

The report of the Outbreak Control Team of the investigation of an outbreak of listeriosis in the Belfast Health and Social Care Trust during May to November 2008

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INTRODUCTION

1. This is the report of the interagency Outbreak Control Team (OCT) of an investigation of an outbreak of listeriosis which occurred during May to November 2008 in the Belfast Health and Social Care Trust. Organisations and individuals represented on the OCT are provided in APPENDIX 1.
2. The report describes the chronology of the outbreak and the outcome of epidemiological, environmental health and microbiological investigations. The report concludes with recommendations for Public Health, Trusts, the Department of Health and Social Services and Public Safety, the Food Standards Agency, and those responsible for hospital food procurement.

LISTERIA MONOCYTOGENES AND LISTERIOSIS

3. Listeriosis is a bacterial disease which usually presents as meningo-encephalitis and/or septicaemia in newborns and adults; although some adults experience only mild gastrointestinal symptoms. In pregnant women it causes fever and abortion. Those at highest risk are neonates, the elderly, immunocompromised individuals, pregnant women and their fetuses, and alcoholic, cirrhotic or diabetic adults.¹ The case fatality rate can range from 20-30%.²

4. Listeriosis is caused by the Gram positive, rod shaped bacterium *Listeria monocytogenes*. Ninety eight percent of human infections are caused by the serotypes 1/2a, 1/2b, 1/2c and 4b. In the UK, 4b is the most common serotype isolated from humans, followed by 1/2a.

5. After a general decline in the 1990s the number of cases of listeriosis has increased since 2000 in Europe, predominantly in immuno-compromised persons over 60 years of age.³ Listeriosis remains an uncommon diagnosis in Northern Ireland with between two and six cases reported annually since 2000, with the majority aged 60 years or older. Historically neither human nor environmental *L. monocytogenes* isolates from N Ireland have been routinely sent to a reference laboratory for typing.

6. *L. monocytogenes* is widespread in the environment and can be found in raw food, soil, vegetation, sewage and in the faeces of many animals, birds and fish. Up to 10% of the population may be carriers of the organism and do not become ill.

7. The majority of cases are believed to be foodborne. *L. monocytogenes* has been found in a range of chilled ready-to-eat foods such as pre-packed sandwiches, pate, butter, soft mould-ripened cheeses, cooked sliced meats and smoked salmon.⁴

¹ Control of Communicable Diseases Manual 18th Edition. Heymann DL: ISBN 0-87553-034-6

² Lianou A, Sofos J. A Review of the Incidence and Transmission of *Listeria monocytogenes* in Ready-to-Eat Products in Retail and Food Service Environments. *Journal of Food Protection*, 2007;70(9):2172-2198

³ Scientific Opinion of the Panel on Biological Hazards on a request from the European Commission on Request for updating the former SCVPH opinion on *Listeria monocytogenes* risk related to ready-to-eat foods and scientific advice on different levels of *Listeria monocytogenes* in ready-to-eat foods and the related risk for human illness. *The EFSA Journal* (2007) 599, 1-42

⁴ Food Standards Agency, 2008. *Listeria – keeping food safe.*

<http://www.food.gov.uk/multimedia/pdfs/publication/listeriafactsheet0708.pdf>

Outbreaks have occurred linked with cooked meats and butter⁵, and since 1999 there have been six outbreaks associated with sandwiches supplied to hospitals in Great Britain.⁶ Serotype 1/2a is the most common serotype isolated from foods, followed by 4b.

8. The infective dose of *L. monocytogenes* is not known, but is likely to vary between individuals. In particular the infective dose is likely to be lower in immunocompromised individuals than the general population.² The incubation period can range from 1 – 90 days, with an average of 30 days. Current EU legislation determines that *L. monocytogenes* should be at or below 100 cfu/g during the shelf life of ready-to-eat foods.⁷ Further detail is presented in APPENDIX 2. Levels of *L. monocytogenes* below 100 cfu/g in ready-to-eat foods are considered very low risk for most population groups.⁸ However, it is acknowledged that vulnerable people may become ill following consumption of food with *L. monocytogenes* at levels lower than 100 cfu/g.⁹ The British Sandwich Association recommends a target level of <10 cfu/g for *L. monocytogenes* in sandwiches.¹⁰

9. All food business operators are required to comply with current EU hygiene legislation including microbiological criteria of foodstuffs as noted above. Compliance with the legislation requires effective and adequate food safety management systems based on Hazard Analysis and Critical Control point (HACCP) principles. The seven internationally accepted HACCP principles are:

- (a) Conducting a hazard analysis. This involves looking at the hazards at each process step and identifying their risk and their control.

⁵ Gillespie I, Changing pattern of human listeriosis in England and Wales, 1993-2004. Report for the ACMSF

⁶ HPA. Human listeriosis linked to hospital sandwiches: implications for procurement and storage

⁷ European Commission. Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs. Official Journal of the European Union 2005; L338:1-26 (as amended by Regulation (EC) No 1441/2007)

⁸ HPA. Human listeriosis linked to hospital sandwiches: implications for procurement and storage. HPR Weekly Report Vol 2 (35): 29 August 2008

⁹ European Commission. Opinion of the Scientific Committee on Veterinary Measures relating to Public Health on *Listeria monocytogenes*, 23 September 1999

http://ec.europa.eu/food/fs/sc/scv/out25_en.pdf

¹⁰ British Sandwich Association Code of Practice and Minimum Standards for Sandwich Manufacturers (Producers), Revised August 2007

http://www.sandwichesonline.org.uk/about_the_bsa/manufacture_code_of_practice.shtml

- (b) Determining the critical control points i.e. the points where control is critical to ensuring the safety of the food.
- (c) Setting critical limits.
- (d) Monitoring of the critical control points to ensure the critical limit not exceeded.
- (e) Corrective actions noted if limit is exceeded.
- (f) Verification of the HACCP system.
- (g) HACCP system to be documented.

CHRONOLOGY OF THE OUTBREAK

This section of the report aims to provide an overview of the chronology of the outbreak through brief summaries of key meetings of the OCT and others. A summary of case details comprising dates of onset of illness, hospital of admission and molecular typing of case isolates is available as an epidemic curve in APPENDIX 3 and as a table in APPENDIX 4.

10 June

10. Belfast Trust reports four cases of listeriosis in hospital inpatients in the Royal Victoria Hospital (RVH) to the Eastern Health and Social Services Board (EHSSB). The onset of illness in the cases ranged from 23 May to 8 June. All cases had become ill during an inpatient stay for an unrelated reason. Cases were over 60 years of age with concurrent debilitating illness.

11 June

11. A meeting is held between Belfast Trust and EHSSB to discuss circumstances surrounding the cases

12 June

12. EHSSB commences preliminary investigations.

13 June

13. Belfast Trust convenes an Outbreak Control Team (OCT), with membership comprising Belfast Trust, EHSSB, and Belfast City Council (BCC) representatives. The cases are noted to have occurred in three wards on two different levels in the RVH new hospital building. Two cases are deceased.

14. Actions taken include a deep clean of all RVH kitchens, microbiological sampling of hospital food and kitchen environments, human isolates sent for typing, and an alert issued to all clinicians on the RVH site.

18 June

15. Belfast Trust OCT meets, with its membership expanded to include Communicable Disease Surveillance Centre (CDSC NI), and Southern Health and Social Services Board (SHSSB) as the

Board of residence of one of the cases. A third patient is noted to have died on 13 June. A fifth case (case 5) was diagnosed while an inpatient in Whiteabbey hospital on 17 June, having become ill on 12 June during an inpatient stay in BCH. All five cases have had inpatient stays in the RVH new hospital building.

16. Investigation of the food supply chains into the RVH is underway. The Trust reports that as a precautionary measure pre-packed sandwiches, from Producer A, and cooked meats, from Producer B, have been removed from patient menus and restaurants in all Trust hospitals. The Trust sets up a public telephone helpline, issues a media statement and the Trust Medical Director gives a television interview.

19 June

17. A video teleconference takes place between EHSSB, BCC and Food Standards Agency Northern Ireland (FSANI) and National FSA. FSA Northern Ireland agrees to join the OCT and to co-ordinate the investigation of food suppliers which are outside the remit of BCC.

20 June

18. The OCT meets and is chaired by the Acting Director of Public Health, EHSSB. FSA Northern Ireland and Northern Group Environmental Health join the OCT. Food histories on all five cases are being gathered through a combination of patient and relative interviews and hospital note review. Initial microbiological typing shows one case is serotype 4 and three others are serotype 1/2a.

19. A further case is reported, with specimen date 4 June. Illness was onset while an inpatient in Antrim Area Hospital (AAH). There are no obvious links between this patient and the RVH.

20. Potential issues around Producer A's distribution cold chain integrity have been identified. A report on this producer indicates Hazard Analysis and Critical Control Point (HACCP) processes, *Listeria* testing regime and historical microbiological records are satisfactory, and that product and environmental samples are being taken at the premise. *L. monocytogenes* is isolated at <20 cfu/g from a sandwich manufactured by Producer A and sampled at RVH. An investigation of the cooked meats manufacturer (Producer B) is underway.

23 June

21. The OCT meets. CDSC NI assumes chair of the OCT at the request of the Acting Director of Public Health of EHSSB and as agreed with the Chief Medical Officer (CMO). Epidemiological and environmental health subgroups are formed.

22. The environmental health investigation identifies potential cold chain integrity issues in RVH and reports of inappropriate storage of food in patients' bedside lockers are noted.

23. *L. monocytogenes* is isolated at <20 cfu/g from a fish pie sampled at RVH.

24. It was agreed that the CMO be asked to consider the circulation of a letter to update health professionals on the investigation.

27 June

25. The OCT meets. Case 6 has been diagnosed as an inpatient in BCH on 22 June, with onset of illness 17 days after admission for an unrelated reason. Molecular subtyping shows that cases 2, 3 and 4 have indistinguishable type 1/2a isolates. The AAH case has been typed with a different and unusual serotype and is thought unlikely to be linked to the other cases.

26. Cold chain issues for food at RVH and for the sandwich distribution network are being addressed. Investigations of suppliers of product common to both BCH and RVH are ongoing.

27. *L. monocytogenes* has been detected in a further sandwich from Producer A sampled at the manufacturing facility. A sample of cooked meat from a supermarket is positive for *L. monocytogenes* at <20cfu/g (not manufactured by Producer B). Environmental swabs from RVH and BCH during the investigation have tested negative to date. All food samples and environmental swabs from AAH have tested negative.

28. OCT notes CMO letter HSS(MD) 19/2008 issued to alert clinicians to the ongoing outbreak investigation, to raise awareness of risk factors, signs and symptoms of listeriosis and to ask to report cases to the appropriate Health Board (APPENDIX 5).

29. FSA Northern Ireland is to liaise with DHSSPS regarding issuing guidance regarding the management of high risk foods in the HPSS.

3 July

30. The OCT meets. Food histories for the period one month prior to illness show four cases to have potentially eaten sandwiches in hospital with two potentially eating cooked meats. Molecular subtyping shows that cases 1 and 5 have indistinguishable type 4 isolates. Case 6 has a serotype 4 isolate and further subtyping information is awaited.

31. Investigation and control actions around the environmental investigation of RVH and BCH are ongoing. Investigation of cooked meat producer (Producer B) shows incomplete temperature recording of the distribution chain for this product. One product and three environmental samples from Producer B are positive for *L. monocytogenes* at <20 cfu/g. Strain typing shows the isolates from the fish pie, a sandwich from Producer A and the cooked meat sampled at the supermarket to be different from any of the human case isolates.

10 July

32. The OCT meets. The serotype 4 isolate from Case 6 diagnosed in BCH is reported as being molecularly indistinguishable from those of two RVH patients (Cases 1 and 5).

33. BCH is working with BCC to address food safety issues identified. A distribution company used by Producer B is working with Environmental Health to address identified HACCP issues. *L. monocytogenes* is detected in four food samples in the manufacturing facility of Producer A. The quantitative counts are reported to be within regulatory limits. All hospital environment samples are negative for *Listeria*.

18 July

34. The OCT meets. Case 7 is diagnosed in an inpatient in BCH on 13 July, 11 days after admission for an unrelated reason. The date of onset of listeriosis is not clear and possibly unrelated to their inpatient stay. A food history from this case shows consumption of a sandwich (from Producer C) in hospital, after a possible period of storage in a bedside locker.

35. The presence in BCH of cooked meat product from Producer B is noted despite Belfast Trust's decision to withdraw this product earlier in the outbreak. Subtyping of the isolates from Producer B does not match with any other isolates identified in the investigation to date. The identified cold chain issues in the distribution company working for Producer B have been addressed. Belfast Trust is drafting guidelines for nursing staff on food storage by patients. *L. monocytogenes* is detected in three environmental samples in the manufacturing facility of Producer A. Subtyping of Producer A food and environmental samples to date is different to that of any human isolates.

30 July

36. The OCT meets. Case 7 is typed as 1/2a which is different to other cases associated with BCH. Further subtyping information is awaited. The sandwich eaten by this case was purchased from a retail outlet on the hospital site. Sandwiches from this producer (Producer C) would also have been supplied to hospital inpatients by BCH until 26 June. Environmental investigations confirm that this case could potentially have eaten cooked meats from Producer B and have identified additional issues around food safety processes in BCH. *L. monocytogenes* has been isolated at <20 cfu/g from sandwiches from Producer C and from another producer sampled at the retail outlet.

14 August

37. The OCT meets. Three strains of *L. monocytogenes* have been identified in samples from Producer C, the manufacturer of sandwiches of the type eaten by Case 7. One strain is molecularly indistinguishable from the strain found in three patients (Cases 1, 5 and 6), two of whom have been inpatients in BCH (Cases 5 and 6). A further strain type is indistinguishable from that of Case 7. The remaining strain type does not match any of the human isolates. Expert microbiological advice is that the matches observed are strongly suggestive of a link between these patients and products from Producer C.

38. BCC is engaged in ongoing work with this producer. Producer C is no longer providing product to BCH catering but is supplying an independent retailer on site. Belfast Trust is to liaise with the independent retailer to recommend use of Trust approved suppliers. Cooked meats sampled at Producer C are positive for *L.*

monocytogenes at levels <20 cfu/g. BCC will liaise with the appropriate home authorities.

3 September

39. The OCT meets. Producer C undertook a deep clean of its premises on 16 August. Product and environmental swabs from Supplier C prior to extensive cleaning were positive for *L. monocytogenes* at <20 cfu/g. BCC is continuing to advise Producer C. BCC is continuing to monitor progress at BCH and a review of HACCP procedures is underway. The OCT recommends that Belfast Trust discuss with the independent retailer on BCH site not to use sandwiches from Producer C.

40. The OCT agrees to recommend that the planned DHSSPS letter to Trusts should raise the issue of food being stored inappropriately by patients and that contracts with onsite independent retailers should specify the use of Trust assured suppliers. In addition, the HPA recommendations in the HPA's Health Protection Report (Vol 35, 2008) should be communicated to Trusts and relevant procurement agencies.

41. The OCT agrees the criterion for declaring the outbreak over is that no cases have occurred within the three months following the deep clean of Producer C's premises on 16 August.

26 November

42. The OCT meets. Two additional cases of listeriosis have been identified since the last OCT meeting, neither of whom have a connection to Belfast Trust. BCC report that significant improvements have occurred at Producer C's premises as reflected in product sample and environmental swab results.

43. The OCT notes CMO letter HSS(MD)35/2008 issued to those involved in provision of food in healthcare settings with regard to minimising the risks of listeriosis (APPENDIX 6).

44. Arrangements for the follow up of future cases of listeriosis in Northern Ireland are described and agreed. The outbreak is declared over.

METHODS

EPIDEMIOLOGICAL INVESTIGATION

45. A case was defined as clinically compatible illness diagnosed in Northern Ireland as listeriosis and with *L. monocytogenes* isolated from a sterile site, between 25 May 2008 and 16 November 2008

AND

An inpatient stay in a Belfast Trust Hospital for any length of time in the three months prior to illness with an isolate strain typed as:

Serotype 4, AFLP type I, Fluorescent AFLP type X2

OR

Serotype 1/2a, AFLP type VIIg, Fluorescent AFLP type XI

OR

Serotype 1/2a, AFLP type XIV, Fluorescent AFLP type F9

46. Case finding was actioned through a telephoned alert to all microbiology laboratories in Northern Ireland, followed by validation of routine laboratory reporting data for listeriosis to date in 2008, as held by CDSC (NI). Clinicians in the Royal Victoria Hospital were alerted to consider the diagnosis of listeriosis in their patients. This was followed by a Chief Medical Officer letter to all clinicians in Northern Ireland alerting them to the outbreak, advising on the signs and symptoms of listeriosis and asking them to report cases to the Consultant in Communicable Disease Control in the appropriate Health Board.

47. Information collected on cases comprised demographic details, date of onset of illness, date of confirmatory laboratory specimen, details of hospital inpatient stays in the 90 days prior to illness, and food history in the 30 days prior to illness.

48. The food history was collected from a number of sources comprising the case patient, their relatives, the hospital clinical records, and the hospital staff caring for the case.

49. Data collection instruments used included the Health Protection Agency Surveillance of Listeriosis, England & Wales

questionnaire and the *Listeria monocytogenes* Trawling Questionnaire. A separate questionnaire for consumption of high and medium risk food in hospital in the 30 days prior to onset of illness was developed, following a detailed risk assessment of foods provided by the hospital. This was used during the week 23/06/08 to 28/06/08.

ENVIRONMENTAL INVESTIGATION

50. The Environmental Health investigation centred on the RVH, moving to include the Belfast City Hospital (BCH) as the outbreak evolved.

51. RVH food premises were inspected. Food safety management systems, and food handling procedures and practices were examined and food and environmental samples taken as appropriate. This included onsite food premises operated by independent business operators.

52. A list of all foods supplied into RVH, along with supplier/manufacturer details, was obtained. With guidance from national experts at FSA, foods were assessed as to the risk of causing listeriosis, either through the nature of the food itself or the way in which it may have been managed following manufacture. Intensive investigation of all aspects of the supply chain was undertaken for sandwich producer, Producer A and cooked meat producer, Producer B.

53. Producers A and B were located outside the Belfast City Council enforcement area. The FSA coordinated the investigation of these manufacturers and distributors.

54. BCH food premises were inspected. Food safety management systems, and food handling procedures and practices were examined and food and environmental samples taken as appropriate. These included onsite food premises operated by independent business operators.

55. A list of all foods supplied into BCH was obtained along with supplier/manufacturer details. A comparison was made with foods supplied to RVH. Manufacturers of foodstuffs common to both were investigated and food and environmental samples taken as appropriate.

56. Investigations at BCH identified a sandwich producer (Producer C) who had supplied sandwiches into the BCH for supply to patients between March and June 2008. Producer C was inspected. Food safety management systems, and food handling procedures and practices were examined and food and environmental samples taken.

MICROBIOLOGICAL INVESTIGATION

57. Human samples were processed as routine in the appropriate hospital laboratory.

58. Food and environmental samples were processed in the Northern Ireland Public Health Laboratory using enumeration and enrichment processes (APPENDIX 7)

59. Typing of human and non-human isolates was undertaken by the Laboratory of Gastrointestinal Pathogens' Foodborne Pathogens Reference Unit (FRPU), HPA, Cfl, London. Multiplex PCR was used to distinguish the four main serotypes associated with human infection, namely serotypes 1/2a, 1/2b, 1/2c and 4. Amplified fragment length polymorphism (AFLP) was used to provide further discrimination of isolates. An initial rapid single enzyme AFLP was performed to cluster strains of the same serotype with a double enzyme fluorescent AFLP technique used for increased strain discrimination.

RESULTS

EPIDEMIOLOGY

60. Seven cases meeting the case definition were reported with dates of onset of illness ranging from 23 May to 13 July. All cases were aged over 60 years, with a median of 67 years. Five cases were male. All cases had very significant co-morbidity. This included congestive cardiac failure, renal failure, liver disease, chronic obstructive pulmonary disease, and malignancy.

61. All cases had become ill during a hospital inpatient stay for an apparently unrelated reason. The period spent as an inpatient prior to onset of illness ranged from 10-29 days (median 11 days). The date of onset of Case 7 was less definite as the patient had enteric symptoms on admission to hospital, developing bacteraemia 13 days after admission. Specimen date was used as proxy date of onset for this case.

62. Five cases occurred as inpatients in the Royal Victoria Hospital (RVH) with admission dates ranging from 12 – 28 May. One of these cases was also an inpatient at the Belfast City Hospital (BCH) with admission on 2 June. Two cases were inpatients in BCH with admission dates of 5 June and 2 July.

63. Six cases were residents of the greater Belfast area, with two of the cases residents of the same street. One case was a resident of Northern Ireland, outside the greater Belfast area.

64. Food history was incomplete in the majority of cases and often based on historic preferences. Information was available from the case themselves for four cases, and by relative-only for a further three cases. Some details of foods eaten in hospital were available for six cases, and for foods eaten prior to admission for three cases.

65. Subject to the caveats above, the main findings of the food history investigations are:

- Five cases ate sandwiches during their hospital admission. Sandwiches could potentially have been supplied either by hospital catering services, from another onsite retailer or from a source outside the hospital site. For four cases this detail is unknown.

- Four cases ate the cooked meats supplied by the hospital, usually associated with a salad

66. Three distinct microbiological strains of *L. monocytogenes* from human isolates were identified.

67. Three cases were identified as Serotype 4, AFLP type I, Fluorescent AFLP type X2. One case was an inpatient only within BCH, one case had been an inpatient in both BCH and RVH in the 15 days prior to illness, and one had only been an inpatient in RVH. Dates of onset of illness for this cluster ranged from 23 May to 22 June, with dates of admission to hospital ranging from 12 May to 5 June. Two of these cases ate sandwiches and one ate cooked meats while in hospital

68. Three cases were identified as Serotype 1/2a, AFLP type VIIg, Fluorescent AFLP type XI. All cases had been inpatients only within the RVH. Dates of onset of illness for this cluster were 4 June (2 cases) and 8 June, with dates of admission ranging from 10 May to 25 May. Two of these cases ate sandwiches, with all occasionally eating cooked meats while in hospital.

69. One case was identified with Serotype 1/2a, AFLP type XIV, Fluorescent AFLP type F9. This, the last, case was diagnosed after a positive blood culture on 13 July, after admission to the BCH on 2 July. Although not the main reason for admission this case reported enteric symptoms on the day of admission. The case had recently returned to Northern Ireland from six weeks spent outside the UK, during which time other high risk foods had possibly been consumed. Symptoms suggestive of bacteraemia began on 8 July, but *L. monocytogenes* was isolated only on 13 July. This case had eaten a sandwich purchased from an onsite retailer at BCH on 10 July, and possibly stored in the bedside locker prior to consumption. This case had also eaten cooked meats while in hospital.

70. Three cases were reported to have died within 30 days of the onset of their illness.

Sporadic cases

71. During the course of the outbreak, an additional three cases of listeriosis, each with different typing characteristics, were diagnosed in Northern Ireland. These did not meet the case

definition and are therefore considered as unlinked (sporadic) cases.

72. One case was identified with Serotype 1/2b, AFLP type IV, Fluorescent AFLP type X4. This case became ill on 4 June while an inpatient in Antrim Hospital.

73. One case was identified with Serotype 1/2a, AFLP type VII-Ic. This case had no hospital exposure in the three months prior to the onset of illness on 14/10/08.

74. One case was identified with Serotype 1/2a, AFLP type III. This case had no hospital exposure in the three months prior to the onset of illness on 29/10/08.

Retrospective review

75. A review of cases for 2008 found one additional case, with date of confirmatory specimen in February 2008. This case had no hospital exposure within the three months prior to illness. This case was considered not to be linked to the outbreak.

ENVIRONMENTAL HEALTH

Royal Victoria Hospital

76. Patient meals are supplied to the new hospital building from four pantry kitchens, each supplying four wards on the same hospital floor. The main food service is cook-freeze. Sandwiches are brought in pre-packed and the cooked meats supplied pre-sliced.

77. The Hospital also operates a canteen used by staff, patients and public, and an outpatients' coffee bar. Two onsite food shops are operated by independent Food Business Operators (FBOs).

Investigation of premises and processes

78. Issues relating to the cold chain integrity of sandwiches, stock control of cooked meats and preparation of mixed salads were identified in the pantry kitchens.

79. Inappropriate storage of food in and on bedside lockers by patients was observed.

80. Although found to be operating effectively, a sandwich display unit in the hospital restaurant was not included in monitoring records. A chill display unit in the coffee bar was found to be operating at above 8 °C.

81. No issues were identified with either independently operated food business.

Belfast City Hospital

82. Patient meals are provided to all parts of the hospital through one main kitchen on the ground floor of the Tower Block building. These meals are also supplied to the dining room used by staff, patients and public on the 1st floor of the Tower Block. Meals are prepared from fresh ingredients. Cook-freeze meals are only used for cancer patients and are pureed meals. All cooking and reheating of meals are carried out in this main kitchen. Sandwiches are made in the kitchen. Cooked meats are delivered as a joint and then sliced in the kitchen.

83. A coffee shop located in the cancer unit and a food shop used by members of staff, patients and public are operated by an independent FBO.

Investigation of premises and processes

84. Issues relating to cleaning of food contact surfaces, cold chain integrity of sandwiches, stock control of foods and missing temperature records for cooking and cooling of foods were identified. Sandwiches had been supplied to hospital inpatients from end March 2008 until mid June 2008 from a supplier (Producer C) not on the approved list of suppliers used by the Trust.

85. A chill display unit in the coffee shop was operating above 8 °C. No issues were identified with the other independently operated outlet.

Food Manufacturer & Distribution Investigation

86. Detailed investigation of the supply chain of products from six different manufacturers was undertaken. These were Producers A, B, C, a liquid egg manufacturer, butter manufacturer and prepared salad vegetable manufacturer.

87. Two of these were identified as part of the initial RVH investigation and were excluded from the Belfast Trust after the outbreak was first recognised. The first, a sandwich manufacturer (Producer A), supplied inpatients in RVH and the level 2 Outpatients Coffee Bar in RVH. Producer A also supplied sandwiches to the dining room in BCH which could be used by staff and patients and the independently operated premises within BCH. The second, a cooked meats manufacturer (Producer B) supplied both RVH and BCH.

88. Inspection and investigation of the premises and the Food Safety Management System at Producer A were reported to be satisfactory.

89. The Northern Ireland distributor for Producer A showed incomplete temperature monitoring and verification.

90. Inspection and investigation of the premises and the Food Safety Management System at Producer B were reported to be satisfactory.

91. Distribution for Producer B involved two different distributors. Temperature monitoring verification at one of the distributors was incomplete. The other distributor was not registered and did not have a documented food safety management system. There were no records of temperature monitoring held by this distributor.

92. Inspection and investigation of the premises and the Food Safety Management System at Producer C identified issues relating to inadequate cleaning of the premises. There were also issues with the supply of hot water and cleanliness of protective clothing. Sandwiches were transported in refrigerated vans by Producer C directly to BCH but no temperature records were kept of these vans.

93. The three other food manufacturers (liquid pasteurised egg, butter and prepared salad vegetables) were common suppliers to

both RVH and BCH. These premises underwent a review of food management processes and all were found to be satisfactory.

Investigation of Belfast Trust procedures of auditing suppliers

94. A list of approved food suppliers should be held by each hospital. These approved suppliers have been audited by Support Training and Services PLC (STS) which carry out audits of all food suppliers to hospitals across the UK. Audits did not address each step in the supply chain including some instances of production and distribution. Investigation of Producer A highlighted that the manufacturer was audited but not the intermediate distributor. Investigation of Producer B highlighted that the audit went one step back and audited the distributor but not the manufacturer.

95. Producer C was not on the approved supplier list but was used by BCH between March and June 2008.

MICROBIOLOGY

96. Between 13.06.08 and 23.10.08 the Northern Ireland Public Health Laboratory (NIPHL) examined 396 food and environmental samples for the presence of *Listeria monocytogenes* and other *Listeria* species. *Listeria* species were detected in 42 samples by that date and 30 samples cultured *L. monocytogenes*. Where detected in food samples, *L. monocytogenes* was detectable only on enrichment (<20 cfu/g).

97. *L. monocytogenes* isolates demonstrating indistinguishable typing patterns from both human and non-human samples were found in two clusters:

98. Serotype 4, AFLP type I, Fluorescent AFLP type X2 isolates were detected in:

- Three patient's blood cultures;
- Two sandwiches from Producer C taken from an independently operated outlet in Belfast City Hospital;
- Two samples of sliced cooked meats and three environmental swabs taken from the manufacturing premises of Producer C.

99. Serotype 1/2a, AFLP type XIV, Fluorescent AFLP type F9 isolates were detected in:

- One patient's blood culture;
- Two sandwiches from Producer C taken from an independently operated outlet in Belfast City Hospital;
- Five environmental swabs taken from the manufacturing premises of Producer C.

100. Cultures from one sandwich and one environmental swab from Producer C, both contained two different *L. monocytogenes* strains which were both molecularly indistinguishable from one of each of the above patient groups.

101. One additional strain, Serotype 1/2a, AFLP type VIIg, Fluorescent AFLP type XI, was detected in three patients' blood cultures and was not matched by that isolated from any food source.

102. *L. Monocytogenes* and other *Listeria* species (ie not *L. monocytogenes*) were isolated from 27 other different food products or food manufacturing environments. These included Producers A and B among others. In all positive food samples processed at the NIPHL *L. monocytogenes* has been detected at levels of <20 cfu/g. *L. monocytogenes* was found in an additional five food samples taken from the manufacturing facility at sandwich manufacturer, Producer A. The associated counts are unknown but understood to be within regulatory limits. When *L. monocytogenes* typing has been performed, all of these other isolates have been distinguishable from the clinical isolates from the seven patients investigated in this incident.

103. No environmental samples from any hospital environment were found to be positive.

CONTROL MEASURES

OVERALL COORDINATION AND MANAGEMENT OF THE OUTBREAK

104. Initial OCT meetings were chaired by Belfast Trust and then by Eastern Health and Social Services Board. CDSC NI assumed chair of the OCT on 22 June at the request of the Acting Director of Public Health, EHSSB. Membership and organisations represented on the OCT are provided in APPENDIX 1.

105. Key roles were provided as follows:

- Epidemiological investigation of cases coordinated by EHSSB;
- Microbiological investigation coordinated by NIPHL, working with the FPRU, HPA, Cfl, London;
- Environmental investigation coordinated by FSANI. BCC and NGEH carried out investigations relevant to their areas;
- Media communications and spokesperson provided by EHSSB;
- Administrative support provided by EHSSB.

106. The OCT met on 12 occasions between 13 June and 26 November 2008. Following each meeting, minutes were circulated in draft form to members of the OCT. Following seven meetings a situation report was circulated to HPA LaRS Divisional Director, HPA Centre for Infections – Gastrointestinal, Emerging and Zoonotic Infections Department; DHSSPS; and FSA.

107. There was extensive liaison between members of the OCT and HPA representatives outside the formal OCT meetings.

PREVENTION OF FURTHER CASES

108. Pre-packed sandwiches from Producer A and cooked meats from Producer B were removed from patient menus and restaurants in all Belfast Trust hospitals by 18 June 2008.

109. Belfast Trust reviewed food safety procedures around chilled ready to eat products through a series of meetings with Belfast City Council officers commencing on 13 June 2008. Issues

identified through this process were addressed by Belfast Trust. Many of the issues took some time to resolve and were not completed until management changes were made in latter part of 2008.

110. Distribution HACCP issues were addressed for both Producer A and Producer B. A number of visits were carried out to assess compliance for the distributor for Producer A and by the 26 June 2008 improvements to temperature monitoring and verification had been put in place. A number of visits were also carried out to assess compliance for both of the Producer B distributors and by February 2009 improvements to the Food Safety Management System and temperature monitoring had been put in place.

111. Frequent visits were carried out to assess compliance for Producer C. Issues with the hot water were rectified within two days and by 25 November 2008 improvements in cleaning and temperature delivery records had been put in place.

112. Independent retailers on the BCH site have voluntarily removed from sale sandwiches supplied by Producer C. All retailers were supplied with a list of Regional Supplies Services (RSS) - assured suppliers and asked to refrain from using non-assured suppliers. This will become a requirement on lease renewal.

113. Due diligence audits of all suppliers of chilled ready to eat foods to the Belfast Trust were undertaken prior to the reintroduction of excluded foods. A contract variation was requested to ensure that the use-by date of sandwiches is reduced to day of production plus two days.

PUBLIC INFORMATION

114. On 18 June 2008, Belfast Trust issued a proactive press statement advising of the investigation and initial control measures, giving background information on listeriosis, and announcing arrangements for a Trust information telephone line. Several broadcast media interviews were given subsequently, which promoted messages around safe handling of chilled ready-to-eat foods. A second press statement issued on 3 July in response to a media enquiry advised of one additional case in the

Northern Health and Social Services Board area. Press statements are included as APPENDIX 8.

INFORMATION TO PROFESSIONALS AND BUSINESSES

115. An alert to all Northern Ireland Trusts through either their Trust microbiologist or Medical Director was telephoned on 18 June. Clinicians in RVH were alerted following the OCT meeting of 13 June.

116. CMO letter HSS(MD)19/2008, Recent Cluster of Cases of Listeriosis in the Belfast Trust, was issued on 25/6/08. This reminded clinicians in primary and secondary care and microbiologists of the signs and symptoms of listeriosis, alerted them to consider the diagnosis, and to report cases promptly to Public Health. (APPENDIX 5)

117. CMO letter HSS(MD)35/2008, Key Steps for Minimising the Risk of Listeriosis from High-Risk Ready to Eat Foods, was issued on 28 October 2008. This alerted Trust, Health Board and Regional Supplies officers to the recommendations of the OCT around the procurement and handling of high-risk foods in hospitals, and to advise that an audit of Trust food safety management protocols would be undertaken by Environmental Health Officers (APPENDIX 6)

DISCUSSION

118. This was the first recognised outbreak of listeriosis to have occurred in Northern Ireland, and involved seven cases diagnosed following admission for unrelated reasons to two different hospitals in the Belfast Trust. Cases met the typical risk factor profile of listeriosis in terms of age and extensive concurrent morbidity.

119. It is likely that cases acquired their infection while in hospital as no case with an outbreak isolate whose illness was onset in the community was reported during the outbreak period 25 May to 16 November 2009. Given the potentially long incubation period of listeriosis, exposure in the community cannot be ruled out completely, however.

120. For the purposes of discussion, cases can be considered as forming two distinct clusters, based on the microbiological typing of the seven human *L. monocytogenes* isolates and possible links to Producer C.

Cluster 1

121. Two of the human isolate strains (accounting for four cases) are indistinguishable from isolate strains from both product and the manufacturing facility of sandwich producer, Producer C.

122. Of the 200 food isolates tested to date (since the beginning of 2008) using the fluorescent AFLP technique the strain Serotype 4 AFLP type 1 Fluorescent AFLP type X2, is unique to those isolated in this outbreak. Similarly, this strain is unique to the human isolates associated with this incident and has not been found in other human isolates in England and Wales.

123. Serotype 1/2a AFLP type XIV, fluorescent AFLP type F9 is also uncommon being present in only two human cases in England and Wales out of approximately 140 human isolates typed using this technique. This type was unique to Producer C amongst the 200 food isolates tested to date using fluorescent AFLP.

124. Although no sandwiches actually eaten by any of these cases were available for testing, these samples were of the same brand served to inpatients at the Belfast City Hospital and on sale

through an independent retailer on this hospital site. Three of the four cases in this cluster became ill during inpatient stays in the Belfast City Hospital. This sandwich brand was also available in the wider community in which the majority of patients lived and in which both hospitals were situated.

125. While the microbiological findings are suggestive of a link in their own right, case food histories provide only very limited support for the possible microbiological link between these cases and Producer C product. Of the two cases with BCH-only exposure, one gave a history of eating a sandwich of this brand in hospital prior to laboratory confirmation of disease. However, the exact date of onset of illness for this case is not known and could conceivably predate the sandwich exposure. One other case with an inpatient stay in both BCH and RVH prior to illness reported eating a sandwich during their stay in hospital, but in which hospital and from what source is not known. The fourth case in this cluster was an inpatient only at RVH and reported eating sandwiches during their stay. Again, the source is unknown.

126. Adequate food histories were difficult to obtain for the majority of cases in this outbreak due to a combination of severity of illness (and death in some cases), extensive co-morbidity, and the inevitable difficulties in recall given the potentially long incubation period of listeriosis.

127. All *L. monocytogenes* detections in Producer C product were made on enrichment only (<20 cfu/g) and therefore within current regulatory limits (≤ 100 cfu/g), regardless of whether sampled from the manufacturing premises or from the onsite retailer. It is possible, however, that patients consumed foods with counts above regulatory levels. Firstly, the sampling process itself may have failed to detect such product. Secondly, amplification of *L. monocytogenes* levels could potentially have occurred as a result of cold chain issues during the delivery process or within the BCH hospital environment, or through inappropriate storage at the patient's bedside. This illustrates the importance of adequate and effective food safety management systems based on HACCP principles at all stages of production, distribution and service ensuring the complete integrity of the cold chain particularly around ready-to-eat products such as sandwiches. Further support for this principle is provided by our findings of cold chain issues also in RVH and of low level *L. monocytogenes* presence in other foods supplied to the hospitals, but subsequently not implicated in this outbreak.

Cluster 2

128. Three further cases with a different indistinguishable isolate strain, but with no microbiological link to any of the foods sampled were identified. While 1/2a AFLP VII is a very common serotype among food isolates, fluAFLP type VIIg is not common and was not seen in any other UK food isolates during 2008. It is also unusual in human isolates and again was not seen in any other human cases in 2008.

129. These three cases had inpatient episodes only in RVH. This combined with the finding of a possible link between cases whose hospital exposure was primarily in the BCH and a food vehicle supplied in BCH but not in RVH makes it possible that the three *unexplained* cases linked to RVH constitute an outbreak from a separate source.

130. On the other hand, UK-level experience suggests it would be very unusual for this incident to represent two outbreaks from two separate sources given the very close time and place relationship between these seven cases. Although not known to be supplied on the RVH site, patients could have been exposed to Producer C product as it was available in the wider community in which both hospitals are sited. It is also possible that this particular strain was not detected by sampling, given the large number and changing nature of the strain types detected from sampling of Producer C. By the time sampling had been initiated this particular strain type may have been replaced by another.

131. The investigation within RVH also found *L. monocytogenes* at counts <20 cfu/g in sandwiches from a different producer (Producer A) supplied to patients, albeit with a strain found to be molecularly distinguishable from those of any of the human cases. As in BCH, amplification of *L. monocytogenes* levels could potentially have occurred as a result of cold chain issues during the distribution process of some foods or during food handling processes within the hospital environment, or through inappropriate storage at the patient's bedside.

Excluded product

132. On a precautionary basis, product from a second sandwich producer (Producer A) and a cooked meat producer (Producer B) were excluded from the Belfast Trust soon after the outbreak was recognised. An intensive investigation of each was performed, with food and environmental samples taken and food safety procedures investigated at the manufacturing site and in the distribution chains for these products. Although ultimately no microbiological linkage was established, the investigations were nevertheless worthwhile as procedures in the distribution chains were improved as a result.

Conclusion

133. In conclusion, this complex investigation has found a possible link between four of the outbreak cases and sandwiches potentially available to hospital inpatients during the outbreak period. This is now the seventh outbreak in the UK to be potentially linked with sandwiches supplied to hospitals.⁶

134. Despite intensive investigation three cases remain with no link to any of the foodstuffs investigated, and it is unclear whether these cases are part of the same outbreak or represent a separate outbreak from a different source of contamination. Enhanced epidemiological and microbiological surveillance for cases of listeriosis will therefore be continued for the next 12 months in the first instance.

135. Finally, the investigation has shown that vulnerable hospital inpatients are likely to have been exposed to food containing *L. monocytogenes*. There is no evidence that food was supplied at levels outside the regulatory limits. The investigation has shown, however, the potential for amplification of low levels of *L. monocytogenes* through issues with the distribution of foods into these hospitals and food handling processes within the hospitals at the time of the outbreak. This investigation emphasizes the need to consider the risk of *L. monocytogenes* contamination in food safety management systems based on HACCP principles at all stages of production, distribution and service.

RECOMMENDATIONS

TO TRUSTS AND PUBLIC HEALTH

All cases of listeriosis should be reported promptly to and investigated promptly by Public Health

All human *L. monocytogenes* isolates should be sent to the Laboratory of Gastrointestinal Pathogens' Foodborne Pathogens Reference Unit (FRPU), HPA, Cfl, London for typing

TO DHSSPS, FSA, PROCUREMENT AGENCIES AND TRUSTS

Trusts should specify in their contracts that independent retailers on hospital sites should ensure high risk ready to eat foods are from Trust-approved suppliers.

Trusts should ensure high risk ready to eat foods served by their catering services are from Trust-approved suppliers.

Trusts should work with environmental health officers to review Food Safety Management arrangements to ensure controls are fully implemented.

Trusts should have information available to inform staff and patients of the risks of inappropriate storage of foods.

Supplier audits should adequately assess each step in the supply chain, including production and distribution.

DHSSPS and FSA should consider issuing guidance on the procurement specification and appropriate storage and handling for ready-to-eat chilled foods served to vulnerable patients in the HPSS. This guidance should reflect the legislation and national guidance on microbiological standards for ready-to-eat food such as sandwiches.

FSA should review the need to include pre-packed sandwiches in the list of foods to be avoided by vulnerable patients.

APPENDIX 1

OUTBREAK CONTROL TEAM MEMBERSHIP

The following organisations were core members of the Outbreak Control Team: Communicable Disease Surveillance Centre Northern Ireland (CDSC NI); Eastern Health and Social Services Board (EHSSB); Belfast City Council (BCC); Food Standards Agency Northern Ireland (FSA); Northern Group Environmental Health Committee (NGEH); Northern Ireland Public Health Laboratory (NIPHL) and Belfast Trust.

In addition, Southern Health and Social Services Board (SHSSB); Northern Health and Social Services Board (NHSSB) and Northern Health and Social Services Trust (NHSST) were represented at some of the earlier OCT meetings.

Core individual members of the OCT are listed in the table below:

Dr N Irvine (Chair) Dr B Smyth	CDSC NI
Dr P Donaghy Mr I Maginnis Mr B Mallaghan	EHSSB
Mr S Leonard Ms K McMillan	BCC
Ms M Jennings Ms S Gilmore	FSA
Dr A Loughrey Mr E Moffat Mr A Brown	Belfast Trust
Dr C Goldsmith	NIPHL
Mr T Purce	NGEH

The following individuals also represented the core OCT organisations at some OCT meetings: Dr J Little, Dr M McCartney, Dr P Darragh, Dr L Geoghegan (EHSSB); Mr D Connolly, Ms H Byrne (BCC); Ms O McWilliams (NGEH); Dr P Rooney, Dr I Wilson (NIPHL); Dr A Stevens, Dr E Smyth, Ms I Thompson, Ms D Curley, Ms J Gibney, Dr C Jack, Ms A Ferguson, Ms O Macleod, Ms M Bardgett, Dr G Ong, Dr P Yew, Ms L McBride, Mr D Gibson, Dr E McHenry, Mr J Thompson, Mr C Clarke, Dr P Rooney, Ms P Donnelly, Ms N Patterson, Ms L Shields, Ms B Carr (Belfast Trust); Ms F McAllister, Mr P McColgan (Regional Supplies)

Acknowledgements:

The OCT gratefully acknowledges the support of Dr K Grant and Dr C Little of HPA during the investigation.

APPENDIX 2

MICROBIOLOGICAL CRITERIA FOR FOODSTUFFS

Current microbiological food safety criteria for *Listeria monocytogenes* in ready to eat foods are determined by Commission Regulation (EC) No 2073/2005.

Three categories of ready to eat food are defined:

1. Foods intended for infants and for special medical purposes.
2. Foods able to support the growth of *L. monocytogenes*
3. Foods unable to support the growth of *L. monocytogenes*. Products with pH 4.4 or a_w 0.92, products with pH 5.0 and a_w 0.94, products with a shelf life less than 5 days are automatically considered to belong to the category of unable to support the growth of *L. monocytogenes*. Other categories of product can also belong to this category subject to scientific justification.

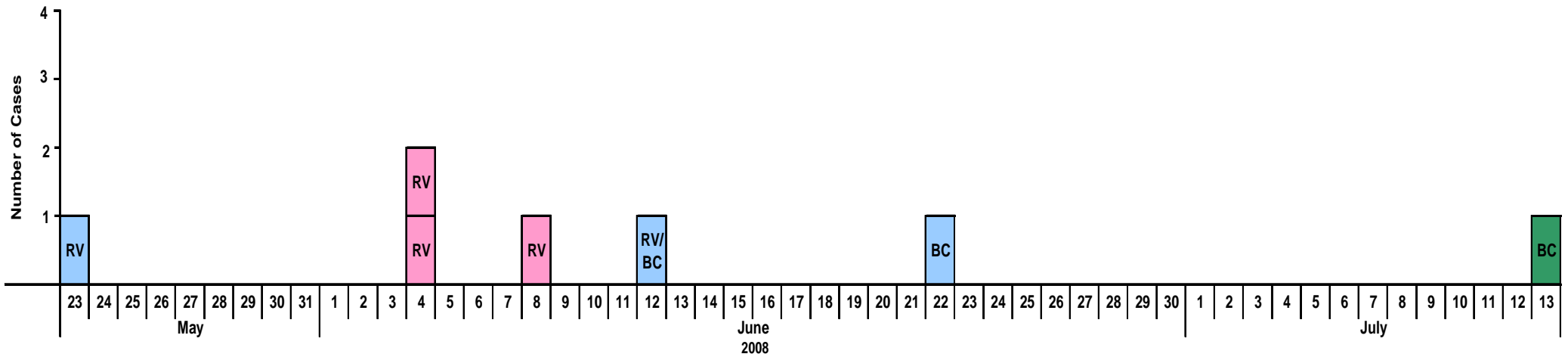
For foods intended for infants and for special medical purposes *L. monocytogenes* should be absent in 25 g during the shelf life of these products.




For ready to eat foods other than those intended for infants and for special medical purposes, *L. monocytogenes* should be at or below 100 cfu/g during the shelf life of ready to eat foods.

- For foods in this category which are able to support the growth of *L. monocytogenes* the operator must be able to show that the product will not exceed 100 cfu/g during its shelf life. Otherwise the food must show an absence of *L. monocytogenes* in 25g before the food has left the immediate control of the food business operator who has produced it.
- For foods unable to support the growth of *L. monocytogenes* the 100 cfu/g limit applies.

APPENDIX 3

LISTERIOSIS CASES MEETING THE CASE DEFINITION, BY HOSPITAL AND MICROBIOLOGICAL SEROTYPE, BY DATE OF ONSET ILLNESS, NORTHERN IRELAND 23rd MAY – 13th JULY 2008 (n=7)



SEROTYPE	HOSPITAL WHERE INPATIENT
 = 4B, 1, X2	RV Royal Victoria Hospital
 = 1/2A, VIIG, X1	BC Belfast City Hospital
 = 1/2, XIV, F9	

APPENDIX 4

SUMMARY OF CASE CHARACTERISTICS

Case Number	Date of onset of illness	Hospital where inpatient	Molecular strain type
1	23/05/08	RVH	4 AFLP 1, fluAFLP X2
2	04/06/08	RVH	1/2a AFLP VII, fluAFLP X1
3	04/06/08	RVH	1/2a AFLP VII, fluAFLP X1
4	08/06/08	RVH	1/2a AFLP VII, fluAFLP x1
5	12/06/08	RVH/BCH	4 AFLP 1, fluAFLP X2
6	22/06/08	BCH	4 AFLP 1, fluAFLP X2
7	13/07/08	BCH	1/2a AFLP XIV, fluAFLP F9

APPENDIX 5

CMO LETTER HSS(MD)19/2008

From the Chief Medical Officer
Dr Michael McBride

HSS(MD)19/2008

To: All General Practitioners
Medical Directors HSC Trusts (*for onward dissemination to all Doctors*)
Consultant Microbiologists
Directors of Public Health HSS Boards
CCDCs
Regional Epidemiologists, CDSCNI
Director, Food Standards Agency NI



Department of
**Health, Social Services
and Public Safety**

www.dhsspsni.gov.uk

AN ROINN

**Sláinte, Seirbhísí Sóisialta
agus Sábháilteachta Poiblí**

MÁNYSTRÉ O

**Poustie, Resydènter Heisin
an Fowk Siccar**

Castle Buildings
Stormont Estate
Belfast BT4 3SQ
Tel: 028 9052 0563
Fax: 028 9052 0574
Email: michael.mcbride@dhsspsni.gov.uk

Your Ref:
Our Ref: HSS(MD)19/2008
Date: 25 June 2008

Dear Colleague

RECENT CLUSTER OF CASES OF LISTERIOSIS IN THE BELFAST TRUST

The purpose of this letter is to provide you with some information on Listeriosis and to alert you to the fact that a multiagency investigation is underway into a cluster of cases of Listeriosis linked with the Belfast Trust. All have been in elderly, debilitated patients and 3, who were ill with other conditions, have died.

Listeriosis

Listeriosis is an uncommon disease in Northern Ireland with up to six cases reported annually. It is a bacterial disease which usually presents as meningo-encephalitis and/or septicaemia in newborns and adults. In pregnant women it presents as fever and miscarriage. Otherwise healthy people may have only an acute mild febrile illness. Invasive listeriosis is diagnosed when the organism is cultured from a normally sterile site such as blood or CSF.

Those at highest risk are neonates, the elderly, immunocompromised individuals, pregnant women and people with alcoholism, cirrhosis or diabetes.

It may have a **long incubation period** and can take between one and over 90 days for illness to develop, with an average of 30 days.

Listeriosis is usually acquired through eating contaminated food. Foods associated with transmission are most often ready-to-eat refrigerated and processed foods such as pre-prepared cooked and chilled meals, soft cheeses, cold cuts of meat, pates and smoked fish.

Working for a Healthier People



APPENDIX 6

CMO LETTER HSS(MD)35/2008

From the Chief Medical Officer
Dr Michael McBride



Department of
**Health, Social Services
and Public Safety**

www.dhsspsni.gov.uk

AN ROINN

**Sláinte, Seirbhísí Sóisialta
agus Sábháilteachta Poiblí**

MÁNYSTRIE O

**Poustie, Resydënter Heisin
an Fowk Siccar**

Castle Buildings
Stormont Estate
Belfast BT4 3SQ
Tel: 028 9052 0563
Fax: 028 9052 0574
Email: michael.mcbride@dhsspsni.gov.uk

Your Ref:

Our Ref: HSS(MD)35/2008

Date: 28 October 2008

HSS(MD)35/2008

To: Chief Executives HSC Trusts (*for dissemination to Heads of Procurement, Risk management Teams, Heads of Catering/Hotel Services, all Ward Managers, Heads of Communications*)
Medical Directors (*for dissemination to Consultant Microbiologists, Consultants in Infectious Diseases, Infection Prevention and Control Leads*)
Chief Executives HSS Boards
Directors of Public Health HSS Boards (*for dissemination to Public Health Staff*)
Members of NI Chief Environmental Health Officers Group
Director, Food Standards Agency NI (*for Members NI Food Liaison Group*)
Director Regional Supplies Service
Procurement Director, Regional Supplies Service

Dear Colleague

KEY STEPS FOR MINIMISING THE RISK OF LISTERIOSIS FROM HIGH-RISK READY TO EAT FOODS

I am writing to remind those involved in the provision of food in healthcare settings of key steps they should take to minimise the risk of listeriosis. This advice has been endorsed by the Food Standards Agency, Northern Ireland (FSA).

Background

Listeria monocytogenes can be present in chilled ready-to-eat foods at low levels; however poor temperature controls and failure to adhere to shelf life guidance can enable the bacteria to grow to potentially hazardous levels. Vulnerable people are particularly susceptible to infection.

Across the UK there have been recent incidents involving clusters of listeriosis cases in which chilled ready-to-eat foods served in healthcare settings were investigated as possible sources, including the recent outbreak in Belfast Trust Hospitals. In addition, the Health Protection Agency has identified an increase in listeriosis, predominantly involving the over 60s with underlying medical conditions, in England and Wales since 2001.

Working for a Healthier People



HEALTH IS MORE


Advice for and Action Required by HSC Trusts

1. All foods consumed by hospital patients should be free from potential pathogens, including *L. monocytogenes*, and those responsible for procuring chilled ready to eat foods for hospitals should ensure the safety of vulnerable patients in their care. Foods which carry a greater risk for Listeria – such as pate, soft mould-ripened or blue-veined cheeses – should not be given to vulnerable patients. Businesses manufacturing such high risk foods, including sandwiches, should aim to ensure *Listeria monocytogenes* is absent from their product wherever possible. The British Sandwich Association recommend a target level of <10 cfu/g for *Listeria monocytogenes* in sandwiches and a use-by date of production plus two days.
2. It is recommended that Trusts should specify in their contracts that independent retailers on hospital sites should ensure high risk ready to eat foods are procured from approved suppliers.
3. Trust should ensure that written food safety procedures for hospitals include ward kitchens, and that ward fridges should be monitored regularly to ensure temperatures remain below 5 degrees C and adequate stock rotation of foods. Temperature control should be maintained from production until food is served, and chilled ready to eat foods including sandwiches should be consumed as close as possible to their production date.
4. A fact sheet (attached) has been produced by FSA to raise awareness and provide general information on the key steps to minimise the risk of listeriosis from chilled ready-to-eat foods. Please note that this advice applies from delivery until consumption, including storage periods and during distribution to patients. Care should also be taken to ensure chilled ready-to-eat foods are not kept on the wards at room temperature. A copy of the factsheet can also be found online at: <http://www.dhsspsni.gov.uk/listeria.pdf>
Trusts should ensure this fact sheet is disseminated to all relevant staff in the organisation.
5. Trust Ward staff should highlight to visitors that they should only bring in food for patients after discussion with the nurse in charge and that it is important that chilled ready-to-eat foods brought in to hospitals are eaten immediately and leftovers disposed of.
6. Environmental Health Officers will visit all hospitals in Northern Ireland in the near future to ensure that listeriosis has been considered in Hazard Analysis and Critical Control Point (HACCP) risk reduction programmes and that appropriate control measures have been put in place. **Trusts should work with Environmental Health Officers to ensure these control measures are in place.**

Further information on *Listeria monocytogenes* is available at

<http://www.hpa.org.uk/webw/HPAweb&Page&HPAwebAutoListName/Page/1191942172752?p=1191942172752>.

Yours sincerely



Dr M McBride
Chief Medical Officer

Listeria - keeping food safe

What is listeria?

- *Listeria monocytogenes* (listeriosis) can cause severe and sometimes life-threatening food borne illness. It usually affects vulnerable groups such as pregnant women and people with weakened immunity, particularly those over 60.
- *Listeria monocytogenes* has been found in a range of chilled ready-to-eat foods such as pre-packed sandwiches, pate, butter, soft mould-ripened cheeses, cooked sliced meats and smoked salmon.
- This fact sheet highlights key control measures, which people involved in the preparation and supply of chilled ready-to-eat foods can take to minimise the risk of people developing listeriosis.

Minimising the risk of listeriosis.

Temperature Control

- Keep Chilled ready-to-eat food cold – at 5°C or below.
- Preparation of chilled ready-to-eat foods must be carried out without delay.
- Chilled Conditions must be maintained from production of food until serving. This includes the supply and distribution of foods.
- Chilled ready-to-eat foods should be eaten as soon as possible after serving. Leftovers should be disposed off.

Shelf-life

- All chilled ready-to-eat foods including sandwiches to be eaten as close to the date of production as possible.
- No foods should be eaten after their use by date.
- Bulk pre-packed foods, when opened, should be used within two days, unless the manufacturer's instructions state otherwise.
- Purchase chilled ready-to-eat foods from reputable suppliers only.

Further Information

- *Food Hygiene – A guide for business.* A general guide to the Food Hygiene Regulations: <http://www.food.gov.uk/multimedia/pdfs/hygienebusinessguide.pdf>
- *Food safety management packs.* Practical guides to food safety management systems: <http://www.food.gov.uk/foodindustry/regulation/hygleg/hyglegresources/>
- *HPA listeria factsheet.* Further information on listeria and listeriosis: www.hpa.org.uk/listeriafactsheet

APPENDIX 7

MICROBIOLOGICAL TESTING - METHODOLOGY & INTERPRETATION

Current guidelines for food examiners and environmental health officers to determine the bacteriological quality of most ready-to-eat foods are based on the enumeration of both *Listeria monocytogenes* and total *Listeria* species.¹

Samples containing more than 100 colony forming units (cfu) of *L. monocytogenes* per gram of food are considered to be of unacceptable quality, whilst those containing more than 100 cfu per gram of other *Listeria* species are considered unsatisfactory. In order to assess the level of contamination in these foods direct enumeration of the organism is carried out on solid selective media. In some ready-to-eat foods such as soft ripened cheeses, pâtés and vacuum or modified atmosphere packed cooked meats with a long assigned shelf life, the presence of *Listeria* is significant, due to the organism's ability to multiply to significant levels during refrigerated storage. Also, for certain foods, such as dairy products, sampled at the producer's premises there is legislation requiring absence of *L. monocytogenes* in 25g or 1g of sample. For these foods, an enrichment procedure is required to determine presence or absence in a defined quantity of food. However, it should be noted that in mixed cultures, the enrichment process can select for one species over another – most importantly *L. innocua* can overgrow *L. monocytogenes*.

Note therefore that food samples submitted during this investigation were generally examined by both direct enumeration and enrichment, whereas environmental swabs were generally only examined by enrichment.

The enumeration process is summarised as follows: A 10⁻¹ dilution of sample was prepared and homogenised by a stomaching machine. An aliquot of 0.5ml of this 10⁻¹ dilution was spread out on an Oxford agar plate. This inoculated plate was then incubated aerobically at 30°C for 48 hours. Up to 5 suspicious colonies / morphotypes were then sub-cultured onto blood agar with subsequent further incubation at 37°C for 18 – 24 hours. Appropriate morphological colony types (≤ 5) were selected for confirmative identification using biochemical tests. The counts of *Listeria* species (and *L. monocytogenes* if present) were then calculated per gram or ml.

The enrichment (detection) process is summarised as follows: A food sample of 25 g or ml was weighed or measured and added to 225 ml of half Fraser broth. Alternatively 90mls of half Fraser broth was inoculated by swirling and agitating a swab. The inoculated mixture was then homogenised by stomaching if necessary. This was then incubated at 30°C for 24 ± 2 hours. Sub-culture to Oxford agar was then performed and these inoculated plates were incubated at 30°C for 48 ± 2 hours. Up to 5 representative morphotypes were selected for identification & confirmation as per Enumeration (see above) Secondary enrichment was also performed by inoculating 0.1ml of the

¹ Public Health Laboratory Service (PHLS). Guidelines for the microbiological quality of some ready-to-eat foods sampled at the point of sale. Communicable Disease and Public Health 2000,3:163-7

above culture grown in half Fraser broth into 10ml of full Fraser broth followed by further incubation at 37°C for 48 ± 2 hours. This was then sub-cultured to Oxford agar which was incubated at 30°C for 48 ± 2 hours in aerobic conditions. Up to 5 representative morphotypes were selected for identification & confirmation as per Enumeration (see above).

When the investigations were completed, the laboratory's findings were reported as follows:

- If *Listeria* species were **not isolated** by enumeration then the target limit was <20/g (where 0.5ml of 10⁻¹ dilution had been plated).
- If *Listeria* species **were** detected by enumeration, the count was reported per gram of ml and the identity of any species, including *L.monocytogenes* was reported.
- If the test organism was detected with counts between 20 and 99 per gram these were reported in the form of:

a cfu/g where **a** is a number between 20 and 99

- If the test organisms were detected at counts of 100 or higher per gram of per mL, this was reported in the form of

a x 10^b cfu per g or ml

Where **a** is never less than 1.0 or greater than 9.9

b represents the appropriate power of ten:

- If *Listeria* species were not detected by enrichment, this was reported as:

Not Detected in **x** gram or ml e.g. Not Detected in 25g food sample

- If *Listeria* species were isolated by enrichment this was reported as:

Detected in **x** gram or ml

And the identity of any species, including *L .monocytogenes* was reported.

APPENDIX 8 A

PRESS STATEMENT 18 JUNE 2008



Belfast Health and Social Care Trust

STATEMENT

18th June 2008

Belfast Health and Social Care Trust is leading an investigation – with support from a range of expert agencies – into five cases of listeriosis, an illness caused by the common bug listeria.

Five patients at the Royal Victoria Hospital were recently confirmed as suffering from listeriosis and of those five, three who were ill with other conditions have since died.

The Eastern Health and Social Services Board, which is one of the agencies helping with the Trust's investigation, stressed that any risk to the wider community is small. All relatives of patients who were directly affected have been contacted.

Listeriosis is caused by a common bug sometimes found in foodstuffs such as pate, soft cheeses, sandwiches and cooked meats. It cannot be easily spread from one person to another. In normally fit and healthy people it can lead to short term and self-limiting illness with symptoms such as mild fever and diarrhoea. However it can cause more serious illness in people who are already ill from other causes, and among pregnant women. Cases of serious illness caused by listeria remain very rare.

The Trust and its partner agencies are investigating all possible causes including external sources.

As a precautionary measure foods such as those listed above have been removed from patient menus in the Royal Victoria Hospital and other hospitals managed by the Trust.

Relatives and patients are being asked not to bring food into the hospital and to only consume food provided to them on the wards at mealtimes by hospital staff. The support and co-operation of relatives is being sought for this.

Fact sheets are being provided for relatives and patients in wards and a Trust information line will be open tonight until 9pm and also between 9am and 5pm until further notice. The phone number is **0800 9801100**. Additional

information on listeria is available from the Health Protection Agency website www.hpa.org.uk (topics A-Z).

ENDS

NOTE TO EDITORS

Dr Tony Stevens, the Trust's Medical Director, and Dr Cathy Jack, Deputy Medical Director, will be available for interview from 4.30pm until 5.30pm in Committee Room 2, King Edward Building, Royal Victoria Hospital (entrance via the blue gates on the Grosvenor Road).

For further information or to arrange interviews please contact:

The Belfast Trust Media Office on 028 9096 0096

Out of Hours telephone 028 9056 5656

NEWS



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Thursday 3rd July 2008

Up-date on listeriosis investigation

The multi-agency investigation into five previous cases of listeriosis in the Belfast Health and Social Care Trust is continuing. One further case has also now been identified in the Trust. A series of precautionary measures announced on 18th June remain in place and are being actively monitored.

One case of listeriosis has also been confirmed in the Northern Health and Social Services Board area. However, there is currently no established link between this case and those in the Belfast Trust.

The multi-agency team again asked for the co-operation of patients and their relatives not to bring food into hospitals, and for patients not to keep food in their bedside lockers or cabinets. More detailed information is available at ward level for both patients and their relatives.

Listeria is a bug that is widespread in the environment, and previous outbreaks of listeriosis in the UK have shown an association with foodstuffs such as pate, sandwiches, soft cheeses, cooked meats and other ready-to-eat items. In normally fit and healthy people it can lead to short term symptoms such as mild fever and diarrhoea. However, it can cause more serious illness to people who are in poorer health, and among pregnant women.

The multi-agency team is continuing to actively pursue its investigations, and a further up-date will be issued if substantive new information emerges from its work.

ENDS.