



CATÓLICA PORTO

BIOTECNOLOGIA

Listeriosis in Portugal: from retrospective studies to the detection of the first confirmed human outbreak

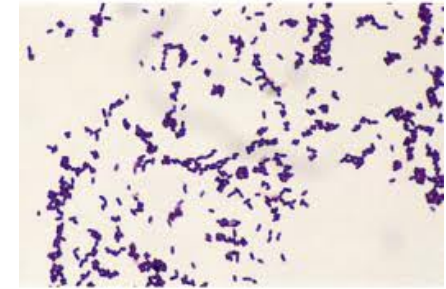
Paula Teixeira

CBQF

Centro de Biotecnologia
e Química Fina



Listeria monocytogenes & listeriose...



Listeria monocytogenes is an ubiquitous bacterium widely distributed in the environment that can cause a severe disease in humans and animals: listeriosis.

Non-invasive listeriosis: gastrointestinal symptoms

Invasive listeriosis:

Septicemia

Central nervous system infections

Miscarriages and stillbirths

Listeria monocytogenes & listeriose...



Elderly



Pregnant

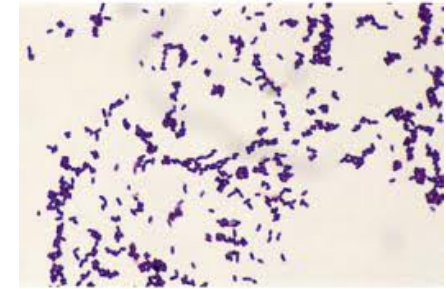


Newborn



Immunocompromised

Listeria monocytogenes & listeriose...



99% of the human *Listeria* infections are from foodborne origin...

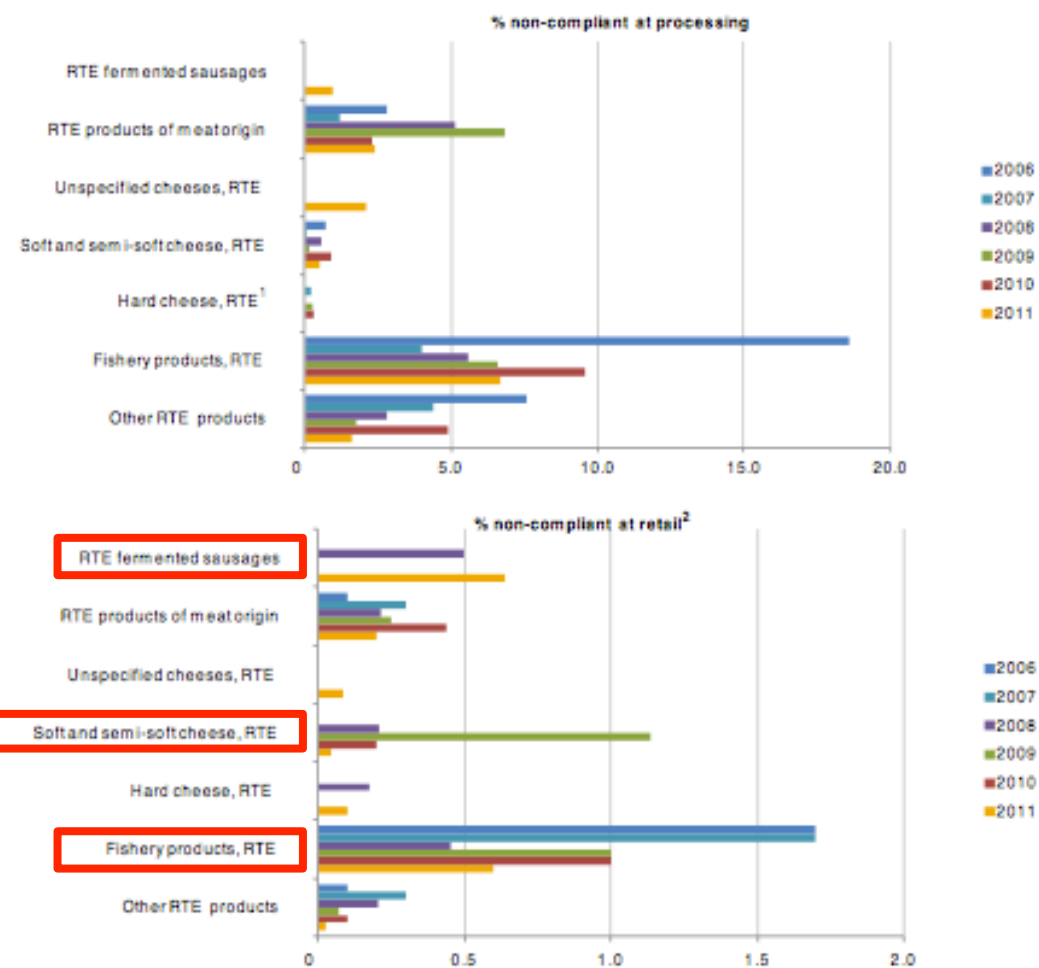
-RTE foods

-Supporting growth of *L. monocytogenes*

-Long shelflife



Figure LI3. Proportion of single samples at processing and retail non-compliant with EU *L. monocytogenes* criteria, 2006–2011



Note: RTE: ready-to-eat products.

in EU summary report on zoonoses, zoonotic agents and foodborne outbreaks 2011. EFSA Journal 2013;11(4):3129

Listeria monocytogenes & listeriosis...

Listeriosis, occurs worldwide both sporadically and epidemically...

Listeriosis was:

- the **most frequent cause of death** due to the consumption of contaminated food in Europe (2008-2011) (EFSA, 2013)
- the **third foodborne infection** concerning illness cost and quality life losses in the USA (Hoffmann, et al., 2012)
- **Mortality** is one of the highest among bacterial infections (> 30%)
- 90% with additional **long term sequelae**

Listeria monocytogenes & listeriose...



US 2011
139 cases
29 deaths
1 abortion



France 2000
23 cases
7 deaths
1 abortion



US 1998
108 cases
14 deaths



US 1985
142 cases
28 deaths
20 abortions

Listeria monocytogenes & listeriosis...

“There is a statutory obligation for Member States to report cases of human listeriosis to the European Union (EFSA) as part of the Zoonoses Directive”

12.12.2003

EN

Official Journal of the European Union

L 325/31

**DIRECTIVE 2003/99/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 17 November 2003
on the monitoring of zoonoses and zoonotic agents, amending Council Decision 90/424/EEC and
repealing Council Directive 92/117/EEC**

Listeriosis is not a reportable disease in Portugal!

19% of the population aged
65 and over

Table L12. Reported cases of human listeriosis in 2007-2011, and notification rate for confirmed cases in the EU, 2011

Country	2011				2010	2009	2008	2007
	Report Type ¹	Cases	Confirmed Cases	Confirmed cases/100,000	Confirmed cases			
Austria	C	26	26	0.31	34	46	31	20
Belgium	C	70	70	0.64	40	58	64	57
Bulgaria	A	4	4	0.05	4	5	5	11
Cyprus	C	2	2	0.25	1	0	0	0
Czech Republic	C	35	35	0.33	26	32	37	51
Denmark	C	49	49	0.88	62	97	51	58
Estonia	C	3	3	0.22	5	3	8	3
Finland	C	44	43	0.80	71	34	40	40
France	C	282	282	0.43	312	328	276	319
Germany	C	337	330	0.40	377	394	306	356
Greece	C	9	9	0.08	10	4	1	10
Hungary	C	11	11	0.11	20	16	19	9
Ireland	C	7	7	0.16	10	10	13	21
Italy	C	83	83	0.14	95	88	118	89
Latvia	C	7	7	0.31	7	4	5	5
Lithuania	C	6	6	0.18	5	5	7	4
Luxembourg	C	2	2	0.39	0	3	1	6
Malta	C	2	2	0.48	1	0	0	0
Netherlands	C	87	87	0.52	72	44	45	68
Poland	C	62	62	0.16	59	32	33	43
Portugal	2	-	-	-	-	-	-	-
Romania	C	9	9	0.04	6	6	0	0
Slovakia	C	31	31	0.57	5	10	8	9
Slovenia	C	5	5	0.24	11	6	3	4
Spain ³	C	91	91	0.79	129	121	88	82
Sweden	C	58	56	0.59	63	73	60	56
United Kingdom	C	164	164	0.26	176	235	206	260
EU Total		1,484	1,476	0.32	1,601	1,654	1,425	1,581
Iceland	C	1	1	0.31	1	0	0	4
Norway	C	21	21	0.43	22	31	34	49
Switzerland ⁴	C	47	47	0.70	67	41	43	51

Official data are scarce ...

in EU summary report on zoonoses, zoonotic agents and foodborne outbreaks 2011. EFSA Journal 2013;11(4):3129

1. A: aggregated data report; C: case-based report; -: no report.
2. No surveillance system.
3. Sistema de Información Microbiológica (SIM), notification rates calculated on estimated coverage, 25 %.
4. Switzerland provided data directly to EFSA.

Listeria monocytogenes & listeriosis in Portugal

In 2003 a collaborative study with the main hospitals in Portugal and CBQF was established aiming to "collect data on listeriosis"

BMC Infectious Diseases



Research article

Open Access

Listeriosis in Portugal: an existing but under reported infection

Gonçalo N Almeida[†], Paul A Gibbs[†], Tim A Hogg[†] and Paula C Teixeira^{*†}

Address: Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Rua Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal

Email: Gonçalo N Almeida - gnalmeida@esb.ucp.pt; Paul A Gibbs - pgibbs@esb.ucp.pt; Tim A Hogg - tahogg@esb.ucp.pt; Paula C Teixeira* - paula@esb.ucp.pt

* Corresponding author †Equal contributors

The incidence of listeriosis was at least 1.4 cases per million inhabitants for the year 2003

Eur J Clin Microbiol Infect Dis (2010) 29:1219–1227
DOI 10.1007/s10096-010-0988-x

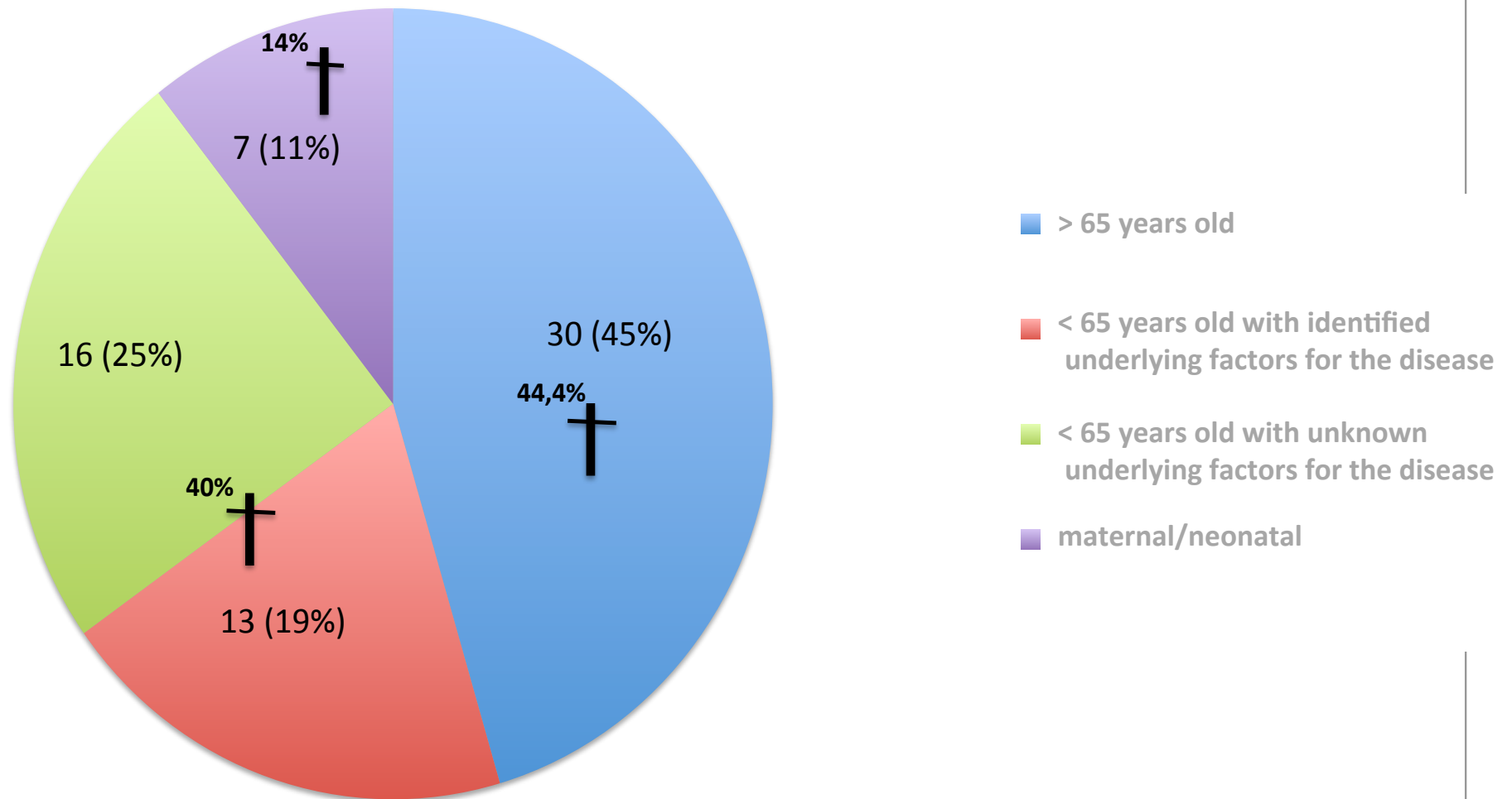
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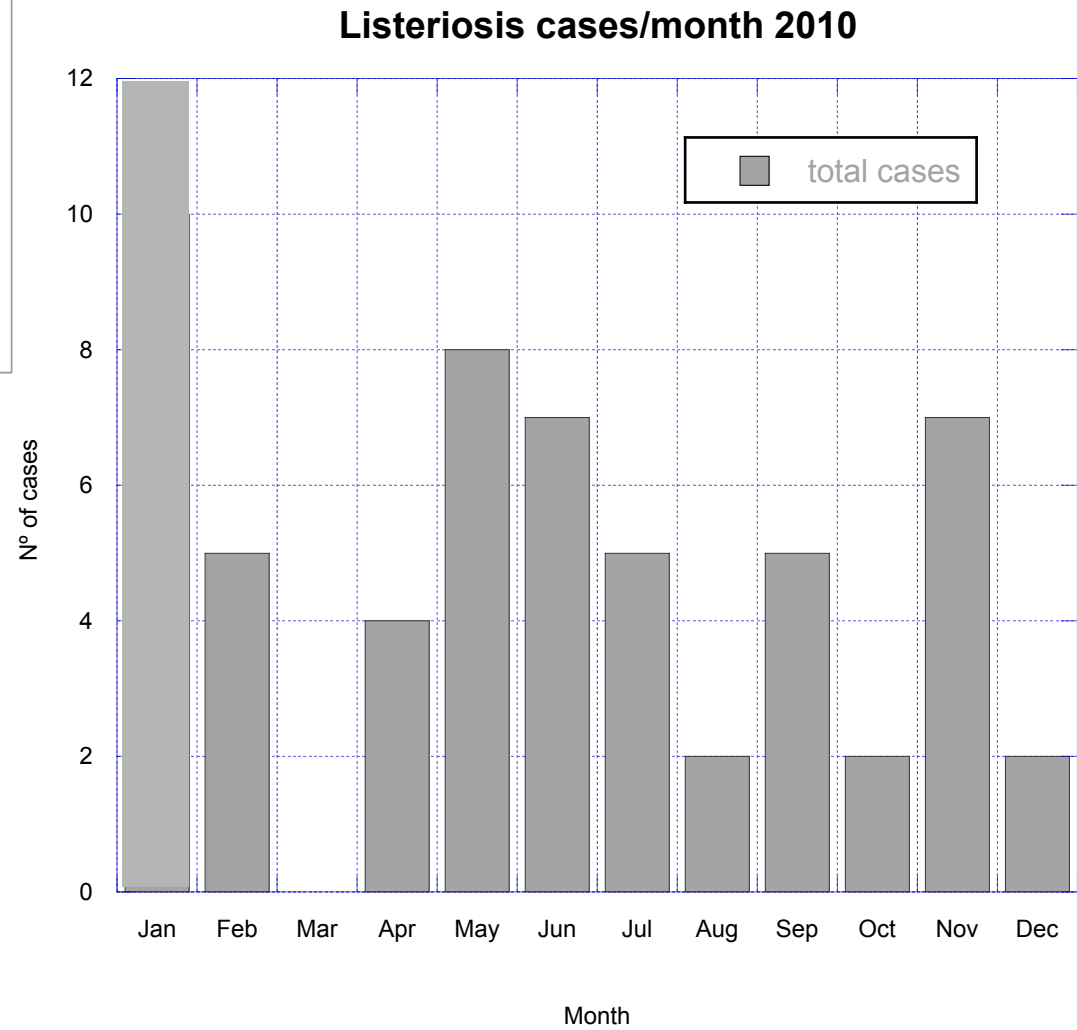
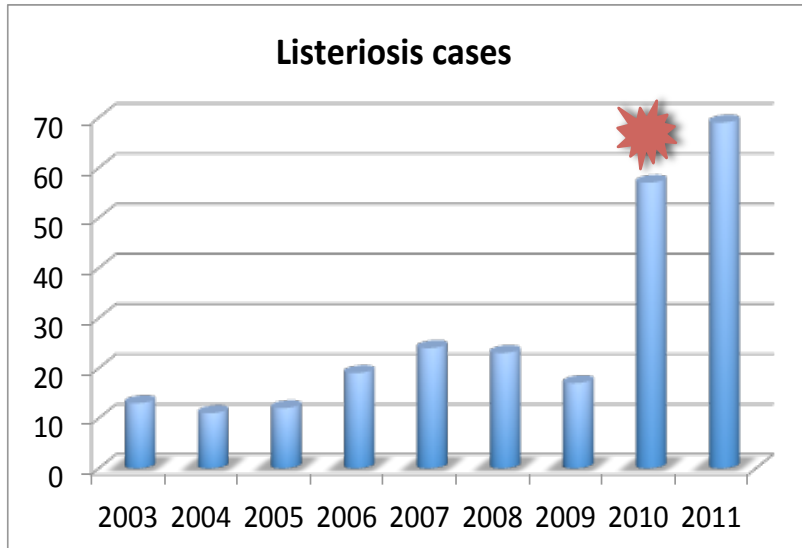
Distribution and characterization of *Listeria monocytogenes* clinical isolates in Portugal, 1994–2007

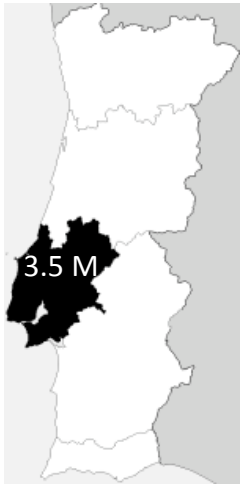
G. Almeida • A. Morvan • R. Magalhães • I. Santos •
T. Hogg • A. Leclercq • P. Teixeira • Research Team

The incidence of listeriosis was at least 2.3 cases per million inhabitants for the year 2007

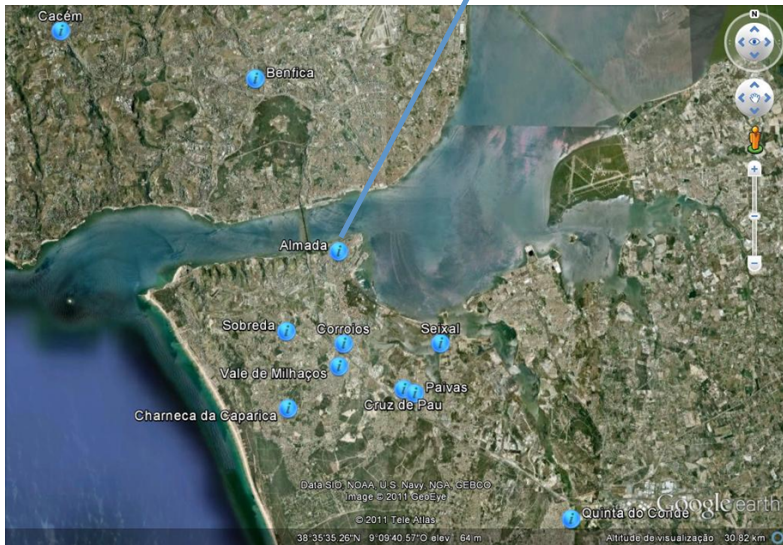
Number of cases of listeriosis (2004-2007)



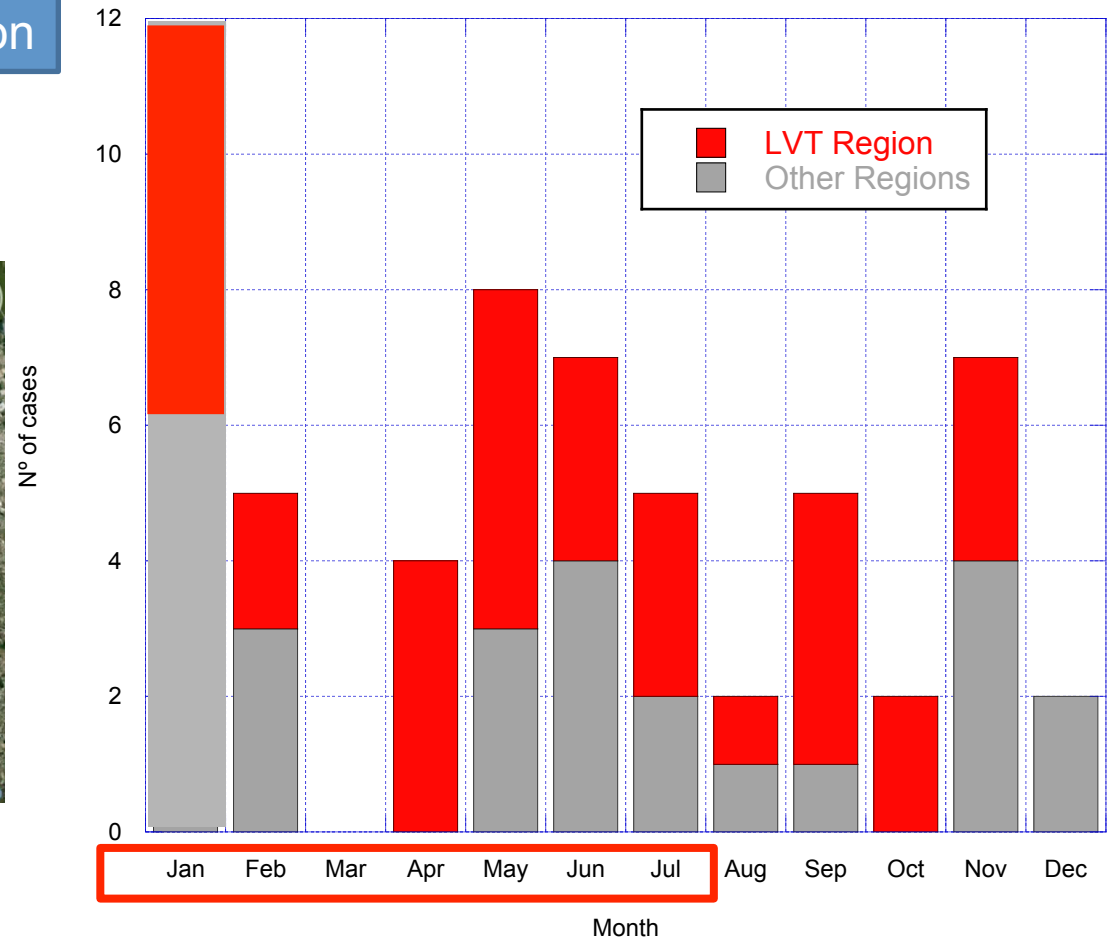




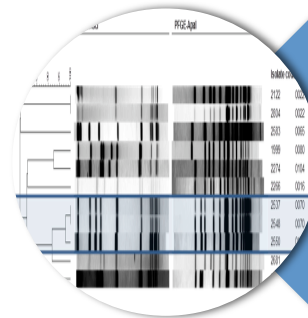
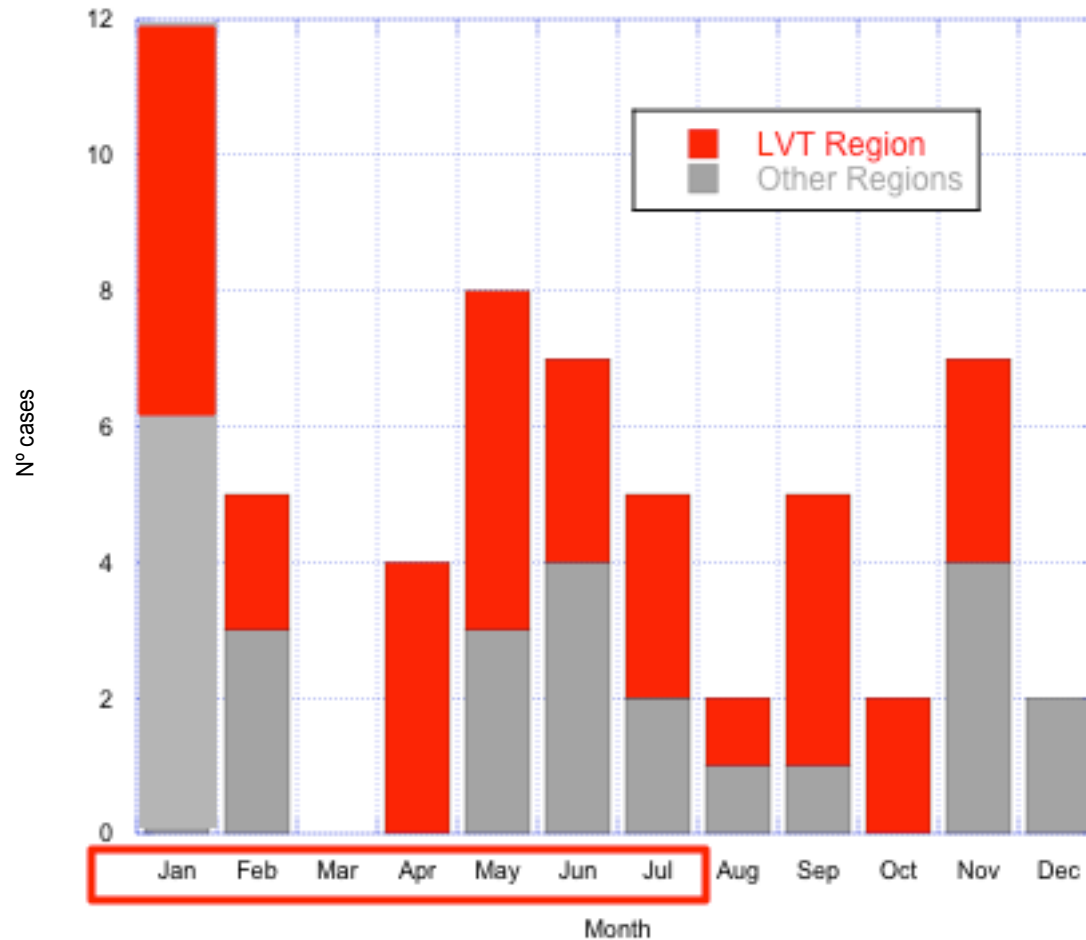
29 cases Feb-Jul
17 in LVT Region



Listeriosis cases/month 2010



Listeriosis cases/month 2010



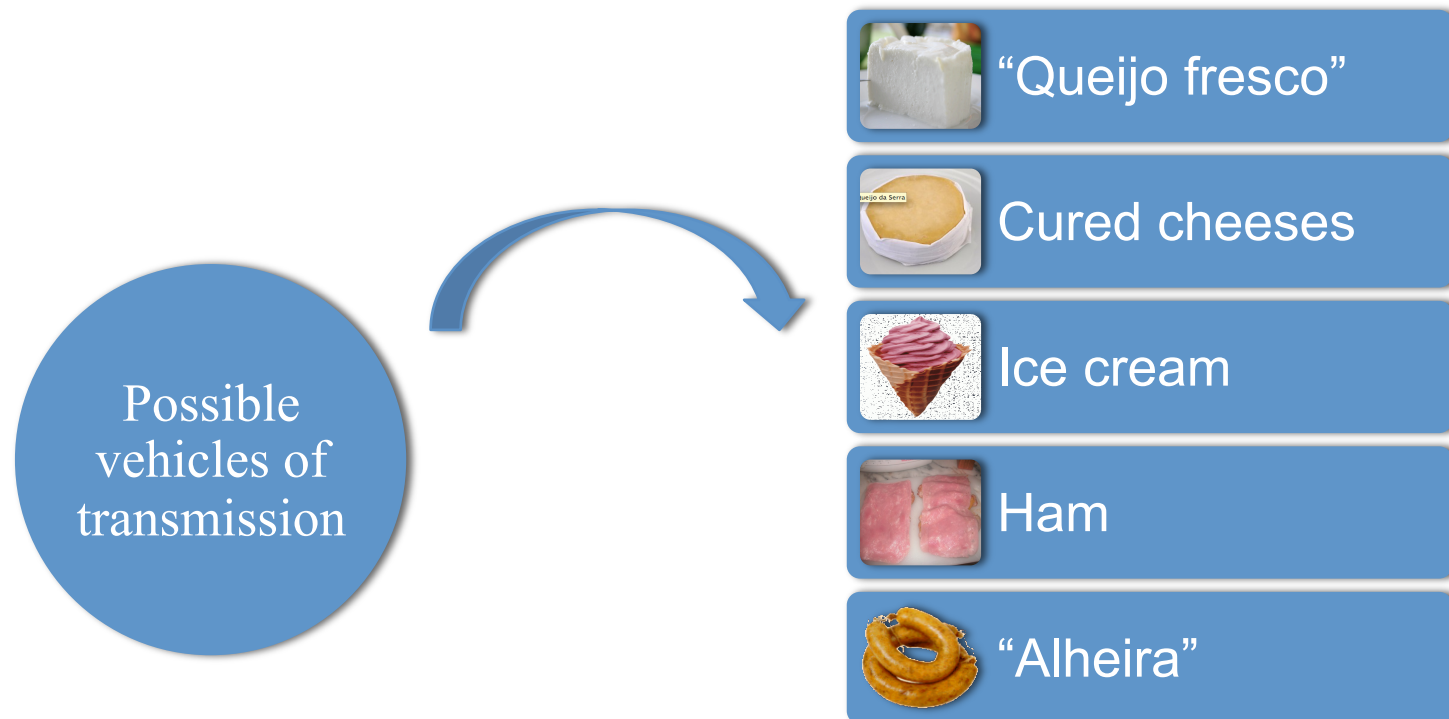
19 isolates
shared the same
pulsotype!!!

July...

Health Directorate (DGS) was informed and Hospitals were notified to communicate cases of listeriosis and to send isolates to CBQF for PFGE typing

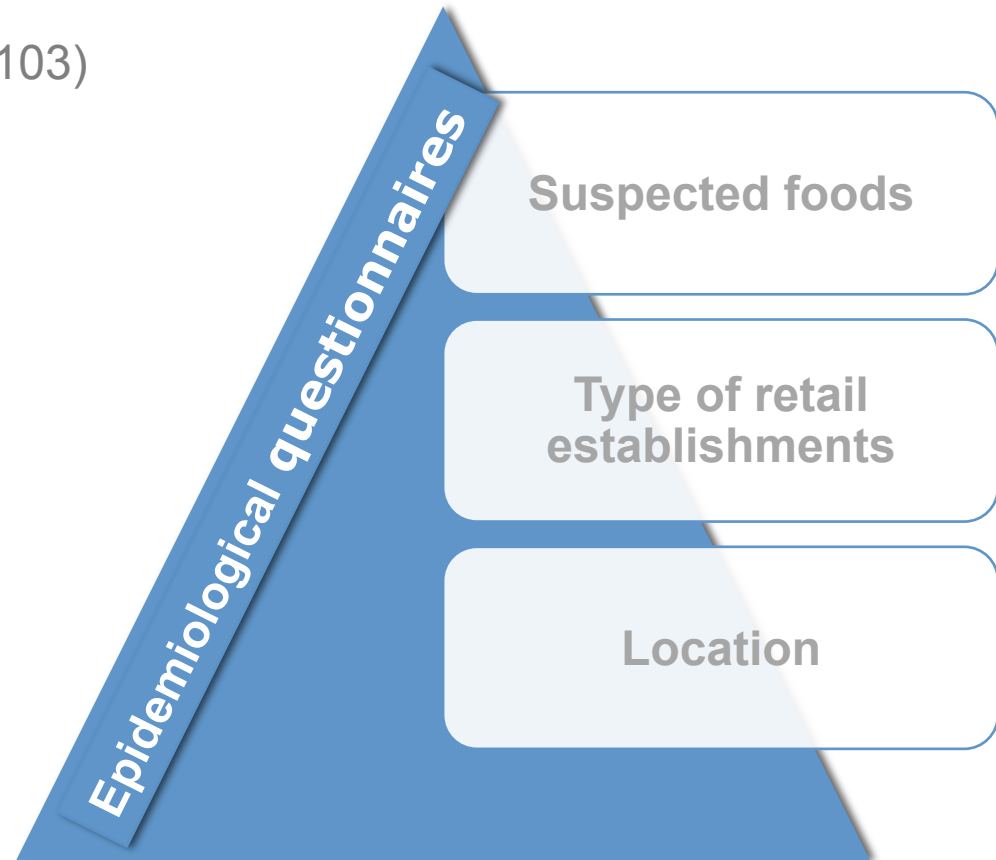
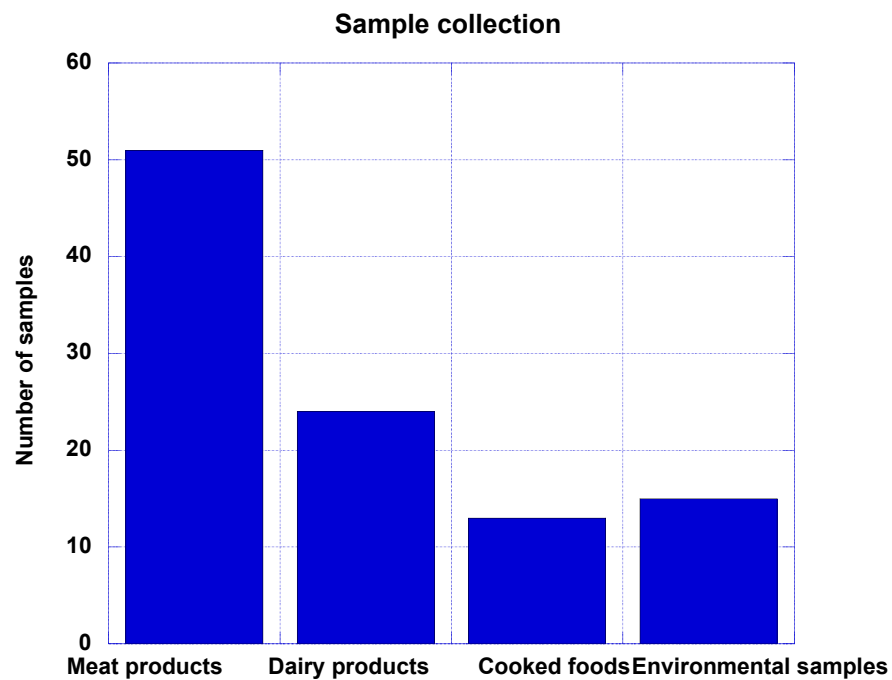
August ...

Lisbon health authorities (ARS-LVT) begun the outbreak investigation...
Epidemiological questionnaires were administered...



11-15th October...

First product sampling by ASAE (N=103)





✘ > 1000 ufc/g

★ + 25 g

⚙ + swab sample

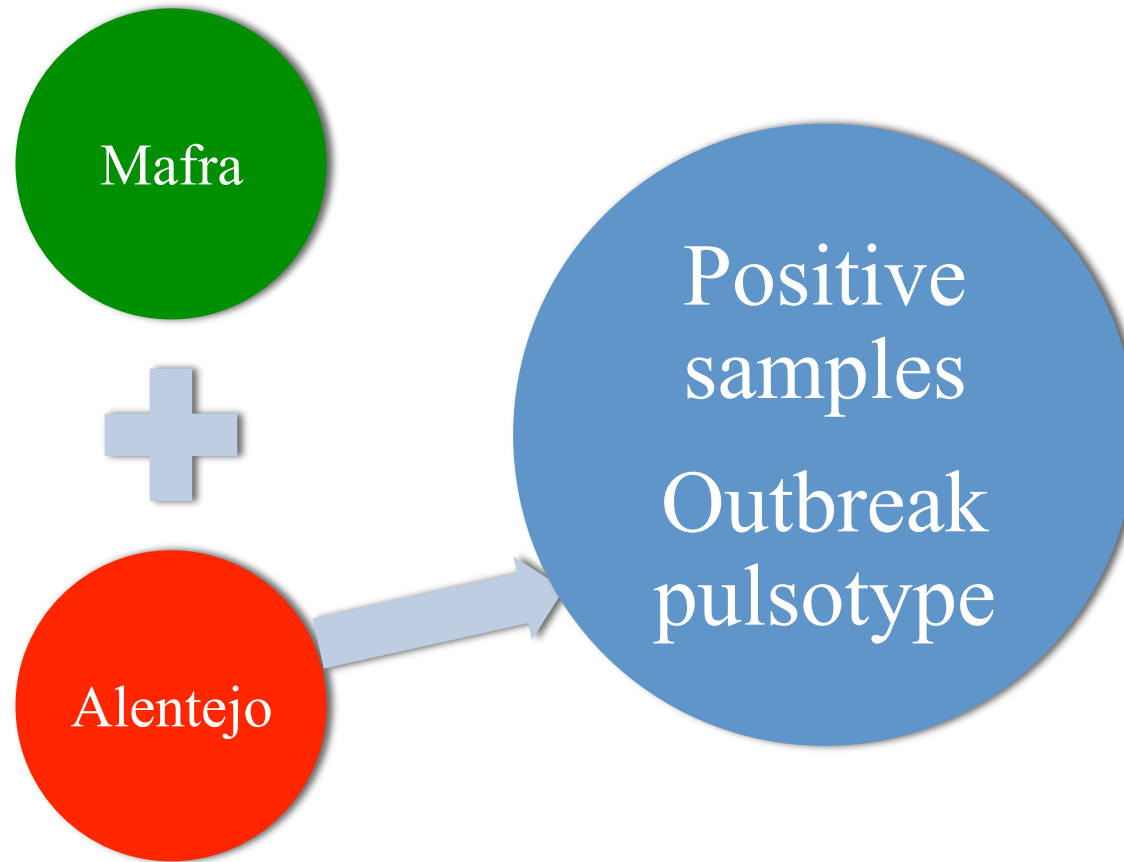


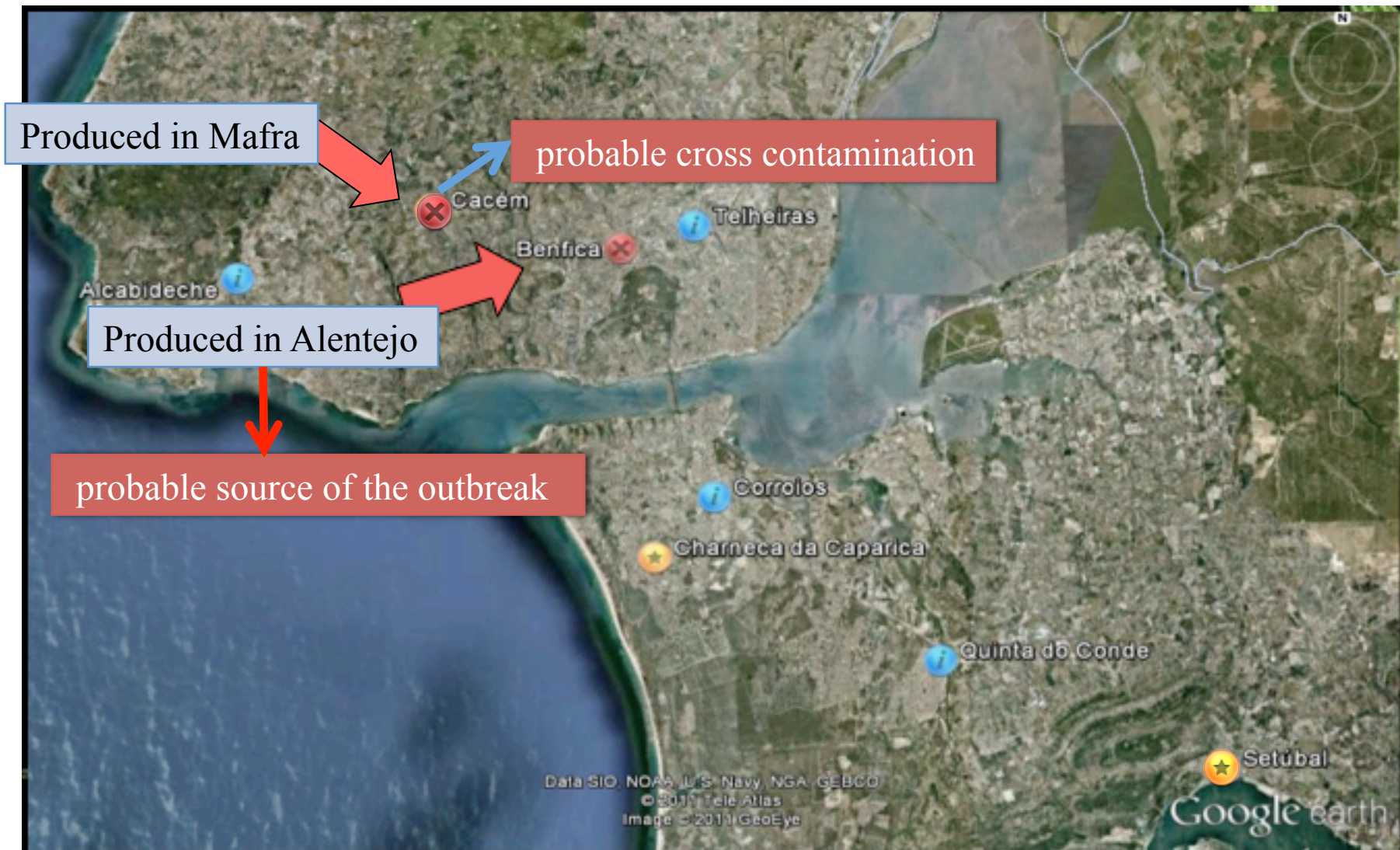
⊗ Same pulsotype as clinical isolates

★ Different pulsotypes

Second product sampling by ASAE (Nov 2010 – Mar 2011):

Product collection, in the two cheese factories, before being delivered to the market...





⊗ Same pulsotype as clinical isolates

★ Different pulsotypes

Product recall/ More samples analyzed (March 2011)

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graph TD; A[Product recall/ More samples analyzed (March 2011)] --> B[Cheeses made with cow and goat milk tested positive (outbreak pulsotype)]; B --> C[Voluntary suspension of production/Disinfection/Sampling]; C --> D[No positive samples/Product delivered to the market]; D --> E[Monthly sample collection in the factory (ASAE)];
```

Cheeses made with cow and goat milk tested positive (outbreak pulsotype)

Voluntary suspension of production/Disinfection/Sampling

No positive samples/Product delivered to the market

Monthly sample collection in the factory (ASAE)

In summary...

*83 cases of listeriosis occurred between January 2010 and March 2011

*40 in Lisboa e Vale do Tejo

*22 isolates shared the same pulsotype

•13 deaths

*Cheeses produced by a factory located in Alentejo were identified as the probable source of this outbreak

*The “outbreak pulsotype” was not isolated from foods/environment/patients after March 2011

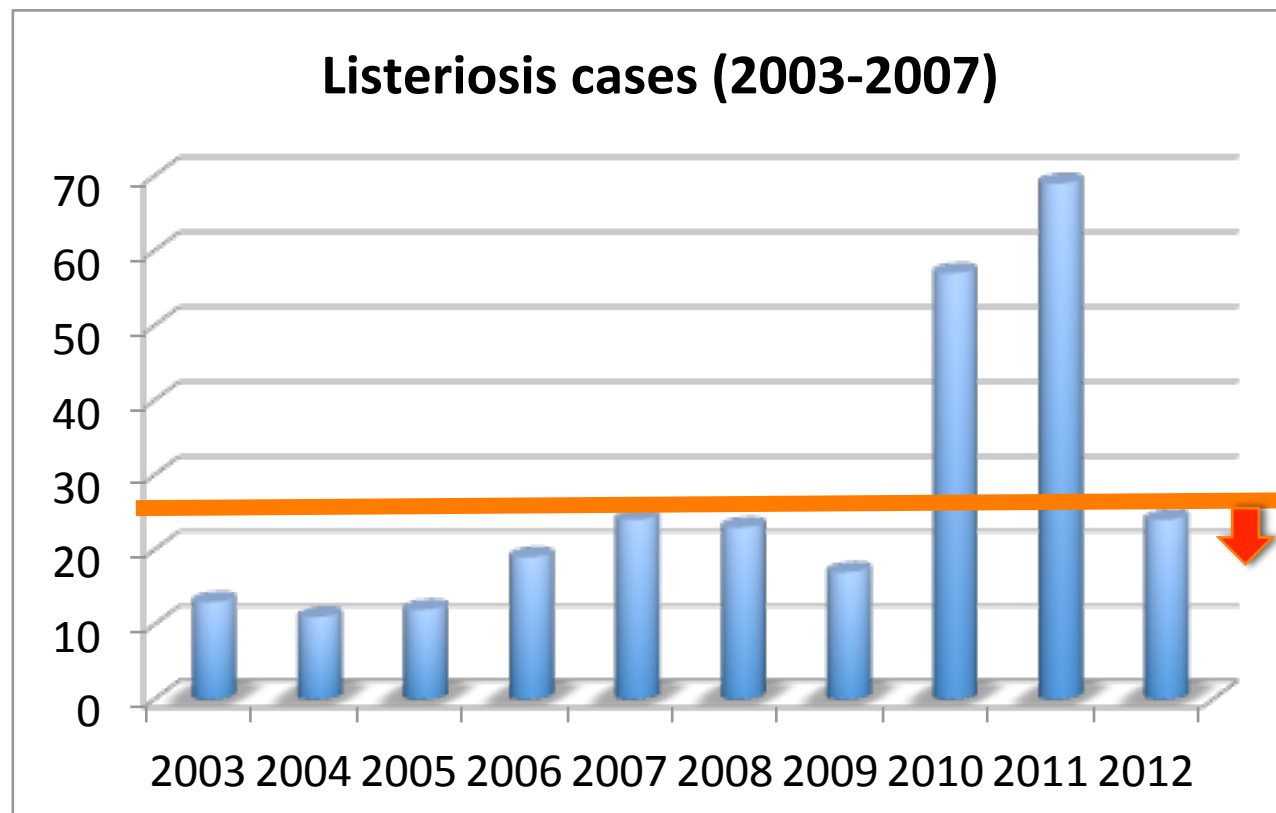
*CBQF still receives isolates for PFGE typing – a non-official Surveillance of *Listeria monocytogenes* infection in Portugal was established

Listeriosis Outbreaks Linked to Cheese

Food	Year	# Ill	# Hospitalized	# Deaths	Location
Soft and semi-soft cheese	2013* ongoing	5	5	2 (1fetal)	USA
Jindi cheese	2013	25		3 (1 fetal)	Australia
Ricotta Salata cheese	2012	22	20	4	USA (14 states)
Latin-style fresh cheese	2012	2 (1 pregnant) and 1 baby			Spain
Blue-veined cheese (unpasteurized)	2011	15	1	1	USA
Hard cheese	2011	12	12		Belgium
All-natural Ackawi and Chive cheeses	2011	2			USA, Michigan
Fresh cheese	2010/2011	40 22*		13	Portugal
Fresh cheese	2010	3 (2 pregnant)	2+2 baby		USA (Washington)
Camembert cheese	2010	17		3	Norway
Acid-curd cheese	2009	14		4	Austria/Germany
Cheese	2008	38 (16 pregnant)	36	2 (3 fetal)	Quebec

*shared the same pulsotype

Jeff Farber, Personal Communication, Isopol 2013



Is this the real situation?

Hospitals are not as aware as they were during and immediately after the outbreak?

CBQF Research Team

Gonçalo Almeida, Rui Magalhães, Isabel Santos, Vânia Ferreira, Joana Silva, Paula Teixeira

In collaboration with:

ASAE (M. M. Mendes, P. Nabais, M. G. Mariano Fernandes, M. I. Mâncio)

ARS LVT (M. M. Sousa)

DGS (Isabel Falcão)

Project team for the study of listeriosis in Portugal also includes:

Ana Florinda (**Centro Hospitalar de Coimbra**), Graça Ribeiro e Luísa Boaventura (**Hospitais da Universidade de Coimbra**), Teresa Afonso (**Hospital Central do Funchal do Serviço de Saúde da Região Autónoma da Madeira**), Helena Peres, Teresa Pina, e Maria José Silvestre (**Hospital Curry Cabral, Lisboa**), João Tiago Guimarães e Maria Dolores Pinheiro (**Hospital de São João, Porto**), Maria Alberta Faustino e Maria Carmen Iglesias (**Hospital de São Marcos, Braga**), José Diogo, Ana Rodrigues, e Isabel Nascimento (**Hospital Garcia de Orta, Almada**), Fernanda Bessa e Elmano Ramalheira (**Hospital Infante D. Pedro-Aveiro, E.P.E.**), João Lago (**Hospital Militar de Belém, Lisboa**), Maria Antónia Read (**Hospital Pedro Hispano, Matosinhos**), Lurdes Monteiro, Luís Marques Lito, e J. Melo Cristino (**Hospital Santa Maria, Lisboa**), Maria Helena Ramos (**Hospital Santo António, Porto**), Maria Augusta Guimarães (**Instituto Português de Oncologia, Porto**)

Thank you for your attention!

Paula Teixeira
pcteixeira@porto.ucp.pt