

Listeriosis : Food safety aspects and control of Listeria in food



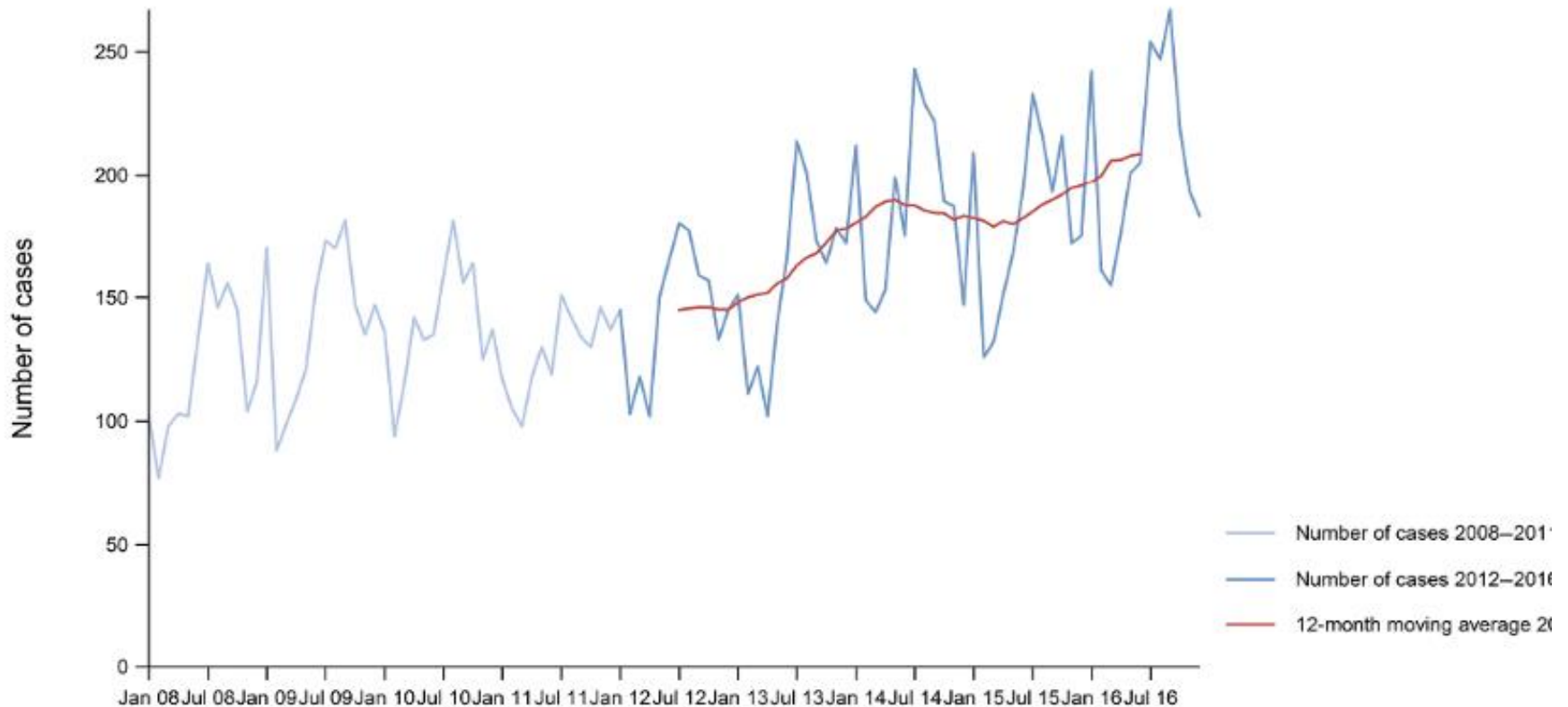
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Estimate of the global burden of listeriosis

- In 2010, a working group under WHO estimated that annually listeriosis resulted in:
 - **23 150 illnesses** (95% credible interval 6061–91 247)
 - **5463 deaths** (1401–21 497)

The proportion of perinatal cases was 20·7% (SD 1·7). The authors were unable to identify incidence data for Africa, the Middle East and South Asia. Urgent efforts are needed to fill the missing data in developing and emerging economies.

Listeriosis in the EU



Trend in reported confirmed human cases of listeriosis in the EU/EEA, by month, 2012–2016

Listeriosis in the world - EU

Listeriosis in the EU:

Increase may partly due to better reporting.

Perhaps associated with changed production systems e.g. proliferation of cook-chill.

L. Monocytogenes infections were most commonly reported in the age group over 64 years. The proportion has increased from 52.9% in 2008 to 61.9% in 2016, and especially in the age group over 84 years, with an increase from 7.6% to 10.4%.

Food most often associated with listeriosis include:

- Foods with a long shelf-life under refrigeration
- Ready-to-eat foods consumed without further cooking
- In past outbreaks, foods involved included ready-to-eat frankfurters, meat spread (paté), smoked salmon, fermented sausages, dairy products (including soft cheeses, unpasteurized milk and ice cream) and prepared salads as well as fresh vegetables and fruits



Listeriosis: high risk groups

- **Pregnant women** are about 20 times more likely to contract listeriosis than other healthy adults
- It can result in miscarriage or stillbirth
- Newborn may also have low birth weight, septicaemia and meningitis
- **People with HIV/AIDS** are at least 300 times more likely to get ill than those with a normally functioning immune system



WHO Response to Listeriosis in General

- WHO and FAO have published an international quantitative risk assessment of *Listeria* in ready-to-eat foods
- This has formed the scientific basis for the **Codex Alimentarius Commission Guidelines on the Application of General Principles of Food Hygiene to the Control of *Listeria Monocytogenes* in Foods**
- This guidance includes microbiological criteria (i.e. maximum limits for the presence of *L. monocytogenes* in foods)

Listeriosis: Control Methods

FAO/WHO International risk assessment:

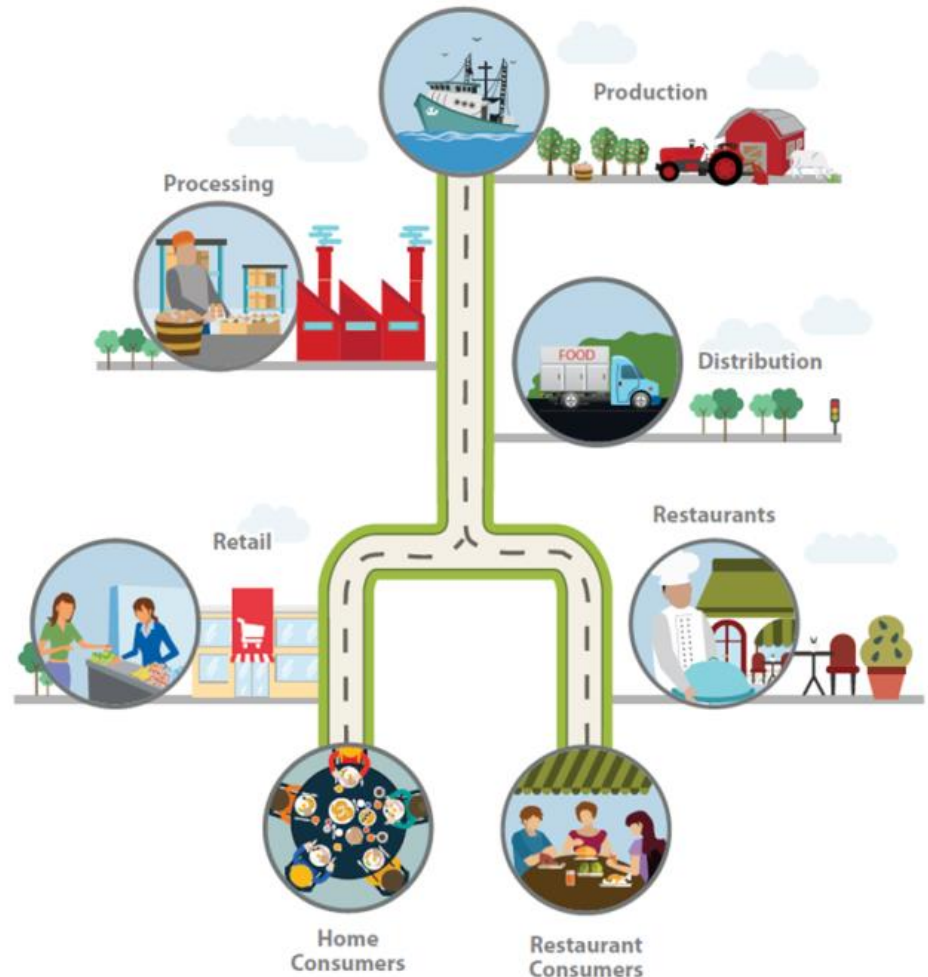
- **Nearly all cases** of listeriosis result from the consumption of foods with **high numbers** of *L. monocytogenes* that would exceed both a zero tolerance limit (i.e. 0 CFU/25 g) and a 100 CFU/g limit.
- Control of the organism:
 - reduction of the frequencies of contamination would have a proportional reduction in rates of illness and
 - preventing high levels of contamination at consumption would have the greatest impact.
- In foods that don't support growth, reducing the occurrences at point of manufacture would improve public health.
- In foods that support growth, in addition you need better temperature control and/or limited shelf life to reduce the risk.

Listeriosis: Control Methods

- Control of *L. monocytogenes* is required at all stages in the food chain and

an integrated approach is needed to prevent the multiplication of this bacteria in the final food product,

BUT.... Industry has the primary responsibility to act!



Listeriosis: Control Methods

- The public health risk of *L. monocytogenes* in RTE food depends on the effectiveness of control and monitoring procedures:
 - Good Hygienic Practices (GHP) (Listeria is found in the environment and should be expected to be present in raw materials)
 - Good Manufacturing Practices (GMP) (high resistance to common preservative methods (salt, smoke or acidic condition in the food))
 - Food safety management system based on the principles of Hazard Analysis Critical Control Points (HACCP) – Listeria can grow at refrigeration temperature

Listeriosis: Control Methods

- Food manufacturers should test against microbiological criteria, when validating and verifying the functioning of their HACCP procedures and other hygiene control measures
- Producers must also conduct environmental monitoring to identify and eliminate niche environments, including areas that favor the establishment and proliferation of *L. monocytogenes*

Listeriosis: Control Methods

In the EU: (EC) No 2073/2005 on microbiological criteria for foodstuffs:

- For RTE foods intended for infants placed on the market during their shelf life: absence of *L. monocytogenes* in 25 g of sample (n = 10, c = 0).
- For RTE foods able to support the growth of *L. monocytogenes*, absence in 25 g of sample (n = 5, c = 0) before the RTE foods has left the producer. This criterion shall apply to products when **the producer** is not able to demonstrate that the product will not exceed the limit of 100 CFU/g throughout the shelf life.
- For RTE foods unable to support the growth of *L. monocytogenes* (based on their pH, water activity values and/or other intrinsic factors) and for products with a shelf life of less than 5 days, other than those intended for infants and for special medical purposes, the limit is 100 CFU/g (n = 5, c = 0) during their shelf life on the market.

Listeriosis: Control Methods

Growth / no growth :

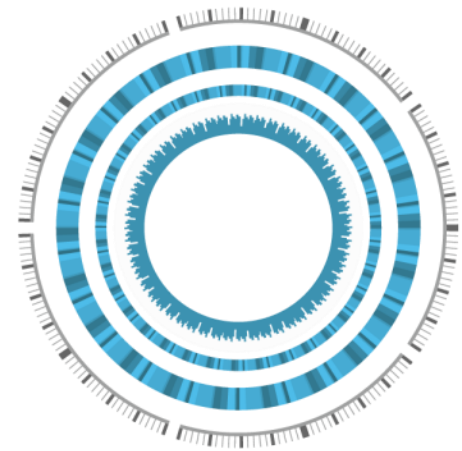
Shelf-life studies are relevant when there is not sufficient scientific basis that a food will not support growth.

E.g. *L. monocytogenes* growth is inhibited if:

- pH < 4.4
- aw < 0.92
- a combination of pH < 5.0 and aw < 0.94
- NaCl > 16%
- freezing (-18 C) (CAC, 2009; European Commission, 2013).

Listeriosis: New Outbreak Investigation tool

- Modern technologies using genetic fingerprint - Whole Genome Sequencing (WGS) - allow for more rapid identification of the food source of listeriosis outbreaks by linking *L. monocytogenes* isolated from patients with those isolated from foods
- Requires rapid sequencing and sharing of sequences to allow for powerful analysis in real time.
- WHO is promoting the idea of an international global open database for sharing and real time analysis of any sequences submitted.



WHO Response to Listeriosis in General

- WHO's main tool to assist Member States in surveillance, coordination and response to FBD outbreaks is the International Network of Food Safety Authorities (INFOSAN) which links national authorities in Member States in charge of managing food safety events
- This network is managed jointly by WHO and FAO and operates closely with IHR Secretariat
- INFOSAN has close to 600 members in more than 180 Member States



Existing Guidance from FAO/WHO

[FAO/WHO framework for developing national food safety emergency response plans](#)

[FAO/WHO guide for application of risk analysis principles and procedures during food safety emergencies](#)

[FAO/WHO guide for developing and improving national food recall systems](#)

[WHO Foodborne Disease Outbreaks: Guidelines for Investigation and control](#)



Overview

- Foodborne listeriosis is one of the most serious and severe foodborne diseases. High case fatality rate of 20-30% makes it a significant public health issue.
- *L. monocytogenes* can survive and multiply at low temperatures usually found in refrigerators
- Eating contaminated food with high numbers of *L. monocytogenes* is the main route of infection and main cause of disease
- *L. monocytogenes* are ubiquitous in nature and found in soil, water and animal digestive tracts from where it can contaminate or persist in foods during processing.
- Effective industry process control is the main key to controlling listeriosis

Thank You

