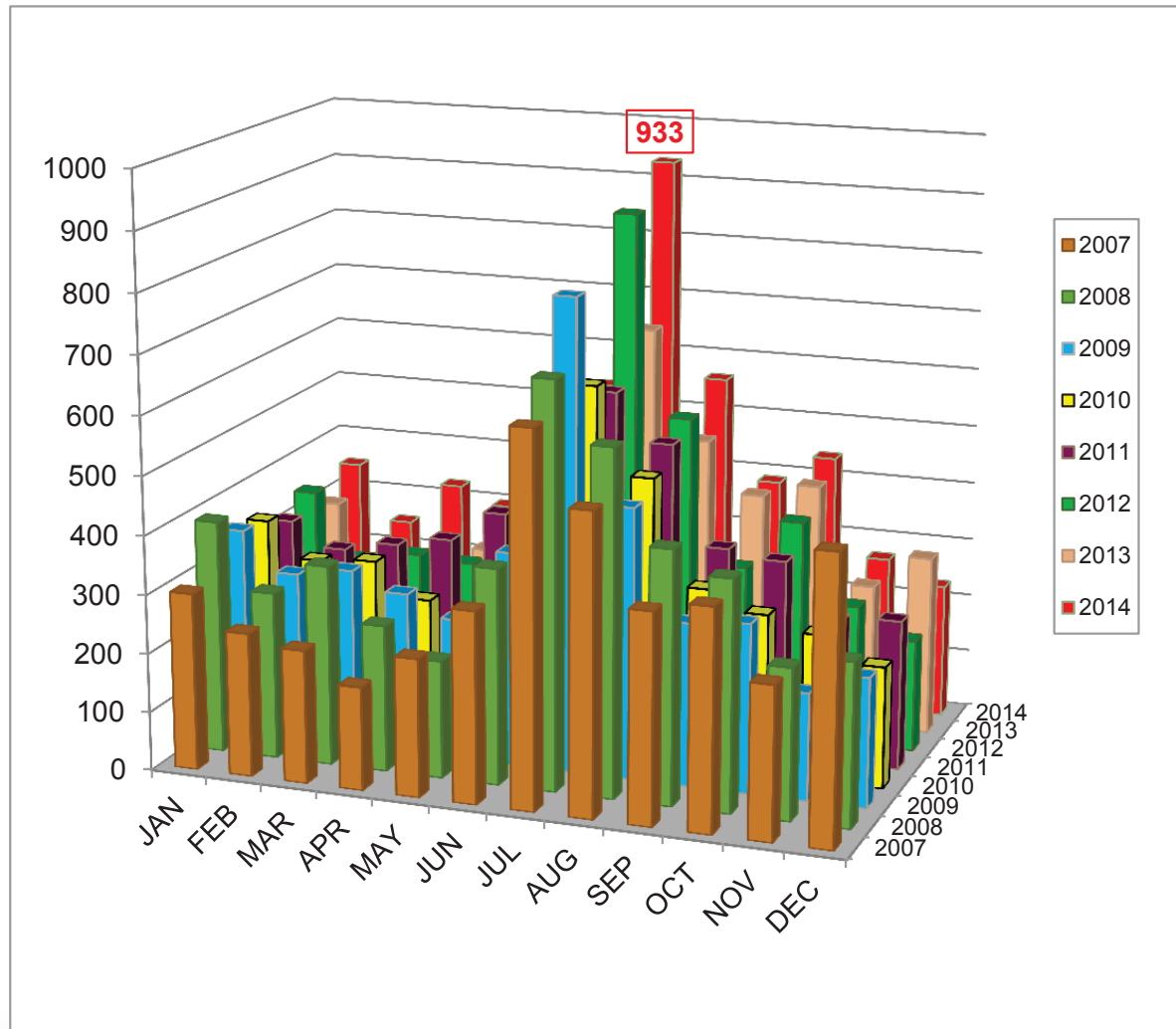
Notification rates and origin of infection in human campylobacteriosis (EU/EFTA 2012)



Campylobacteriosis incidence in Nordic countries

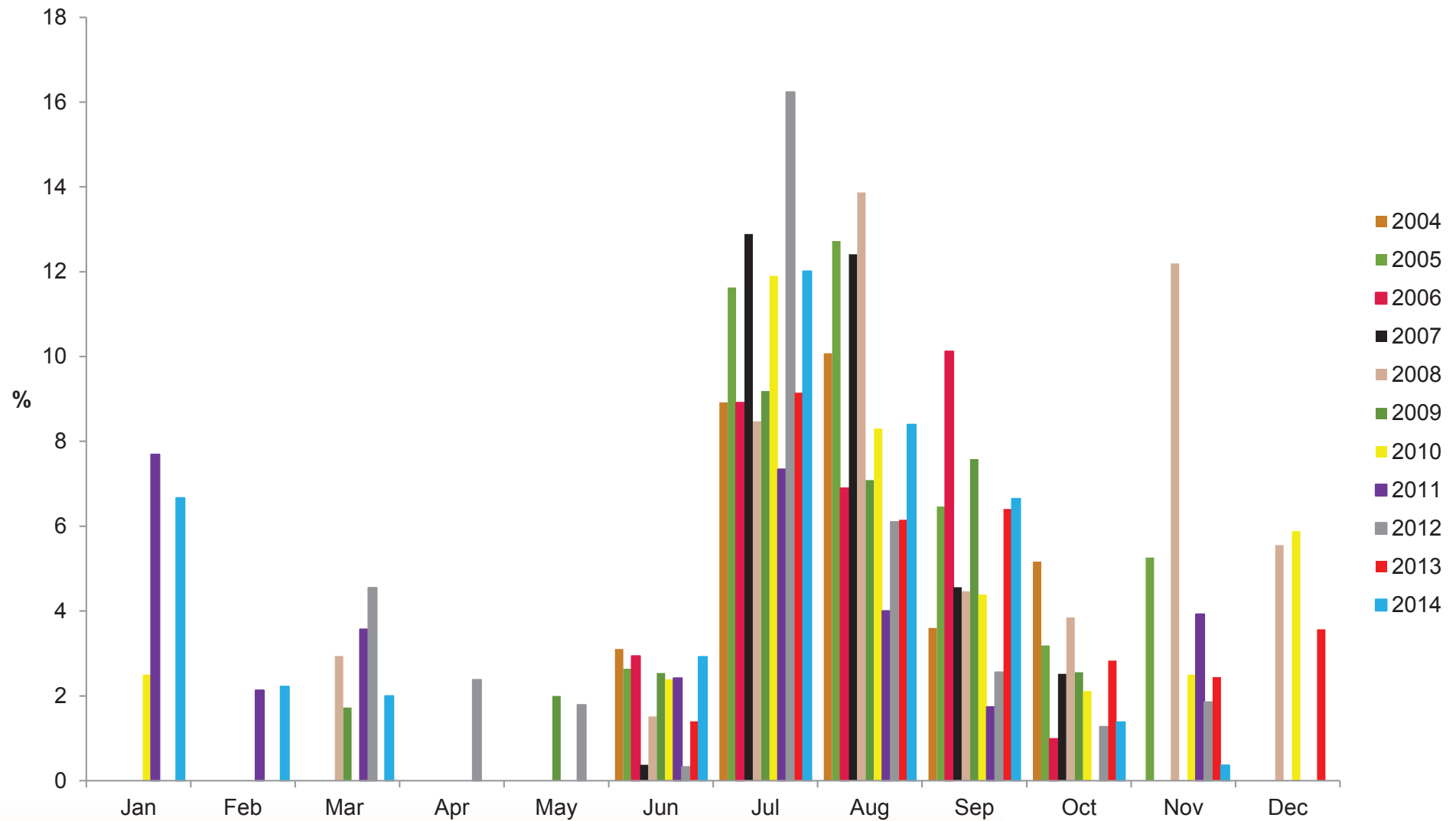


Campylobacteriosis registered cases in Finland (2007-2014) (THL)

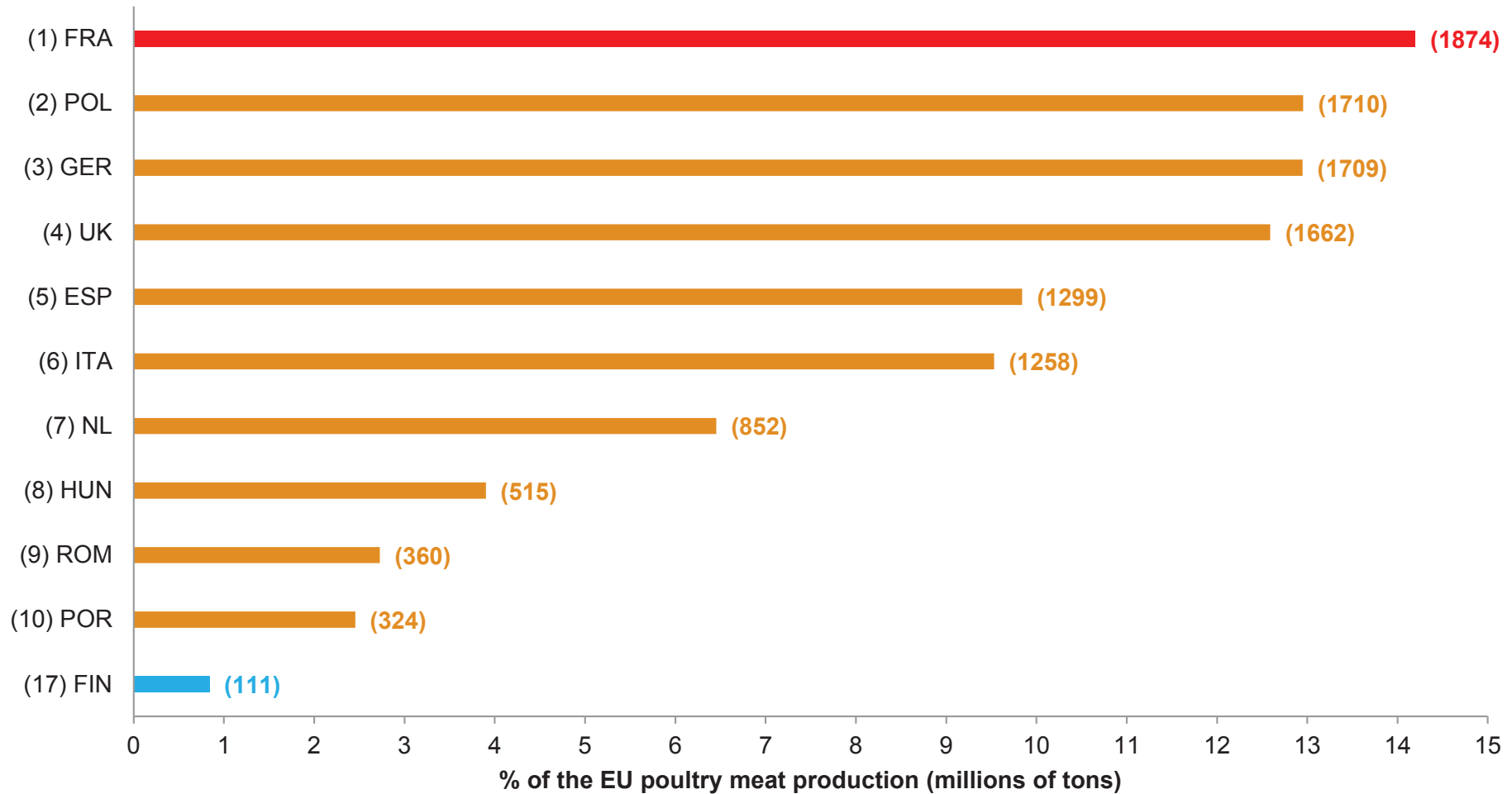


- A total of **4887** cases were registered in **Finland** during 2014.
- Most of **summer** cases are **domestic**, while in **winter** most cases are associated with **traveling**.
- **50% Foreign trip**
 - Spain (302 cases)
 - Thailand (287 cases)
 - Turkey (285 cases)
- **38 % Unknown**
- **12 % Domestic**

Percentage of *Campylobacter* positive samples out of all examined in the Finnish *Campylobacter* Control Programme for Broilers 2004-2013

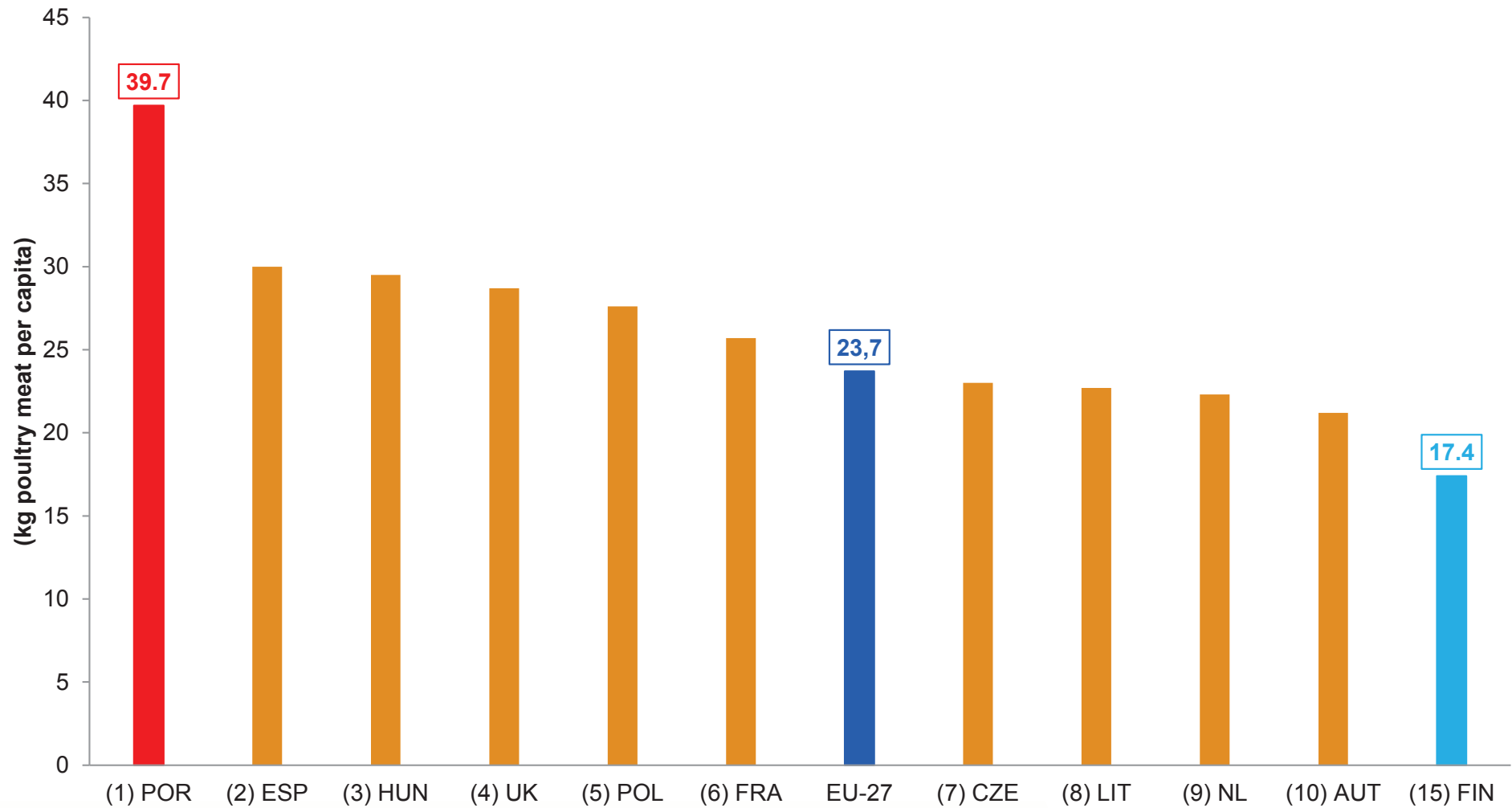


Poultry meat production in the EU-27 (2013)



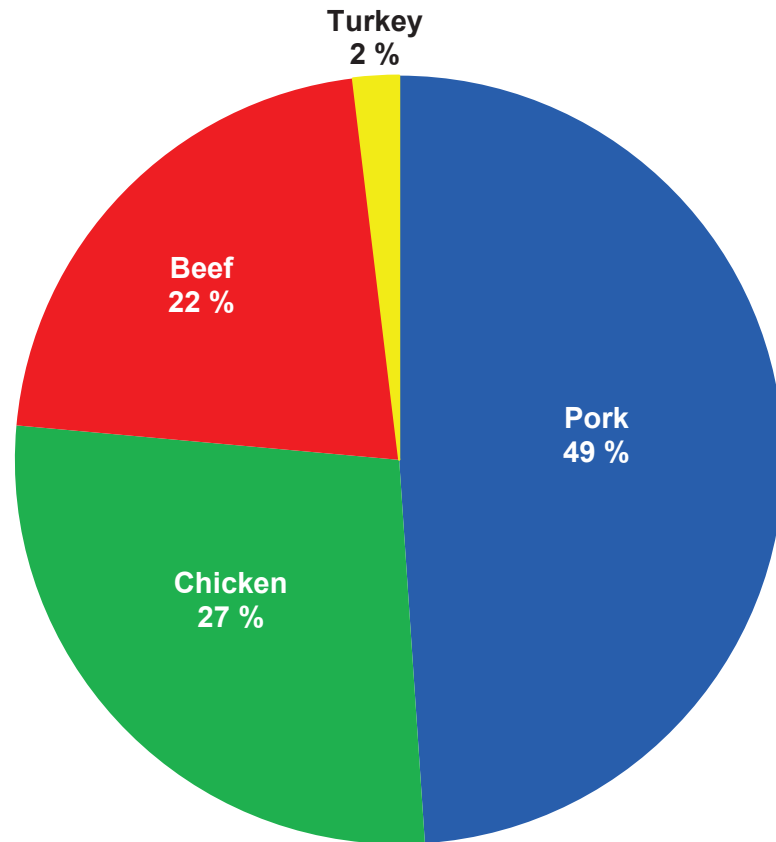
Total poultry meat production (in millions of tons) in EU-27 (13 200) and in the World (107 500)

Consumption per capita of poultry meat in EU-27 (2012)

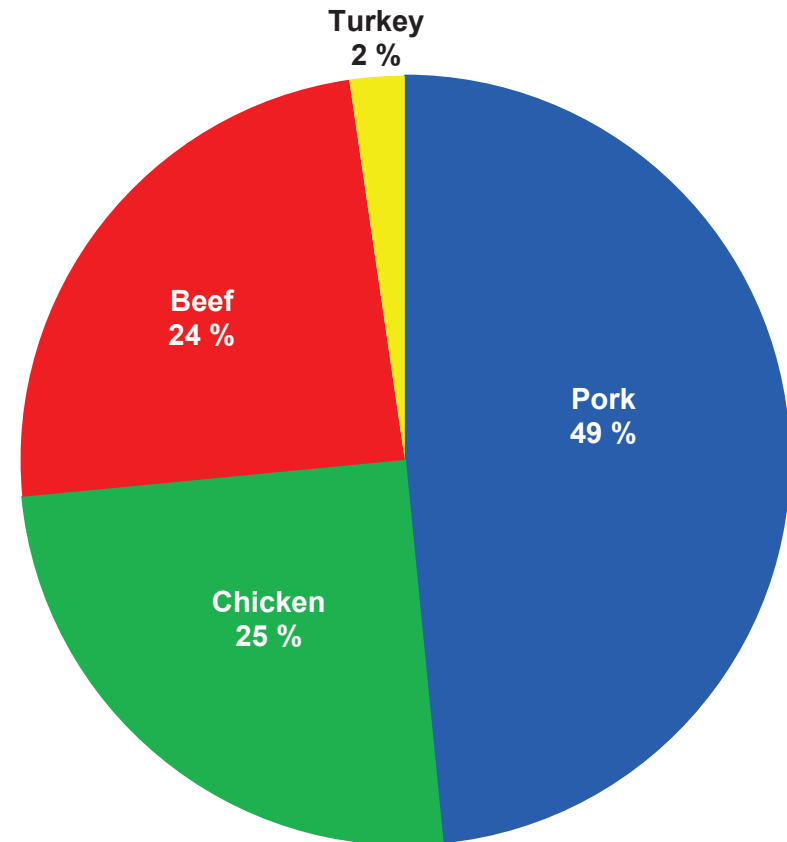


Distribution of meat production and meat consumption (per capita) in Finland in 2014 (%)

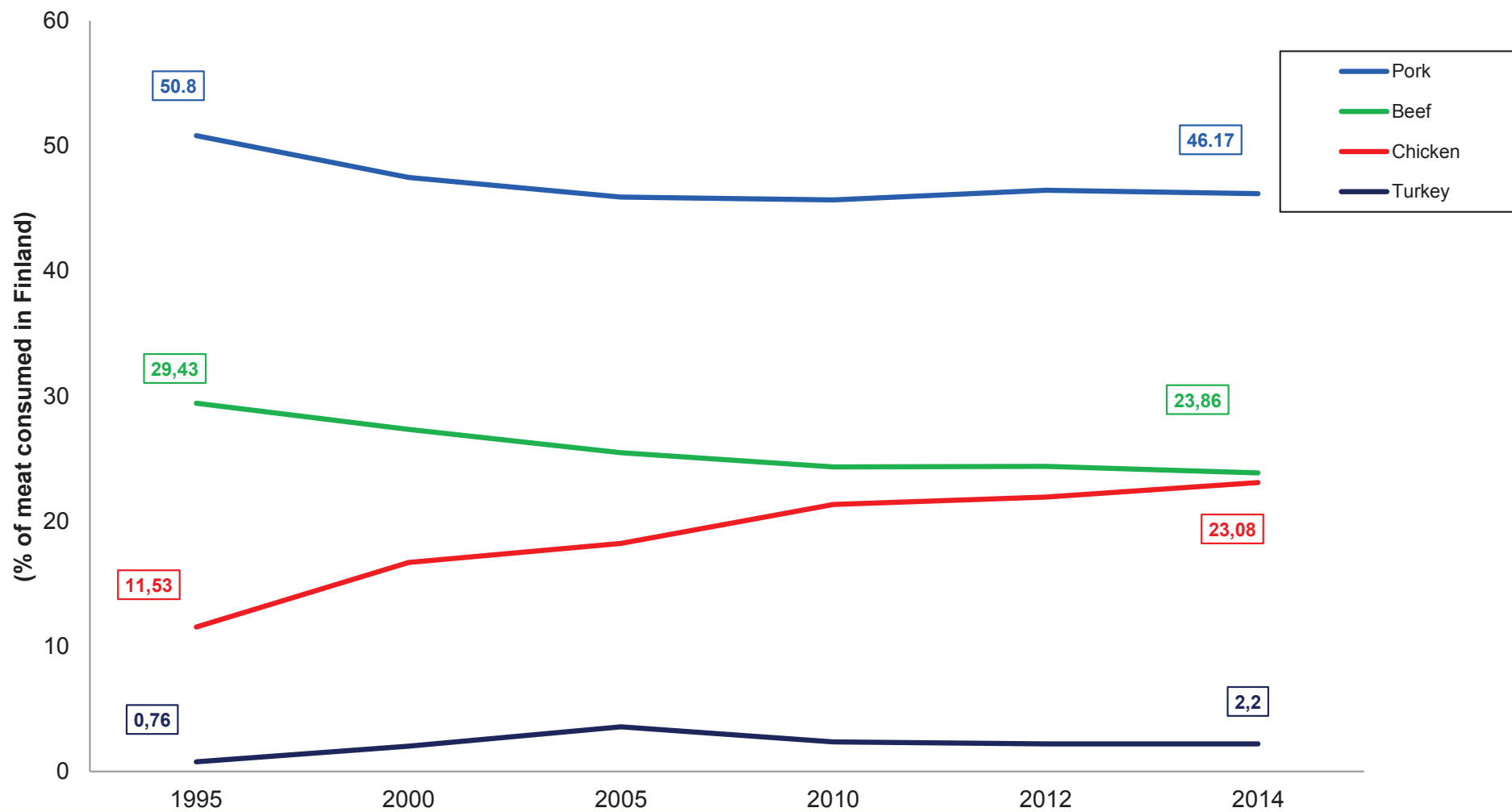
Total meat production 383.24 kt



Total meat consumed per capita 77.1 kg



Evolution of the distribution of meat consumed in Finland



Mean and 95% credible interval for the relative proportion of each meat type from their total burden of human cases in Finland.

	Mean	2.5%	97.5%
Chicken meat	73.6%	20.3%	97.4%
Turkey meat	8.1%	0.8%	39.4%
Beef (*)	6.5%	0.0%	35.8
Pork (*)	11.8%	0.1%	55.3%
TOTAL	100 %		

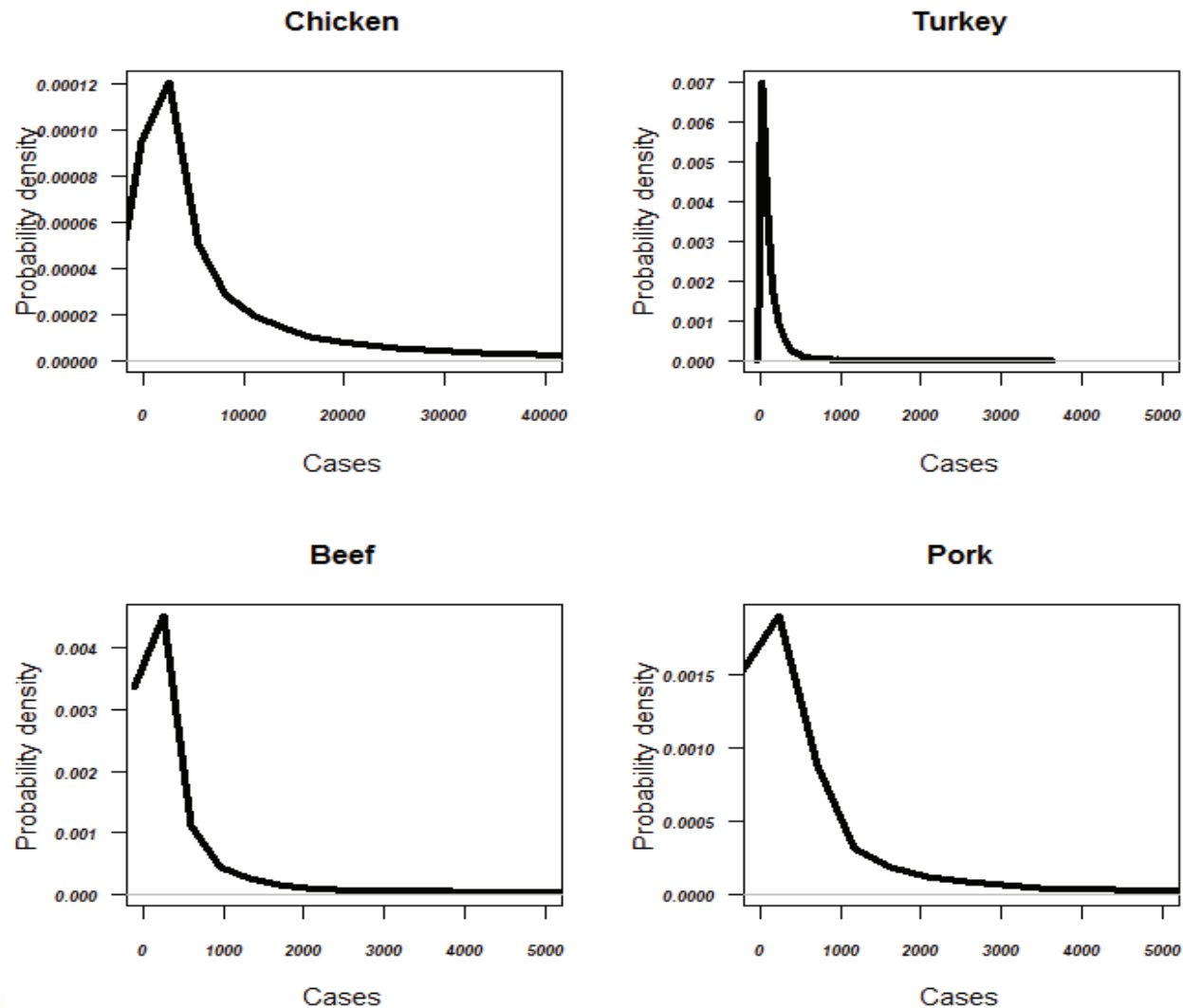
(*) Assuming same concentrations as in poultry, because we had no positives to estimate them separately.

Mean and 95% credible interval for the **probability of infection** and **illness** due to the amount of bacteria in **one contaminated meal in Finland**

	Mean		2.5%		97.5%	
	Illness	infection	illness	Infection	Illness	infection
Chicken (raw meat)	9.5%	28.8%	1.4%	4.2%	19.4%	55%
Chicken (cross contamination)	0.7%	2.2%	0%	0%	5.3%	16%
Turkey (raw meat)	7.4%	22.4%	3.2%	10.4%	11.7%	31.8%
Turkey (cross contamination)	0.2%	0.6%	0%	0%	1.2%	3.5%

However, **probability** of having a contaminated meal is rather **low**.

Predicted number of all human cases of campylobacteriosis (all illnesses) in Finland due to salad meal (or similar preparation), that is cross-contaminated from meat.



[Assuming *all meals* are subject to similar risk of kitchen cross-contamination as in the experiment described in Nauta et al. Risk Analysis, vol 28, no1. 179-192. 2008]

Cross-contamination during (domestic) food preparation

Mean **transfer probabilities** per cfu *Campylobacter* and wash-off effects associated with different food handling activities

Transfer/Wash-Off	Mean Value
Chicken to hand	0.0415
Chicken to cutting board	0.0125
Hand to salad	0.2070
Cutting board to salad	0.3430
*Hand washing	0.0347
*Cutting board washing	0.0000464

* The effect of hand washing or board washing is only relevant if there are actually washed. If not, the transfer coefficient will have value 1.

What can you do to help avoiding getting campylobacteriosis?

- You can ensure that you **cook thoroughly** the meat before ingesting
- You implement **good hygienic practices** in your kitchen by
 - **Washing hands**
 - **Avoiding cross-contamination**
 - Washing the utensils you have used to prepare the meat (**knives, cutting boards**) when you follow with the preparation of salads and vegetables.

Thank you
Kiitos

