Listeriosis in England and Wales
Summary for 2017

Data from the national enhanced surveillance system for *Listeria monocytogenes*
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Key points for 2017

This report summarises the number and characteristics of confirmed cases of listeriosis in England and Wales in 2017:

- in 2017, 135 cases of listeriosis were reported in England and Wales, representing a 17.7% decrease compared to the previous 6 year period
- as per previous years, the largest proportion of reported listeriosis was in those over the age of 60, particularly elderly men (aged 70 and over)
- pregnancy associated infections accounted for almost a fifth of reported cases and, where known, almost a quarter of pregnancy-associated cases resulted in miscarriage or still birth
- among non-pregnancy associated cases of listeriosis, death was reported for 30.3% of cases
- incidence of listeriosis varied geographically, with the lowest incidence in East of England (0.08 per 100,000 population) and the highest in Yorkshire and The Humber (0.35 per 100,000 population)
- four listeriosis outbreaks were investigated in 2017 along with 2 incidents with single cases, one linked to raw milk/cheese, the other sandwiches
Background

Listeriosis is a foodborne disease caused by the bacterium *Listeria monocytogenes*. These bacteria are widely distributed in the environment and infection usually occurs after consumption of contaminated raw, chilled, or ready-to-eat foods, and can cause sporadic infection and outbreaks of disease. People with listeriosis have been reported to develop symptoms between 1 to 70 days after consuming food contaminated with *Listeria*.

Compared to other foodborne pathogens, infections in humans are rare. However, listeriosis can cause severe disease in vulnerable groups, including the elderly, pregnant women, unborn and newborn babies, and people with impaired immunity. In these groups, listeriosis can present as infection of the bloodstream or brain. Due to the severity of infection and high case fatality rate, listeriosis is an important public health concern.

National surveillance of listeriosis in England and Wales has been undertaken since 1992. This report summarises the number and characteristics of confirmed cases of listeriosis in England and Wales in 2017, and compares it to previous years.
Methods

National surveillance of listeriosis in England and Wales is coordinated by the Gastrointestinal Infections team at Public Health England and involves the collation of routinely collected epidemiological, clinical and microbiological data for cases of listeriosis.

New cases are reported to the surveillance system by local clinical laboratories, health protection teams and/or by referral of *L. monocytogenes* isolates to the Gastrointestinal Bacterial Reference Unit for whole genome sequencing (WGS).

Demographic and food history data are collected via a standardised questionnaire (trawling questionnaire) administered to the case or a proxy via Health Protection Teams or the Local Authority. Clinical data are collected from clinical microbiologists at the relevant frontline hospital laboratories via a second separate questionnaire (clinical questionnaire).

The WGS data, combined with clinical and epidemiological data from standardised food and clinical questionnaires, are used to detect clusters of related cases and inform outbreak investigations.

Case definitions

For reporting, a confirmed case of listeriosis is defined as:

- a person with a clinically compatible illness#
  - AND
- isolation of *Listeria monocytogenes* from a normally sterile site
  - OR
- isolation of *Listeria monocytogenes* from a normally unsterile site from a foetus, stillborn, newborn, placenta, foetal tissue or from the mother following birth
Clinical criteria

In adults, invasive disease caused by *Listeria monocytogenes* (listeriosis) manifests most commonly as meningoencephalitis and/or septicaemia.

Invasive listeriosis principally affects high risk groups including:

- people aged over 60 years
- people with malignancies (especially of the blood)
- kidney disease
- liver disease
- diabetes
- alcoholism
- patients on immunocompromising treatment
- pregnant women and their unborn or newborn infants

Symptoms are related to sepsis, and include fever, confusion, collapse, and/or diarrhoea. Infection during pregnancy may result in foetal loss through miscarriage or stillbirth, neonatal meningitis or bacteraemia. Neonatal infection can range from mild illness to neonatal death, usually within 10 days of delivery.

Cases are further sub-classified as pregnancy associated or non-pregnancy associated.

### Table 1: Sub-classification of confirmed listeriosis cases

<table>
<thead>
<tr>
<th>Pregnancy associated</th>
<th>Non-pregnancy associated</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Listeria</em> illness in a pregnant patient and neonatal patients aged 28 days or less. A mother-baby pair is considered a single case.</td>
<td><em>Listeria</em> illness in a patient aged over 28 days.</td>
</tr>
</tbody>
</table>

Counts and rates

Data presented relate to confirmed cases reported to the Public Health England national enhanced surveillance system for *Listeria* during the period 2008 - 2017.

All population data were sourced from the Office for National Statistics (ONS). Mid-year population estimates for England and Wales were used to provide denominators for the calculation of incidence rates. All rates are calculated as per 100,000 population.
Listeriosis in England and Wales: Summary for 2017

National surveillance data for listeriosis

Annual cases of listeriosis

In 2017, 135 cases of listeriosis were reported in England and Wales (Figure 1). This represented a 17.7% decline in reported cases compared to the average number of cases (n=164) reported in the preceding 6 years (2010 - 2016). The crude incidence was at its lowest in a decade, with 0.23 cases per 100,000 population (95% CI: 0.19 – 0.27).

Figure 1: Annual cases and crude incidence rate of listeriosis reported in England and Wales, 2008 – 2017
Age and gender distribution of cases

Incidence of listeriosis varied by age group and gender, with age-specific incidence rates highest in people aged 70 years and over (Figure 2). Overall, the incidence of listeriosis was higher in men than women (Table 2, IRR: 1.07, 95% CI: 0.75 – 1.52), and the difference was most pronounced in those aged 70 – 79 (Figure 2, IRR: 3.36, 95% CI: 1.46 – 8.64). All 13 cases in the 10 – 19 and 20 – 29 age groups were female and were associated with pregnancy (range: 17 – 29).

Table 2: Gender-specific incidence rates of listeriosis reported in England and Wales, 2017

<table>
<thead>
<tr>
<th>Gender</th>
<th>Reported cases</th>
<th>Incidence rate (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>69</td>
<td>0.24 (0.18 – 0.30)</td>
</tr>
<tr>
<td>Female</td>
<td>66</td>
<td>0.22 (0.17 – 0.28)</td>
</tr>
</tbody>
</table>

Figure 2: Age-specific incidence of listeriosis in England and Wales, stratified by gender, 2017
Pregnancy associated cases

In 2017, almost a fifth of cases were pregnancy associated (n=26, 19.2%), which was comparable to previous years (10.1% - 18.4%, 2007 - 2016).

Amongst pregnancy associated cases, where known, 73.9% of women had live births and 26.1% resulted in still birth or miscarriage (Figure 3).

Figure 3: Pregnancy associated cases of listeriosis in England and Wales in 2017

Mortality rate

In 2017, there were 33 reported deaths among 109 non-pregnancy cases (30.3%), although principle cause of death was not recorded. This represented a 2.1% decline in reported deaths compared to the average number of deaths (n=46) reported in the preceding 6 years (2010 - 2016).
Regional distribution of cases

The incidence rate of listeriosis varied geographically (Table 3; Figure 4). In England, Yorkshire and The Humber had the highest incidence rate of 0.35 cases per 100,000 population whilst the East of England had the lowest incidence rate of 0.08 cases per 100,000 population. In Wales, the incidence rate was 0.13 cases per 100,000 population.

Table 3: Regional incidence of listeriosis reported in England and Wales, 2017

<table>
<thead>
<tr>
<th>Country</th>
<th>Region</th>
<th>Number of cases</th>
<th>Incidence rate (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>East Midlands</td>
<td>11</td>
<td>0.23 (0.12 - 0.42)</td>
</tr>
<tr>
<td></td>
<td>East of England</td>
<td>5</td>
<td>0.08 (0.03 - 0.19)</td>
</tr>
<tr>
<td></td>
<td>London</td>
<td>28</td>
<td>0.32 (0.22 - 0.46)</td>
</tr>
<tr>
<td></td>
<td>North East</td>
<td>5</td>
<td>0.19 (0.07 - 0.45)</td>
</tr>
<tr>
<td></td>
<td>North West</td>
<td>18</td>
<td>0.25 (0.15 - 0.40)</td>
</tr>
<tr>
<td></td>
<td>South East</td>
<td>20</td>
<td>0.22 (0.14 - 0.35)</td>
</tr>
<tr>
<td></td>
<td>South West</td>
<td>11</td>
<td>0.20 (0.10 - 0.36)</td>
</tr>
<tr>
<td></td>
<td>West Midlands</td>
<td>14</td>
<td>0.24 (0.14 - 0.41)</td>
</tr>
<tr>
<td></td>
<td>Yorkshire and The Humber</td>
<td>19</td>
<td>0.35 (0.21 - 0.55)</td>
</tr>
<tr>
<td>Wales</td>
<td>Wales</td>
<td>4</td>
<td>0.13 (0.04 - 0.33)</td>
</tr>
</tbody>
</table>
Figure 4: Incidence rates of reported listeriosis cases in England and Wales in 2017, by region

Legend
Incidence of listeriosis per 100 000 population
- 0.05 - 0.10
- 0.11 - 0.15
- 0.16 - 0.20
- 0.21 - 0.25
- 0.26 - 0.30
- 0.31 - 0.35
### Seasonality

July was the peak month for listeriosis reporting in 2017, although cases were infected with different subtypes of *Listeria monocytogenes* and no outbreaks influenced the peak in cases. In comparison, in the previous 2 years, case numbers peaked in October.

**Figure 5: Seasonal trend of reported listeriosis cases in England and Wales, 2015 – 2017**
Incidents of listeriosis

There were 4 outbreaks (comprising 2 or more linked cases) of listeriosis investigated in England in 2017. One outbreak was associated with a cooked chicken producer and another with a sandwich producer where the same strain (≤5 SNPs) of *L. monocytogenes* was recovered from clinical specimens and food samples. The remaining 2 outbreaks comprised cases spanning 2013 to 2017 inclusively and the source of infection was unknown (Table 4).

Additionally, 2 incidents were investigated involving sporadic cases microbiologically linked to food samples by the recovery of the same strain (≤5 SNPs) of *L. monocytogenes* recovered from clinical specimens and food samples; one involving pre-prepared sandwiches and the other involving a raw cheese product.

Table 4: Incidents of listeriosis investigated in England and Wales, 2017

<table>
<thead>
<tr>
<th>Incident</th>
<th>Clinical cases</th>
<th>Time-frame*</th>
<th>Region</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>2013-2017</td>
<td>National</td>
<td>Cooked, pre-packed chicken</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2017</td>
<td>West Midlands</td>
<td>Pre-packed sandwiches</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>2012-2017</td>
<td>National</td>
<td>Unknown source</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2017</td>
<td>National</td>
<td>Unknown source</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>2017</td>
<td>Yorkshire and The Humber</td>
<td>Sandwiches supplied to hospitals</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>2017</td>
<td>South West</td>
<td>Raw milk cheese</td>
</tr>
</tbody>
</table>

*Time-frame indicates the years from which clinical cases associated with each cluster were reported.
Conclusions

Listeriosis remains a rarely reported disease (~3 cases per million of the population), with a decline in the number of reported cases in 2017 compared to previous years. However, amongst cases, the outcome in pregnancy remains severe with almost a quarter resulting in miscarriage or still birth, and a fatality rate of 30.3% amongst non-pregnancy related cases.

As a predominantly foodborne infection, this severe disease is largely preventable. It remains imperative that sporadic cases of illness and clusters of disease continue to be monitored and investigated to inform the continued risk assessment of the food chain.
Acknowledgements

We are grateful to the microbiologists, health protection and environmental health specialists who have contributed data and reports to the national surveillance system.

We also thank our colleagues in the:

- Gastrointestinal Bacterial Reference Unit (GBRU) for providing the Reference Laboratory Services and laboratory surveillance functions and expertise
- PHE Local Public Health Laboratories and Food Water and Environmental Microbiology Services for providing a surveillance function for GI pathogens and testing of food and environmental samples routinely and during outbreak investigation
- PHE Health Protection and Field Services for their contributions to incident investigations

References

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