Enhanced Surveillance for Listeriosis in Europe

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Listeriosis and Europe
Before 1985

- Several large outbreaks: Germany, France
  - No identification of the source
- No surveillance data: incidence?
  - France 1983: first national laboratory-based study
  - Estimated incidence: 11 cases/million population
  - 56% pregnancy-associated cases
- No food control for *Listeria*
Listeriosis and Europe
1985-2000

- **1985** - Los Angeles outbreak
  - "Zero-tolerance" for LM in USA
  - LM control of cheeses destined for USA
- **1987** - Outbreak in Switzerland due to vacherin Montd’or
  - LM prevention efforts in all cheese production plants
Listeriosis and Europe
1985-2000

- **1990-1992** - major outbreaks in England (>300 cases, pâté) and France (279 cases, pork tongue in jelly)
- Implementation of LM control on meat products and other product at risk for LM
Feasibility Study for a Collaborative Surveillance of Listeria Infections in Europe: 2002

Institut de Veille Sanitaire
Institut Pasteur, Paris
DG Sanco
Feasibility Study 2002
Objectives

1. Make inventory of
   • existing surveillance systems of Listeriosis in Europe
   • reference laboratories, practices and methods

2. Define scope and feasibility of a European surveillance network

3. Make recommendations on operating procedures
Feasibility Study 2002
Listeriosis Reporting Sources

Laboratories

Switzerland
Greece
Germany
Scotland

Physicians

Austria
Belgium
Denmark
England & Wales
Finland
France
Iceland
Netherlands
Norway
Spain
Sweden

Italy
Feasibility Study 2002
Operating National Surveillance Systems

12 countries
# Feasibility Study 2002

## Type of Data Collected

<table>
<thead>
<tr>
<th>Data Category</th>
<th>No of countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics (age, sex, residence)</td>
<td>14</td>
</tr>
<tr>
<td>Date of Lm isolation</td>
<td>14</td>
</tr>
<tr>
<td>Type of investigated material</td>
<td>14</td>
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<tr>
<td>Clinical presentation</td>
<td>9</td>
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<tr>
<td>Pregnancy associated</td>
<td>6</td>
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<tr>
<td>Underlying medical condition</td>
<td>4</td>
</tr>
<tr>
<td>Outcome</td>
<td>5</td>
</tr>
<tr>
<td>Travel history</td>
<td>6</td>
</tr>
<tr>
<td>Suspected source of infection</td>
<td>5</td>
</tr>
<tr>
<td>Food history systematically</td>
<td>1</td>
</tr>
<tr>
<td>Food history occasionally</td>
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</tr>
<tr>
<td>Link to other cases</td>
<td>5</td>
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</tbody>
</table>
# Feasibility Study 2002

Typing Methods in National Reference Laboratories

(16 countries)

<table>
<thead>
<tr>
<th>Method</th>
<th>Countries</th>
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</thead>
<tbody>
<tr>
<td>Serotyping</td>
<td>15</td>
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<tr>
<td>PFGE</td>
<td>9</td>
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<tr>
<td>Biotyping</td>
<td>4</td>
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<tr>
<td>Ribotyping</td>
<td>3</td>
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<tr>
<td>Phagetyping</td>
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</tbody>
</table>

No countries
Feasibility Study 2002
Observed and Estimated Incidence of Listeriosis

- Range: 0.3 - 7.5 cases per million
- Reflects:
  - incidence
  - sensitivity of surveillance system
- 5 countries > 4 cases per million
- 3 countries > 6 cases per million
Feasibility Study 2002
Outbreaks and Outbreak Related Cases of Listeriosis, 1991-2002

Outbreaks

Cases

Year
Feasibility Study 2002

Conclusion

- European surveillance feasible
- Much interest from countries
- Project submitted to EC, May 2003
- Part of budget allocated, August 2004
- Further resources needed to enable project implementation
Surveillance of Listeriosis in Western Europe Since 2002

- No Europe-wide collaborative surveillance
- National summary data published;
  - Peer-review journals
  - National bulletins
- Important trends
Belgium
Surveillance System

- Laboratory-based with weekly notification to the Scientific Institute of Public Health (~ 80% cases)
- Centralisation of strains to the Belgian Listeria Reference Centre (~ 2/3 strains)
- Pregnancy–associated cases: 11%
Belgium Typing

- Serotyping
- Biotyping
  - arsenic and cadmium susceptibility (4 groups)
- RAPD, PFGE
  - if suspicion of cluster based on temporal and geographical clustering or on grouping (same serotype and biotype)
Switzerland
Surveillance System

- Cases notified to ministry of health
- Strains sent to NRL
- Incidence:
  - 2006: 68 cases (10 cases /million pop)
- Pregnancy-associated cases: 20%
Switzerland

Cases of listeriosis in Switzerland

Years: 1990 to 2006
Cases: 10/10^6
Switzerland
Typing

- Centralisation of strains at the NRL
- Serotyping
- PFGE performed if a cluster of isolates is observed based on:
  - Geographical consideration
  - Temporal clustering
  - Cluster of isolates with same serotype
Germany
Surveillance System

- Mandatory notifiable since 2001
- Cases reported by physicians and laboratory to Local Health Department
- National Database at Robert Koch Institute
- Pregnancy associated cases: 15%
Annual number of reported listeriosis cases by patient category and age group, Germany, 2001-2005

- **Listeriosis (all)**
- **Non-pregnant (all)**
- **Non-pregnant (aged ≥ 60)**
- **Non-pregnant (aged < 60)**
- **Pregnant and neonates**
- **Neonates**
- **Pregnant**

**2001** 2.6/10⁶

**2005** 6.6/10⁶
Germany
Typing

- Typing: no centralisation of strains to a NRC
- Serotyping of strains available for 5% of strains
Enhanced surveillance by collecting information:
- Food habits
- Underlying diseases

Necessity of a nationwide system of molecular subtyping of Listeria strains

Recommendations for prevention to risk groups with predisposing conditions
England and Wales Surveillance System

- Notification by laboratories through electronic system to HPA
- Referral of cultures to HPA
- Epidemiological and microbiological data combined
- Additional demographic data sought with standard questionnaire
Sporadic Cases of Listeriosis
England and Wales, 1990–2004

1990-2000
2.1/10^6

2001-2004
3.5/10^6
England and Wales

- Decrease of pregnancy associated-cases:
  - 20% in 1990
  - 10% in 2004

- Increase by 50% of cases ≥ 60 years
  RR = 1.49 (CI: 1.39-1.60)
England and Wales
Nonpregnancy-associated Listeriosis
England and Wales

Analysis of the increase in persons ≥ 60 years:

- Same increase in men and women
- Occurs in most regions
- Same seasonality
- Same distribution of serovar
- Same distribution of underlying illness
England and Wales

Demographic data: no difference with

- Patient socioeconomic status (postal code as index of deprivation)
- Ethnicity (proportion of cases with non-ethnic name)
- % patient living in a residential care home
England and Wales Typing

- Phage-typing until 2003
- AFLP since 2002
- PFGE on selected isolates since 2003

1990-2004:
- Identification of 10 clusters (<5% total cases)
### England and Wales Clusters Identified, 1990-2004

**Table 1. Clusters of human listeriosis, England and Wales, 1993–2004**

<table>
<thead>
<tr>
<th>Year</th>
<th>Area</th>
<th>No. cases</th>
<th>Pregnancy associated</th>
<th>Listeria monocytogenes type</th>
<th>Vehicles of infection</th>
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<tbody>
<tr>
<td></td>
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<td>Serovar</td>
<td>AFLP</td>
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<td></td>
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<td></td>
<td>ND</td>
<td>ND</td>
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<tr>
<td>1999a</td>
<td>NE England</td>
<td>4</td>
<td>0</td>
<td>4b</td>
<td>ND</td>
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<tr>
<td>2003</td>
<td>NE England</td>
<td>17</td>
<td>11</td>
<td>4b</td>
<td>V</td>
</tr>
<tr>
<td>2003</td>
<td>NE England</td>
<td>18</td>
<td>0</td>
<td>4b</td>
<td>I</td>
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<tr>
<td>2003</td>
<td>S Wales</td>
<td>2</td>
<td>0</td>
<td>1/2a</td>
<td>XI</td>
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<tr>
<td>2003b</td>
<td>SW England</td>
<td>5</td>
<td>5</td>
<td>1/2a</td>
<td>III</td>
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<tr>
<td>2004</td>
<td>E Midlands</td>
<td>6</td>
<td>0</td>
<td>4b</td>
<td>I</td>
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<tr>
<td>2004</td>
<td>SE England</td>
<td>2</td>
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<td>4b</td>
<td>IV</td>
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<td></td>
<td>4b</td>
<td>V</td>
</tr>
</tbody>
</table>
Finland
Surveillance System

- Notification by physicians since 1995 to National Public Health Institute (KTL)’s Department of Infectious Disease Epidemiology
- Strains send to (KTL)’s Enteric Bacteria Laboratory for serotyping and PFGE
Annual number of listeriosis cases and annual incidence per 1 000 000 population, Finland, 1995-2004
Netherlands Surveillance System

- Until 2003: 15 regional laboratories covering 44% of the Dutch population with additional data from isolates of patients with meningitis or bacteriemia sent to the NRLBM

- Since 2005: all laboratories report cases to public health services and strains are sent to RIVM for serotyping and PFGE
Netherlands

Cases of listeriosis in Netherlands

- 1995: 17 cases/10^6
- 1996: 12 cases/10^6
- 1997: 20 cases/10^6
- 1998: 24 cases/10^6
- 1999: 26 cases/10^6
- 2000: 17 cases/10^6
- 2001: 22 cases/10^6
- 2002: 25 cases/10^6
- 2003: 26 cases/10^6
- 2004: 30 cases/10^6
- 2005: 56 cases/10^6
- 2006: 40 cases/10^6
Figure 1. Laboratory diagnosed listeriosis 1998-2005

(Source: EPI-NEWS 42-23/2006)

Source: Statens Serum Institut Copenhagen Denmark
France
Surveillance System

- Mandatory notifiable since 1999
- Cases reported by laboratory to local Health Department
- National Database at the InVS
Surveillance of Human Listeriosis in France

Mandatory notification

Physicians → District Public Health Officers

Food history

Patients

Samples

Microbiologists → Lm isolates

NRC
National Reference Center of Listeria

Ongoing routine typing
Surveillance of Human Listeriosis in France

Physicians → District Public Health Officers → InVS Institut de Veille Sanitaire

Mandatory notification

Patients → District Public Health Officers

Food history

Patients → Samples

Samples → Microbiologists

Microbiologists → Lm isolates → NRC National Reference Center of Listeria

Ongoing routine typing
France
Trend in Cases Not Associated with Pregnancy
France
Trend in Cases Not Associated with Pregnancy < 60 years

Underlying disease
No underlying disease
France
Trend in Cases Not Associated with Pregnancy ≥ 60 years

Underlying disease
No underlying disease
France
Clusters in 2005-2006

- 23 clusters (cases with same PFGE profiles) were investigated during these 2 years
- No common source could be found
Recent increase of listeriosis in several countries (England, Germany, Netherland, Belgium, Denmark, France)

Incidence around 6 cases /million population for countries with national surveillance (range 3.5-10 cases/million population)
Summary (2)

- % pregnancy-associated cases is stable or in decrease
- Increase due to bacteriemic infections
- Increase affects mostly persons aged >60 years with underlying disease
Summary (3)

- Countries performing subtyping noticed that the increase is caused by various subtypes.

- Frequently, investigation of clusters identified by PFGE fails to identify common source.
Factors That Could Contribute to This Increase

- Increased population with immunosuppressive diseases
- Aging population
- Increase of blood cultures taken
- More efficient blood cultures systems
- Change in the process of food (less salt in meat-products.....)
- Increase of food contaminated at very low doses
- Change in consumer habits: more ready-to-eat food....
Acknowledgements

Belgium: Annual report of the Scientific Institute of Public Health


Acknowledgements

