

ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD
UPDATE ON LISTERIOSIS IN ENGLAND AND WALES, DECEMBER 2007

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Key issues and summary

1. The Committee was apprised of the increase in human listeriosis in England and Wales in September 2005 and received updates in June 2006, December 2006 and June 2007. Incidence has doubled since 2001 and this increase has occurred primarily in older patients who present with bacteraemia (invasion of the blood stream) in the absence of central nervous system (CNS) infection. This increase has continued into 2007.
2. A standard structured surveillance questionnaire for listeriosis was introduced in June 2005 and sufficient data have now accrued to allow initial analyses. Examination of the relationship between patients' exposure and infecting *Listeria monocytogenes* subtype has generated hypotheses for food sources of infection. Examination of food typing data demonstrates similar associations in a number of instances, adding weight to these findings. Members are requested to review current food safety advice for vulnerable groups in light of this evidence.

Background

3. Listeriosis is a disease caused by the bacterium *Listeria monocytogenes*. First described in laboratory animals in 1924, the disease is now recognised as amongst the most important human foodborne illnesses. The disease, whilst rare, is severe, primarily affecting the unborn, the newly delivered, the immunocompromised and the elderly. The disease normally presents as abortion, bacteraemia (bacterial invasion of the blood stream) or central nervous system (CNS) infections, with high mortality rates reported in all patient groups.
4. Members were first informed of a change in the epidemiology of *L. monocytogenes* infection in England and Wales at its meeting in September 2005. This change was characterised by increased incidence from 2001, occurring predominantly in patients aged ≥ 60 years presenting with bacteraemia without CNS infection. This increase occurred in most regions in England and Wales, in both genders, and could not be explained by recognised outbreaks. Additional data presented at subsequent meetings suggested that the altered epidemiological/clinical picture in England & Wales was not artefactual. Similar increases have been reported in other European countries.

Update on epidemiological/clinical picture in England & Wales, 2007

5. One hundred and eighty five cases were reported in England and Wales in the first three quarters of 2007, and the incidence (3.5 cases per million population) was the highest since active national surveillance began in 1990. The incidence in people aged 60 years and over in 2007 (11.0 per million) was almost eight times higher than in younger people (1.4 per million; RR 7.9; 95%CI 5.8-10.7; P<0.001) in the same year, and over four times higher than in people aged ≥ 60 years in 2003 and 2004 (RR 4.2; 95%CI 3.4-5.3; P<0.001)(figure 1). Bacteraemia in the absence of CNS involvement remains the most common clinical presentation (131/177 patients in 2007 where the source culture type was known; 74%).

Update on activities of the HPA on surveillance and epidemiological investigations for human listeriosis

6. The Health Protection Agency (HPA) continues to collect isolates of *L. monocytogenes* from clinical cases of listeriosis in England and Wales and carries out a range of discriminatory tests to identify clusters of possibly related cases. Isolates from food are also subjected to these tests. Isolates from approximately 80% of cases are referred to the HPA. A clinical questionnaire is sent to microbiologists in England and Wales and completed information is currently obtained for approximately 70% of cases.
7. A trawling questionnaire for listeriosis was introduced in 2003. However this was found to be unsuitable for sporadic cases and was only used for outbreak investigations. A shorter, more structured surveillance questionnaire was therefore developed and introduced in 2005, and its use has been encouraged subsequently. Due to the population at risk for listeriosis (generally the elderly or the infirm) follow up of cases is problematic. Nevertheless, the response rates have increased over the surveillance period (18%, 28% and 63% for 2005, 2006 and 2007 to date respectively).
8. Cases for whom surveillance questionnaires were completed (n = 125) were similar to all reported cases (n = 580) in terms of age group, gender and infecting *L. monocytogenes* subtype, but fewer questionnaires were received where the patient had died. Preliminary analyses has focused on comparing the food exposures of cases with the infecting *L. monocytogenes* type (serotype, and amplified fragment length polymorphism (AFLP) type). Typing data on 1301 *L. monocytogenes* isolates from foods (referred to the HPA Centre for Infections between 2004 and 2007) which were not examined as part of investigations of specific cases, were compared in the same way.

9. Infection with serotype 4b was associated with consumption of cold cooked beef and sandwiches containing hard cheese, and this serotype was recovered more commonly from red meats (including beef) and butter. Serotype 1/2a was associated with consumption of tongue, chicken pies, fish, cheese, beef sandwiches, salad vegetables and herbs. Similarly, serotype 1/2a was recovered from a wide variety of foods including fish, shellfish and salads. Humans infected with *L. monocytogenes* serotype 1/2a were less likely to avoid smoked fish, pre-cut/pre-packed fruits, soft/blue cheese and sliced uncooked meats. Too few cases were infected with *L. monocytogenes* serotypes 1/2b and 1/2c for comparison.
10. The analysis of *L. monocytogenes* AFLP types in isolation were, on the whole, less revealing. Of note, however:
- Infection with *L. monocytogenes* AFLP type I was associated with foods from burger bars, hospital snack bars, sandwich shops, pork, pasteurised cows milk and dairy spread. Amongst food isolates butter, vegetables or tongue were associated with this type.
 - The consumption of pre-packed sliced turkey, cold roast chicken, chicken sandwich meat and soft cheeses other than brie or camembert was associated with *L. monocytogenes* AFLP type VII.
 - Pregnant women were more likely to be infected with *L. monocytogenes* AFLP type V, and this type was associated the consumption of smoked trout and smoked salmon and shopping from ethnic grocers. Food isolates associated with this type were more likely to be rice, fish or salad.
11. When combining serotypes and AFLP types, associations were detected between cases infected by *L. monocytogenes* 4b I and exposures to beef and dairy product, between 4b V and smoked fish exposures and between 1/2a IX/XIV and smoked fish and mould-ripened cheese exposures. For subtypes 4b I, 4b V and, to a lesser extent, 1/2a IX/XIV these associations were apparent in the analysis of data from food isolates.

Conclusions

12. Initial investigations have revealed significant differences in the exposure histories of patients infected with different subtypes of *L. monocytogenes*. Separate analysis of data accrued from the routine reference typing of isolates from food has revealed associations with the same/similar food types. This allows the generation of the hypothesis that specific food types give rise to infection with specific *L. monocytogenes* subtypes. Additional data are required to examine these relationships in greater detail including the source, levels of contamination and manufacturers of the foods, and to study a wider range of *L. monocytogenes* subtypes.
13. Listeriosis is a rare disease which usually affects people who already have underlying illness. Because of the severity of infection and the difficulty in collecting data on food exposure, it has taken two and a half years to capture sufficient data for this initial analysis, which, to our knowledge, is the first of its kind in England and Wales. Initial findings are encouraging, but further work and additional data are required.

Figure 1. Age specific rates of listeriosis in the first three quarters of the year. England and Wales, 1990-2007.

