
Driscolls

Listeria monocytogenes/ EMP

workshop

February 18, 23, 25, Mar 1, 2021

Meeting Logistics

- English: use computer audio (preferred) or dial Zoom number
- Spanish: see calendar invite

- MUTE if not speaking
- Ask questions using the “chat” box

- Slides are available at: <https://www.unitedfresh.org/driscolls-listeria-workshop/>
- Talks are being recorded

Objective

- Understand how to develop & implement an environmental monitoring program
 - Identify hazards of concern
 - Assess risk of facility and equipment
 - Understand the role of sanitation
 - Understand regulatory implications
- Use test results to improve your plan and improve food safety
 - “seek and destroy”



About United Fresh

- Trade association based in Washington DC
- 1,600 members, 30 countries - Grower/shipper/packers, Processors, Distributors, Retail/ foodservice, Government, academia, other associations
- Free resources on our website www.unitedfresh.org

LISTERIA MONOCYTOGENES

RECALL READY PROGRAM

MICROBIOLOGICAL TESTING OF FRESH PRODUCE

ZONE 1 SAMPLING

GAP HARMONIZATION INITIATIVE

PRODUCE TRACEABILITY INITIATIVE (PTI)

AGRICULTURAL WATER

REGULATORY INVESTIGATIONS AND SAMPLING

Driscolls Environmental Monitoring Workshop

Day 1: Environmental Monitoring 101

Jennifer McEntire, Ph.D.

SVP Food Safety & Technology

United Fresh Produce Association

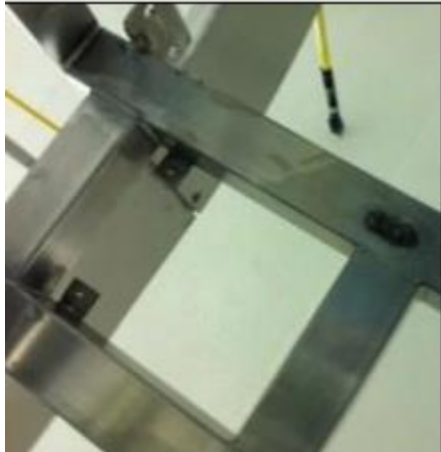


What do you know about environmental monitoring?

- Nothing
- A little
- A lot
- Everything

- During inspections, the FDA may collect samples from the environment in a building where foods are produced ...to determine whether that environment contains **harmful bacteria, such as *Salmonella* spp. or *Listeria monocytogenes***. FDA investigators ...collect these samples from both **food contact surfaces ...and non-food contact** surfaces (e.g., floors, drains, carts or equipment housing). This type of sampling is called “Environmental Sampling,” and it is important because environmental contamination – absent proper monitoring and controls – may contribute to **contamination of finished product**.

EMP= Hunting for Microorganisms



Poll Question

- When it comes to food safety concerns related to the **packing line** sanitation, I think of:
 - Pathogenic *E. coli*
 - *Salmonella*
 - *Listeria monocytogenes*
 - All of the above
 - None of the above

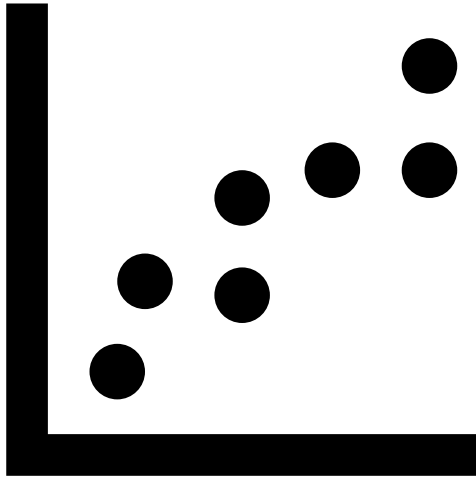


Listeria monocytogenes
creates some unique food safety
challenges

We'll mention *Salmonella* in a bit



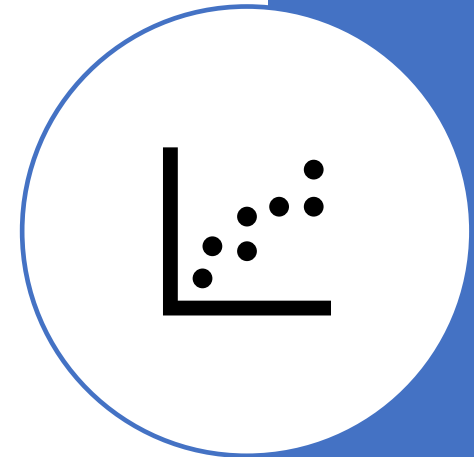
Poll Question



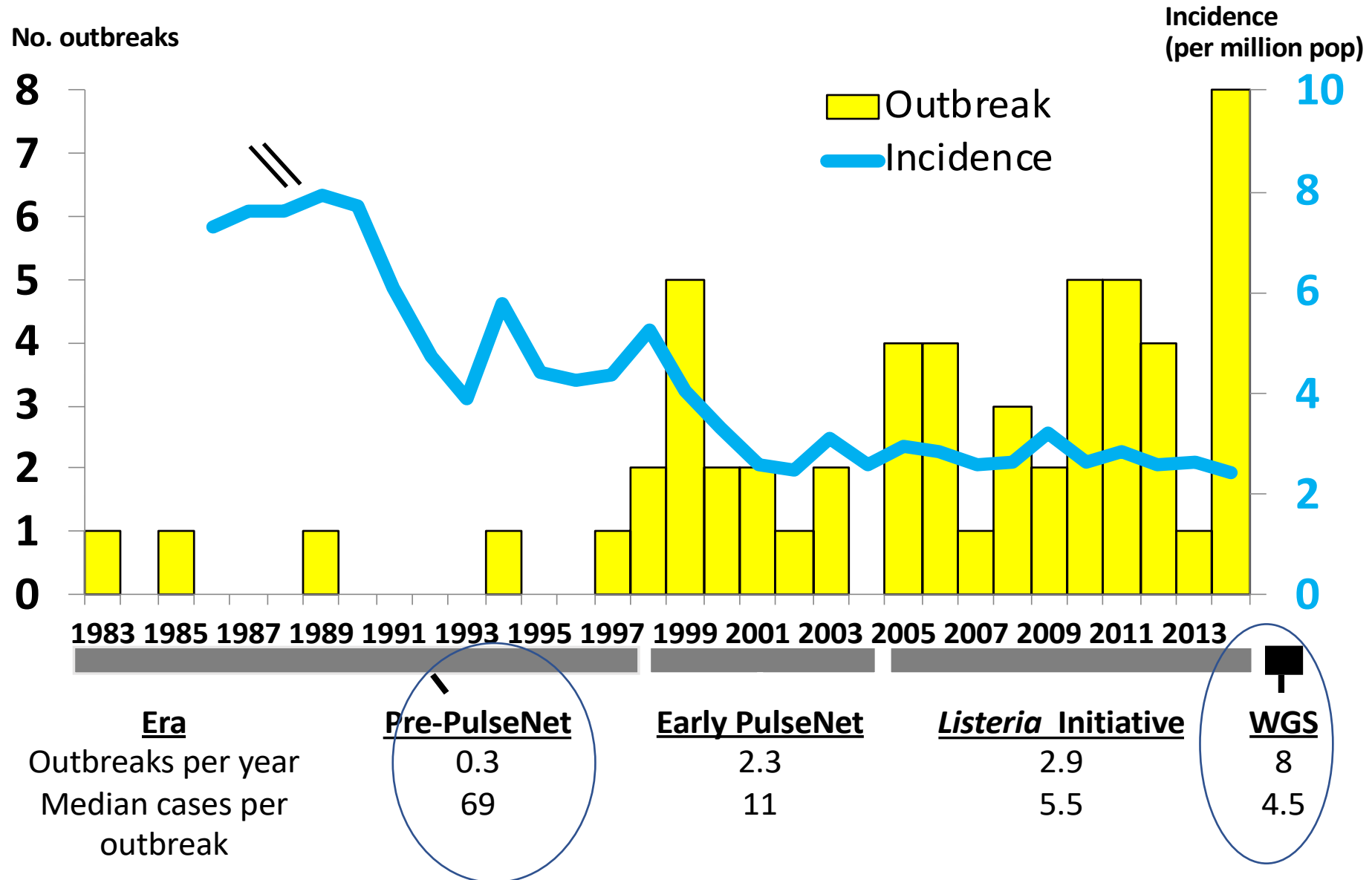
- How many illnesses are associated with listeriosis annually?
 - 16
 - 160
 - 1,600
 - 16,000

Poll Question

- How many illnesses are associated with listeriosis annually?
 - 16
 - 160
 - **1,600, generally very serious!**
 - 16,000



Listeria Outbreaks and Incidence, 1983-2014



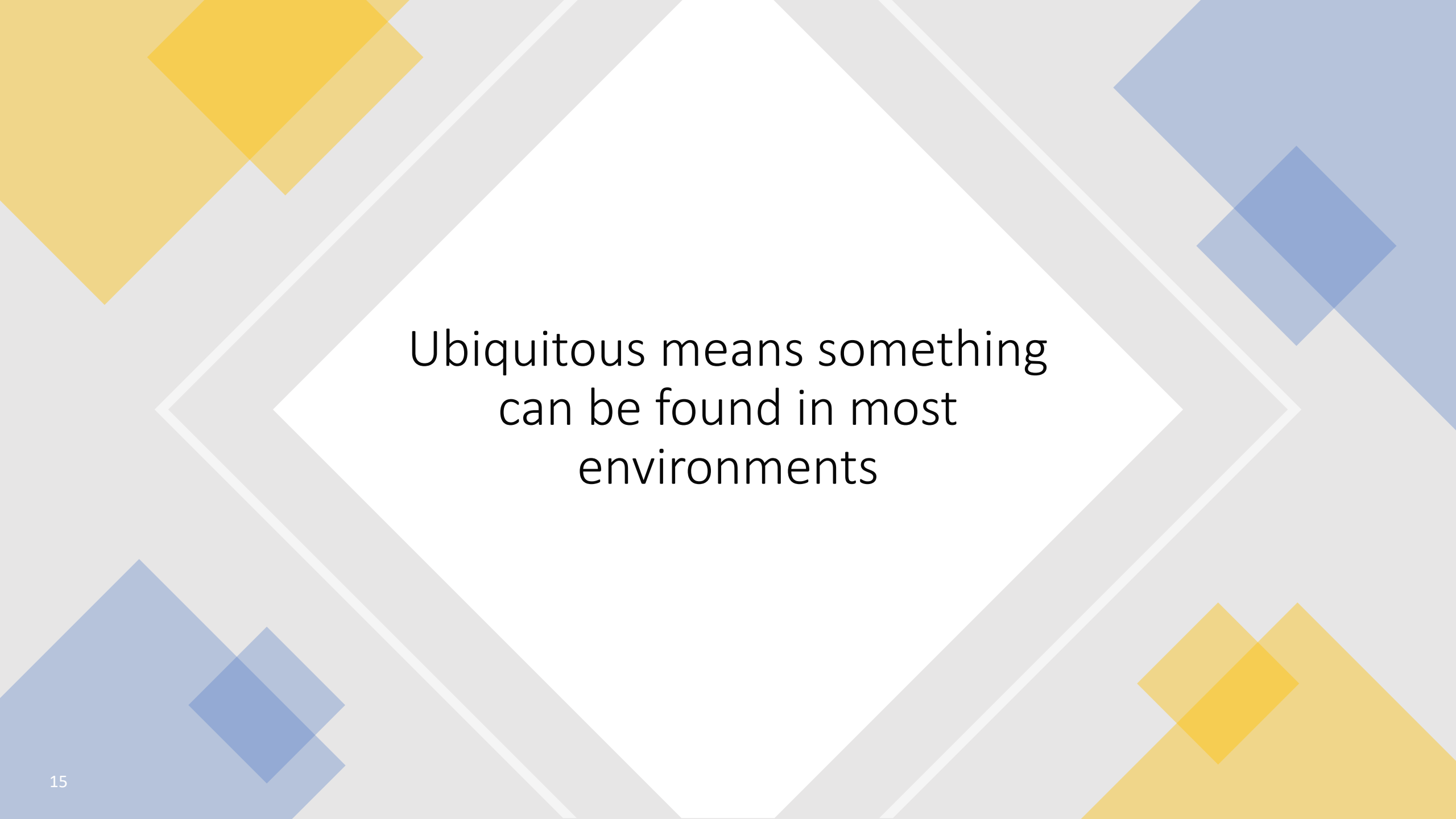
Data are preliminary and subject to change

Poll Question

- Why is *Listeria* difficult to control?
 - *Listeria* can grow at refrigeration temperatures
 - *Listeria* can hide in niches where they are difficult to remove through normal sanitation
 - It's "ubiquitous" in the environment
 - All of the above

Poll Question

- Why is *Listeria* difficult to control?
 - *Listeria* can grow at refrigeration temperatures
 - *Listeria* can hide in niches where they are difficult to remove through normal sanitation
 - It's "ubiquitous" in the environment
 - All of the above



Ubiquitous means something
can be found in most
environments

“ubiquitous”

- 17.5% NY farm soil samples positive for *L. monocytogenes* (2013 Strawn et al. AEM)
 - 30% of 74 water samples positive
 - Non-irrigation surface water
 - Wiedmann- *Listeria* in state parks
- 1% positive for “raw cut vegetables” in market basket survey (2017 Luchansky et al. JFP)
- **Ubiquitous does NOT mean it can't be controlled in your packing shed!**



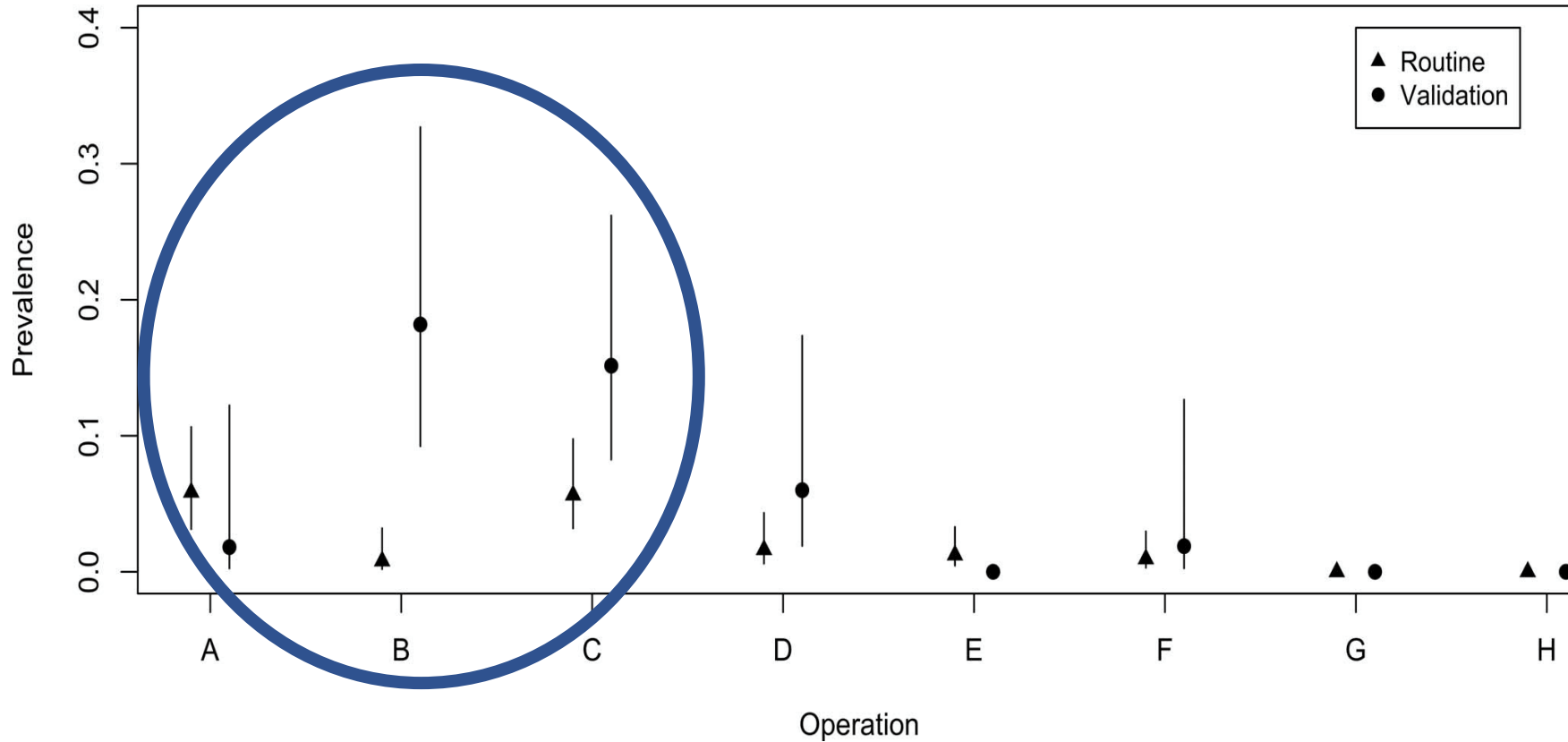


FIGURE 1. Routine and validation prevalence of *L. monocytogenes*, with 95% confidence intervals derived from the nested generalized linear model for eight produce operations: three packinghouses (A, B, and C) and five fresh-cut facilities (D, E, F, G, and H). Prevalence is the probability of a sample testing positive for *L. monocytogenes*.

Sullivan & Wiedmann 2020, JFP

<https://doi.org/10.4315/JFP-20-094>

Listeria monocytogenes can be somewhere in the packinghouse

These frequently tested positive for *Listeria* in this study:

- forklifts
- around bin dumpers
- in drains
- on floors

2% to 26% prevalence of *Listeria* spp. in five produce handling facilities in the Pacific Northwest (2020 Jorgensen et al. FM)

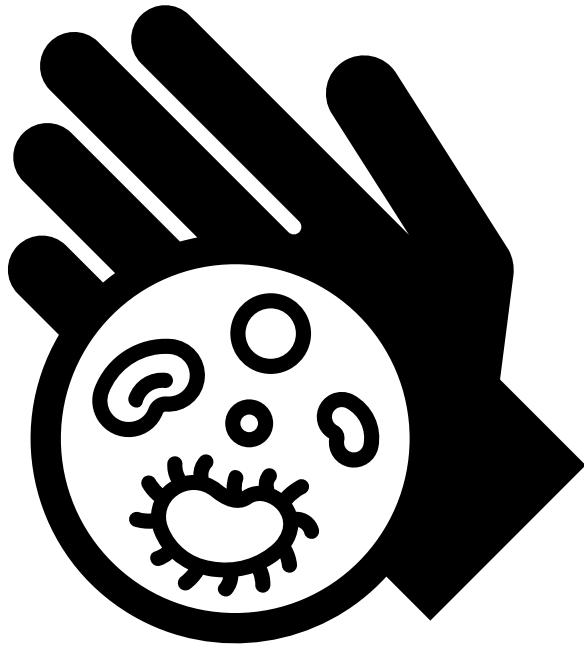
Poll Question



- What I know about biofilms is:
 - Nothing
 - A little
 - A lot
 - Everything

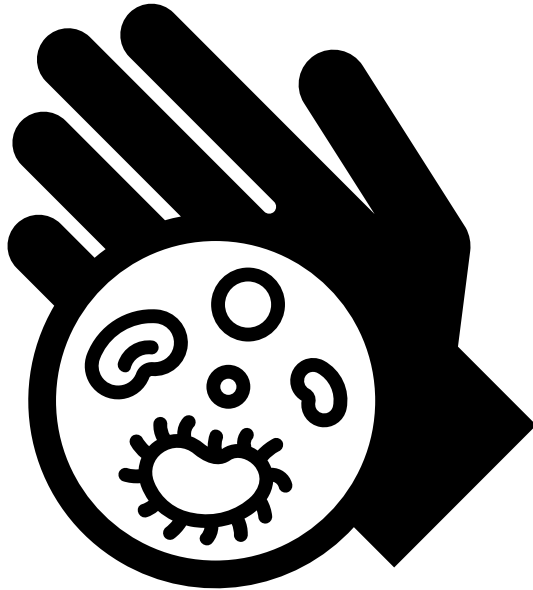
Biofilm Formation Video

- Biofilm Formation | Whiteley Medical 0:00:00 – 0:01:10
- <https://www.youtube.com/watch?v=TB0JQ9Ma354>



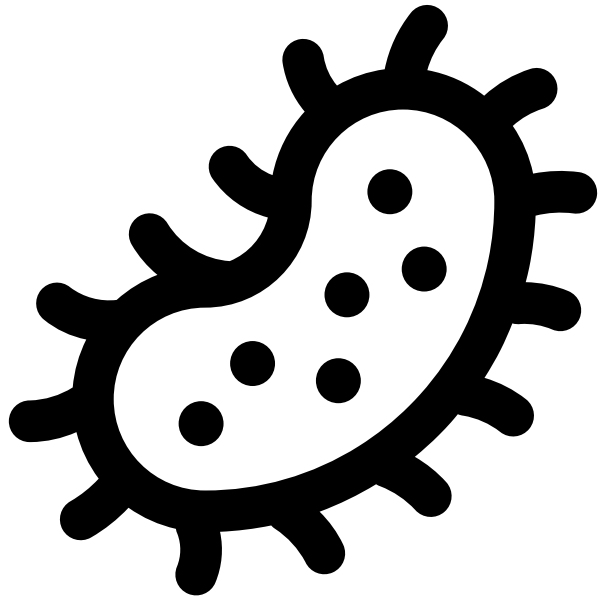
Agree or Disagree:
Normal Sanitation can
remove *Listeria* from
surfaces.

It depends, some equipment may need intensive sanitation practices

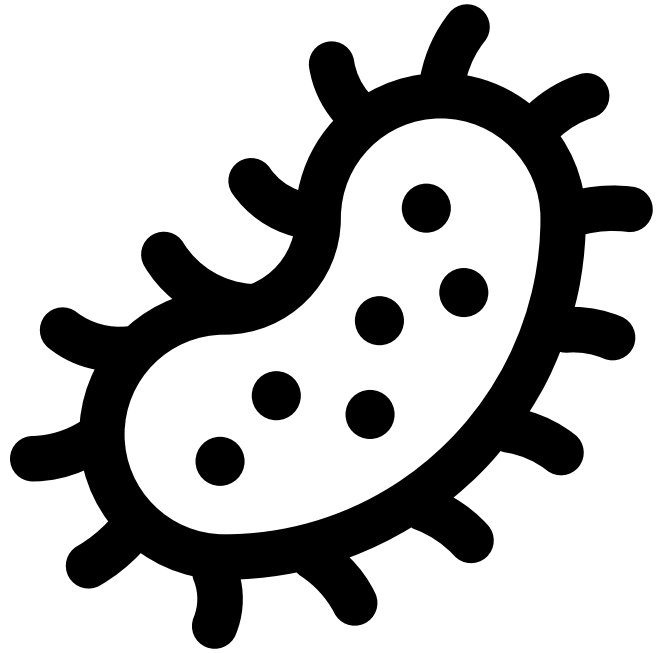


- Transient vs. resident strains
 - Presence of biofilms
- Hygienic design of the equipment and facility

Agree or Disagree:



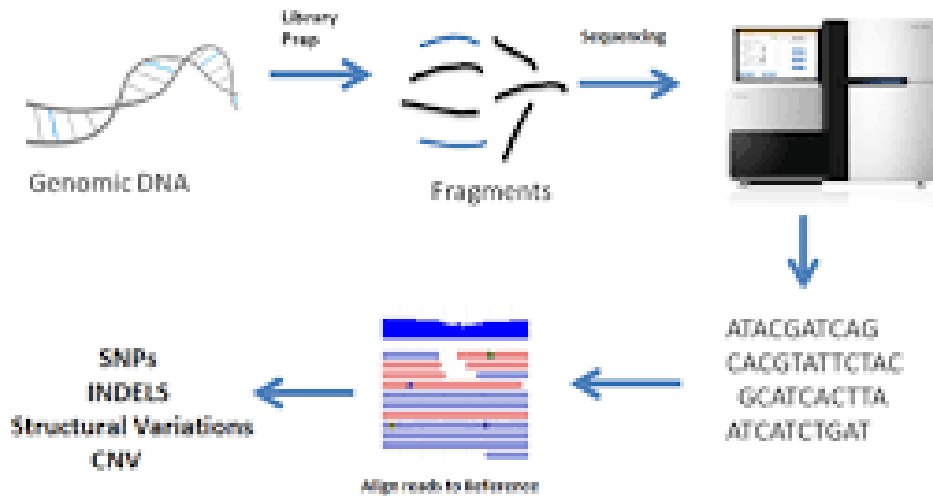
- Some types of *Listeria* are not pathogenic



Only *Listeria monocytogenes* is a human pathogen.

There are several other non-pathogenic species.

Side note on Whole Genome Sequencing



Matched Clusters

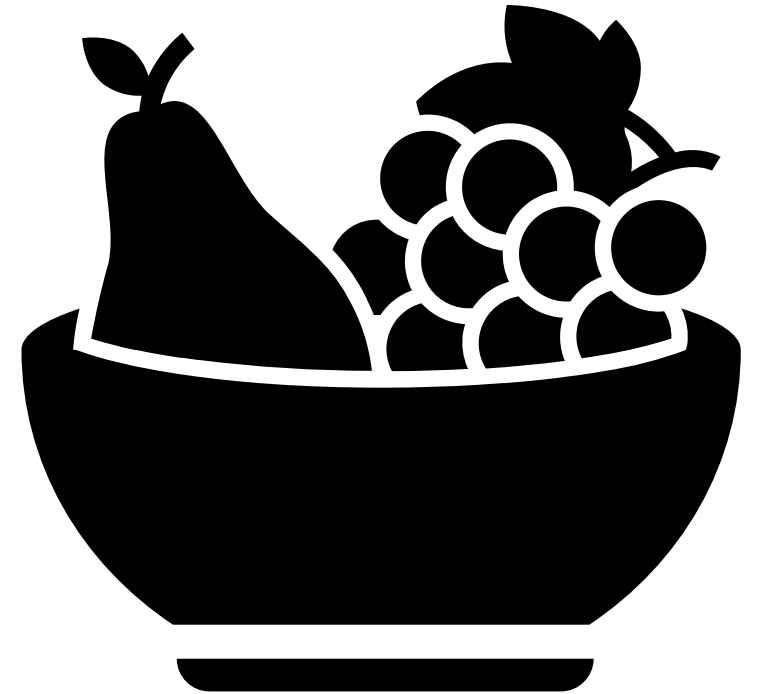
#	Organism groups	SNP cluster	Matched isolates	Matched clinical isolates	Matched environmental isolates
1	Listeria monocyto...	PDS000000366.405	1537	102	1435
2	Listeria monocyto...	PDS000025311.160	991	390	601
3	Listeria monocyto...	PDS000024989.83	779	101	678
4	...	PDS000024656.100	686	44	685

True or False

- FDA does Whole Genome Sequencing on all *Listeria monocytogenes* and *Salmonella* isolates?

Use the Chat Box!

- Which of the following foods has **not** been recalled due to *L. monocytogenes*?
 - Ice cream
 - Hummus
 - Macadamia nuts
 - Frozen waffles
 - Organic basil pesto
 - Butternut spirals
 - Frozen vegetables
 - Peaches
 - Leafy greens
 - Sliced apples
 - Onions



Environmental Pathogens Overview

- *Listeria*
 - Not all species are pathogenic
 - Grows/ replicates in the cold = competitive advantage; otherwise a poor competitor
 - High numbers cause illness/ death
 - Associated with fresh produce
- *Salmonella*
 - All species ARE pathogenic
 - Does not grow at refrigeration temperature
 - Lower numbers cause illness and occasionally death
 - Association with fresh produce relates to the growing environment, not packing
 - Outbreaks due to post-process contamination related to “dry” products

Thank you!