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Studies of Lm at Retail

Susan Hammons

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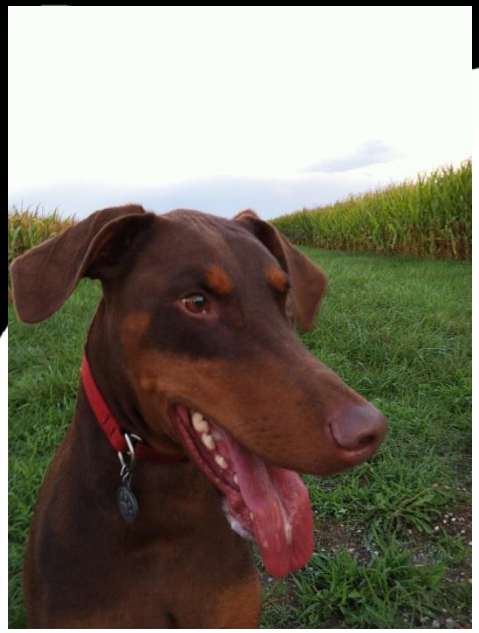
Mid-Continental Association of Food and Drug Officials



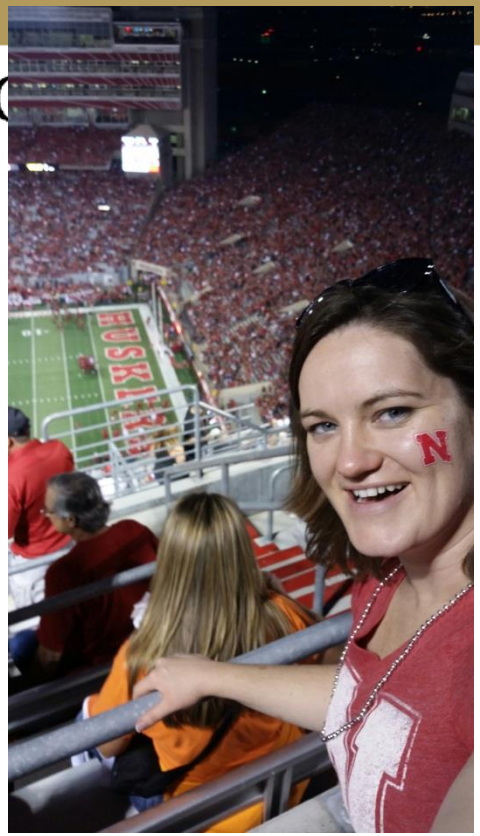
My Background

Master of Science

Food Science

Purdue University

May 2014



Bachelor of Science

Food Science & Technology

University of Nebraska-Lincoln

May 2011

Oliver Lab – *Listeria* at Retail

Objective

Improve public health through evidence-based interventions to control *Listeria monocytogenes*.

- Strategies
  - Collaborate with retailers & sanitation providers
  - Locate environmental niches
  - Determine transient vs. persistent contamination
  - Test alternative sanitation procedures
  - Identify best practices
  - Develop long-term practical controls

Estimated annual human health burden of selected known foodborne diseases, United States

Pathogen	Illnesses	Deaths	Case-fatality
Campylobacter	1,322,137	119	0.1%
Salmonella	1,229,007	452	0.5%
***E. coli* O157:H7**	96,534	31	0.5%
Listeria (LM)	1662	266	15.9%

CDC
Centers for Disease Control and Prevention

Scallan, et al., *Emerging Infectious Diseases, 2011*

2010 FSIS Risk Assessment

FSIS Comparative Risk Assessment for *Listeria monocytogenes* in Ready-to-eat Meat and Poultry Deli Meats

This risk assessment indicates that of those listeriosis cases and deaths attributed to deli meats, approximately 83% are associated with deli meats sliced at retail.

Relative Risk Ranking	Predicted Median Cases of Listeriosis for 23 Food Categories					
	Per Serving Basis[a]			Per Annum Basis[b]		
		Food	Cases		Food	Cases
1		Deli Meats	7.7×10^{-8}	Very High	Deli Meats	1598.7

Why *Listeria* in deli meats

- Ubiquitous: “found everywhere”[12-14]
- Salt tolerant[15, 16]
- Grows at refrigeration temps [15, 16]
- Formation of biofilms [16, 7]

Once *L. monocytogenes* enters a deli, it can grow, potentially be transferred to food, and cause illness.

Listeria monocytogenes and *Listeria* spp. Contamination Patterns in Retail Delicatessen Establishments in Three U.S. States

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Longitudinal study of deli environments

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Food Contact

Site	+/Total	%
Slicer Blade	5/180	2.8
Deli Case	4/179	2.2
Case by Meat	2/33	6.1
Deli Case Tray	4/180	2.2
3-Basin Sink Interior	14/179	7.8
1-Basin Sink Interior	30/164	18.3
Cold Room Rack	4/180	2.2
Cutting Board	4/152	2.6
Rewrap table	1/179	0.6
Counter	5/178	2.8

Transfer Point

Site	Total	%
Slicer Knob	3/180	1.7
Case Handle	8/180	4.4
Scale Top	7/180	3.9

Non-Food Contact

Site	+/Total	%
3-Basin Sink Ext	6/180	3.3
Floor-Wall Junct. (under 3-basin sink)	24/180	13.3
1-Basin Sink Exterior	7/164	4.3
Floor/Wall Junct (under 1-basin sink)	31/111	27.9
Deli Drain	36/180	20.0
Floor Adjacent to Deli Drain	46/180	25.6
Deli Floor	23/179	12.8
Cold Room Floor	36/179	20.1
Cold Room Wall	4/180	2.2
Cold Room Drain	40/119	33.6
Standing Water	16/90	17.8
Squeegee	36/132	27.3
Cart Wheel	14/180	7.8
Hose	6/134	4.4
Trash Can	9/180	5.0

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	July	Aug	Sept	Oct	Nov	Dec
Food Contact Sites						
Slicer	-	-	-	-	-	-
Deli case	-	-	-	-	-	-
Deli case near raw meat	NT	NT	NT	NT	NT	NT
Deli case trays	-	-	-	-	-	-
3-basin sink interior	-	-	-	-	-	-
1-basin sink interior	NT	NT	NT	NT	NT	-
Cold room rack	-	-	-	-	-	-
Cutting board	-	-	-	-	-	-
Rewrap table	-	-	-	-	-	-
Counter	-	-	-	-	-	-
Non-food contact sites						
3-basin sink exterior	-	-	-	-	-	-
Floor/wall junction (3-basin)	-	-	-	-	-	-
1-basin sink exterior	NT	NT	NT	NT	NT	NT
Floor/wall junction (1-basin)	NT	-	NT	NT	NT	-
Deli drain	-	-	-	-	-	-
Floor adjacent to drain	-	-	-	-	-	-
Deli floor	-	-	-	-	-	-
Cold room floor	-	-	-	-	-	-
Cold room wall	-	-	-	-	CU-299,338	-
Cold room drain	-	-	-	-	-	-
Standing water	NT	NT	NT	NT	NT	NT
Squeegee	NT	NT	NT	-	-	-
Cart Wheel	-	-	-	-	-	-
Hose	NT	NT	NT	NT	NT	NT
Trash can	-	-	-	-	-	-
Transfer Points						
Slicer knob	-	-	-	-	-	-
Case handle	-	-	-	-	-	-
Scale	-	-	-	-	-	-

- = negative for LM; NT= not tested; LM = positive for *L. monocytogenes;* CU-#= PFGE subtype

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	April	May	June	July	August	September	October	November	December
Food Contact Sites									
Slicer	-	-	-	-	-	-	-	-	-
Deli case	NT	NT	NT	-	-	-	-	-	-
Deli case near raw meat	NT	NT	NT	-	-	-	-	-	-
Deli case trays	NT	NT	NT	-	-	-	-	-	-
3-basin sink interior	NT	NT	NT	CU-57,267	-	-	-	-	-
1-basin sink interior	NT	NT	NT	CU-258,69	-	-	-	CU-294,321	-
Cold room rack	-	-	-	-	-	-	-	-	-
Cutting board	NT	NT	NT	NT	-	-	NT	NT	-
Rewrap table	NT	NT	NT	-	-	-	-	-	-
Counter	NT	NT	NT	-	-	-	-	-	-
Non-food contact sites									
3-basin sink exterior	NT	NT	NT	-	-	-	-	-	-
Floor/wall junction (3-basin)	CU-258,69	CU-258,69	CU-258,69	CU-258,69	CU-258,69	CU-8,96	LM	CU-258,69	CU-258,69
1-basin sink exterior	NT	NT	NT	CU-258,69	-	-	LM	-	CU-258,69
Floor/wall junction (1-basin)	NT	NT	NT	CU-258,69	-	-	LM	CU-258,69	CU-258,69
Deli drain	NT	NT	NT	CU-258,69	CU-258,333	-	CU-258,69	CU-258,69	CU-258,69
Floor adjacent to drain	-	CU-258,69	CU-258,69	CU-258,69	CU-258,69	-	-	CU-258,69	CU-258,69
Deli floor	NT	NT	NT	CU-258,69	-	-	-	CU-258,69	-
Cold room floor	NT	NT	NT	CU-258,69	CU-295,329	-	CU-258,69	CU-258,69	CU-258,69
Cold room wall	CU-258,69	-	-	-	-	-	-	-	-
Cold room drain	NT	NT	NT	CU-258,69	CU-258,69	-	CU-258,69	CU-258,69	CU-258,69
Standing water	NT	NT	NT	NT	-	-	NT	NT	-
Squeegee	NT	NT	NT	CU-258,69	CU-258,69	-	CU-258,69	CU-258,69	CU-258,69
Cart Wheel	-	-	CU-258,69	CU-258,69	-	-	-	-	-
Hose	NT	NT	NT	-	CU-258,69	-	-	-	-
Trash can	-	-	CU-258,69	-	CU-258,69	-	-	-	-
Transfer Points									
Slicer knob	-	-	-	-	-	-	-	-	-
Case handle	-	-	-	-	-	-	-	-	-
Scale	NT	NT	NT	-	-	-	-	-	-

	August	September	October	November	December	January
Food Contact Sites						
Slicer	-	-	-	-	-	-
Deli case	-	-	-	-	-	-
Deli case near raw meat	-	CU-259,322	-	-	-	-
Deli case trays	-	-	-	-	-	-
3-basin sink interior	-	-	-	-	-	-
1-basin sink interior	CU-40,96	CU-296,330	CU-57,267	CU-296,330	-	LM
Cold room rack	-	-	-	-	-	-
Cutting board	-	CU-262,79	-	-	-	-
Rewrap table	-	-	-	-	-	-
Counter	-	-	-	-	-	-
Non-food contact sites						
3-basin sink exterior	-	-	-	-	-	-
Floor/wall junction (3-basin)	CU-258,323	CU-258,322	-	-	-	LM
1-basin sink exterior	-	-	-	-	-	-
Floor/wall junction (1-basin)	CU-258,323	CU-258,323	-	CU-258,69	-	LM
Deli drain	CU-259,322	CU-258,323	CU-11,320	CU-262,334	-	LM
Floor adjacent to drain	CU-259,322	CU-262,317	CU-258,322	LM	CU-258,322	LM
Deli floor	CU-258,333	CU-258,323	-	-	-	LM
Cold room floor	CU-258,322	-	CU-258,322	-	-	LM
Cold room wall	-	-	-	-	-	-
Cold room drain	CU-258,322	CU-259,322	CU-258,67	LM	CU-258,323	LM
Standing water	CU-82,215	NT	CU-298, 335	NT	CU-258,323	-
Squeegee	CU-259,322	CU-258,322	CU-262,334	LM	CU-259,322	LM
Cart Wheel	-	-	CU-258,323	-	-	-
Hose	-	-	-	-	-	-
Trash can	-	CU-258,322	-	-	-	LM
Transfer Points						
Slicer knob	-	-	-	-	-	-
Case handle	-	CU-258,322	-	-	-	-
Scale	-	-	-	-	-	-

Conclusions From Simmons, et al. 2014

- LM can be prevalent in retail delis (0-40%) [18, 19]
  - only 8/30 delis were highly prevalent (>10% LM)
- LM can persist in retail delis (observed ~1.5 years)[19, 21]
- LM does not persist in all stores (only 11/30 observed)[19]
- Non-food contact surfaces have higher LM prevalence than food contact surfaces (NFCS 15% vs. FCS 4%)[18-21]

Remaining slides embargoed pending peer review and publication

Recommendations to Retailers

- Maintain good daily SSOPs in all delis
- Identify store with greatest food safety challenges and focus resources
- Target NFCS for additional cleaning
  - Use cleanable squeegees; store in sanitizer solution
  - Eliminate standing water
  - Improve floor cleaning procedures/frequency
- Education, training & facilities maintenance complement benefits of sanitation changes

- Review Food Code and ensure compliance

What else should I do?

FSIS
Best Practices Guidance for Controlling *Listeria monocytogenes* (*Lm*) in Retail Delicatessens
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Questions?

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