

**Be Careful In What You Wish  
For....**

***Pathogen Testing In Raw Milk Cheeses***

# Dialogue

- Artisan Cheese Maker: Why do you test for generic coliforms?
- Regulator: It is usually indicative of post-pasteurization contamination. That means you could also have a problem with pathogens because you are not maintaining sanitation after pasteurization.
- Artisan Cheese Maker: I make raw milk cheese, we know they are naturally in the milk.
- Regulator: Good point.....lets have Cornell study it.



# PENNSYLVANIA PRESSROOM

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03/02/2018

## State Department of Agriculture Warns Consumers

**Harrisburg, PA** - Consumers who purchased raw, whole milk from Fertile Valley Farm in Honesdale, Wayne County between February 21 and March 1, 2018 should immediately discard the milk. Tests completed after a routine inspection and sampling were positive for *Listeria monocytogenes*, the bacteria that causes Listeriosis.

Milk was sold directly from the farm in plastic gallon, half gallon, and quart containers with the Fertile Valley Farm label. The farm has discarded all remaining milk and posted a notice to its customers on social media.

No reported illnesses have been attributed to the product, but anyone who consumed the milk and became ill should consult their physician.

Listeriosis symptoms include fever, muscle aches, nausea and diarrhea. The illness mainly affects pregnant women, newborns, the elderly, and adults with impaired

## Research Paper

# Outbreak of *Escherichia coli* O157:H7 Infections Linked to Aged Raw Milk Gouda Cheese, Canada, 2013

ANDREA CURRIE,<sup>1\*</sup> ELENI GALANIS,<sup>2</sup> PEDRO A. CHACON,<sup>3</sup> REGAN MURRAY,<sup>1</sup> LYNN WILCOTT,<sup>4</sup> PAUL KIRKBY,<sup>3</sup> LANCE HONISH,<sup>5</sup> KRISTYN FRANKLIN,<sup>1</sup> JEFF FARBER,<sup>6,7</sup> ROB PARKER,<sup>8</sup> SION SHYNG,<sup>4</sup> DAVENDRA SHARMA,<sup>3</sup> LORELEE TSCHETTER,<sup>9</sup> LINDA HOANG,<sup>10</sup> LINDA CHUI,<sup>11,12</sup> ANA PACAGNELLA,<sup>10</sup> JULIE WONG,<sup>10</sup> JANE PRITCHARD,<sup>13</sup> ASHLEY KERR,<sup>1</sup> MARSHA TAYLOR,<sup>2</sup> VICTOR MAH,<sup>14</sup> AND JAMES FLINT<sup>1</sup> FOR THE INVESTIGATIVE TEAM†

<sup>1</sup>Centre for Foodborne, Environmental and Zoonotic Infectious Diseases, Public Health Agency of Canada, Guelph, Ontario, Canada N1H 8J1; <sup>2</sup>Communicable Disease Prevention and Control Services, <sup>4</sup>Environmental Health Services, and <sup>10</sup>British Columbia Public Health Microbiology and Reference Laboratory, Centre for Disease Control, Vancouver, British Columbia, Canada V5Z 4R4; <sup>3</sup>Canadian Food Inspection Agency, Ottawa, Ontario, Canada K1A 0Y9; <sup>5</sup>Alberta Health Services, Edmonton, Alberta, Canada T5J 2Y2; <sup>6</sup>Bureau of Microbial Hazards, Health Canada, Ottawa, Ontario, Canada K1A 0K9; <sup>7</sup>University of Guelph, Guelph, Ontario, Canada N1G 2W1; <sup>8</sup>Interior Health Authority, Kelowna, British Columbia, Canada V1Y 0C5; <sup>9</sup>National Microbiology Laboratory, Public Health Agency of Canada, Winnipeg, Manitoba, Canada R3E 3R2; <sup>11</sup>Provincial Laboratory for Public Health, Edmonton, Alberta, Canada T2N 4W4; <sup>12</sup>Department of Laboratory Medicine and Pathology, University of Alberta, Edmonton, Alberta, Canada T6G 2R7; <sup>13</sup>Ministry of Agriculture, Abbotsford, British Columbia, Canada V3G 2M3; and <sup>14</sup>Alberta Health, Edmonton, Alberta, Canada T5J 1S6

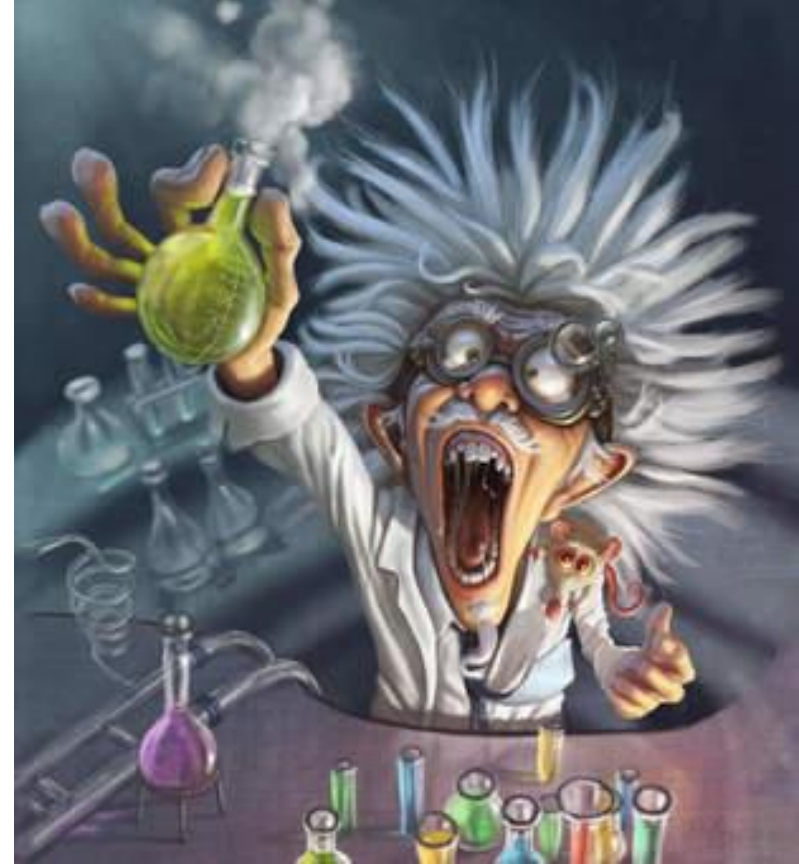
# So we did.....



J. Dairy Sci. 99:6105–6120

<http://dx.doi.org/10.3168/jds.2016-11112>

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**Coliform detection in cheese is associated with specific cheese characteristics, but no association was found with pathogen detection**

A. Trmčić, K. Chauhan, D. J. Kent, R. D. Ralyea, N. H. Martin, K. J. Boor, and M. Wiedmann<sup>1</sup>  
Milk Quality Improvement Program, Department of Food Science, Cornell University, Ithaca, NY 14850

# Consensus categorization of cheese based on water activity and pH—A rational approach to systemizing cheese diversity

A. Trmčić, R. Ralyea, L. Meunier-Goddik, C. Donnelly, K. Glass, D. D'Amico, E. Meredith, M. Kehler, N. Tranchina, C. McCue, M. Wiedmann



DOI: <https://doi.org/10.3168/jds.2016-11621>



Article Info

- Abstract
- Full Text
- References

## Abstract

Development of science-based interventions in raw milk cheese production is challenging due to the large diversity of production procedures and final products. Without an agreed upon categorization scheme, science-based food safety evaluations and validation of preventive controls would have to be completed separately on each individual cheese product, which is not feasible considering the large diversity of products and the typically small scale of production. Thus, a need exists to systematically group raw milk cheeses into logically agreed upon categories to be used for food safety evaluations. This paper proposes and outlines one such categorization scheme that provides for 30 general categories of cheese. As a base for this systematization and categorization of raw milk cheese, we used Table B of the US Food and Drug Administration's 2013 Food Code, which represents the interaction of pH and water activity for control of vegetative cells and spores in non-heat-treated food. Building on this table, we defined a set of more general and broader water activity categories to better

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- From milk to cheese: fingerprint of milk, ricotta, scotta, and obtained during sun
- Publication stage: In Journal of Dairy Science
- A 100-Year Review: and quality

# Discussion ensued (2016)

- Based on the science presented, NYS Department of Agriculture and Markets decides to start testing for pathogens (*Listeria monocytogenes* to start)
- In the run-up to preparing for the extra lab work that this will entail.....

**THIS happens.....!!!!**

# Vulto Creamery Listeria Outbreak “over” at 8 with 2 dead

By Denis Stearns on May 3, 2017

POSTED IN [FOODBORNE ILLNESS OUTBREAKS](#)

***Case Count: Connecticut (1), Florida (1),  
New York (5) and Vermont (1)***

CDC collaborated with public health and regulatory officials in several states and the U.S. Food and Drug Administration (FDA) to investigate a multistate outbreak of *Listeria monocytogenes* infections





# FDA OBSERVATION 1

- **Failure to manufacture and store foods under conditions and controls necessary to minimize the potential for growth of microorganisms and contamination .**

Specifically:

- **A finished product sample of your firm' s Ouleout soft raw milk cheese product bearing lot #617 was analyzed by an FDA laboratory and found to be positive for *Listeria monocytogenes*, a foodborne pathogen.**
- **A finished product sample of your firm's Ouleout soft raw milk cheese product bearing lot #623, collected by the New York State Department of Agriculture and Markets in your facility on 2/28/2017 during the FDA inspection, was found to be positive for *Listeria monocytogenes*, a foodborne pathogen.**

<https://www.fda.gov/ucm/groups/fdagov-public/@fdagov-afda-orgs/documents/document/ucm554717.pdf>

# FDA OBSERVATION 2

**Failure to perform microbial testing where necessary to identify sanitation failures and possible food contamination.**

Specifically, a review of your **environmental sampling** test records noted the following:

- You have conducted environmental sampling during 20 months from 7/28/2014 through 2/19/2017 . **Your records show 54 out of 198 results positive for *Listeria* spp.** taken from various locations throughout your manufacturing facility, which include, but are not limited to: floor drains in the manufacturing room, wash room and cheese aging room; outside of brine tanks in the walk-in cooler ; door handles to the cheese aging room, walk-in cooler and entry door; various areas of the floor in the cheese aging room; bottom of a squeegee in the cheese aging room; employee aprons; and wooden cheese rack dollies in the cheese aging room. The most recent positive finding being a swab taken from the floor in the manufacturing room on 2/19/2017 . **You have not conducted an investigation to provide identification of the *Listeria* spp. to Genus and species and you have also failed to identify its source or point of entry/harborage in your facility.**

# FDA OBSERVATION 2 (cont.)

Failure to perform microbial testing where necessary to identify sanitation failures and possible food contamination.

• A total of 10 of the 54 positive results were found on food contact surfaces between 10/30/2014 and 4/28/2015. You did not conduct microbial testing of finished products to confirm that your finished products were not contaminated with the organism found by your environmental testing program . According to your sample records, the food contact surface locations were as follows :

o Wooden cheese aging board in cheese aging room; positive result from 10/30/2014.

o The cheese brush used to brush Ouleout and Miran da soft cheeses and two wooden cheese aging boards in cheese aging room; positive results from 12/3/2014 .

o The cheese brush used to brush Ouleout and Miran da soft cheeses and two wooden cheese aging boards in cheese aging room; positive results from 11/6/2015.

o Two cheese brushes used to brush the Andes and the Walton Umber hard cheeses; positive results from 2/3/2015.

o Two cheese brushes used to brush the Andes and the Walton Umber hard cheeses; positive results from 3/22/2015.

o A cheese brush (not specified to product); positive result from 4/28/2015.

• You did not continue sampling food contact surfaces after 4/28/2015 to determine if *Listeria* spp. was still present on these surfaces representing a continued contamination risk to your cheese products.

# Corrective Action

- Development of corrective action plan *prior* to finding a positive
  - Determine type of action that should be taken (driven by what zone the positive occurred in)
  - Action to determine that the pathogen has been eliminated from the area
    - Focused cleaning and sanitation
    - Vector testing
  - Root cause analysis to determine source of the contaminant
  - Document any positives and corrective action taken

# What to do with testing results

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- Review testing results every time results are reported
  - This should include review of at least last 4-8 sampling results to identify trends (e.g., site that has positives with intervening negatives)
  - Take corrections on each positive sample and **document action**
- Organize testing results in one location (folder, three-ring binder or ideally electronically)
  - Include documentation of corrections in same location
- Conduct regular (quarterly, yearly; depends on testing frequency & volume) review of testing results
  - Tabulate and evaluate long-term trends

# FDA Observation 3

- The procedure used for cleaning and sanitizing of equipment and utensils has not been shown to provide adequate cleaning and sanitizing treatment.
- Specifically, review of your environmental sampling results across 20 months from 7/28/2014 through 2/19/2017 showed positive results for *Listeria* species on several food contact and non-food contact surfaces in your facility. Per your documented corrective actions, upon getting a positive result you re-cleaned and re-sanitized the affected areas using your routine cleaning and sanitizing operations.
- **However, when you re-sampled these locations a month or more later and tests showed repeated positive results, you did not investigate the use of a more effective method of cleaning and sanitizing.**

# FDA Observation 4.....

- And 5,
- And 6,
- And 7,
- And 8.....
- Skip to Observation 15.....

# FDA Observation 15

- You did not submit a reportable food report to FDA within 24 hours after you determined that a food was a reportable food.
- Specifically, you were notified via telephone on 3/3/2017 that your firm's Ouleout soft raw milk cheese product bearing lot #617 was found to be positive for *Listeria monocytogenes*, a foodborne pathogen and that you would need to file a reportable food report to the FDA within 24 hours. At this present time (3/22/2017), you still have not filed a reportable food report with the FDA.



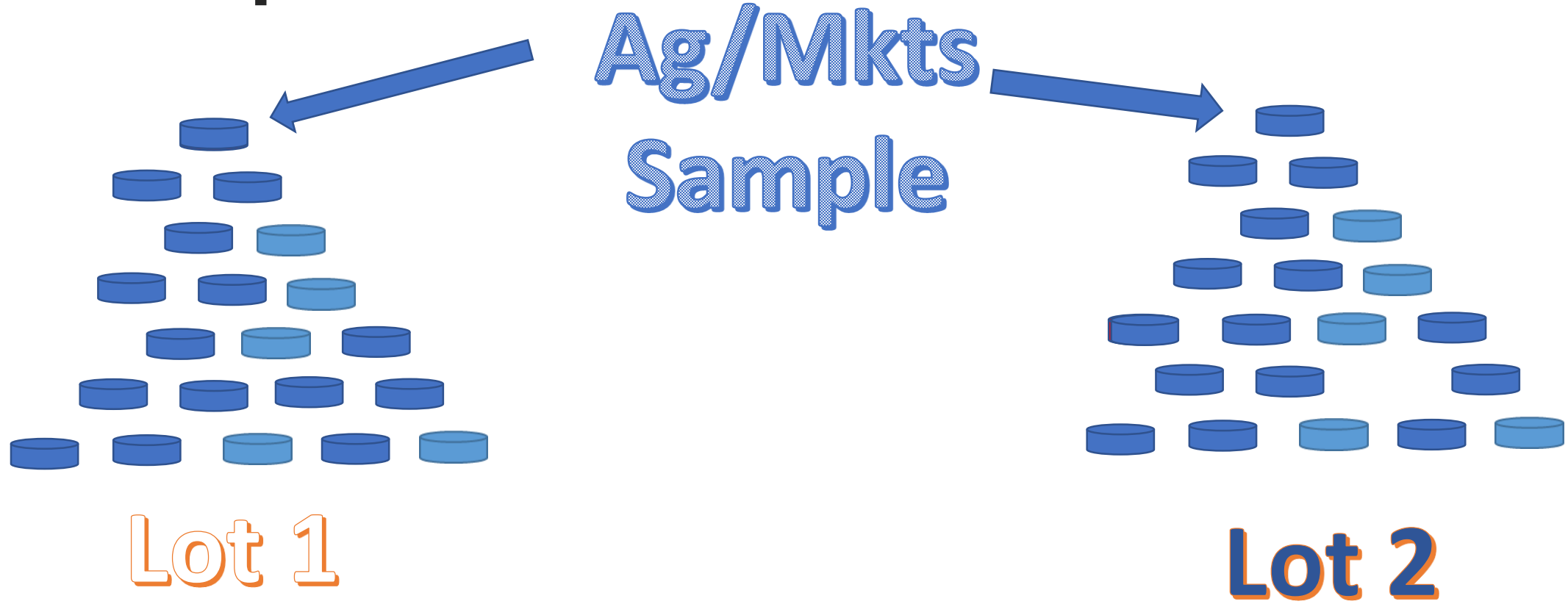
# FDA DATES OF INSPECTION

- 2/28/2017(Tue)
  - 3/1/2017(Wed)
  - 3/02/2017(Thu)
  - 3/07/2017(Tue)
  - 3/13/2017(Mon)
  - 3/17/2017(Fri),
  - 3/22/2017(Wed)
- The plant in total, is about as large as this meeting room we're in today. Including:
    - Cheese make room
    - Wrapping area
    - Cleaning area
    - Small office area
    - Cheese aging room

# Effective April 1, 2017

- NYS Ag/Mkts starts testing for *Listeria monocytogenes* in raw milk cheeses
  - Program is **Surveillance** only
  - 1 sample/month taken for each 'type' of cheese a producer makes

# A known 5% Listeria Positive Rate Assumption



# And .....it starts.....Hit #1

- Positive Sample for *Listeria monocytogenes* – **August 2017**
  - Very limited production - <100 lbs of a Monterey Jack style
- Cornell samples plant (pre-cleaning/sanitizing): 5 of 20 positive
  - Positives: window sill, floor drain, floor drain cover, water standing in floor drain, floor where whey drains/runs from press to drain
  - All 5 positive environmental samples genetically identical by WGS
  - Genetic match to Ag/Mkts isolate found in original sample
- **Devout cleaning/sanitizing:** follow-up testing by regulatory authority all negative for *Listeria*.

# Yancey's Fancy School of Listeria Remediation

*Where SAFETY is ALWAYS first!!*

*Days since last lost time  
accident:*

**1**



# And .....it continues.....Hit #2

- Positive Sample for *Listeria monocytogenes* – October 2017
  - Cornell tests: 8/19 positive for *Listeria* spp., 0 for *Listeria monocytogenes*
  - FDA takes 176 environmental swabs – 7 positives for *Listeria* spp., 0 for *Listeria monocytogenes*
  - Manufactured cheese from milk for another company
    - FDA takes 108 swabs, 3 positive for *Listeria monocytogenes*

# And .....again.....Hit #3

- Positive Sample for *Listeria monocytogenes* – November 2017
  - Manufacturer says all product in their control
- No distribution, seemingly not on the radar.
- No FDA visit.

# To Date: As of Friday March 2, 2018

- 427 samples tested since April 1, 2017
- And late in the day.....**a FOURTH positive confirmed**.....



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## Warning: Organic, raw goat milk cheese positive for Listeria

BY NEWS DESK | MARCH 5, 2018

New York State Agriculture Commissioner Richard A. Ball warns consumers not to eat The Maiden's Creamery "Wild Meadow" raw goat milk cheese made in South New Berlin because of possible Listeria contamination.

So far, no illnesses have been reported in connection with the goat cheese made by by Mark Harvey, 1277 Copes Corner Road.

The product is sold in various sizes of sealed flexible plastic [packaging](#), displaying the plant number 36-1315, with a code of 101. The state's consumer warning affects all packages with this code. The goat cheese was sold at the Cooperstown Farmers' Market in Cooperstown, NY, in late December 2017 and early January 2018, and at the Sunflower Natural Foods Market starting on Jan. 10.



A routine sample of the cheese taken by an inspector from the Division of Milk Control and Dairy Services on Feb. 20 was tested by the New York State Food Laboratory and discovered to be contaminated with Listeria

# Case Study 1 – No Outbreak - 2014

- *Listeria monocytogenes* in raw milk sheep cheese from 2 farms
  - Flocks of 170 and 400
  - SCC: relatively unchanged
  - Traced back to a single udder of single ewe
    - Udder milk contained ~100 CFU/ml Lm
- Same strains isolated from:
  - Processing and cooler floors
  - Cheese forms
  - Work bench
  - Brushes used to wash cheese





# Case Study 2 – No Outbreak - 2018

- *Listeria monocytogenes* found in popsicles
  - Found as part of finished product testing by customer
- Same strains isolated from:
  - Processing floor drain 6 months previously
  - Drain in close proximity to popsicle machine

Full ▾

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### Pathogen: environmental/food/other sample from *Listeria monocytogenes*

**Identifiers** BioSample: SAMN07255467; SRA: SRS2315508; CFSAN: CFSAN065101

**Organism** [Listeria monocytogenes](#)  
cellular organisms; Bacteria; Terrabacteria group; Firmicutes; Bacilli; Bacillales; Listeriaceae; Listeria

**Package** [Pathogen: environmental/food/other: version 1.0](#)

<b>Attributes</b>	<b>collection date</b>	2017-06-15
	<b>strain</b>	FDA00011950
	<b>description</b>	cntn_cf_publicComments
	<b>host disease</b>	missing
	<b>isolate name alias</b>	CFSAN065101
	<b>collected by</b>	FDA
	<b>latitude and longitude</b>	missing
	<b>geographic location</b>	<a href="#">USA:NY</a>
	<b>host</b>	missing
	<b>isolation source</b>	environmental swab
	<b>attribute_package</b>	environmental/food/other

**BioProject** [PRJNA215355](#) *Listeria monocytogenes*  
Retrieve [all samples](#) from this project

**Submission** [CFSAN](#); 2017-06-19

#### Related information

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 [Pathogen: environmental/food/other sample from \*Listeria monocytogenes\*](#) biosample

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## Listeria toll nears 1,000 in South Africa; source undetermined

BY NEWS DESK | MARCH 2, 2018

Authorities in South Africa continue to remind the public how to decrease the risk of contracting foodborne Listeria infections amidst an outbreak that has sickened almost 1,000 and killed at least 176.

World health officials have said it is the largest known outbreak from Listeria monocytogenes bacteria.

Public health officials have not yet been able to pinpoint the cause of the outbreak, which has been ongoing for several months.

However, several government agencies have repeatedly urged the public to follow good hygiene practices and cook foods thoroughly.

As of this week, the Centre for Enteric Diseases and Division of Public Health Surveillance and Response, the Outbreak Response Unit, and the National Institute for Communicable Diseases/National Health

Laboratory Service joined in reporting 945 illnesses, with 202 of those cases occurring since the first of this year.

Ages of the sick people range from birth to 92 years old. Of the neonatal cases, 94 percent had symptom onset less than six days after birth. In pregnant women, Listeria monocytogenes infections can cross through the placenta or be transferred to babies during birth.

Most of the infections, 59 percent, have been reported from Gauteng Province, followed by Western Cape with 12



# Your opinion on the mindset of:

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*“If sampling reveals the presence of Listeria species, it is important that the processor immediately shuts down the plant and implements an aggressive sanitation protocol and resampling until Listeria is not found.”* (KSU professor in IFT ePerspectives)

*“Our company goal for 2016 is zero Listeria environmental positives”*  
(Anonymous)

*“FDA will collect 100s of environmental samples in your plant if your records show a single Listeria positive”* (industry rumors after an FDA visit and record review, followed by FDA swab-a-thon)

“We’re not going to swab sample the floor, because we’ve been walking on it.”

# USDA Grading Course-Recalibration

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- USDA Grading Course
- Interest?
- Day 1
  - Basic Principles of Sensory
  - USDA Standards for Grades Discussion
  - Discussion of Grading Process vs. Judging
  - Common Occurring Defects
  - American-Style Cheeses (All Cheddars, Colby, Jack)
  - Brick, Muenster, Havarti
  - Mozzarella

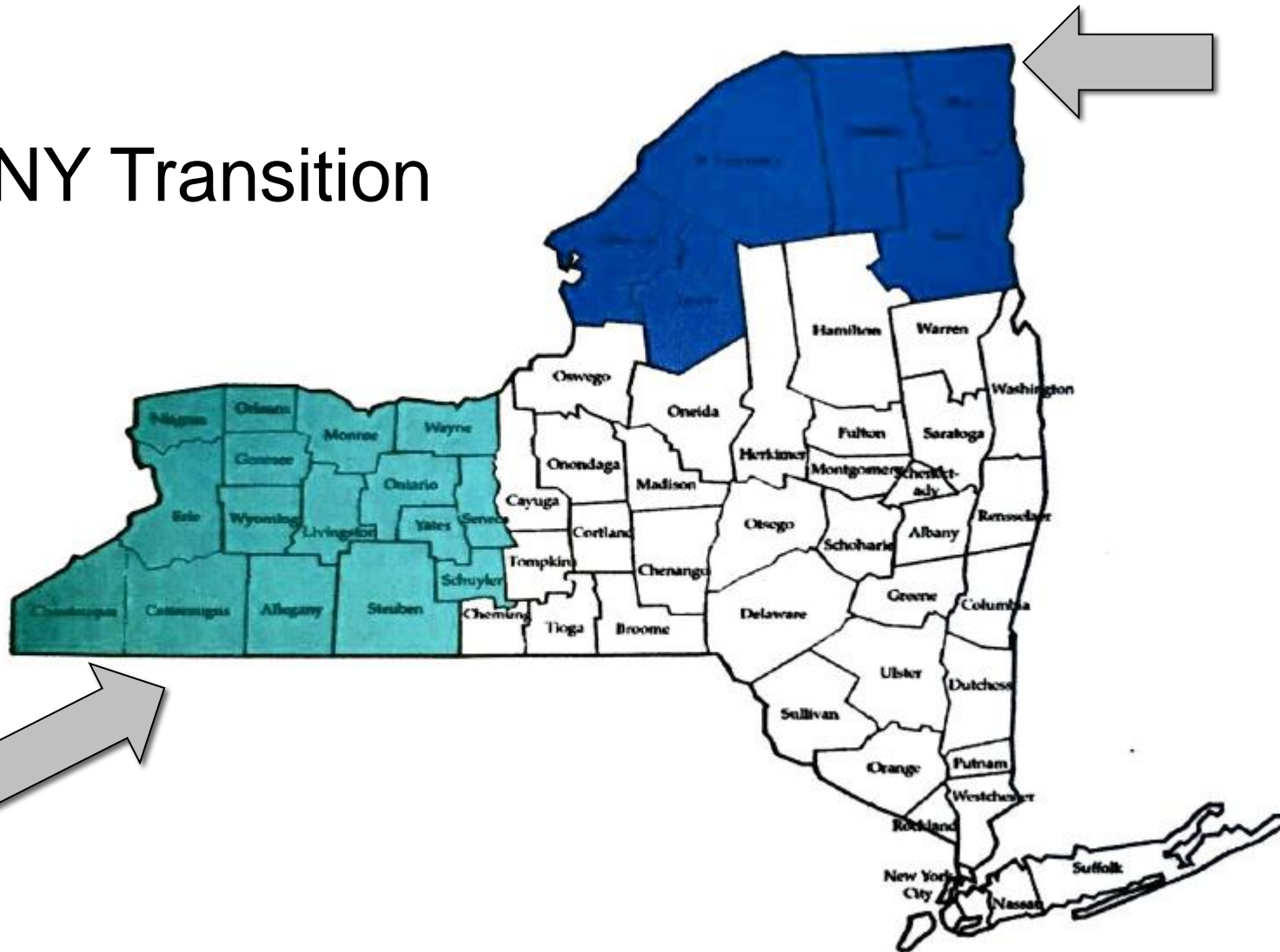


# USDA Grading Course-Recalibration

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- Day 2
  - Gouda, Swiss
  - Feta
  - Cream Cheese/Mascarpone/Spreads
  - Final Exam/Standardization Exercise
  
- Cost: TBD

# Harvest NY Transition



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