InFORM 2017: PulseNet, OutbreakNet and Environmental Health

Demystifying the Laboratory
Outline

• Role of a regulatory laboratory
• Where do samples come from?
• What do we test?
• Laboratory programs
• Rapid Response Team program
• RRT investigations
• Investigations involving environmental samples
Food Laboratory Mission:

• To provide expert state of the art analytical testing in support of food safety and security programs, and consumer and agricultural interests in New York State.
Division of Food Laboratory

Albany, NY
Food Laboratory sections:

- **Food and Dairy Microbiology**: analyze over 15,000 food samples/yr. ~ 2,500 of these for foodborne pathogens and the remainder for other indicators

- **Food and Dairy Chemistry**: analyze over 5,000 food samples/yr. ~ 1,500 for chemical hazards

- **Pesticide residues**: analyze over 2,500 produce samples/yr. for 165 different pesticide residues and pharmaceutical products
What do we test?

- Primarily testing for specific health hazards and/or accuracy of labeling
- Focus on high risk, ready-to-eat food, feed, and environmental samples
- Collaborate and coordinate work planning with other allied public health agencies (FDA, USDA, EPA, NYSDOH, etc.)
Division of Food Laboratory

- PulseNet Ag laboratory
- Genome Trakr laboratory
- FDA certified for milk testing laboratory
- Member of Food Emergency Response Network (FERN)
- Participant of the Pesticide Data Program (USDA)
2008 Accredited to

- ISO/IEC 17025 Standard
- AOAC ALACC Criteria: Guidelines for Laboratories Performing Microbiological and Chemical Analysis of Food, Dietary Supplements, and Pharmaceuticals

https://www.a2la.org/scopepdf/2749-01.pdf
https://www.a2la.org/scopepdf/2749-02.pdf
Scope of Accreditation - Chemical

- Ash in Feed
- Determination of Crude Fiber in Animal Feed
- Determination of Cyclamate by UPLC/MS
- Determination of Fat, Fiber, Protein and Moisture in Animal Feed by NIR
- Determination of Lasalocid in Feed by HPLC/MS/MS
- Determination of Minerals in Animal Feed
- Determination of Monensin in Feed by HPLC/MS/MS
- Determination of Nitrogen in Fertilizer
- Determination of Patulin by HPLC/MS/MS
- Determination of Potash in Fertilizer
- Determination of Sulfites
- Metal Analysis by Closed Bessel Microwave Digestion an ICP/MS
- Multiple Residue Screening of Pesticide Data Program (PDP) Samples
- Percent Moisture in Feed and Pet Food
- Toxic Metal Analysis in Foods by Closed Vessel Microwave Digestion and ICP/MS
Division of Food Laboratory

Scope of Accreditation - Biological

- *Campylobacter jejuni/lari/coli* species on BAX
- *Campylobacter* species USDA Method
- *Escherichia coli* O157:H7 on ABI 7500 Fast
- *Escherichia coli* O157:H7 Modified BAM Method
- Detection of Shiga-toxin producing *E. coli* (STEC) by rtPCR on 7500 ABI Fast
- *Listeria monocytogenes* on ABI 7500 Fast
- *Listeria monocytogenes* BAM Method
- *Salmonella* species on ABI 7500 Fast
- *Salmonella* species BAM Method
- Phosphatase Testing using the Advanced Instruments Fluorophos
Where do the samples come from?

- **Within Ag and Markets (surveillance)**
  - Division of Food Inspection
  - Division of Milk Control/Dairy Services
  - Division of Plant Industry

Collected by field staff from farms, food processing plants, food/feed/fertilizer manufacturers, distribution centers, farmers markets, and retail stores.
Where do the samples come from?

- Other states
- NE Region
Where do the samples come from?

• Federal agencies
  • AMS Pesticide Data Program
  • Food Emergency Response Network (FERN)
  • Feed Safety Program
Where do the samples come from?

- Develop and maintain multi-jurisdictional RRTs that operate under ICS/NIMS and Unified Command to support integrated all-hazards prevention, response and recovery efforts for food/feed. Unify and coordinate federal/state/local food/feed emergency response efforts, including:
  - Strengthening the link among epidemiology, lab and environmental health components.
  - Foodborne illness/outbreak investigations, removing tainted food from commerce, root cause investigations.
  - Supporting components: training, data sharing, data analysis and communications.
- Capture/develop and support adoption of best practices (mentorship)
- Ensure alignment with national priorities (FSMA, IFSS, PFP)
“The RRT Five-Legged Stool”

- Food Program
- FDA District
- Feed Program
- Laboratory
- Epidemiology
Outbreaks & Recall Investigations

• *Salmonella* associated with deli meats/spices (2010)
• Shiga-toxin producing *E. coli* O145 in lettuce (2010)
• *Listeria monocytogenes* in potato salad (2011)
• *Salmonella* in chicken livers (2011)
• *E. coli* O157:H7 associated with produce (2013)
• *Listeria monocytogenes* in imported seafood (2012-13)
• *Salmonella* in pet foods/treats (2013)
• *Salmonella* in chia seeds (2014)
• *Listeria monocytogenes* in soft cheese (2016-17)
• *Listeria monocytogenes* in deli markets (ongoing)
RRT Investigations

• From December- October 2017
  • Six events investigating presence of *Salmonella* Enteriditis and *Listeria monocytogenes*
  • Four joint investigation with FDA (NYSDAM-product samples and FDA-environmental)
  • Most samples tested in the laboratory were negative except for one.....

• February 2017
  • *Listeria monocytogenes* in raw milk cheese
    • Joint investigation with FDA (NYSDAM-product samples; FDA-environmental and product samples)
    • 6 samples were taken. Three samples positive.
Listeria monocytogenes in Raw Milk Soft Cheese

- Firm issues nationwide recall of product 3/7/17
- PFGE performed by NYS Ag and Markets Food Laboratory on cheese isolates patterns matched to clinical isolates 3/8/17
- WGS performed by NYS Ag and Markets Food Laboratory on cheese isolates and FDA matches sequence to ≤3 SNPs difference to those of the clinical isolates 3/13/17
Investigations involving Environmental Sampling

• From January - October 2017
  • Seven environmental sampling events investigating presence of *Listeria monocytogenes* in deli markets
  • Swabs are collected from different zones
  • Five events resulted in positive results (environmental or food)
  • Once positive samples are identified, Food Safety inspectors return to the establishment and request compliance of the “Listeria protocol”.
Listeria monocytogenes – environmental samples

PFGE-ApaI

PFGE-ApaI

PFGE-Ascl

Serving tool

Human (2016)
Listeria monocytogenes – environmental samples

<table>
<thead>
<tr>
<th>Isolation Date</th>
<th>NYAG</th>
<th>USA</th>
<th>NY</th>
<th>Bronx</th>
<th>Food</th>
<th>Deli meat</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/15/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli meat</td>
<td>Food</td>
<td>mortadella w/ pistachio</td>
</tr>
<tr>
<td>6/6/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli meat</td>
<td>Food</td>
<td>mortadella w/ pistachio</td>
</tr>
<tr>
<td>6/27/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Sponge</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>6/27/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Sponge</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>9/26/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Sponge</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>9/26/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Sponge</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>6/21/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli case #1</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>6/21/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli case #1</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>7/11/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli case #4</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>7/11/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli case #4</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>6/26/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli case #1</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>6/26/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli case #1</td>
<td>Environmental</td>
<td>Ware wash sink</td>
</tr>
<tr>
<td>9/26/17</td>
<td>NYAG</td>
<td>USA</td>
<td>NY</td>
<td>Bronx</td>
<td>Deli case #7 (by exit)</td>
<td>Environmental</td>
<td>Cutting board #4 (front, w.</td>
</tr>
</tbody>
</table>

LM-1.2W4-103116
LM-2 WK1 080817
Acknowledgements

• **NYSDAM**
  - Food Laboratory staff
  - Food Safety and Inspections staff
  - Milk Control and Dairy Services staff

• **NYSDOH – Bureau of Community Environmental Health and Food Protection**

• **FDA – New York District**
Thank you!

Maria Ishida, PhD
Director of Food Laboratory
NYS Department of Agriculture and Markets
Email: Maria.Ishida@agriculture.ny.gov