

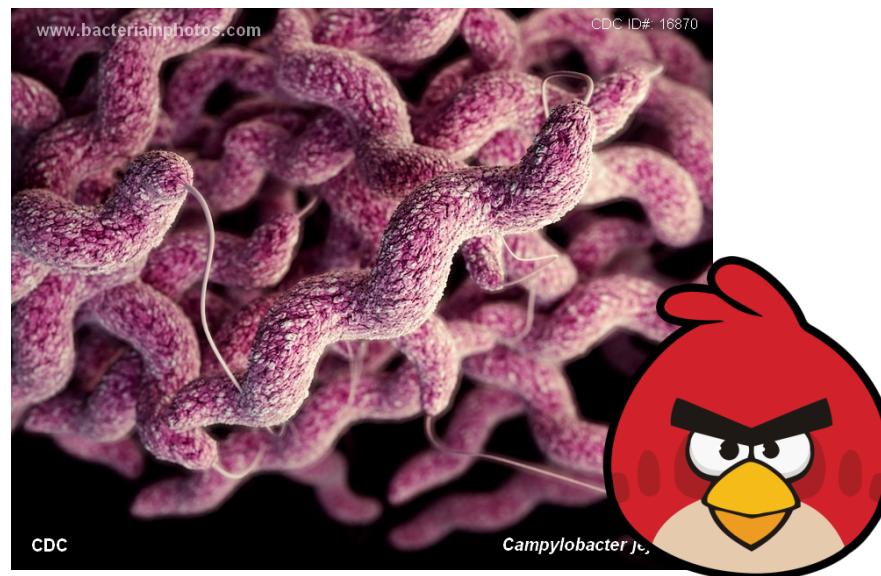
Challenges in Ensuring Microbial Food Safety in the Future

PhD, DVM Ann-Katrin Llarena

Teaching Demonstration 12.05.2017

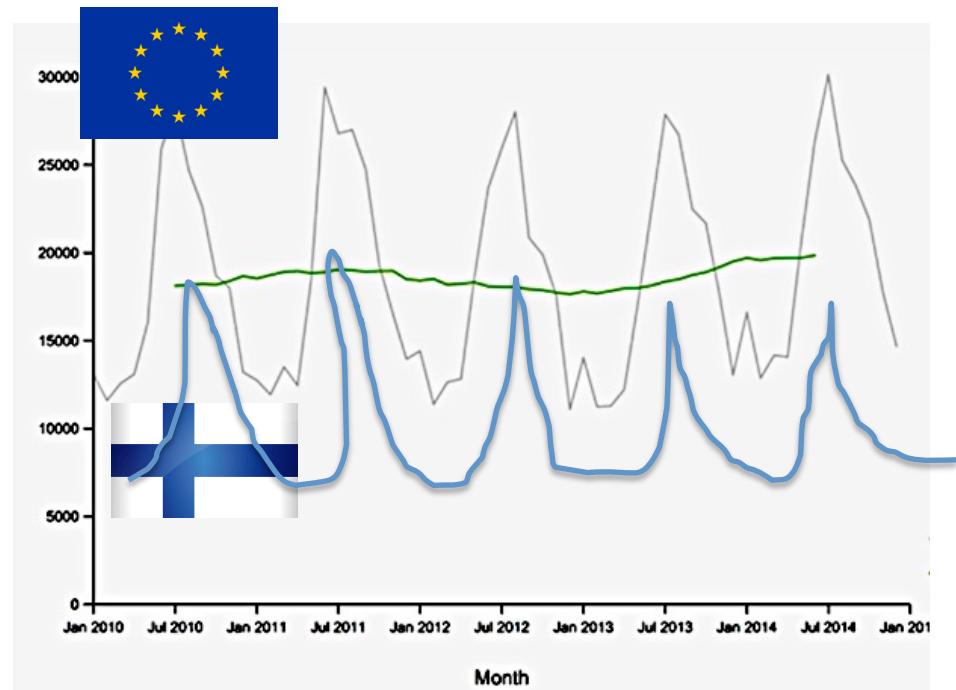
Teaching objectives

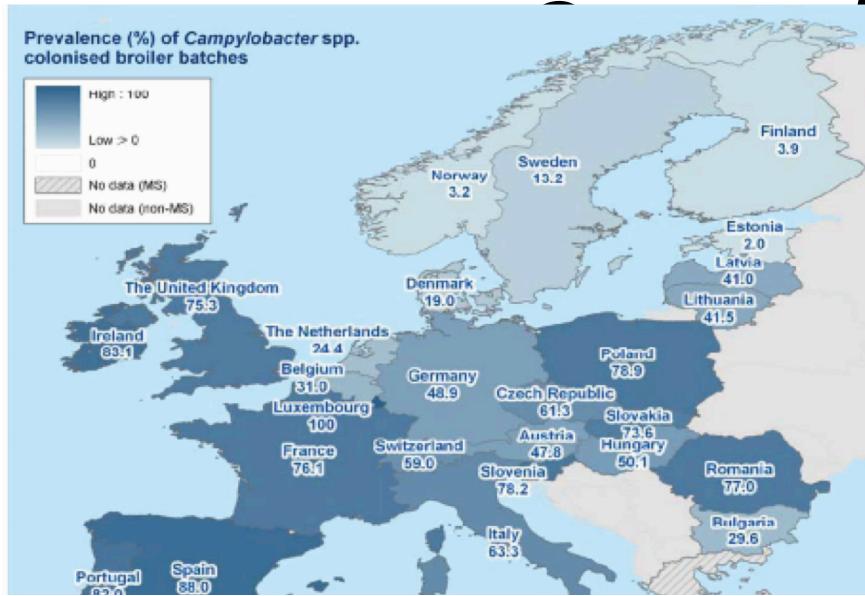
- Will the risk of *Campylobacter jejuni* acquired from eating chicken increase or decrease in Finland?



Campylobacter

- **What does it do to humans?**
 - Campylobacteriosis
 - Profuse diarrhea, severe stomach cramps
- **How common is this disease?**
 - Most common bacterial gastroenteritis
 - Summer





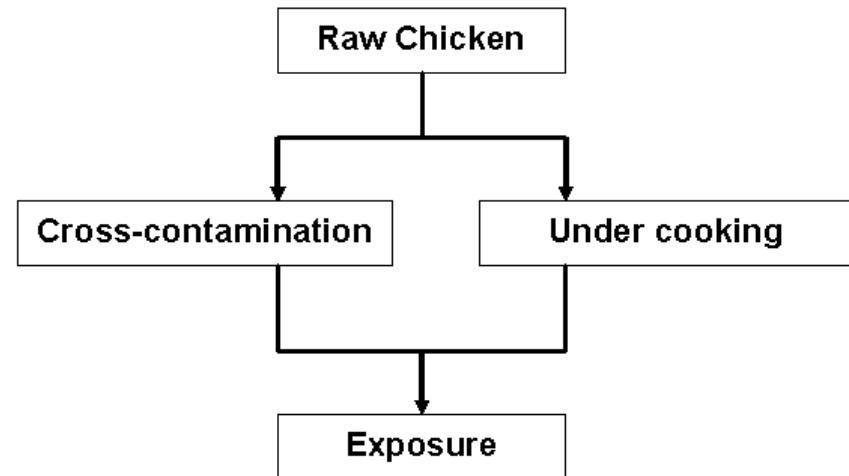
Campylobacter



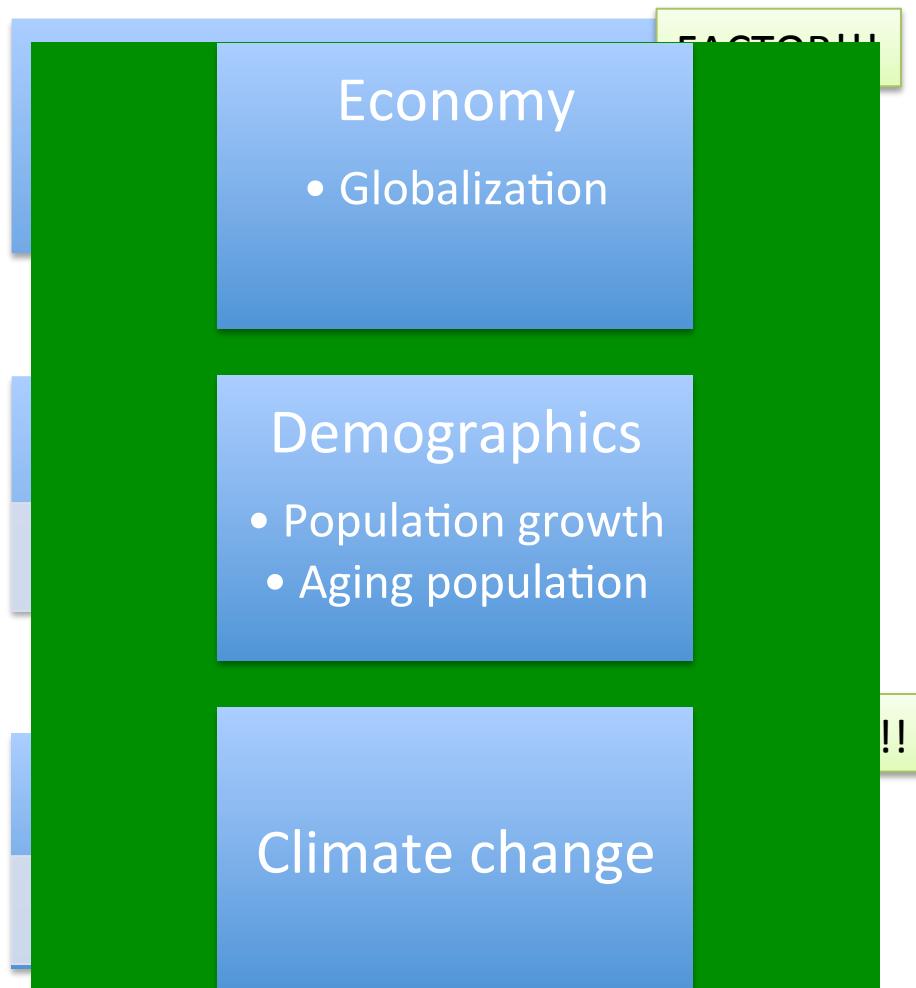
Photo by Alex Wild



- How does *Campylobacter* infect humans?
 - Pos flock
 - Dirty slaughter

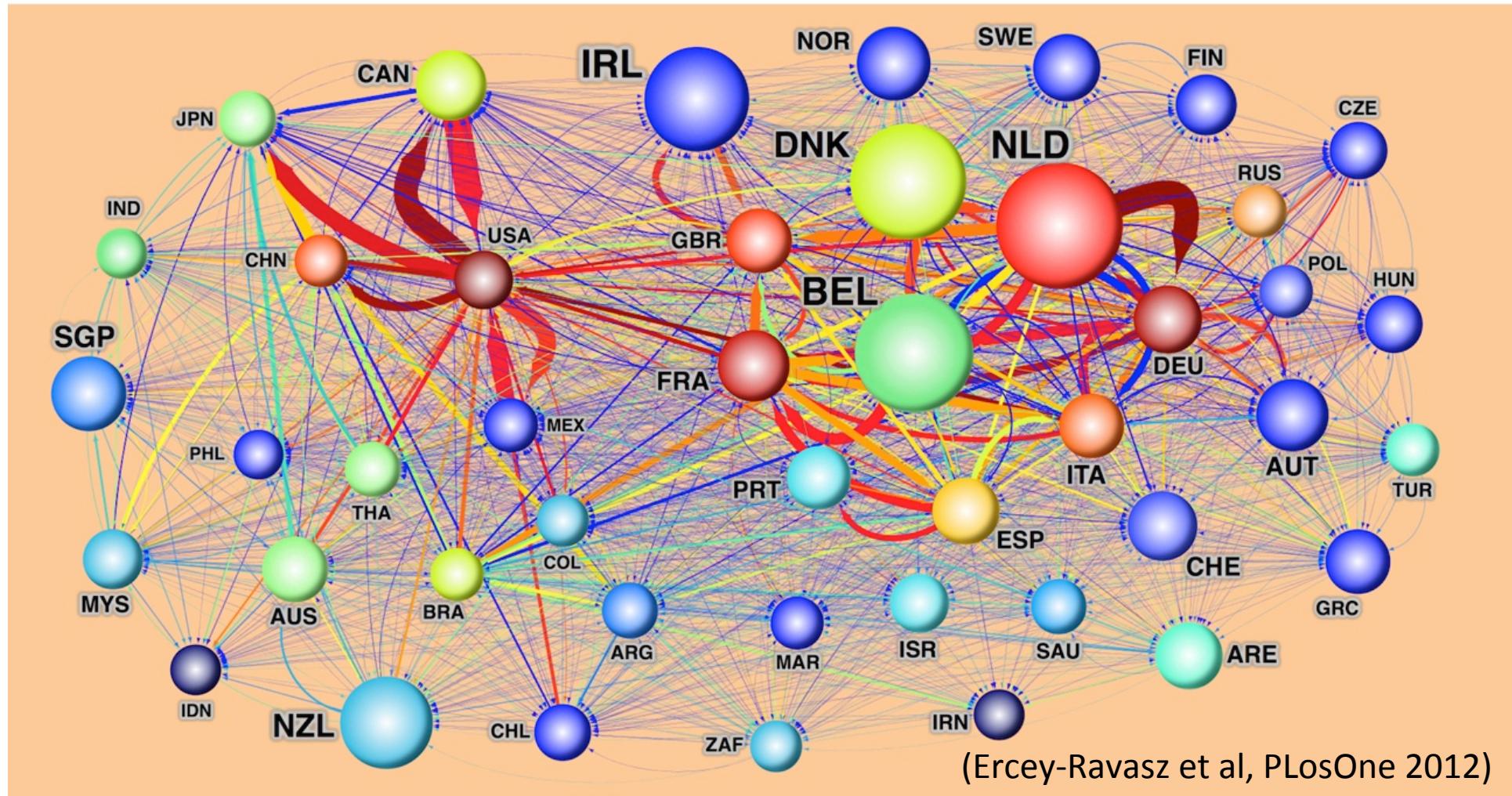


ACTIVITY: Assess the **risk** from getting **campylobacteriosis** by **eating chicken** in Finland in the future



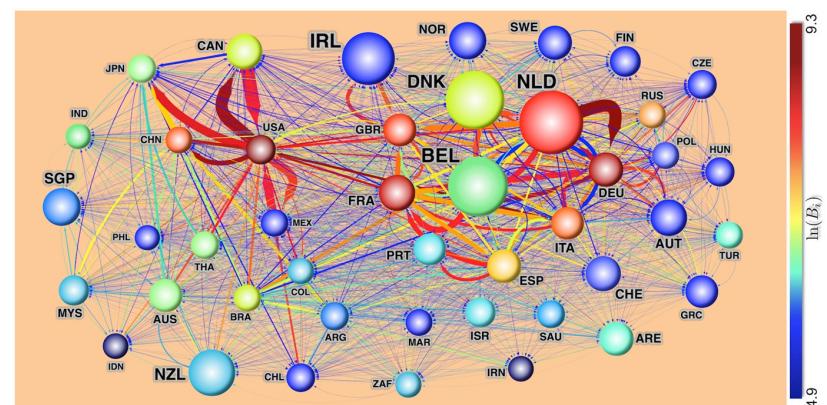
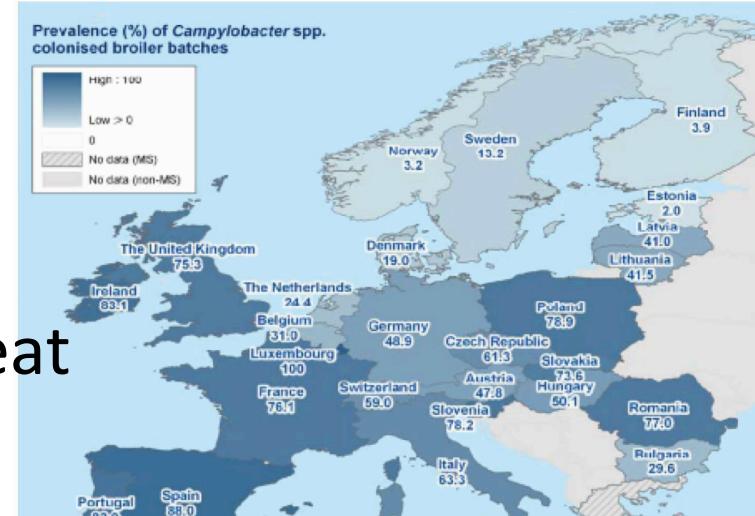
1. Pair up
2. Write UP or DOWN
3. Vote
4. Discuss together

Economy 1: Globalization



Campylobacter

- TASK
- Breakdown of barriers
 - Import of contaminated meat
 - Increased exposure
 - Antimicrobial resistance
 - → Severity
- Complex processing chain
 - Outbreaks
 - Risk UP?



Economy 2: Higher income

- Shift towards meat consumption
 - 1 kg meat needs 3-10 kg of grain
- Industrial production of meat
 - Chickens housed together >100 000
 - Environmental burden up due to manure
 - Spread to wild birds, wild animals, nearby livestock such as cattle, pigs etc.
 - Vulnerable to animal disease
 - Avian influensa biggest fear
 - → prophylactic use of antimicrobials to avoid prod loss
 - Quinolon resistant *C. jejuni* (Smith et al 1999)
 - » STAYS – one mutation without fitness cost
 - » Lacking treatment will worsen disease outcome for risk patients requiring AB treatment
 - » Transfer to other foodborne bacteria such as *Salmonella*

Economy 2: Higher income

- More engaged in risk activities
 - Eating at a restaurant(ref any case control study)
 - Recreational grilling
 - → Risk of catching C. jejuni increase

Economy 2: Lower income

For the individual

On state level

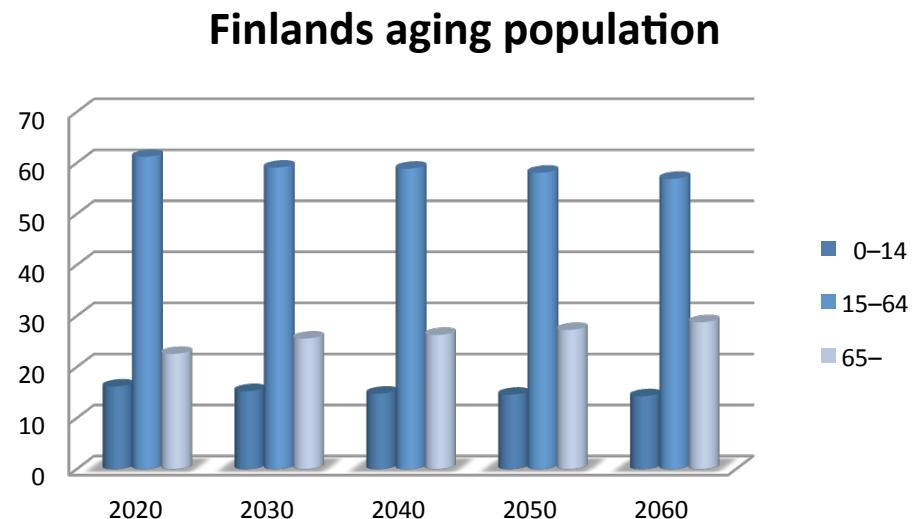


Campylobacter

- TASK
- Consumer habits
 - More chicken meat – cheaper!
 - Vegetarianisms?
 - More imported meat?
- Cut-backs in
 - Research on sustainable agriculture
 - Manure
 - Antimicrobials
 - In schools economy
 - Kitchen hygiene deteriorates

Demographics

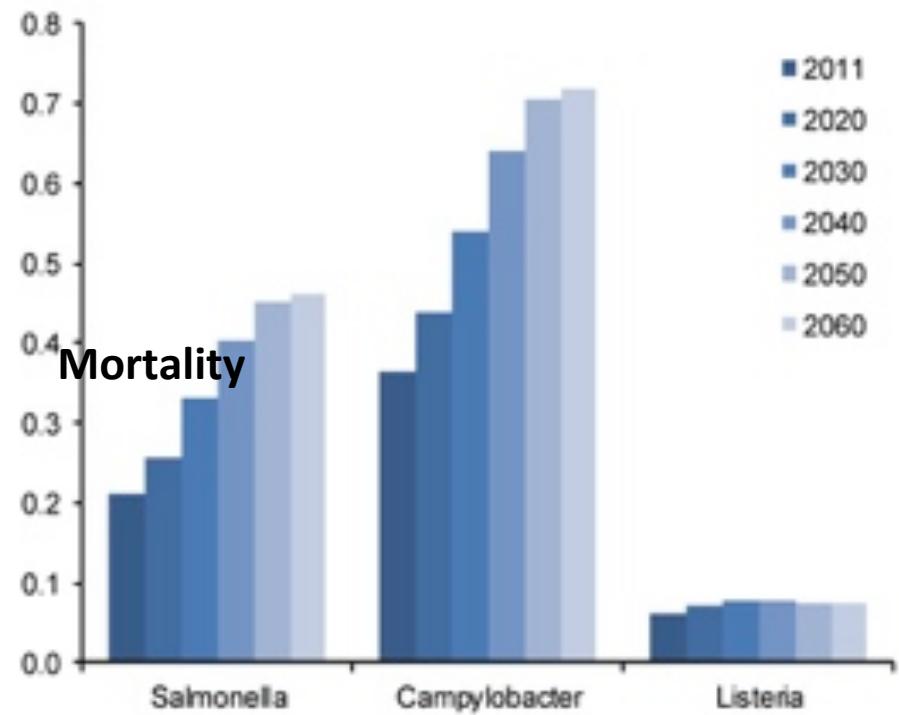
- Population growth globally
- Aging population in Finland



Campylobacter

TASK

- Population growth
 - Increased demand for food
 - Food safety vs. Food Waste
 - Higher consumption of chicken?
- Aging
 - Immune compromised
 - Medication
 - Antacida
 - Incidence stable
 - Mortality up



Consumer behaviour

- Locally produced
- Minimally processed
- Organic and animal friendly



Minimally Processed Chicken Burgers



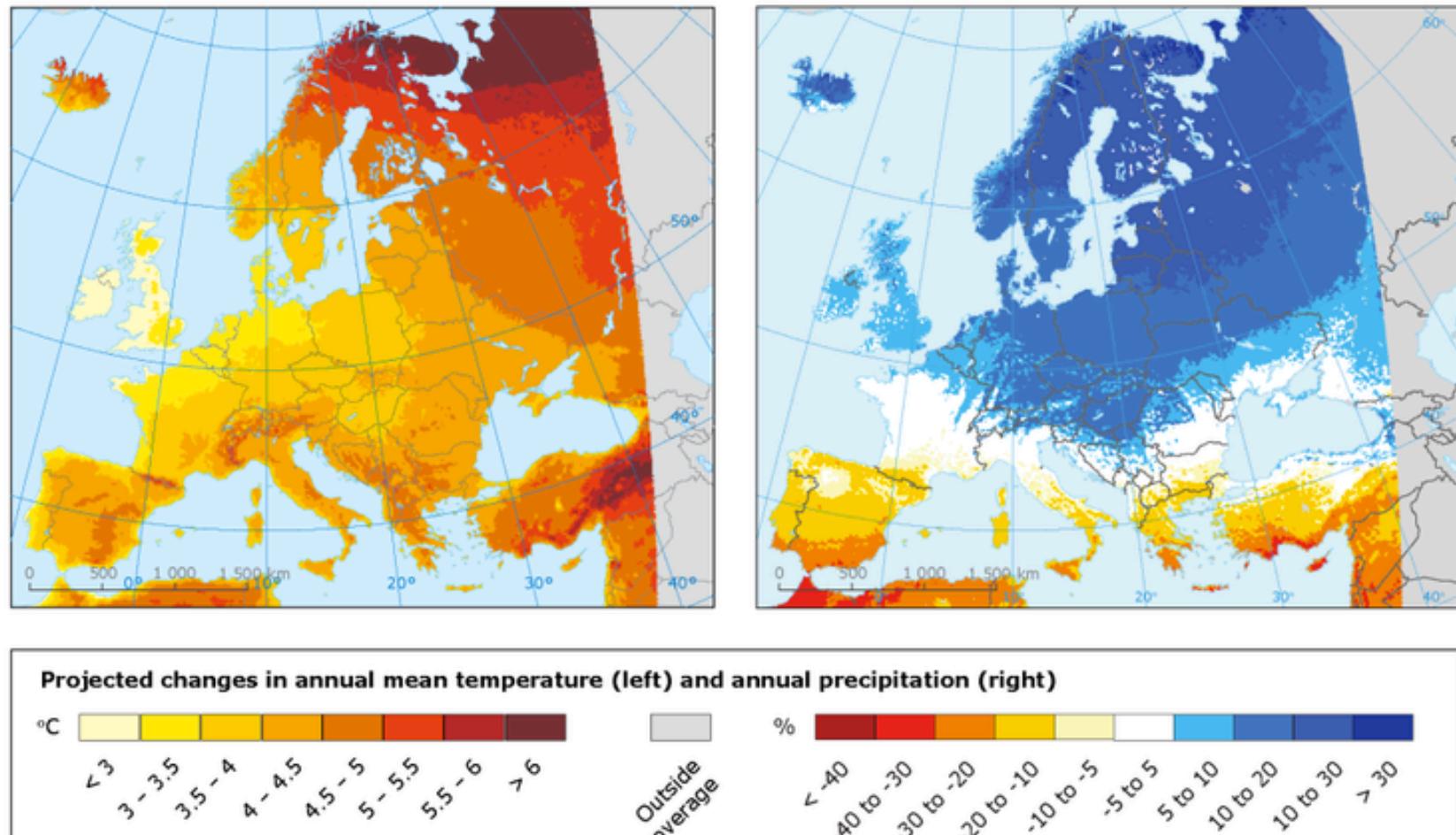
Related > Spicy Chicken Sandwiches > Photo 2



Campylobacter

- Small scale
 - Competence?
 - Time – risk of undercooking?
- Animal friendly
 - Backyard hens
 - Often carry *C. jejuni*
- Organic
 - Manure
 - Treatment → contamination load UP
- Less processing
 - Raw chicken the major problem anyway

Climate change



Climate change

TASK

- < 6°C less colonization
 - Broader seasonal peak of campy chickens
- More precipitation
 - Contaminated water overflowing environment
→ chicken colonization?
- Mitigation by eating less red meat
 - Increased corn production
 - Vegetarianism

Water and air temp UP →
campylobacteriosis

Precipitation increase → 10-40%
more campylobacteriosis

Source: Review By Patz et al. 2005

Gloom and doom or....

Thank you

- Questions?