Changing Epidemiology of Listeria Outbreaks and Recalls: A review of ProMED reports from 1996-2018

Angel N. Desai, MD, Amylee Anyoha, Lawrence C. Madoff, MD, Britta Lassmann, MD

Brigham & Women’s Hospital, Division of Infectious Diseases, Boston, MA
Tufts University, Boston, MA
University of Massachusetts, Division of Infectious Diseases, Worcester, MA
International Society for Infectious Diseases, Boston, MA
Background

• *Listeria monocytogenes* is an important cause of foodborne outbreaks worldwide
• Several, recent large-scale outbreaks
• Variety of food sources implicated
LISTERIOSIS - SOUTH AFRICA: INCREASING INCIDENCE

A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the
International Society for Infectious Diseases
http://www.isid.org

Published Date: 2017-03-12 18:42:17
Subject: PRO/AH/EDR> Listeriosis - USA (02): fatal, unpast soft cheese, aged 60 days, recall
Archive Number: 20170312.4896013

LISTERIOSIS - USA (02): FATAL, UNPASTEURIZED SOFT CHEESE, AGED 60 DAYS, RECALL

A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the
International Society for Infectious Diseases
http://www.isid.org

[1] Date: Thu 9 Mar 2017
Source: CDC Listeria (Listeriosis) [edited]
https://www.cdc.gov/listeria/outbreaks/soft-cheese-03-17/index.html

Published Date: 2018-04-10 15:11:20
Subject: PRO/AH/EDR> Listeriosis - Australia (04): fatal, cantaloupe, international distribution, WHO
Archive Number: 20180410.5736603

LISTERIOSIS - AUSTRALIA (04): FATAL, CANTALOPE, INTERNATIONAL DISTRIBUTION, WHO RESPONSE

INTERNATIONAL SOCIETY FOR INFECTIOUS DISEASES
Objective

• Identify key epidemiologic trends in global *Listeria* outbreaks
• Use ProMED as source of outbreak information
Methods

• Keywords “listeria,” and “listeriosis,” were utilized in the ProMED search engine from January 1996-March 2018.

• Report date, countries involved, source, suspected and confirmed case counts, and fatalities were extracted.

• Three investigators independently reviewed the database.

• Number of events and countries involved over time were normalized to the total number of ProMED events each year and compared using a two sided t-test; p <0.05 was considered statistically significant.
# Results

<table>
<thead>
<tr>
<th>Table I: Characteristics of Study Population</th>
<th>Report Counts (%)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 Events</td>
<td></td>
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<tr>
<td>Outbreak Events</td>
<td>91 (76%)</td>
<td></td>
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<tr>
<td>Recalls</td>
<td>29 (24%)</td>
<td></td>
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<tr>
<td>Identification of food source</td>
<td>105 (87%)</td>
<td></td>
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<tr>
<td>Hospital-acquired infections</td>
<td>8 (6.6 %)</td>
<td></td>
</tr>
<tr>
<td>“Atypical” food sources</td>
<td>27 (26%)</td>
<td></td>
</tr>
<tr>
<td>Events involving multiple countries</td>
<td>17 (14%)</td>
<td>14/17 (82%) of multi-national events occurred between 2008-2018</td>
</tr>
<tr>
<td>Case-Fatality Rate, overall</td>
<td>409/1964 (21%)</td>
<td></td>
</tr>
<tr>
<td>Outbreak events 1998-2007</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Outbreak events 2008-2018</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Delta</td>
<td>p-value &lt;0.05</td>
<td></td>
</tr>
</tbody>
</table>
Results

Figure I: ProMED Event Reports Stratified by 10-year period

Average number of international listeria outbreaks and recalls per total number of listeria events reported on ProMED each year

For the 1997-2007 period, the average number of international listeria outbreaks and recalls per total number of listeria events reported on ProMED each year was lower than for the 2008-2018 period, with a p-value of less than 0.05.
### Results

Table II: Outbreak Sources Identified by ProMED Reports

<table>
<thead>
<tr>
<th>Foods historically associated with Listeria outbreaks</th>
<th>Additional food products associated with Listeria events reported in ProMED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ready-to-eat deli meats and hot dogs</td>
<td>Sprouts, chopped lettuce, chopped celery, packaged salad</td>
</tr>
<tr>
<td>Refrigerated pâtés and meat spreads</td>
<td>Cantaloupe (whole and pre-cut), stone fruits (nectarines, peaches, plums and pluots)</td>
</tr>
<tr>
<td>Unpasteurized (raw) milk and dairy products</td>
<td>Sliced apples, Caramel apples</td>
</tr>
<tr>
<td>Soft cheeses such as queso fresco, Feta, Brie, Camembert</td>
<td>Ready made sandwiches, wraps, salads and bakery products; chicken burritos</td>
</tr>
<tr>
<td>Refrigerated smoked seafood</td>
<td>Asparagus soup</td>
</tr>
</tbody>
</table>

- 26% of outbreaks on ProMED were associated with “atypical” food sources
Results

Figure I: ProMED Event Reports of additional food sources
Conclusions

• Epidemiology of *Listeria* infections has been changing over time
• More events are being reported
• Variety of implicated food sources
• Changes in food production, distribution, and improved diagnostics may contribute to observed trends
• Open data sharing and communication across borders is critical to ensure timely investigation and recall
Acknowledgments

• Amylee Anyoha
• Larry Madoff
• Britta Lassmann
• International Society for Infectious Diseases
• ProMED-mail
• Supported in part by NIAID T32 AI 007433
Questions?