

***Listeria monocytogenes* contamination of ready-to-eat foods and the risk for human health in the EU**

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SCS1 – Analisi del rischio e sistemi di sorveglianza in sanità pubblica – IZSVe

Chair Biohaz Panel - EFSA

Workshop annuale del Laboratorio Nazionale di Riferimento per la Listeria

Teramo, 14 dicembre 2017



● Baseline studies (2010 – 2011)

- Per stimare a livello europeo la prevalenza (e i livelli di contaminazione) di *L. monocytogenes* in tre categorie di alimenti RTE al dettaglio:
 - ✓ pesce affumicato confezionato (non congelato): 10.3%
 - ✓ prodotti a base di carne confezionati: 2.07%
 - ✓ formaggi freschi o a breve stagionatura: 0.47%



European Food Safety Authority

EFSA Journal 2013;11(6):3241

SCIENTIFIC REPORT OF EFSA

Analysis of the baseline survey on the prevalence of *Listeria monocytogenes*
in certain ready-to-eat foods in the EU, 2010-2011
Part A: *Listeria monocytogenes* prevalence estimates¹

European Food Safety Authority^{2,3}

European Food Safety Authority (EFSA), Parma, Italy



European Food Safety Authority

EFSA Journal 2014;12(8):3810

SCIENTIFIC REPORT OF EFSA

Analysis of the baseline survey on the prevalence of *Listeria monocytogenes*
in certain ready-to-eat foods in the EU, 2010-2011
Part B: analysis of factors related to prevalence and exploring compliance¹

European Food Safety Authority^{2,3}

European Food Safety Authority (EFSA), Parma, Italy

“Closing gaps for performing a risk assessment on *L. monocytogenes* in RTE foods”: outsourcing activities

Activity 1: an extensive literature search and study selection with data extraction on *Lm* in a wide range of RTE foods

- NP/EFSA/BIOCONTAM/2015/04-CT1
- 3/11/2015-2/10/2016



Activity 2: a quantitative risk characterization on *Lm* in RTE foods; starting from the retail stage

- OC/EFSA/BIOCONTAM/2014/02-CT1
- 1/10/2014-31/01/2017



Activity 3: the comparison of isolates from different compartments along the food chain, and in humans using Whole Genome Sequencing

- OC/EFSA/BIOCONTAM/2014/01-CT1
- 7/10/2014-7/10/2016



● Precedente Opinione Scientifica



The EFSA Journal (2007) 599, 1-42

Request for updating the former SCVPH opinion on *Listeria monocytogenes* risk related to ready-to-eat foods and scientific advice on different levels of *Listeria monocytogenes* in ready-to-eat foods and the related risk for human illness¹

Scientific Opinion of the Panel on Biological Hazards

(Question No EFSA-Q-2007-064)

Adopted on 6 December 2007

DRAFT SCIENTIFIC OPINION

ADOPTED: dd mmmm yyyy

doi:10.2903/j.efsa.20YY.NNNN

1 ***Listeria monocytogenes* contamination of ready-to-eat**
2 **foods and the risk for human health in the EU**

3 EFSA Panel on Biological Hazards (BIOHAZ),
4 Antonia Ricci, Ana Allende, Declan Bolton, Marianne Chemaly, Robert Davies, Pablo Salvador
5 Fernández Escámez, Rosina Girones, Lieve Herman, Konstantinos Koutsoumanis, Birgit
6 Nørrung, Lucy Robertson, Giuseppe Ru, Moez Sanaa, Marion Simmons, Panagiotis
7 Skandamis, Emma Snary, Niko Speybroeck, Benno Ter Kuile, John Threlfall, Helene
8 Wahlström, Johanna Takkinen, Martin Wagner, Davide Arcella, Maria Teresa Da Silva Felicio,
9 Marios Georgiadis, Winy Messens and Roland Lindqvist

10 **ENDORSED FOR PUBLIC CONSULTATION ON 6 JULY 2017**

Background

- Attività EFSA
- Aumento significativo nei casi di listeriosi confermati notificati a livello europeo (EFSA and ECDC, 2015)

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17 December 2015
Biological hazards DATA

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Campylobacter and Listeria infections still rising in the EU – say EFSA and ECDC



Human cases of listeriosis and campylobacteriosis rose once again in 2014, continuing an upward trend that began in 2008. Salmonellosis cases increased slightly for the first time since 2008. These are the main findings of the latest annual report by EFSA and ECDC on zoonoses and foodborne outbreaks in the European Union.

Listeriosis infections reported in humans increased by 16% compared with 2013: there were 2,161 confirmed cases in 2014. Although this number is relatively low, the rise of reported listeriosis cases is of concern as the surveillance of these infections is focused on severe forms of the disease, with higher death rates than for other food-borne diseases, particularly among the elderly, and patients with a weak immune system. However, *Listeria monocytogenes*, the bacterium that causes listeriosis in humans and animals, seldom exceeded the legal safety limits in ready-to-eat foods – the most common foodborne source of human infections.

Subject area
Biological hazards

Related topics
Food-borne zoonotic diseases

Related News
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News in brief
Biological hazards
published: 16 Dec 2015

[EFSA advises on heat treatment of bivalve molluscs](#)
News
Biological hazards
published: 14 Dec 2015

[European Antibiotic Awareness Day](#)

Campylobacteriosis cases stable, listeriosis cases continue to rise, say EFSA and ECDC

Campylobacteriosis infections reported in humans have now stabilised, after several years of an increasing trend, but it is still the most commonly reported foodborne disease in the EU. Listeriosis and VTEC infections in humans have increased, while reported salmonellosis and yersiniosis cases have decreased. These are some of the key findings of the *European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks in 2013*.

“The stabilisation of campylobacteriosis cases and the continuing downward trend of salmonellosis is good news, but we should not lower our guard as reporting of other diseases such as listeriosis and VTEC infections is going up,” says Marta Hugas, Head of Department of EFSA’s Risk Assessment and Scientific Assistance Department, who stresses the importance of monitoring foodborne illnesses in Europe.

Listeriosis and VTEC infections on the rise

Listeriosis cases increased by 8.6 percent between 2012 and 2013 and have been increasing over the past five years. Although the number of confirmed cases is relatively low at 1,763, these are of particular concern as the reported *Listeria* infections are mostly severe, invasive forms of the disease with higher death rates than for the other foodborne diseases. “The rise of reported invasive listeriosis cases is of great concern as the infection is acquired mostly from ready-to-eat food and it may lead to death, particularly among the increasing population of elderly people and patients with weakened immunity in Europe”, says Mike Catchpole, the Chief Scientist at ECDC. Despite the rise of listeriosis cases reported in humans, *Listeria monocytogenes*, the bacterium that causes listeriosis in humans and animals, was seldom detected above the legal safety limits in ready-to-eat foods.

● Background

- ECDC surveillance report (ECDC, 2015)
 - il tasso di notifica della listeriosi aumenta rapidamente in funzione dell'età, nella popolazione > 65 anni
 - un maggior numero di casi notificato nei maschi > 45 anni. Il rischio di infezione è il doppio rispetto a quello delle femmine della stessa età
- Listeria outbreaks (EFSA and ECDC, 2015)
 - nel 2013 in Europa sono state notificate 12 epidemie di Listeria, più che nel 2011 (otto) e nel 2012 (nove)

● Terms of reference

- The BIOHAZ panel is requested by EFSA to issue a Scientific Opinion on *Listeria monocytogenes (Lm)* contamination of ready-to-eat (RTE) foods and the risk for human health in the EU. In particular, the BIOHAZ Panel is requested:

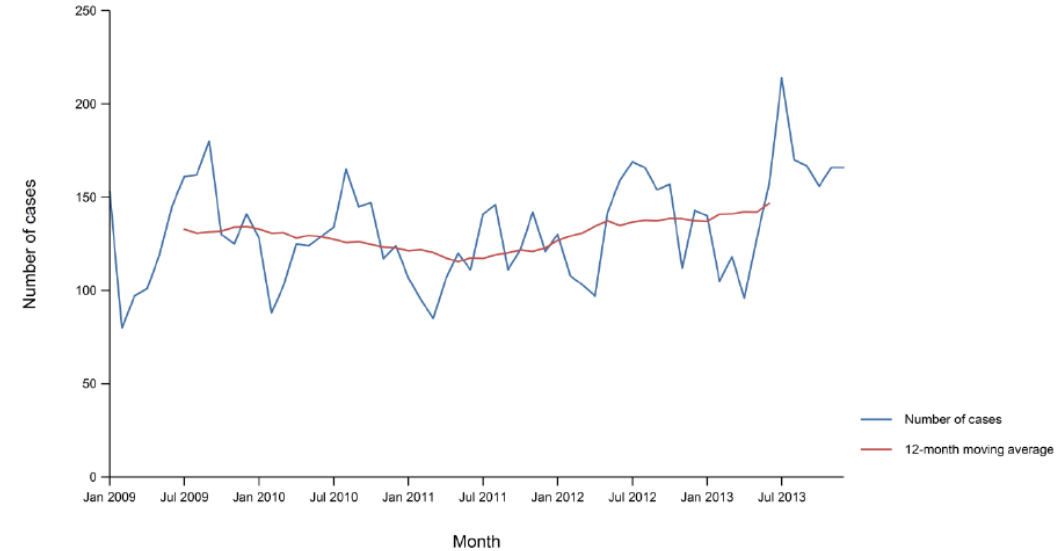
ToR 1 - To summarise and critically evaluate the most recent information on *Lm* in RTE foods, and in particular from:

- the EU-wide baseline survey and monitoring data
- the three ongoing EFSA outsourcing activities



Terms of reference

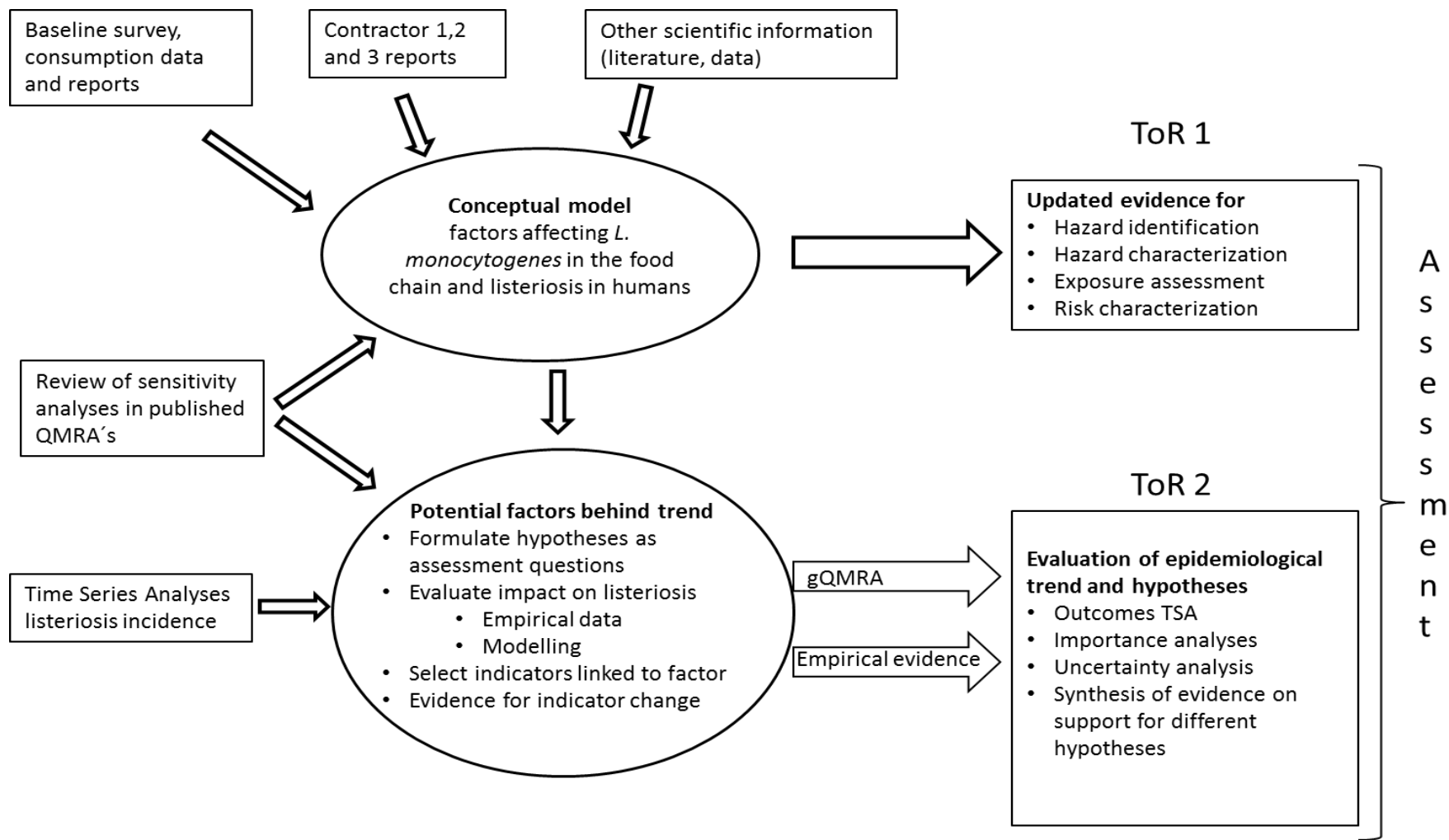
ToR 2 - To discuss and evaluate the factors related to the contamination in the food chain and the consumption patterns that may contribute to the reported trend of listeriosis incidence in the EU



Source: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. Croatia, Italy and Luxembourg did not report data over the whole period at the level of detail required for the analysis. Portugal has no surveillance system for listeriosis.

Figure 7. Trend in reported confirmed cases of human listeriosis in the EU/EEA, 2009-2013

Approccio utilizzato per rispondere ai ToRs



● I casi di listeriosi sono aumentati a partire dal 2008?

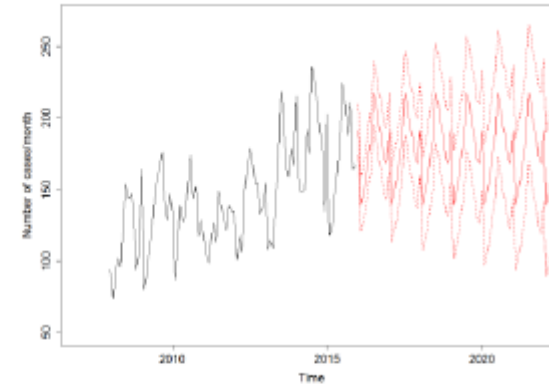
Dai dati alla previsione

year	months	cases
2011	1	2
2011	2	6
2011	3	3
2011	4	14
2011	5	5
2011	6	4
2011	7	10
2011	8	6
⋮	⋮	⋮

The European
Surveillance
System (TESSy)



Software

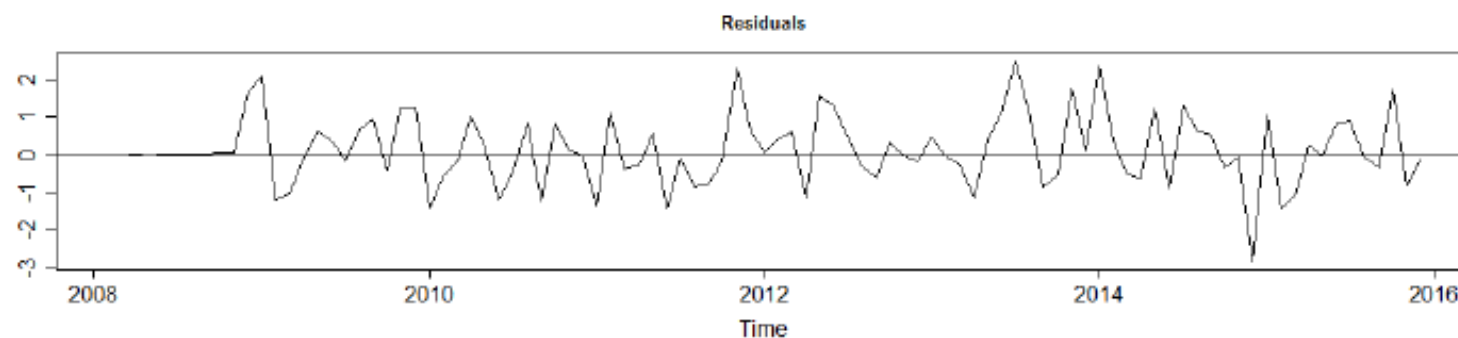
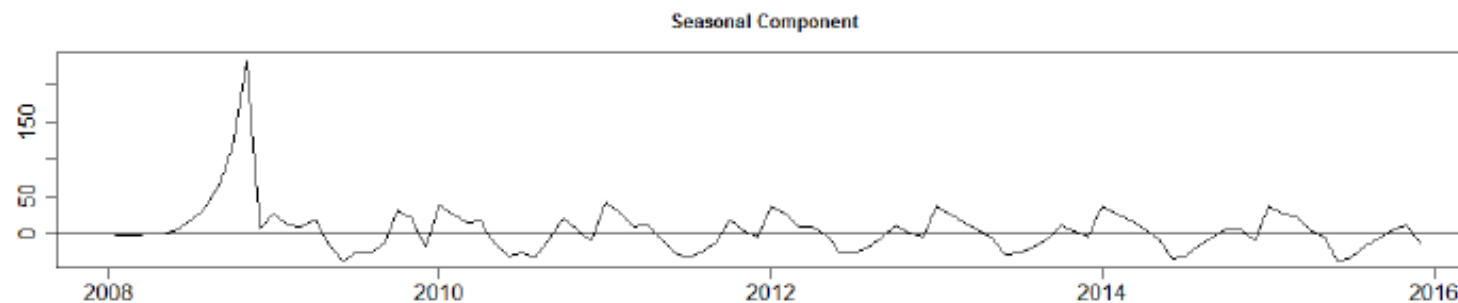
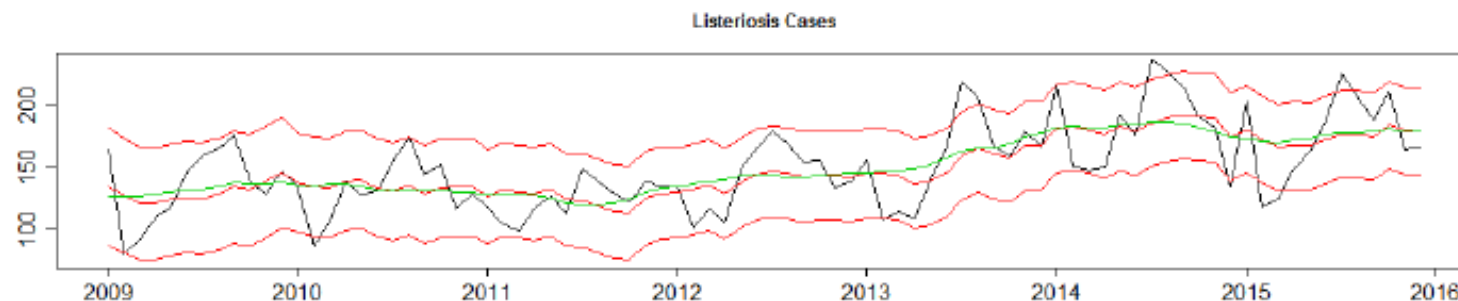


Forecasting

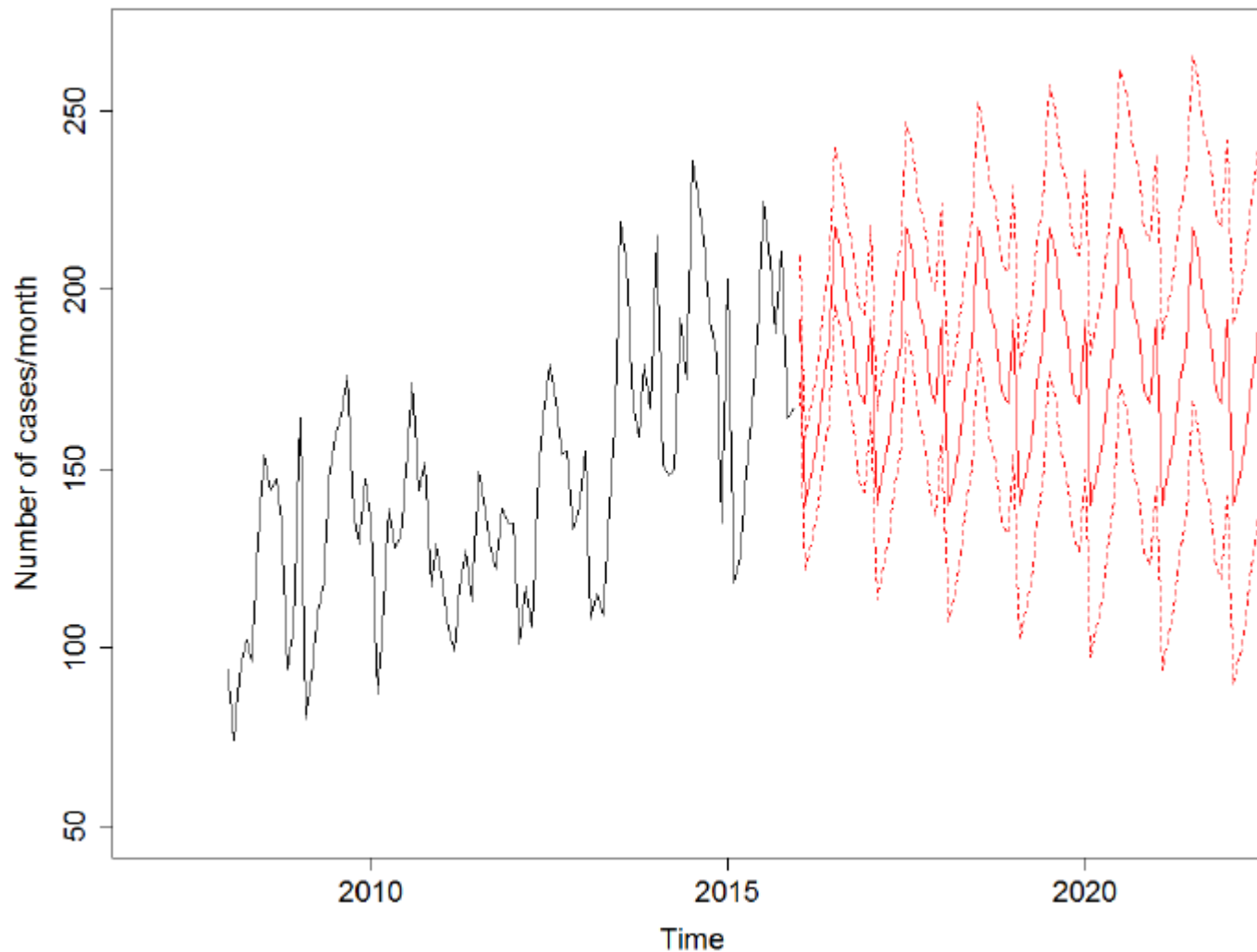
- **2008-2015: osservazioni mensili dei casi di listeriosi: in totale 14.002**
- **Dati suddivisi per genere ed età: maschi/femmine, età: 1-4, 5-14, 15-24, 25-44, 45-64, 65-74, >75**

● Risultati: dati aggregati

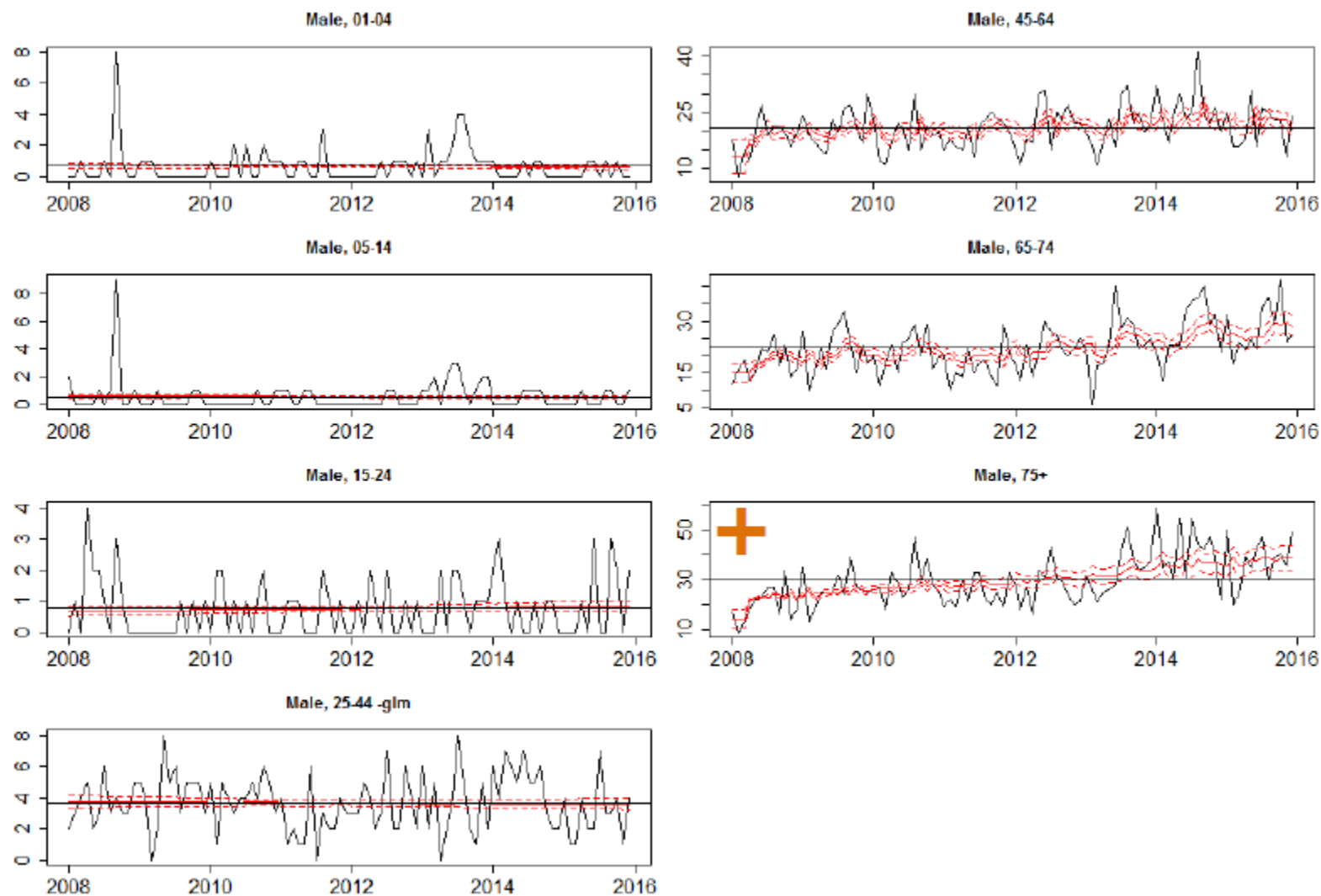
- Non si evidenzia un trend significativo



● Risultati: dati aggregati - previsione

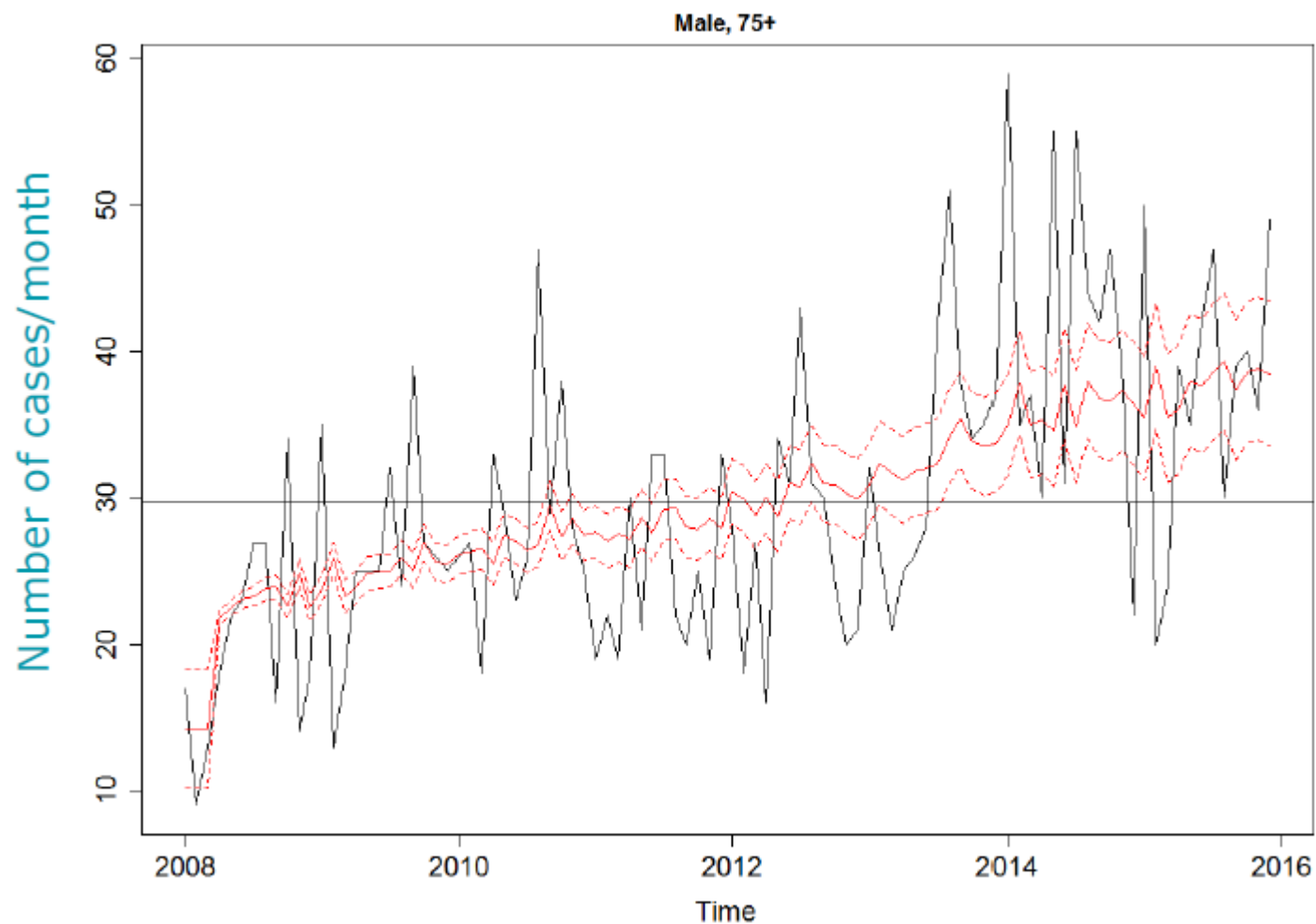


● Risultati: dati disaggregati, maschi





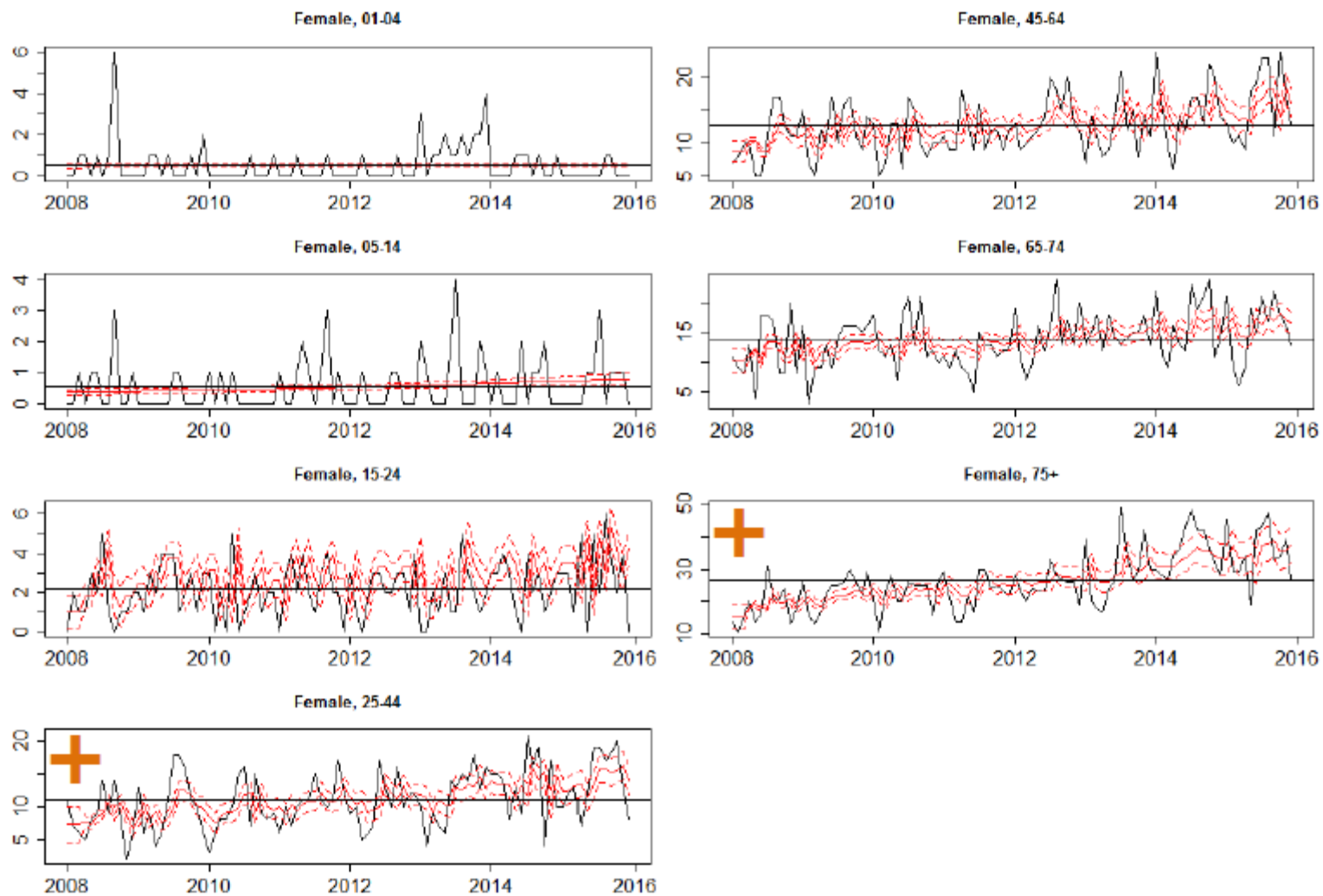
Risultati: dati disaggregati



**Incidenza mensile:
+ 0,52 (0,37; 0,64)**

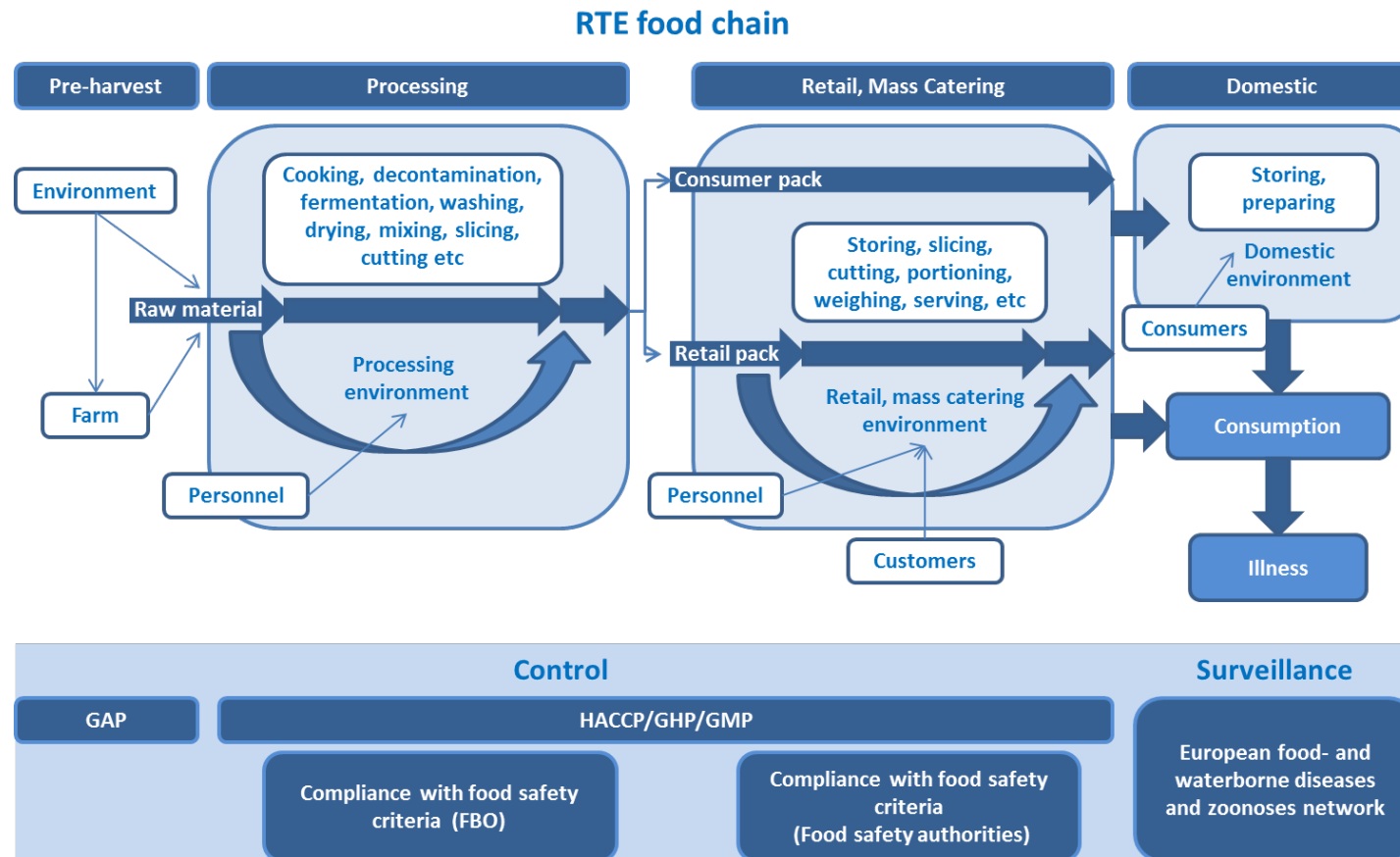
**Corrispondente ad
un aumento
da 22 a 36 casi/mese**

● Risultati: dati disaggregati, femmine



Quali fattori possono aver determinato questo trend?

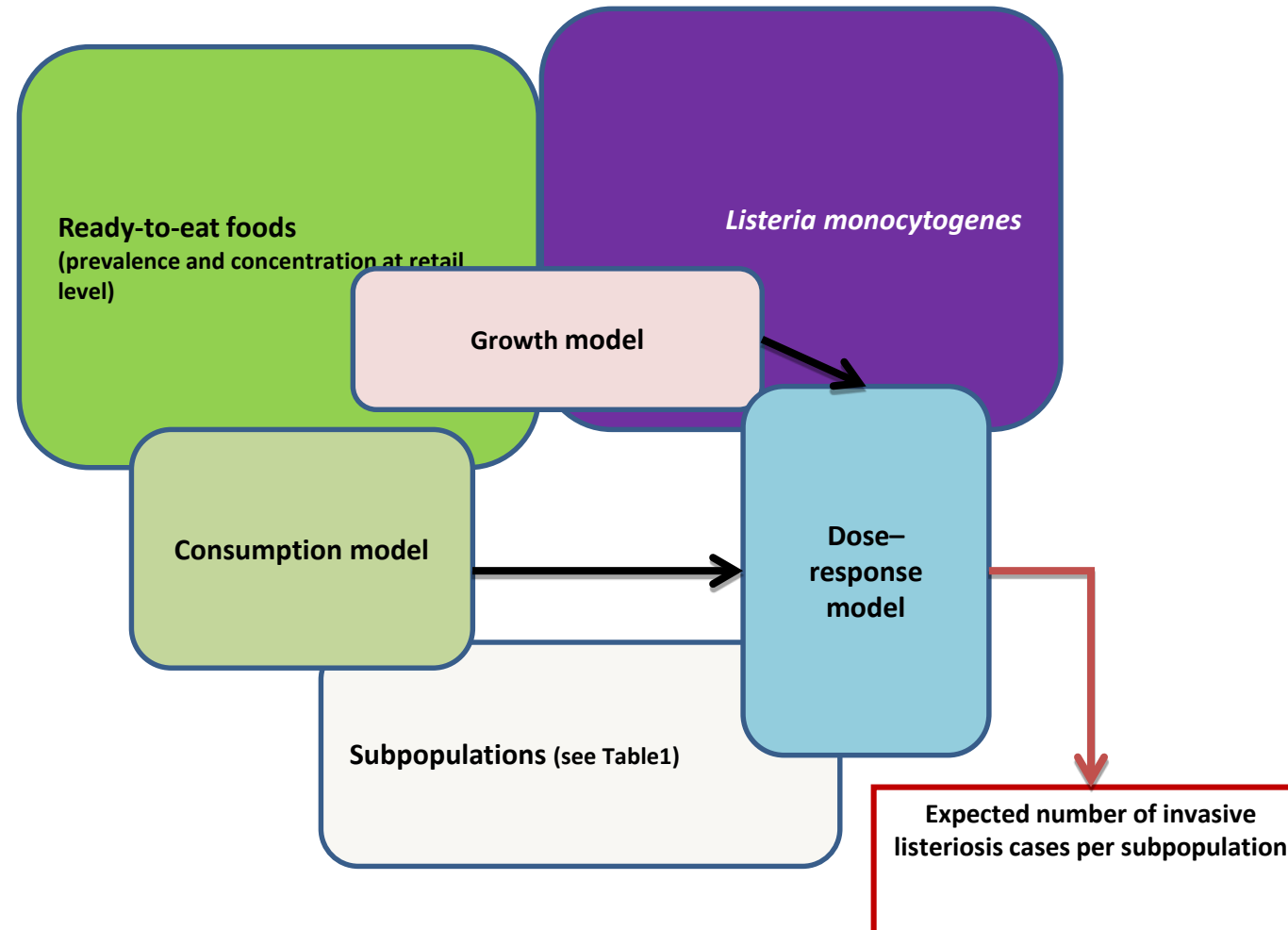
- Rappresentazione schematica delle vie di trasmissione e dei sistemi di controllo di *Listeria monocytogenes* in alimenti ready-to-eat



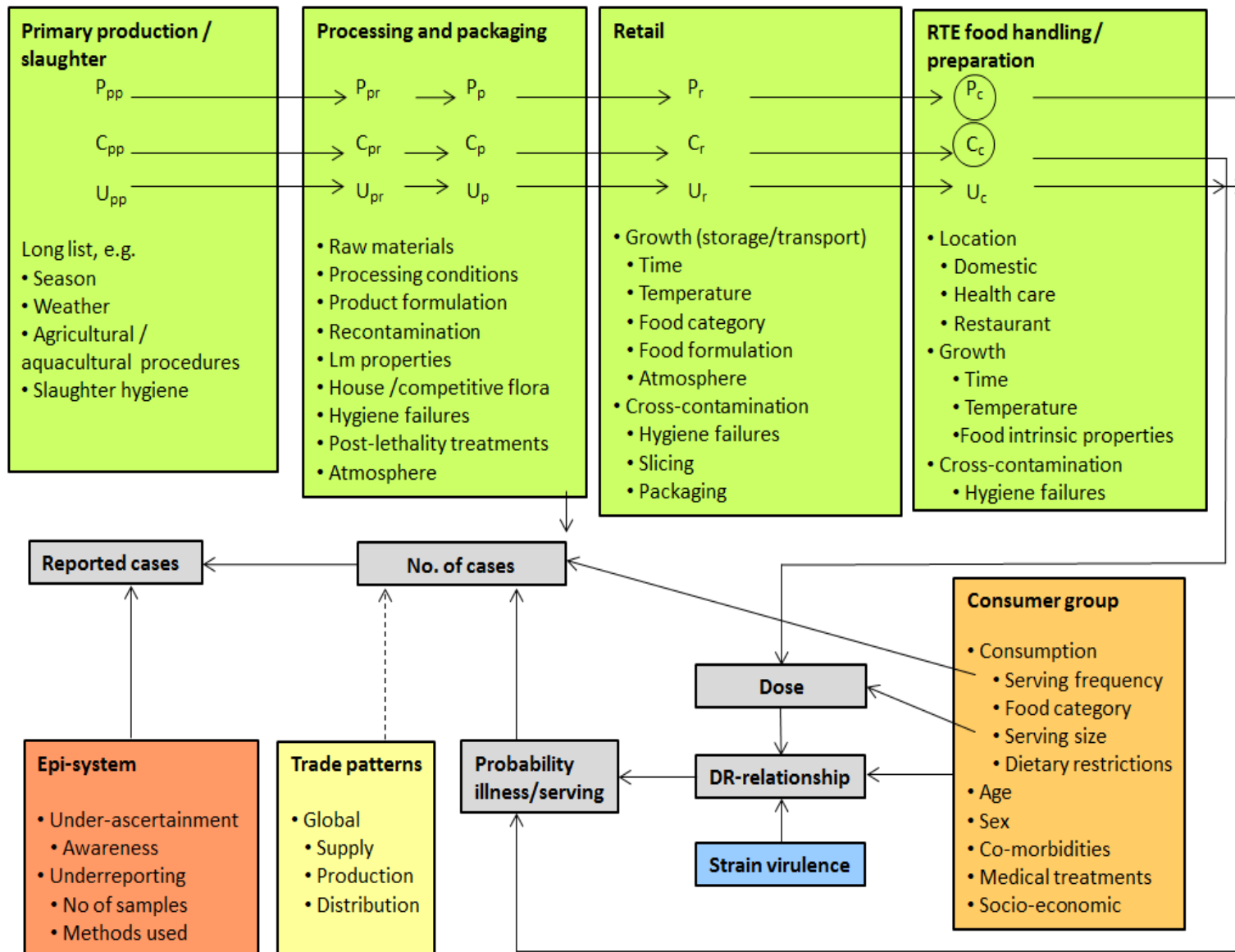
● Fattori considerati

- **Ospite** (i. popolazione anziana e/o suscettibile; ii. tasso di malattie intercorrenti),
- **Alimento** (iii. prevalenza di *L. monocytogenes* in alimenti RTE food al dettaglio; iv. concentrazione di *L. monocytogenes* in alimenti RTE food al dettaglio; v. condizioni di conservazione dopo l'acquisto; vi. consumo),
- Sistemi nazionali di **sorveglianza** (vii. miglioramento della sorveglianza),
- **Batterio** (viii. virulenza).

Listeria monocytogenes generic quantitative microbiological risk assessment (gQMRA) model

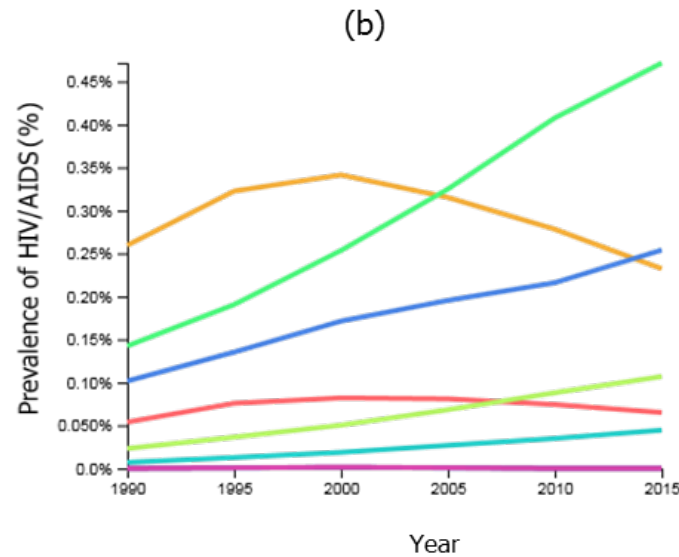
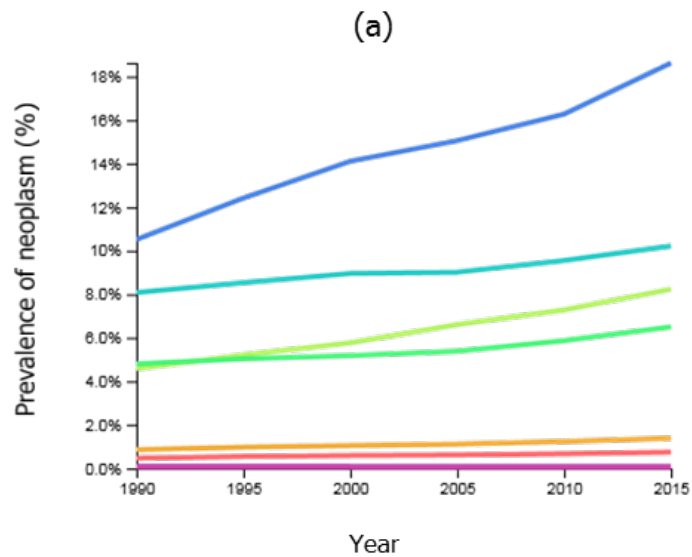


Conceptual model of stages, processes and factors influencing listeriosis incidence

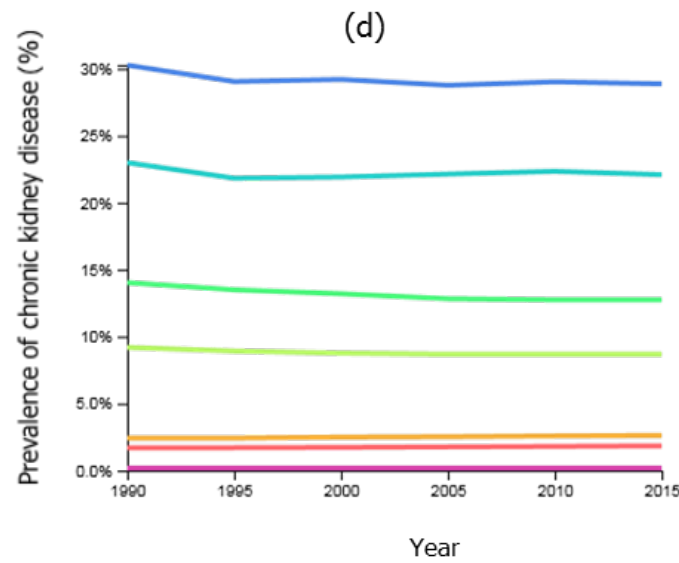
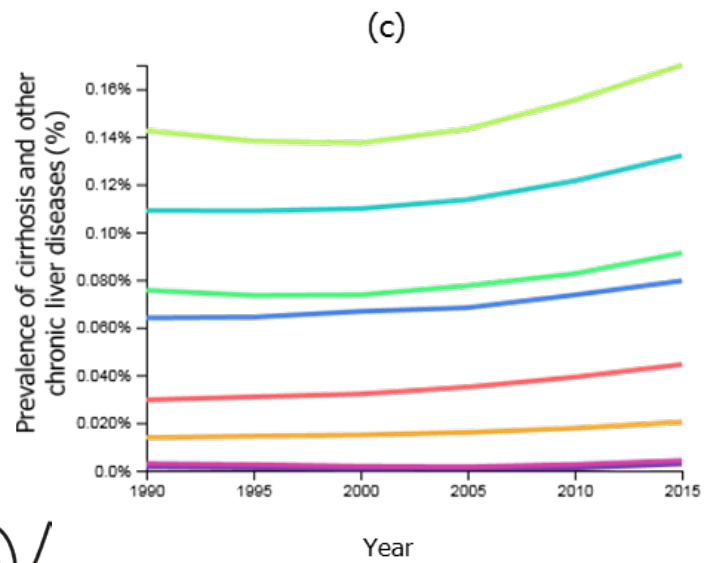


Fattori che possono aver contribuito all'aumento nel numero di casi di listeriosi

- Il fattore più probabile (66–90%) è l'aumento nella proporzione delle persone a rischio nelle fasce di età > 45 anni sia nei maschi che nelle femmine
- Il secondo fattore probabile è l'aumento nella popolazione anziana e a rischio. Questo fattore può aver contribuito al numero dei casi di listeriosi invasiva ma non all'aumento dell'incidenza



- Males, 5-14 years
- Females, 5-14 years
- Males, 15-49 years
- Females, 15-49 years
- Males, 50-69 years
- Females, 50-69 years
- Females, 70+ years
- Males, 70+ years





Fattori considerati “**as likely as not**” (33–66%) sono:

- l’aumento dei consumi (numero di porzioni per persona) di alimenti RTE in Europa
- una migliore sorveglianza dei casi invasivi di listeriosi, in quanto ci sono state delle modifiche nei sistemi di sorveglianza, in particolare in alcuni Paesi che riportano un numero relativamente elevato di casi.



Fattori considerati “inconclusive”:

- concentrazione di *L. monocytogenes* nelle tre categorie considerate di alimenti RTE al dettaglio;
- prevalenza di *L. monocytogenes* nelle tre categorie considerate di alimenti RTE al dettaglio;
- virulenza di *L. monocytogenes*;
- condizioni di conservazione (tempo e temperatura) post vendita .

● **Grazie!**

***Listeria monocytogenes* contamination of ready-to-eat foods and the risk for human health in the EU**

EFSA Panel on Biological Hazards (BIOHAZ)

Antonia Ricci, Ana Allende, Declan Bolton, Marianne Chemaly, Robert Davies, Pablo Salvador Fernández Escámez, Rosina Girones, Lieve Herman, **Konstantinos Koutsoumanis**, Birgit Nørrung, Lucy Robertson, Giuseppe Ru, **Moez Sanaa**, Marion Simmons, **Panagiotis Skandamis**, Emma Snary, **Niko Speybroeck**, Benno Ter Kuile, John Threlfall, Helene Wahlström, **Johanna Takkinen**, **Martin Wagner**, **Davide Arcella**, **Maria Teresa Da Silva Felicio**, **Marios Georgiadis**, **Winy Messens** and **Roland Lindqvist**