Updated Health Canada Policy on Listeria monocytogenes in ready-to-eat foods

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May 31, 2011
Outline

• Background on *Listeria monocytogenes (Lm)*

• *Listeria* control in Canada
  - Updated version of the Health Canada (HC) *Policy on Lm in ready-to-eat (RTE) foods*
    - 2004 version vs. 2011 version

• Next steps
  - Implementation of the 2011 *Listeria* policy by industry and regulatory authorities
  - Research initiatives
Listeria monocytogenes

• Bacterial pathogen that is widely distributed in the environment

• Can be found in soil, vegetation, water, sewage, silage and in the faeces of humans and animals

• Unlike most bacteria, Listeria can survive and sometimes grow on foods being stored in the refrigerator

• Moreover, foods that are contaminated with this bacterium look, smell and taste normal

• Listeria can be killed by proper cooking procedures (e.g., pasteurization)
Barriers and challenges to the control of *Listeria*:

- The microorganism is commonly found in the environment, including food processing, distribution, retail environments, and in the home.

- Because *Lm* is widespread, it can easily enter processing plants via raw foods, humans, equipment, vehicles, shoes, etc.

- Once inside a processing plant, *Lm* can establish itself and persist for long periods of time.

- It can grow in many foods during refrigerated storage.
Listeria monocytogenes

• It was not until several large, common-source outbreaks of listeriosis occurred in North America and Europe during the 1980s that the significance of foods as the primary route of transmission for human exposure to Lm was recognized

• First outbreak in Canada, in 1981, was due to contaminated coleslaw (41 cases, 17 deaths)

• In Canada, there is on average about 100 confirmed cases per year, almost all sporadic

• Serious infections of Lm are almost exclusively seen in high-risk individuals

• High case-fatality rate in foodborne outbreaks
Listeria monocytogenes

Largest Canadian listeriosis outbreak:

<table>
<thead>
<tr>
<th>Year</th>
<th>Invasive / Non-invasive</th>
<th>Number of cases (deaths)</th>
<th>Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>Invasive</td>
<td>57 (23)</td>
<td>RTE deli meats</td>
</tr>
</tbody>
</table>


Report of the Independent Investigator into the 2008 listeriosis outbreak
Purpose:
Explore how and why the 2008 Maple Leaf listeriosis outbreak happened, and to make recommendations about what can be done to prevent a similar incident in the future.
Canada’s General Approach to *Listeria* Control

Revision of the 2004 Health Canada “policy on *L. monocytogenes* in RTE foods”

This policy applies to all RTE foods sold in Canada, whether domestically produced or imported.

- **All Food Commodities:**
  - Meat and poultry products
  - Dairy products
  - Fish and seafood products
  - Fruit and vegetable products

- **All Establishments:**
  - Registered
  - Non-registered
Canada’s General Approach to *Listeria* Control

- Focus is on environmental control, especially in post-processing areas
- Includes a combination of industry controls, environmental and end-product testing
- Environmental testing is used to monitor the efficiency of a plant’s sanitation program
- When environmental testing indicates persistence of *Listeria* spp. in the plant environment, the sanitation program is considered to be inadequate
- The inspection strategy then shifts to heightened environmental and end-product testing, and intensive sanitation and cleaning is undertaken to correct the problem
Update of the HC policy on *Lm* in RTE foods

Goal: Enhance the ability to detect *L. monocytogenes*

- Update information in the policy to reflect the latest scientific information on *L. monocytogenes*

- Review our operational and sampling guidelines for *Listeria* spp. in the environment and *L. monocytogenes* in end-product, as well as the accompanying text

- Develop new end-product compliance criteria to align with the International Codex standard
Update of the HC policy on *Lm* in RTE foods

Scientific basis for *L. monocytogenes* criteria in RTE foods

- Levels of *L. monocytogenes* in a food
- Potential for growth of *L. monocytogenes* in a particular food
- Factors:
  - pH, water activity (*A_w*), presence of preservatives and storage condition (e.g., temperature and shelf-life)
- In-line with:
1) The definition of RTE foods in which growth of *Lm* can or cannot occur has been modified and/or developed to be in-line with the Codex Alimentarius Commission standards:

Growth of *Lm* is assumed not to occur in RTE foods if the pH and *a*_w* values fall within the range below under reasonably foreseeable conditions of distribution, storage and use throughout the stated shelf-life

- pH < 4.4, regardless of *a*_w;
- *a*_w < 0.92, regardless of pH;
- combination of factors (e.g., pH < 5.0 and *a*_w < 0.94);
- frozen foods
2) Foods that are subject to the provisions of this policy have been clearly defined:

- **Foods included:**
  - Deli-meats, **cheeses**, hot dogs, pâtés, mousses, smoked fish, **milk**, **yoghurts**, **butter**, **ice cream**, etc.
  - Sushi, which may or may not contain raw fish, as well as steak tartar and Carpaccio which contains raw meat are considered RTE foods
  - RTE fresh-cut fruits and vegetables, i.e., raw fresh fruit and vegetables that have been washed and peeled, sliced, chopped or shredded prior to being packaged for sale and are intended to be consumed raw and not for further processing or cooking (e.g., coleslaw, shredded bagged lettuce, fresh-cut melons, fruit salad)
  - Processed products which have a cooked appearance (but are not fully cooked) may be considered RTE, if they only have microwave cooking instructions, or if the instructions are only to warm and serve
2) Foods that are not subject to the provisions of this policy have also been clearly defined:

- **Foods NOT included:**
  
  - Dry goods (e.g., cereals, dried herbs, dried spice mixtures, dry pasta, bread, powdered milk products, etc).
  
  - Raw meat or raw fish or seafood
  
  - Non-RTE fresh-cut fruits and vegetables packaged with cooking instructions (e.g., for use as pizza dressing or in soup preparation)
  
  - Whole fresh fruit and vegetables that have only been trimmed, cleaned, brushed, washed, graded, packaged or otherwise prepared for human consumption (e.g., fresh herbs, whole leaf vegetables, berries)
  
  - Products that are fully cooked in a hermetically sealed container and are not exposed to the environment after a validated heat treatment, e.g., canned foods, aseptic processing and packaging, as well as cook-in-bag products which achieve a minimum 5-log reduction in numbers of *Lm*
  
  - Processed products which require cooking and which are clearly labelled with adequate cooking instructions
Food Categories Defined in the *Listeria* Policy

**RTE FOODS**

- CATEGORY 1
  - (High priority)

- CATEGORY 2
  - (Med – Low Priority)
    - Category 2A
      - Med to Low Priority
    - Category 2B
      - Low Priority
Examples of Category 1 Foods

*L. monocytogenes* is able to survive and grow on soft and semi-soft cheeses (e.g., Brie cheese and blue cheese). Lm gained notoriety in 1985 when 48 people died from eating Lm-contaminated Mexican-style soft cheeses produced in California.

CFIA, 2011
Example of a Category 2B Food

The growth of *L. monocytogenes* is not supported in foods with a pH of less than 4.4, or in foods with a water activity of less than 0.92. Parmesan cheese is an example of a Category 2B food.

CFIA, 2011
Listeria and Dairy Products – “Ranking the Risks”

• Developed a quantitative and empirical risk-ranking approach to compare the relative public health impact of 14 major foodborne pathogens and the food categories with which they are associated

• The Foodborne Illness Risk Ranking Model (FIRRM) ranked pathogen-food combinations by estimated public health impact as quantified by a number of distinct, but related measures

• Developed a comparable set of estimates of disease burden for 14 leading pathogens across 12 food categories (168 pathogen-food combinations)

• The top 50 pathogen-food combinations accounted for more than 90% of illnesses, hospitalizations and deaths examined in the study

• **Listeria/dairy combination ranked 5th out of the top 50** (COI 724M; 434 illnesses, 397 hospitalized and 70 deaths)

(Batz et al. 2011; EPI, UF)
3) The list of food products implicated in listeriosis outbreaks has been updated:

Creation of Appendix B: Major reported foodborne listeriosis outbreaks

- **Dairy products**: 21
- Meat and poultry products: 13
- Fish and Seafood products: 6
- Fruit and Vegetable products: 3
- Other food products: 3
Listeriosis Outbreaks related to Dairy Products
(International – 1980’s and 1990’s)

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Invasive / Non-invasive</th>
<th>Number of cases (deaths)</th>
<th>Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>U.S.A.</td>
<td>Invasive</td>
<td>49 (14)</td>
<td>Pasteurized milk</td>
</tr>
<tr>
<td>1983-1987</td>
<td>Switzerland</td>
<td>Invasive</td>
<td>122 (31)</td>
<td>Soft cheese</td>
</tr>
<tr>
<td>1985</td>
<td>U.S.A.</td>
<td>Invasive</td>
<td>142 (48)</td>
<td>Mexican-style fresh cheese</td>
</tr>
<tr>
<td>1989-1990</td>
<td>Denmark</td>
<td>Invasive</td>
<td>26 (6)</td>
<td>Blue mould cheese or hard cheese</td>
</tr>
<tr>
<td>1994</td>
<td>U.S.A.</td>
<td>Invasive</td>
<td>45</td>
<td>Chocolate milk</td>
</tr>
<tr>
<td>1995</td>
<td>France</td>
<td>Invasive</td>
<td>37 (11)</td>
<td>Raw milk soft cheese</td>
</tr>
<tr>
<td>1997</td>
<td>France</td>
<td>Invasive</td>
<td>14</td>
<td>Soft cheese</td>
</tr>
<tr>
<td>1998-1999</td>
<td>Finland</td>
<td>Invasive</td>
<td>25 (6)</td>
<td>Butter made from pasteurized milk</td>
</tr>
</tbody>
</table>
# Listeriosis Outbreaks related to Dairy Products (International – 2000-2010)

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Invasive / Non-invasive</th>
<th>Number of cases (deaths)</th>
<th>Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2001</td>
<td>U.S.A.</td>
<td>Invasive</td>
<td>13</td>
<td>Mexican-style fresh cheese</td>
</tr>
<tr>
<td>2001</td>
<td>Sweden</td>
<td>Non-invasive</td>
<td>&gt; 120</td>
<td>Fresh cheese made from raw milk in a summer farm</td>
</tr>
<tr>
<td>2001</td>
<td>Japan</td>
<td>Non-invasive</td>
<td>38</td>
<td>Washed-type cheese</td>
</tr>
<tr>
<td>2001</td>
<td>Belgium</td>
<td>Invasive</td>
<td>2</td>
<td>Frozen ice cream cake</td>
</tr>
<tr>
<td>2003</td>
<td>U.S.A.</td>
<td>Invasive</td>
<td>13 (2)</td>
<td>Mexican-style fresh cheese</td>
</tr>
<tr>
<td>2005</td>
<td>Switzerland</td>
<td>Invasive</td>
<td>10 (3)</td>
<td>Soft cheese</td>
</tr>
<tr>
<td>2007</td>
<td>U.S.A.</td>
<td>Invasive</td>
<td>5 (3)</td>
<td>Pasteurized flavoured and non-flavoured milk</td>
</tr>
<tr>
<td>2009-2010</td>
<td>Austria, Germany and Czech Republic</td>
<td>Invasive</td>
<td>34 (8)</td>
<td>Acid curd cheese “Quargel”</td>
</tr>
</tbody>
</table>
### Listeriosis Outbreaks related to Dairy Products (Canada)

<table>
<thead>
<tr>
<th>Year</th>
<th>Provinces</th>
<th>Invasive / Non-invasive</th>
<th>Number of cases (deaths)</th>
<th>Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Manitoba</td>
<td>Invasive</td>
<td>7</td>
<td>Flat whipping cream</td>
</tr>
<tr>
<td>2002</td>
<td>British Columbia</td>
<td>Invasive</td>
<td>47</td>
<td>Cheese</td>
</tr>
<tr>
<td>2002</td>
<td>Quebec</td>
<td>Invasive</td>
<td>17</td>
<td>Soft and semi-hard raw milk cheese</td>
</tr>
<tr>
<td>2002</td>
<td>British Columbia</td>
<td>Non-invasive</td>
<td>86</td>
<td>Cheese made from pasteurized milk</td>
</tr>
<tr>
<td>2008</td>
<td>Quebec</td>
<td>Invasive</td>
<td>41(2)</td>
<td>Cheeses</td>
</tr>
</tbody>
</table>
Listeria control in Canada
Update of the HC Lm policy
– 2004 vs. 2011–

4) Environmental monitoring program should be included in all plants used in the production of RTE foods:

• This point is stressed throughout the document, for example:

  ➢ “The foundation for this policy is a combination of inspection, environmental sampling (both FCS and non-FCS) and end-product testing to verify control of Lm in RTE foods”.
  
  ➢ “Focus in this policy is given to environmental verification and control, especially in post-processing areas, as applicable”.
  
  ➢ “Food processing plants should carry out regular environmental sampling, to verify the effectiveness of their sanitation program for controlling Listeria spp. in the plant environment, and should increase sanitation efforts and control measures in areas where Listeria spp. are found”.
  
  ➢ “Experience indicates that environmental sampling is the most sensitive tool to assess control of the environment and risk of product contamination”.

  ➢ Creation of Section 7.2: Environmental sampling
  
  ➢ Creation of Section 7.4: Importance of trend analysis and quality assurance tools
In the 2011 *Listeria* policy, **RTE products** are classified based on the potential of *Lm* to grow:

**Category 1:** Includes RTE products which support the growth of *Lm* throughout the stated shelf-life or any other RTE products for which validation studies, when required, are either insufficient, inadequate or not provided.

**Category 2A:** Includes RTE products in which limited growth of *Lm* to levels ≤ 100 CFU/g can occur throughout the stated shelf-life. In addition, these RTE products must:

- be known to occasionally contain low levels of *Lm* and to not have a kill step (validation needed) and/or
- have a refrigerated shelf-life of ≤ 5 days (validation not needed).

**Category 2B:** Includes RTE foods in which growth of *Lm* cannot occur (i.e., < 0.5 log CFU/g increase) throughout the stated shelf-life (validation needed unless the physico-chemical parameters of the RTE foods fall into the following range: pH < 4.4, regardless of Aw, Aw < 0.92, regardless of pH; pH < 5.0 and Aw < 0.94; or frozen, i.e., kept frozen until consumption).
5) The compliance action decision tree, including environmental testing for *Listeria* spp. and end-product testing for *Lm*, has been completely modified and further sub-divided:

- **Risk-based:**
  - Differentiation in the approach depending if the line is producing Category 1 or Category 2 foods (i.e., Figure 1 vs. Figure 2)
  - Differentiation between FCS testing and non-FCS testing (i.e., Figures 1 & 2 vs. Figure 3)

**Titles of Figures:**
- Figure 1: Sampling Guidelines for FCSs and Category 1 Ready-to-Eat Foods
- Figure 2: Sampling Guidelines for FCSs and Category 2 Ready-to-Eat Foods
- Figure 3: Sampling Guidelines for non-FCSs, especially those in proximity to FCSs, linked to RTE foods in Category 1 and 2
6) New end-product compliance criteria have been developed to be in-line with the Codex Alimentari standards:

<table>
<thead>
<tr>
<th>Categories</th>
<th>Action level for Lm</th>
<th>Nature of concern</th>
<th>Level of priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) RTE foods in which growth of Lm can occur throughout the stated shelf life</td>
<td>Detected in 125 g (5 x 25 g)</td>
<td>Health Risk 1</td>
<td>High</td>
</tr>
<tr>
<td>2A) RTE foods in which a limited potential for growth of Lm to levels not greater than 100 CFU/g can occur throughout the stated shelf life. A number of factors will be taken into consideration with regards to which foods may fall into this Category (i.e., foods which are known to occasionally contain low levels of Lm and do not have a kill step (validation required; e.g., cold-smoked salmon) and/or RTE refrigerated foods with a shelf-life ≤ 5 days (validation not required; e.g., sushi)).</td>
<td>100 CFU/g (5 x 10 g)</td>
<td>Health Risk 2</td>
<td>Medium to low</td>
</tr>
<tr>
<td>2B) RTE foods in which growth of Lm cannot occur throughout the stated shelf life (validation required except if limiting pH and Aw values (Codex) have been determined or food is frozen).</td>
<td></td>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>

Note: The 2004 version had 3 categories: 1) linked to an outbreak and/or rated “high-risk” in HHS/USDA assessment (absence in 50g); 2) support the growth of Lm with SL > 10 days (absence in 25 g) and 3) support the growth of Lm with SL ≤ 10 days or does not support the growth of Lm (action level 100 CFU/g with different level of health risk assigned based on GMP status).
7) Recommendations which encourage the use of post-processing lethality treatments and/or *Lm* growth inhibitors are provided to industry:

Creation of Appendix C: Use of food additives, processing aids and/or post-lethality treatments for RTE foods:

- “Although voluntary, the use of food additives, processing aids and/or post-lethality treatments for *Lm* in RTE foods, alone or in combination, is strongly encouraged to reduce or eliminate *Lm* in RTE foods”.
- The policy refers to food additives that may currently be used as Class II preservatives in Canada (e.g., potassium and sodium lactate, sodium acetate and sodium diacetate)
- Examples of post-lethality treatments are provided:
  - Surface heat pasteurization (e.g., by steam, hot water, radiant oven heating or infrared technology)
  - High-pressure processing
Recommendation 12

“Health Canada should review its approval processes and fast track, where appropriate, new food additives and technologies that have the potential to contribute to food safety giving particular attention to those that have been scientifically validated in other jurisdictions (provinces or countries).”
The Food Directorate has developed a policy for **priority scheduling** and **expedited handling** of submissions for substances and technologies that have the **demonstrated capacity to enhance food safety**.
The Policy’s Effect

Coordinated priority evaluation of submissions for substances and technologies that can make foods safer microbiologically

- Food Rulings Committee assigns priority based on recommendation of lead evaluation bureau or Inter-bureau Evaluation Discussion Group

- Each bureau places priority submissions at the front of its evaluation queue (ahead of non-priority submissions, but “in queue” with other priority submissions)

- Timelines proposed for management of submissions for novel foods, food additives, and infant formulas are also applied to priority submissions for food irradiation and food processing aids
8) There is an increased focus on outreach:

Expansion of educational component (section 8):

- The importance of increasing awareness of the risk of foodborne listeriosis and providing guidance to personnel in institutions with high-risk individuals, is touched on in the policy
- The need for collaboration between the federal and provincial/territorial and municipal governments, to ensure that all Canadians receive reliable and consistent information, is mentioned
- References to educational materials for consumers and others involved in food handling and preparation is provided
Food Safety Education

1. Retail
2. CCMOH – high-risk groups and Listeria
3. General education Advice
Retail Guidance Document

Retail Guidance Document for the Control of Pathogens including Lm in RTE Refrigerated Foods

- CCGD (Retail Council of Canada) draft document being developed together with HC
- Food safety, including the control of pathogens such as L. monocytogenes, is a priority for all sectors of the food supply chain from producers through to retail and ultimately consumers
- This guidance document is intended to provide an overview of the priority food safety practices for pathogen control, including L. monocytogenes, at retail
1. Retail Guidance Document

Current outline of the document:

1. Supplier/Vendor
2. Sourcing/Procurement (food, non-food)
3. Receiving
4. Storage
5. Preparation
6. Display
7. Checkout
8. Consumer
Pathogen Control at Retail

Although food safety procedures should be followed throughout the retail store, the following areas have been identified as ‘key’ components in the control of pathogens, including *L. monocytogenes*: 

- **Sourcing from inspected suppliers** indicates that the food has passed the initial government inspection for food safety.
- **Cleaning and Sanitizing** are the number one controls available to the retail sector to minimize the spread of pathogens.
- **Temperature Control** is vital, as refrigeration temperatures inhibit or slow the growth of foodborne pathogens.
2. CCMOH - General Advice on Food Safety

- *Lm* can grow on many ready-to-eat foods in the refrigerator, but the colder the fridge is, the slower the organism will grow. Refrigerators should be kept clean and at a temperature below 4°C. Freezers should be kept at –18°C.

- Installing a thermometer in refrigerators is recommended. Refrigerator thermometers are best placed in a visible area on the top half of the inside hinged-side wall of the refrigerator.

- "Best before" dates should be observed to ensure freshness. "Best before" dates apply to unopened packages only.
Incidence of listeriosis* by age group (rate per million population) for the years 1995-2004

*Based on Listerial Reference Service (LRS) data received from the provinces and territories
Food Safety Advice for Risk Groups

- Avoid pasteurized and unpasteurized soft cheeses such as Brie, Camembert, and Hispanic-style fresh cheeses (e.g., Queso Fresco, Queso Blanco, Queso Panela, Halloumi cheese, etc.), as well as unpasteurized semi-soft cheeses (e.g., Roquefort, Stilton), unless the cheeses are baked or cooked into dishes, and have reached 74°C during cooking.

- Avoid raw (unpasteurized) milk

Adapted from CCMOH, 2010
3. Canadian Partnership for Consumer Food Safety Education

- Health Canada is a founding member of the Canadian Partnership for Consumer Food Safety Education, which was formed in 1998 with the participation of industry, consumer associations and government organizations.

- It is a non-profit organization committed to reducing foodborne illness in Canada by increasing awareness of safe food handling practices through the coordination and delivery of food safety education programs focused on the consumer.

- The Partnership has created tools and resources such as the popular FightBAC!® program, which is a huge success for educators messaging the importance of food safety at home and elsewhere.

Recently, the Partnership developed the “Be Food Safe®” Campaign featuring the four core messages: **Clean, Separate, Cook and Chill.**


It provides information needed by consumers to exercise their responsibilities for food safety.

**Some of the Partnership’s successes include:**

- Media outreach campaigns that have reached millions of Canadians through TV and print;
- Distribution of over half a million food safety tools (including fridge thermometers, magnets and brochures) to consumers and educators;
- Reliable resource for media;
- Leadership in education and food safety knowledge

The Partnership is viewed internationally as a good example of how government, industry and consumer groups can work together.
• Children’s Health & Safety Campaign
Health Canada – Social Media

• Social Media Strategy has received good feedback

• www.foodsafety.gc.ca
**Listeria control in Canada**

**Update of the HC *Lm* policy**

- **March- May 2010**
  - Solicited comments from stakeholders during a 6-week consultation period (March 22 to May 3, 2010)
  - Hybrid approach to the technical consultation:
    1) Targeted e-mail out (e.g., FPT governments, large industry associations, trading associations, academia and other groups)
    2) Online posting
  - More than 450 individual comments were received and taken into consideration

- **November 2010**
  - Final version of the policy is available upon request
  - Summary of comments received on Health Canada’s proposed policy on *Listeria monocytogenes* in RTE foods – March to May, 2010

- **April 2011**
  - The full version is available on the Health Canada website - with minor adjustments and clarification
Listeria control in Canada
Update of the HC Lm policy

• Other relevant documents that directly relate to the policy:

- Updates of related methods in the Compendium of Analytical Methods

- L. monocytogenes challenge testing of RTE refrigerated foods

- To be published in the near future

  Validation of food safety control measures to limit or prevent the growth of L. monocytogenes in RTE foods
Other relevant documents that directly relate to the policy:

- Updates of related methods in the Compendium of Analytical Methods
  

  - It has become important to assess the application of each method based on available data and performance parameters for each food category

  - Scope of the application of the *Listeria* methods published in the CAM have been modified

  For further information, please consult with the MMC at:
  Micro_methods_committee@hc-sc.gc.ca
Listeria control in Canada
Update of the HC Lm policy

Environmental testing for Listeria spp. (any environmental samples)
- MFHPB-07*
- MFHPB-30*
- MFHPB-29
- MFLP-13
- MFLP-15
- MFLP-34
- MFLP-39
- MFLP-71

* Note, these cultural methods will speciate Listeria isolates.

End-product testing for L. monocytogenes in dairy products (presence/absence)
- MFLP-33; cheese made from unpasteurized milk
- MFHPB-07; cheese made from unpasteurized milk
- MFHPB-30; all foods, hence all dairy products
- MFLP-14**, MFLP-28** and MFLP-33**

** Note, during a 6-month transition period (i.e., until Sept 30, 2011), given by the CFIA, all dairy products can be tested using these methods

End-product testing for L. monocytogenes in dairy products (enumeration)
- MFLP-74; all foods, hence all dairy products
On April 1, 2011, implementation of Health Canada’s *Listeria* policy

- Canadian Food Inspection Agency (CFIA); Provincial/territorial governments

- Issues/details regarding any specifics about the implementation of the 2011 Health Canada’s policy on *L. monocytogenes* in RTE foods, or any other requirements, would fall under the jurisdiction of the CFIA or provincial/territorial governments, as applicable.

- We would invite you to inquire directly with them for further information, if necessary
Research initiatives

Centre for Rapid Diagnostics, Regulatory Science & Food Safety

( BMH, Health Canada and IMI-NRC)

• Creation of a joint HC-NRC laboratory for rapid diagnostics of microbial hazards in food
  ↴ aiming to connect at *an operational level* complementary expertise in microbiology at HC and in fabrication and integration technologies at NRC

• Fabrication at IMI-NRC and deploy at BMH prototypes for testing and development

• The initial focus of the joint lab is to develop rapid diagnostic technologies that will address the recommendations from the Weatherill Report

• Enhance the responsiveness of laboratories to national foodborne emergencies
Research initiatives

Project Outline:

This schematic view represents integration of Phase 1-3:
1) Sample preparation and bacteria separation using size (S-Chip) or by magnetic capture
2) Bacteria culture on C-Chips
3) Integrated genomic identification with the G-Chip
Research initiatives

Capture Chip - Performance

• Capture molecule $\rightarrow$ Anti-Listeria antibody

• *L. monocytogenes* cells were captured and cultured on chip

• Capture/Culture Chip Gen. 1 shows excellent sensitivity

• Stable detection of 50 cells per ml

• Future generations of the C-Chip may improve detection limit
Human listeriosis cases across Canada from 1988-2010 were caused by a novel epidemic clone of *Listeria monocytogenes*

- Over the last two decades, the predominant subtype causing human listeriosis were serotype 1/2a isolates with similar Ascl/Apal PFGE macrorestriction profiles
- Study used numerous molecular subtyping methods to further determine the genetic relatedness and diversity of isolates with these very similar PFGE profiles, and compare them to isolates with dissimilar PFGE patterns and serotypes
- In addition to serotyping and PFGE, other molecular methods were used to screen for markers possibly unique to the 2008 ML outbreak clone
- Overall results suggest that a unique epidemic clone (ECV) has been causing human illness throughout Canada for at least the past two decades

Knabel et al., 2011; submitted for publication
Thank you
Salamat
Takk
Grazie
Arigato
Xie Xie
Khawp khun
Sukriya
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