SALMONELLA SEROTYPE BAREILLY OUTBREAK : IS SOMETHING FISHY??

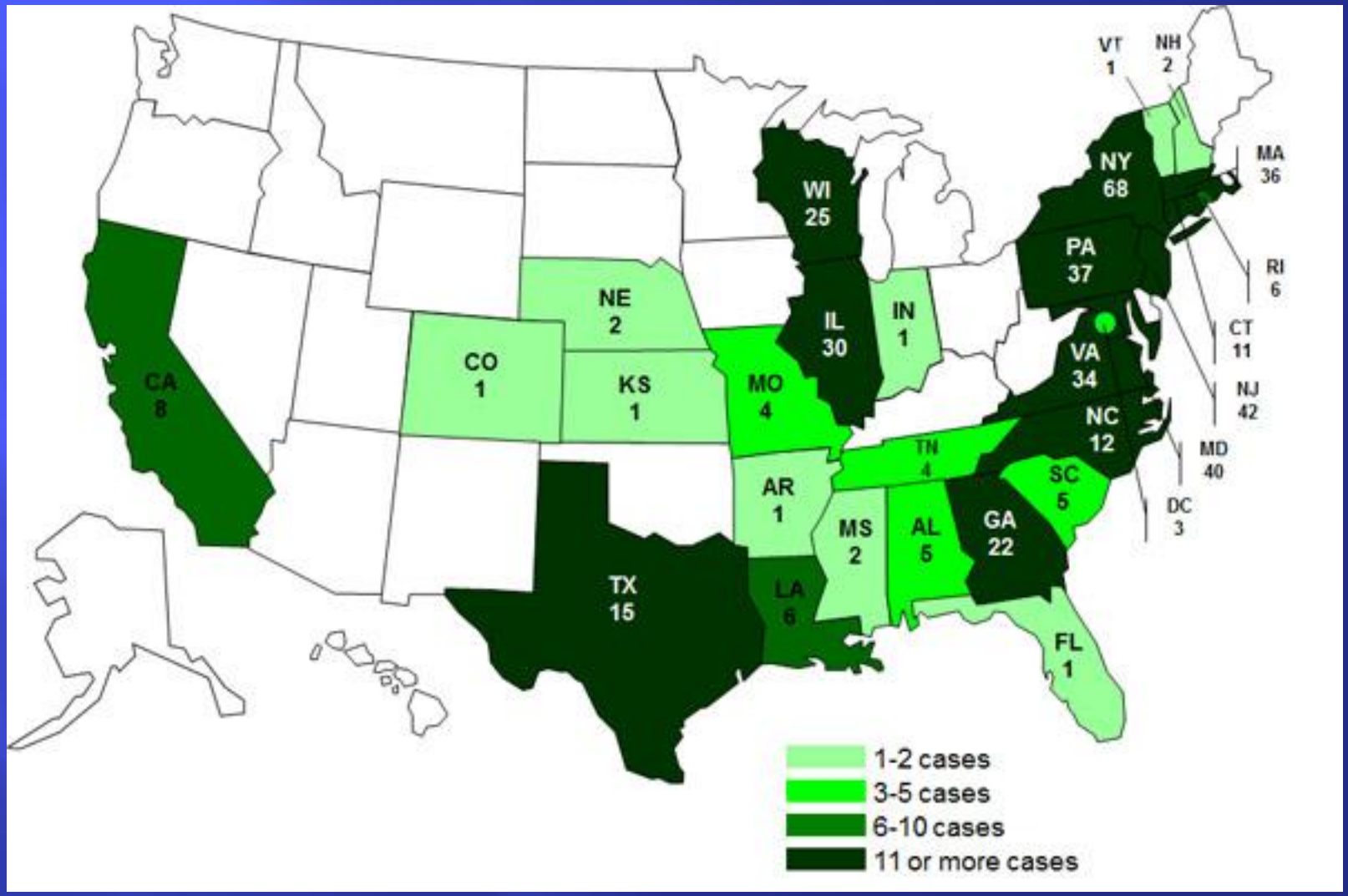
Dianna Bopp
Wadsworth Center, New York State Department of Health
518-474-5822
djs03@health.state.ny.us

Objectives

- Describe the tuna-associated *S.* serotype Bareilly/Nchanga outbreak
- Review the timeline for this outbreak
- Review the steps involved in outbreak investigation
- Identify possible areas where steps can be taken to improve foodborne illness prevention

Goal – Prevention of foodborne illness!!

S. Bareilly JAPX01.0042, *S.* Nchanga JRQX01.0004



Timeline of Events: Multistate Outbreak of *Salmonella* Bareilly and *Salmonella* Nchanga Infections Associated with a Raw Scraped Ground Tuna Product -- United States, 2012

Outbreak Identification and Source Implication

March 1
NY State Department of Health notified CDC's Outbreak Response Team (ORT) of a cluster of 4 ill persons infected with *Salmonella* Bareilly with the same unusual pulsed-field gel electrophoresis pattern.

March 2
PulseNet shows 11 persons in 7 states with the same pattern. CDC began coordinating a multistate investigation and held first multistate conference call.

March 8
Exposure information from 8 ill persons revealed that 7 reported eating seafood and 5 ate sushi in the week before becoming ill. TX Department of State Health Services reported first cluster of 2 unrelated ill persons who ate at the same Japanese steakhouse which serves sushi.

March 13
WI Department of Health Services (WDHS) reported a second cluster of unrelated ill persons eating at the same Japanese restaurant.

March 16
Preliminary information from 22 ill persons revealed that in the week before illness 80% reported eating seafood and 55% reported eating sushi. Among 8 ill persons who reported the type of sushi, all reported eating tuna. WDHS reported a third cluster of unrelated ill persons who ate sushi purchased from the same grocery store.

March 22
Among 19 ill persons who were asked detailed questions about eating sushi, 18 reported eating sushi in the week before illness and 80% of sushi eaters reported eating spicy tuna. CT Department of Public Health reported a fourth cluster of unrelated ill persons who ate sushi at the same restaurant. MD Department of Health and Mental Hygiene reported a fifth cluster of unrelated ill persons who ate sushi at the same restaurant.

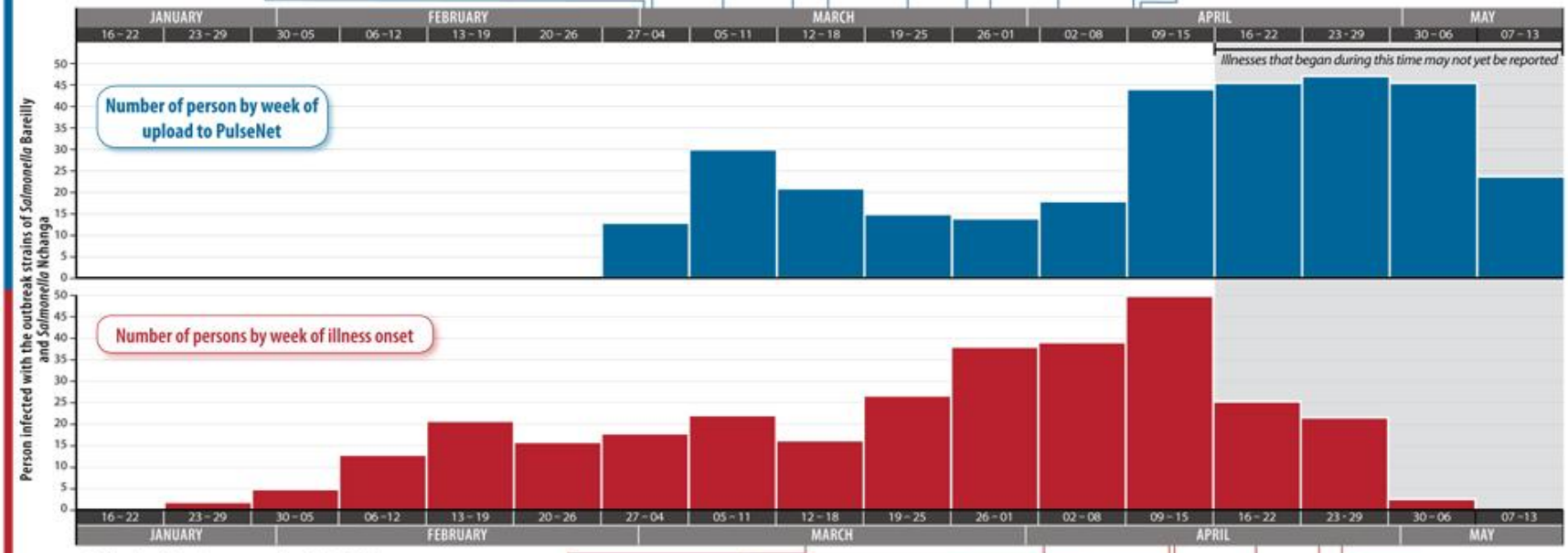
March 27
Among 29 ill persons who were asked detailed questions about eating sushi, 90% reported eating sushi and 81% of sushi eaters reported eating spicy tuna.

March 29
Restaurant sushi order comparison study launched.

April 4
CDC posted initial web announcement about investigation.

April 9
Preliminary results of restaurant comparison study from 4 restaurants show that the proportion of comparison sushi orders containing spicy tuna as an ingredient averaged 37% (ranging from 29% to 53%).

April 10
WDHS notified CDC's ORT about 5 recent *Salmonella* Nchanga infections occurring in the same states as the *Salmonella* Bareilly cases. One ill person in WI had reported eating tuna sushi.



n=316 for whom information was reported as of May 14, 2012

Trackback and Regulatory Activities, and Results of Product Testing

March 15
FDA began receiving supplier and invoice data collected by state and local departments of health and agriculture.

April 2
FDA activated an Incident Management Group and transferred *Salmonella* Bareilly response activities within the FDA Emergency Operations Center. CDC staff member joined FDA Team in Washington, DC.

April 13
Moon Marine USA Corporation voluntarily recalled 58,828 pounds of frozen raw yellowfin tuna product, labeled as Nakaochi Scrape AA or AAA, from a single tuna processing facility in India. CDC and FDA warned public not to eat recalled product.

April 13 – 14
FDA issued two Import Alerts for fresh and frozen tuna from Moon Fishery India Pvt Ltd.

April 19 – 24
FDA conducted a seafood Hazard Analysis and Critical Control Point inspection at Moon Fishery Pvt Ltd. in India.

April 24
WDHS announced that the Department of Agriculture Trade and Consumer Protection laboratory had found *Salmonella* Bareilly contamination in recalled yellowfin tuna and in a spicy tuna roll made with the recalled tuna.

April 26
FDA announced finding the outbreak strains of *Salmonella* Bareilly and *Salmonella* Nchanga in unopened packages of yellowfin tuna product imported from Moon Marine USA Corporation.

For more information, visit CDC's *Salmonella* website: **http://www.cdc.gov/salmonella/**

As of May15, 2012
CS232379-A

Timeline

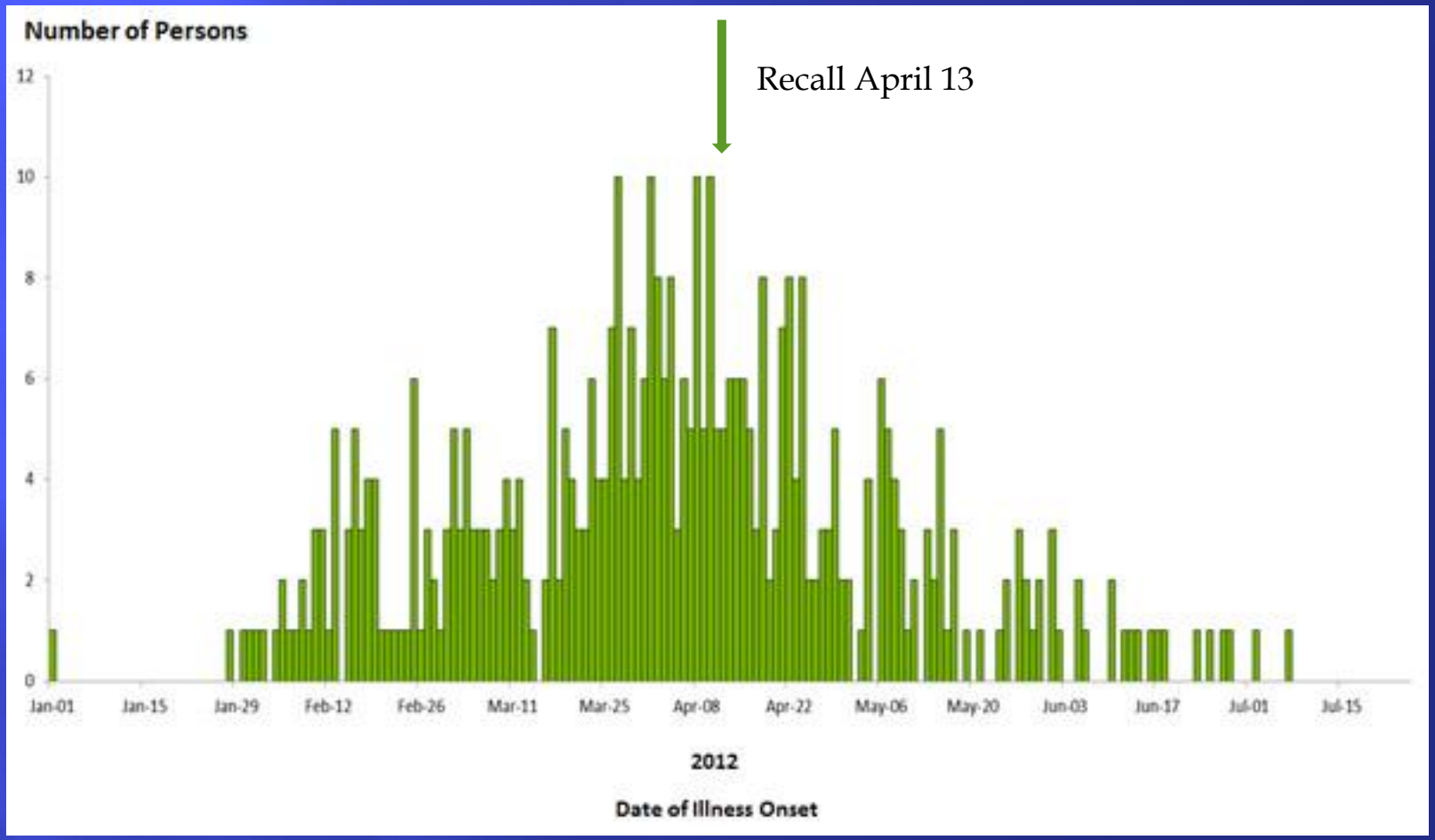
- **March 1** – 4 Bareilly cases posted by NY State
- **March 2** – Conference call – 7 states/cities – epi pointing toward Japanese restaurant/seafood
  - PulseNet search of database showed 68 prior isolates of Bareilly – 10 from food, 9 of 10 from seafood
- **March 8** – 30 cases, 13 states – many references to seafood/sushi, fine tune questionnaire
- **March 16** – 61 cases from 15 states, spicy tuna emerging as common exposure

Timeline (continued)

- **March 20** – FDA tracing back tuna
- **March 26** – CDC discussing doing analytic study
- **March 29** – Restaurant sushi order comparison study launched
- **April 4** – Initial CDC announcement (Marler Clark blog posts outbreak). No convergence on tuna traceback.
- **April 9** – Preliminary results of analytic study
- **April 10** – 4 Nchanga posted by NY state
- **April 12** – FDA identified potential common source
- **April 14** – Press release by FDA

Timeline (continued 2)

- **April 19** – WI has isolates of Bareilly and Nchanga from same tuna sample
- **April 19-24** – Hazard Analysis and Critical Control Point (HACCP) inspection of Moon Marine Fishery in India
- **April 25** – WI, SC, MA, MD, CT, FDA report isolation of *Salmonella* from tuna; some have completed PFGE; states report product still being served
- **April 25-July 26** – cases increase from 220 to 425
- **May 9** – tuna strips recalled


Number of Persons
Recall April 13
12
10
8
6
4
2
0
Jan-01
Jan-15
Jan-29
Feb-12
Feb-26
Mar-11
Mar-25
Apr-08
Apr-22
May-06
May-20
Jun-03
Jun-17
Jul-01
Jul-15
2012
Date of Illness Onset

Can we do better?

- TAT - symptom onset to upload
- Cluster detection
- Additional tests to further define outbreak – second enzyme, WGS
- Epidemiologic investigation of cases
- Identification/communication of information implicating source
- Traceback/traceforward
- Collection/testing of implicated food
- Communicate information for public/consumers
- Follow-up on recall
- Better labeling/better control of imports

TAT – onset of symptoms to upload

- Onset of symptoms to collection of isolate – (NY 37 cases) – 4 days (0 days to 3 weeks)
- Isolate date to date received in reference lab – 7 days
- Received at reference lab until uploaded to CDC database – 4 days
- Onset to upload – 15 days

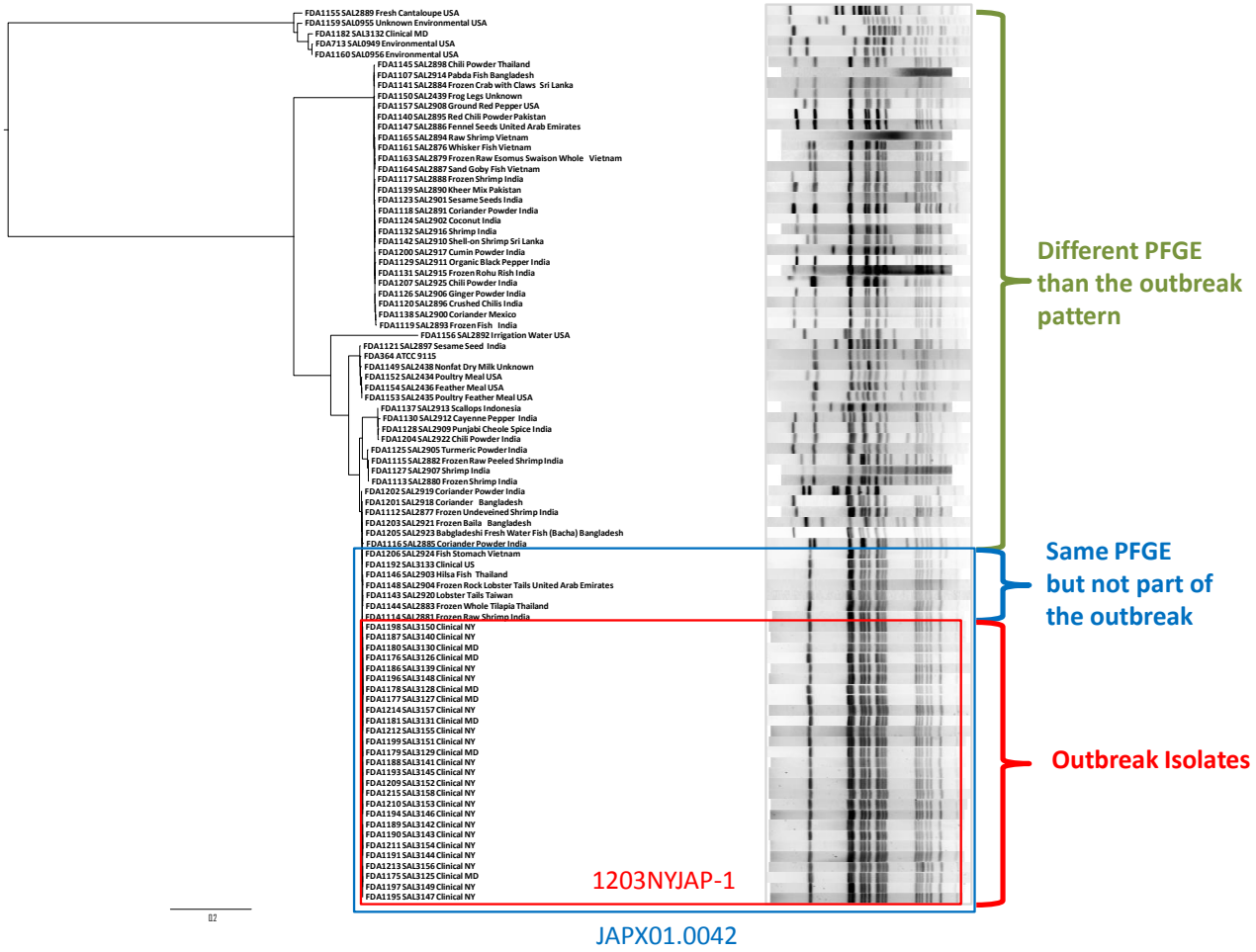
Cluster Detection

- Streamline processing of isolates
- Compare recent isolates against local database, postings, national database
- Embrace decentralized vision of Dr. Swaminathan - know what is going on in your state!
- Data sharing/Communication with Bureau of Communicable Disease Control, Center for Environmental Health, Ag and Markets, other PulseNet members.

Additional tests to further define outbreak

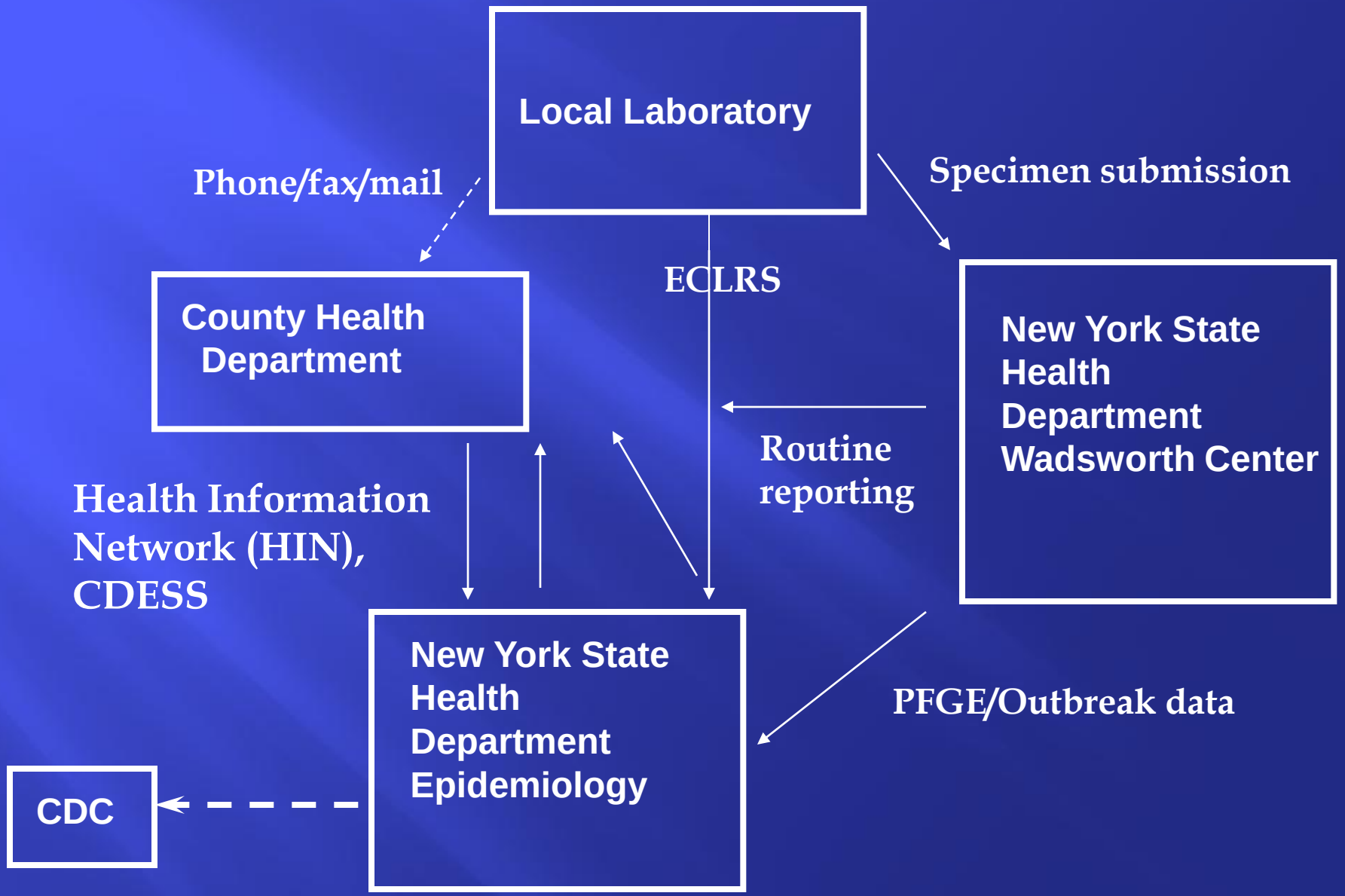
- Second enzyme – useful for many serotypes and patterns. This pattern quite rare. *Bln*I added a little confidence.
- MLVA – Useful for many species, serogroups, patterns.
- WGS – Possible future test to help further define outbreaks or clonal organisms?

S. Bareilly Phylogeny vs. PFGE



FDA - Eric Brown, Marc Allard, Errol Strain, Chrisiine Keys

Epidemiologic Information Flow for Investigations



Epidemiologic Investigation of Cases

- Complete food histories in a timely manner
- Identify clusters of cases from restaurants/stores
- Identify good historians
- Standardized questionnaire
- Communication of data
- Compilation of data

Identification/communication of Information implicating source

- **March 20** – FDA tracing back tuna
- **April 12** – potential common source

} 3 weeks

- Can there be sharing (informal, confidential) of information so that directed sampling can be done by laboratories?

Traceback/Traceforward (FDA territory)

- Challenges – complex food i.e., many ingredients
- Consumers frequently eat multiple types of sushi
- Lack of accurate records at point of service
- Lack of consistent product description
- Lack of product labeling
- Many records to examine
- Communication of progress would be helpful to expedite investigation

Collection/testing of implicated food

- Foods can be complex and consumers frequently eat multiple types of sushi, so need to narrow down what food to test
- Restaurant clusters and good historians valuable
- *Salmonella* isolation takes a couple of days – very fast and definitive
- Encourage food testing because it can "solve" the outbreak very quickly

Follow-up on recall

- Is the product out of commerce?
- Have the point of service providers received adequate communication?
- Language barrier issues
- Did the restaurant serve this product?
- Did the restaurant serve this brand of product?

Better labeling/Better control of imports

- Product not labeled consistently
- Inspection revealed several HACCP deficiencies (controls for histamine, controls for *C. botulinum*, monitoring for temperature on vessels).
  - In addition, water and ice which came into contact with fish during processing were dirty.
  - Broken and cracked tiles in floor and ceiling, product residue on the ceiling.

Communicate information for public/consumers

- CDC and FDA websites posted information.
- In the face of an ongoing outbreak, especially if the product is not clearly labeled and removal from the point of service is difficult to guarantee ….. it is important to communicate to the public that there is a current outbreak associated with Nakaochi Scrape tuna.
- "The consumer should take precautions…"

Conclusions

- Tuna (Nakaochi Scrape) was identified as source of *S.* serotype Bareilly/Nchanga outbreak
- Voluntary recall of scrape tuna and tuna strips resulted
- TAT for onset date to upload good but it could be shortened
- Rapid and complete food histories are critical for identification of food item, traceback, and selection of food for testing

Conclusions (continued)

- Information to direct food testing would expedite identification of source
- Follow-up to make sure contaminated product is removed from commerce
- Communication to public is important so that "consumers should (can) take precautions"

Goal – Prevention of foodborne illness!!

Questions?

- Acknowledgements
  - **PFGE lab** – Deb Baker, Lisa Thompson, Amy Saylors
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