GenomeTrakr database: WGS network for foodborne pathogen traceback

Conference for Food Protection
WGS workshop
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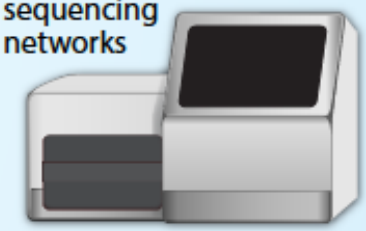
Center for Food Safety and Applied Nutrition
Ruth E. Timme, PhD
Research Microbiologist
GenomeTrakr data manager

Basic Data Flow for Global WGS Public Access Databases

DATA ACQUISITION

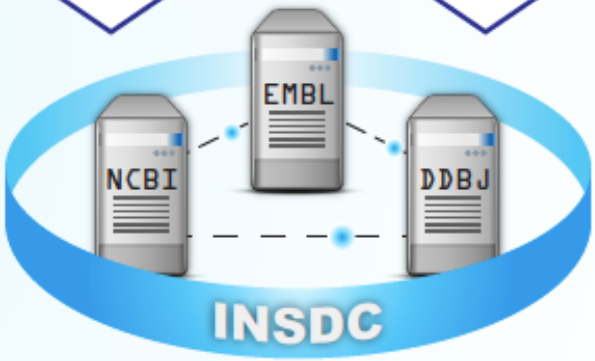
Sequence and upload genomic and geographic data



DATA ASSEMBLY, ANALYSIS, AND STORAGE

International Nucleotide Sequence Database Collaboration (INSDC)
Shared Public Access Databases

- *NCBI – National Center for Biotechnology Information*
- *EMBL – European Molecular Biology Laboratory*
- *DDBJ – DNA Databank of Japan*



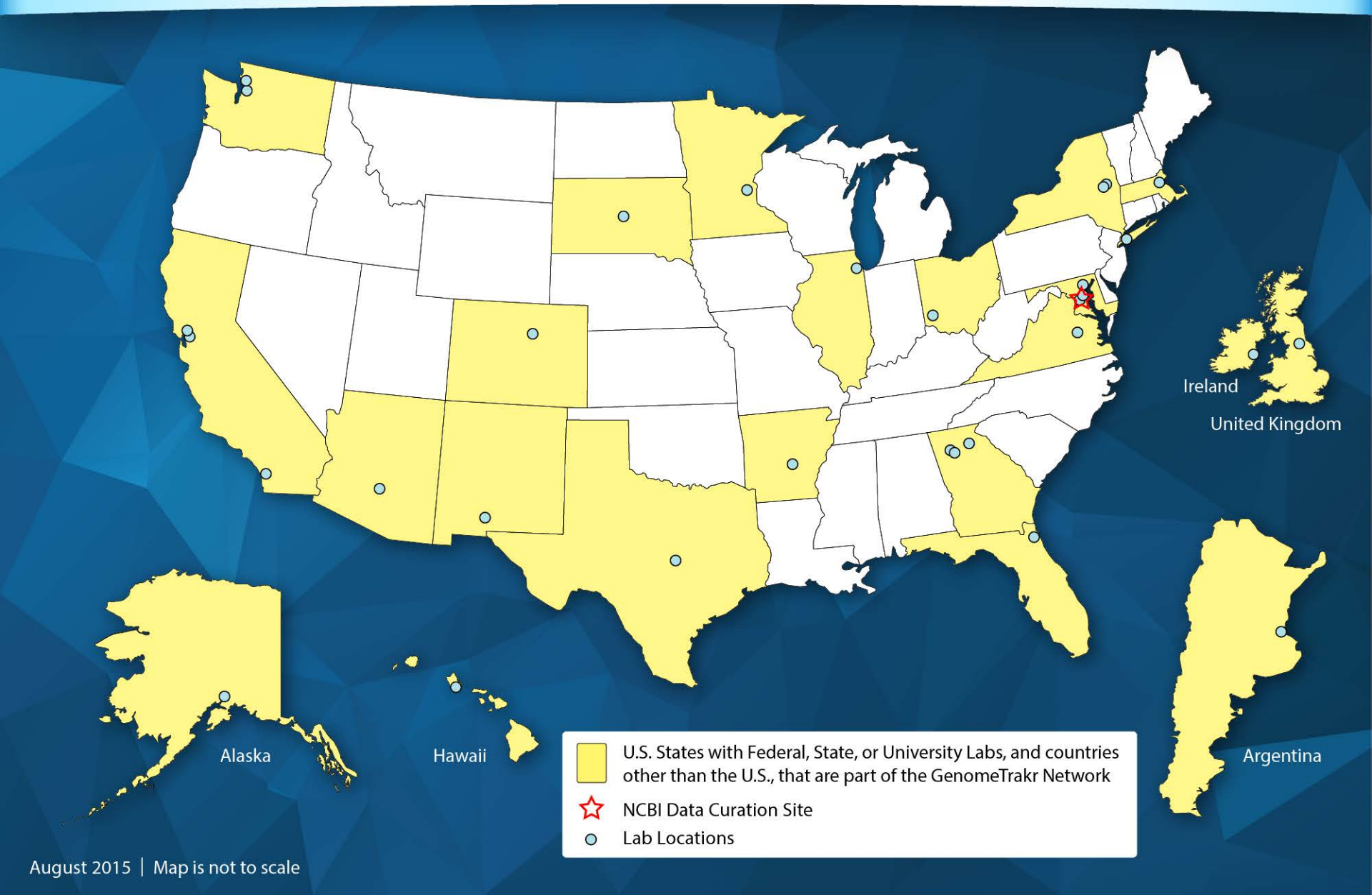
PUBLIC HEALTH APPLICATION AND INTERPRETATION OF DATA

- *Find clinical links*
- *Identify clusters*
- *Conduct traceback*
- *Develop rapid methods*
- *Develop culture independent tests*
- *Develop new analytical software*

State, Local, Federal, and Foreign Public Health Agencies

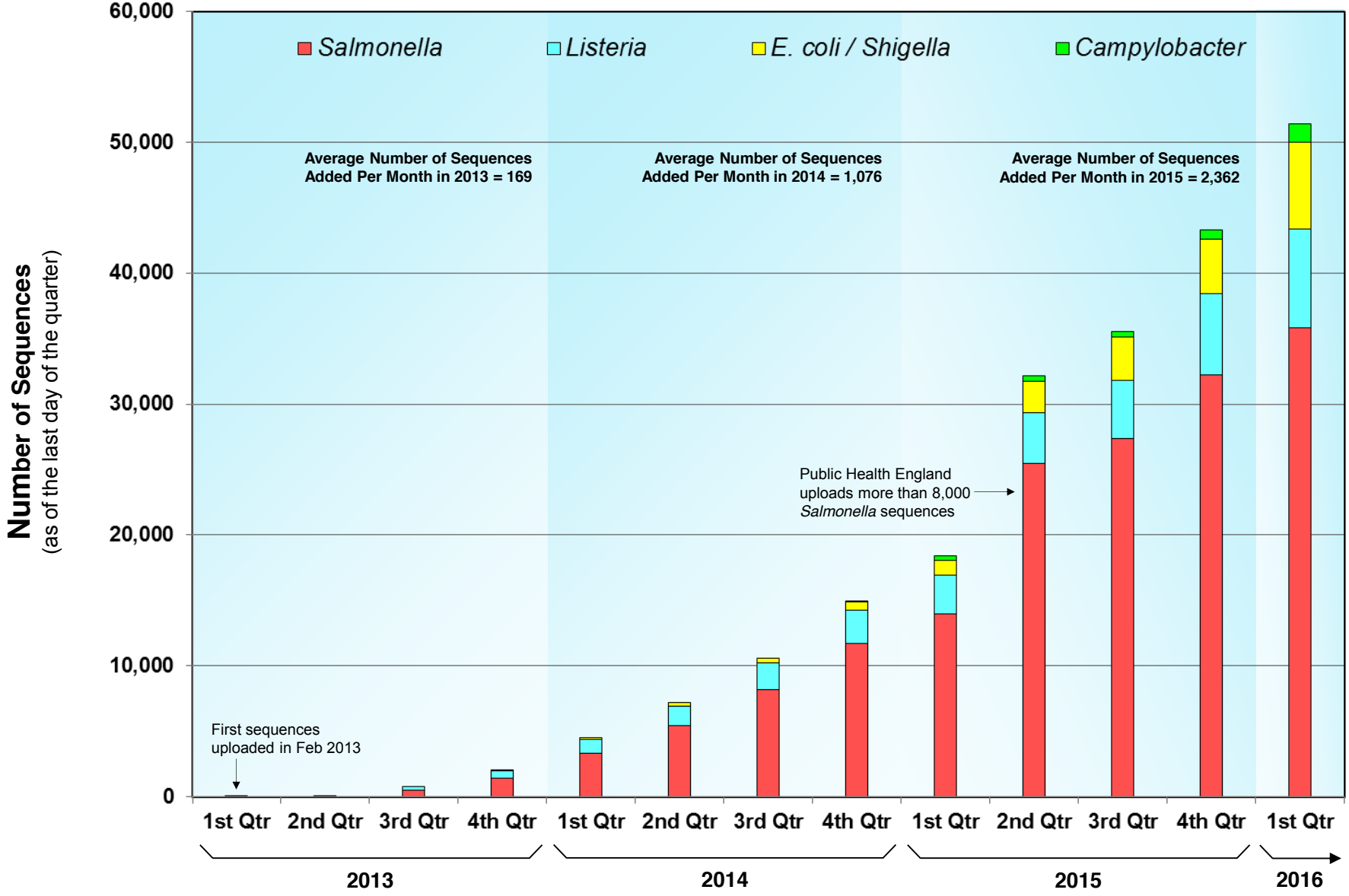
Academia/Industry

GenomeTrakr Labs

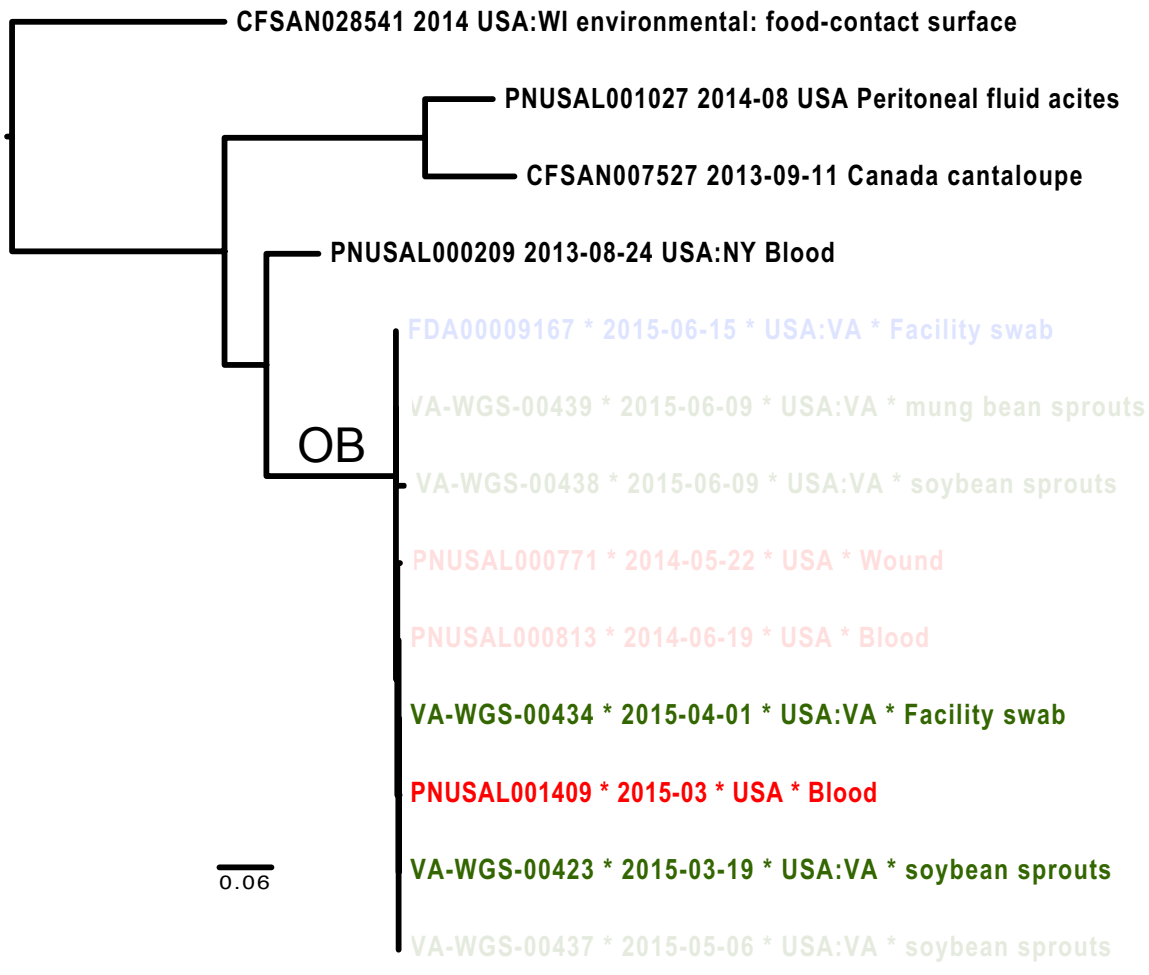


Total Number of draft genomes in the GenomeTrakr database

**CDC contributing clinical isolates



A Growing Regulatory Role:



Timeline:

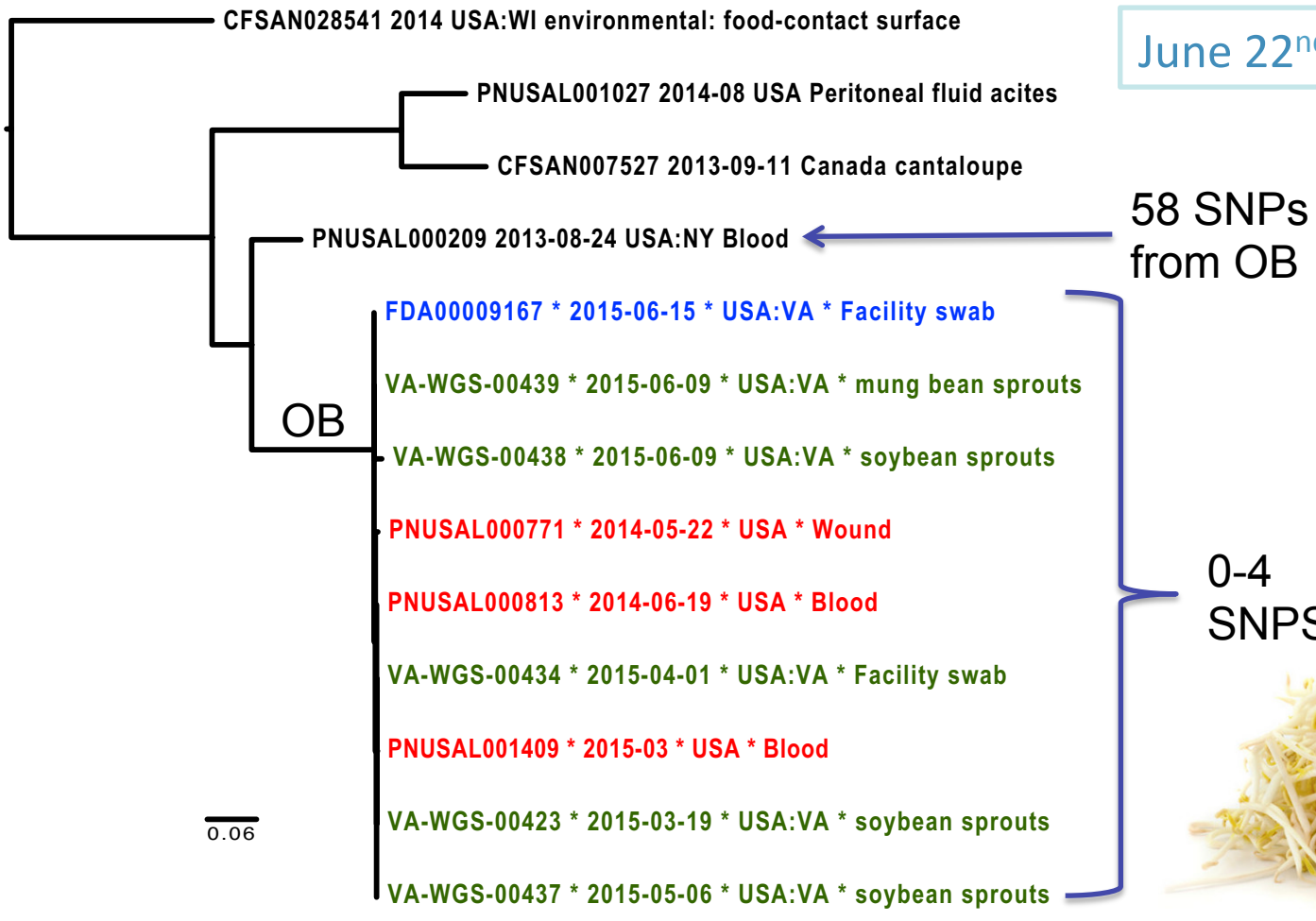
Virginia, 2015

Listeria monocytogenes

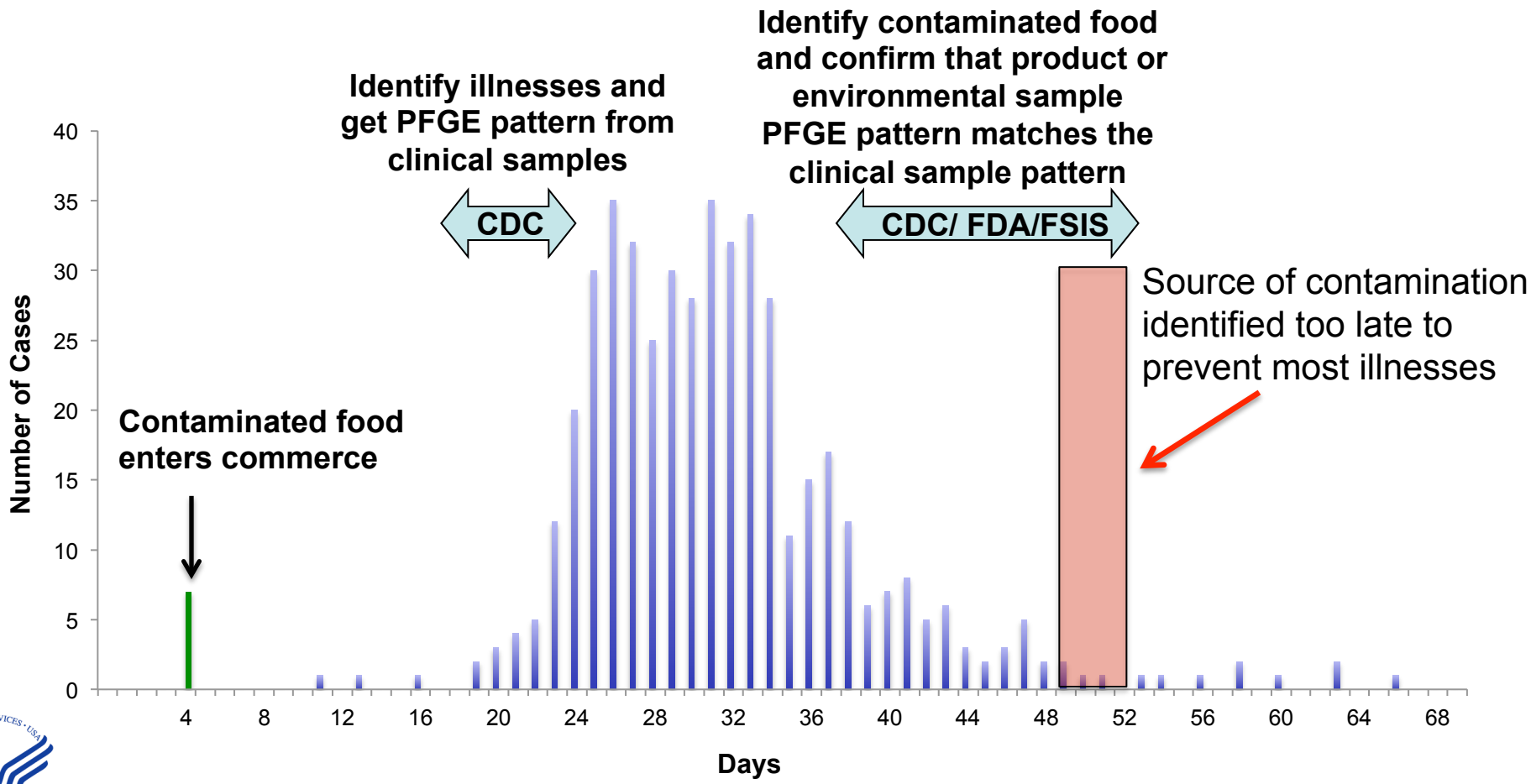
- March-April 2015, first matches
- May 5th, FDA contacts VA lab
- May-June, more matches

A Growing Regulatory Role:

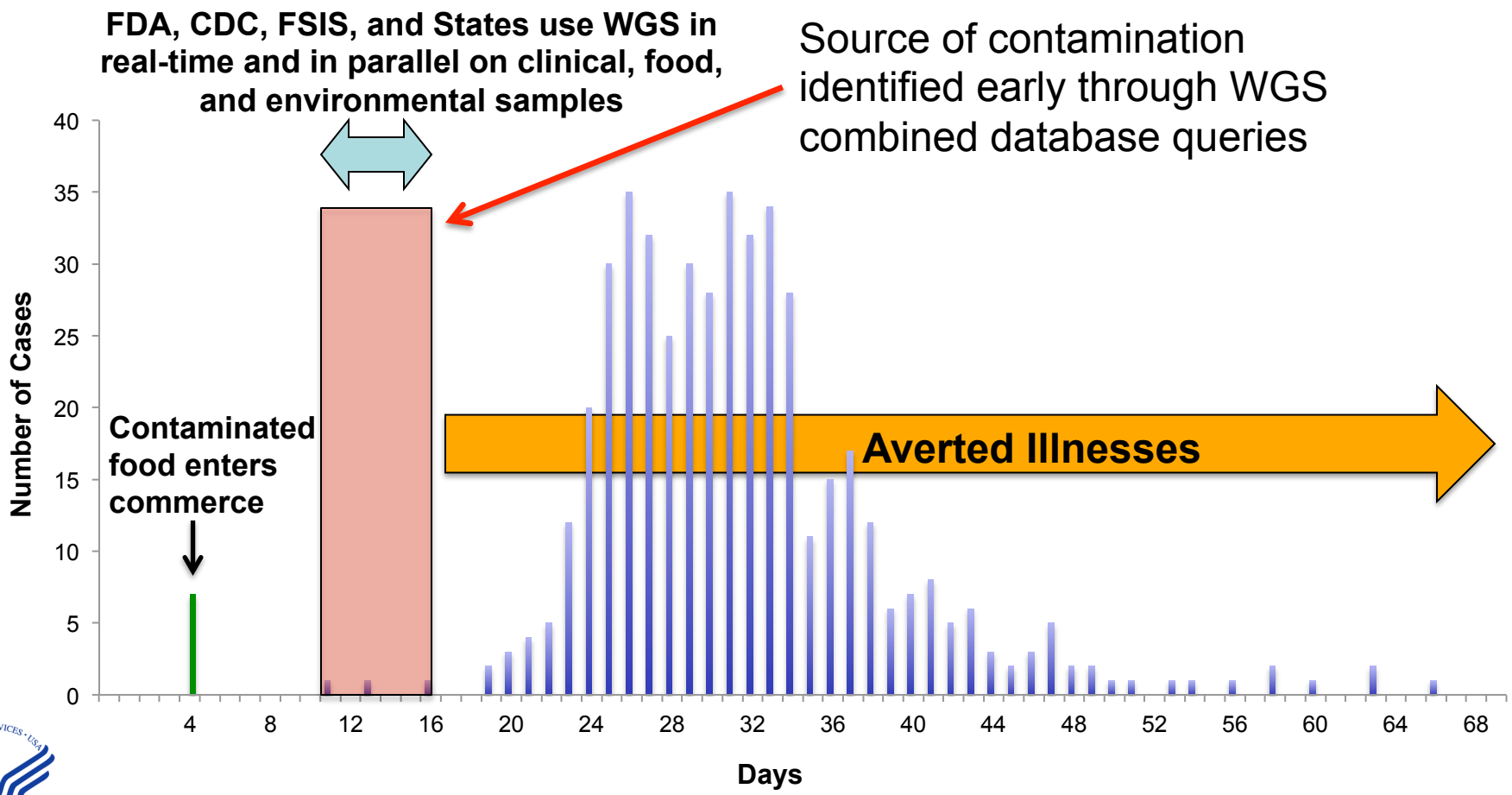
June 22nd, voluntary recall



Timeline for Traditional Approach to Foodborne Illness Investigation



TARGET: Timeline for Foodborne Illness Investigation Using Whole Genome Sequencing

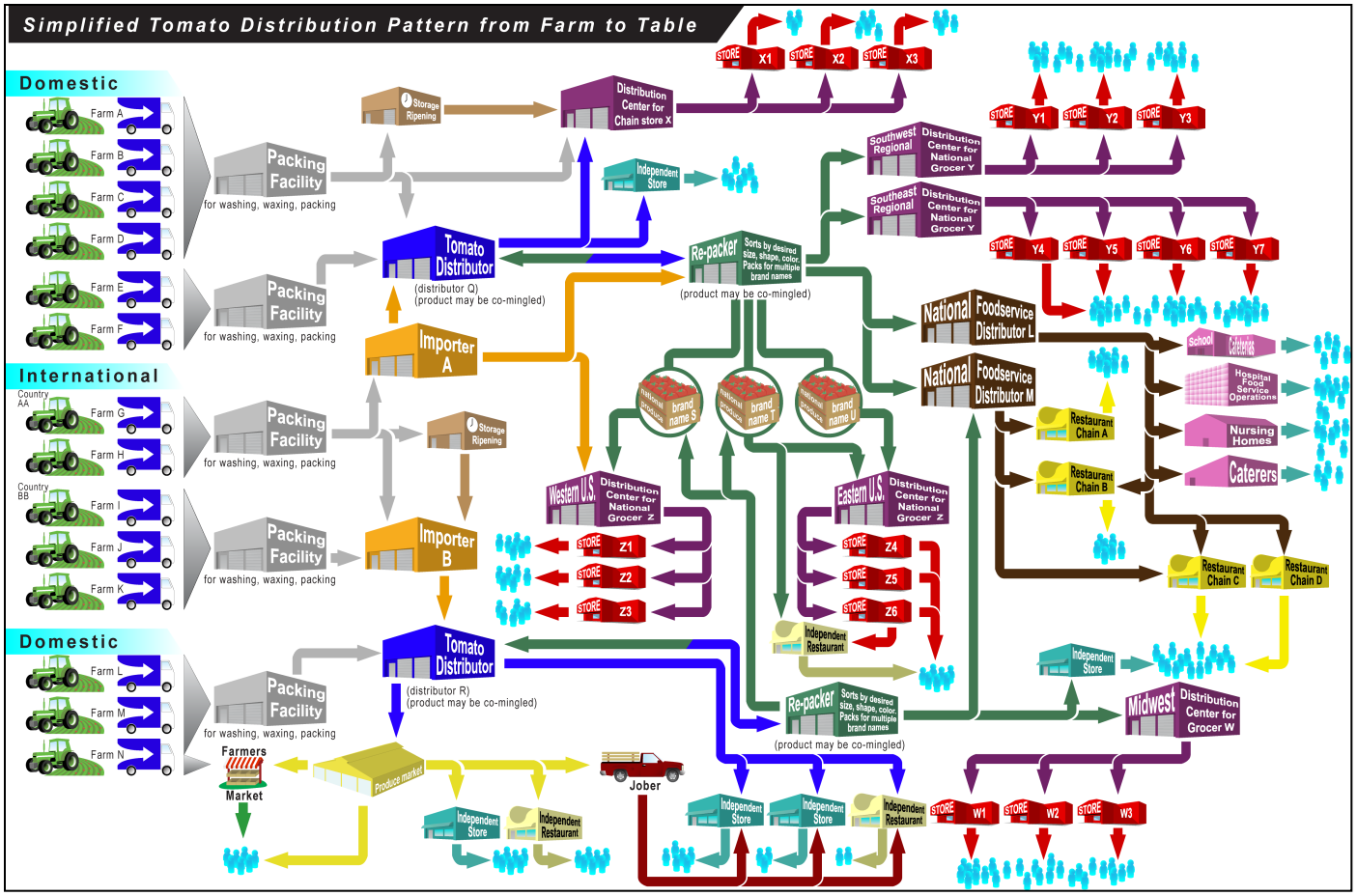


Immediate benefits of WGS to industry, growers, and distributers.

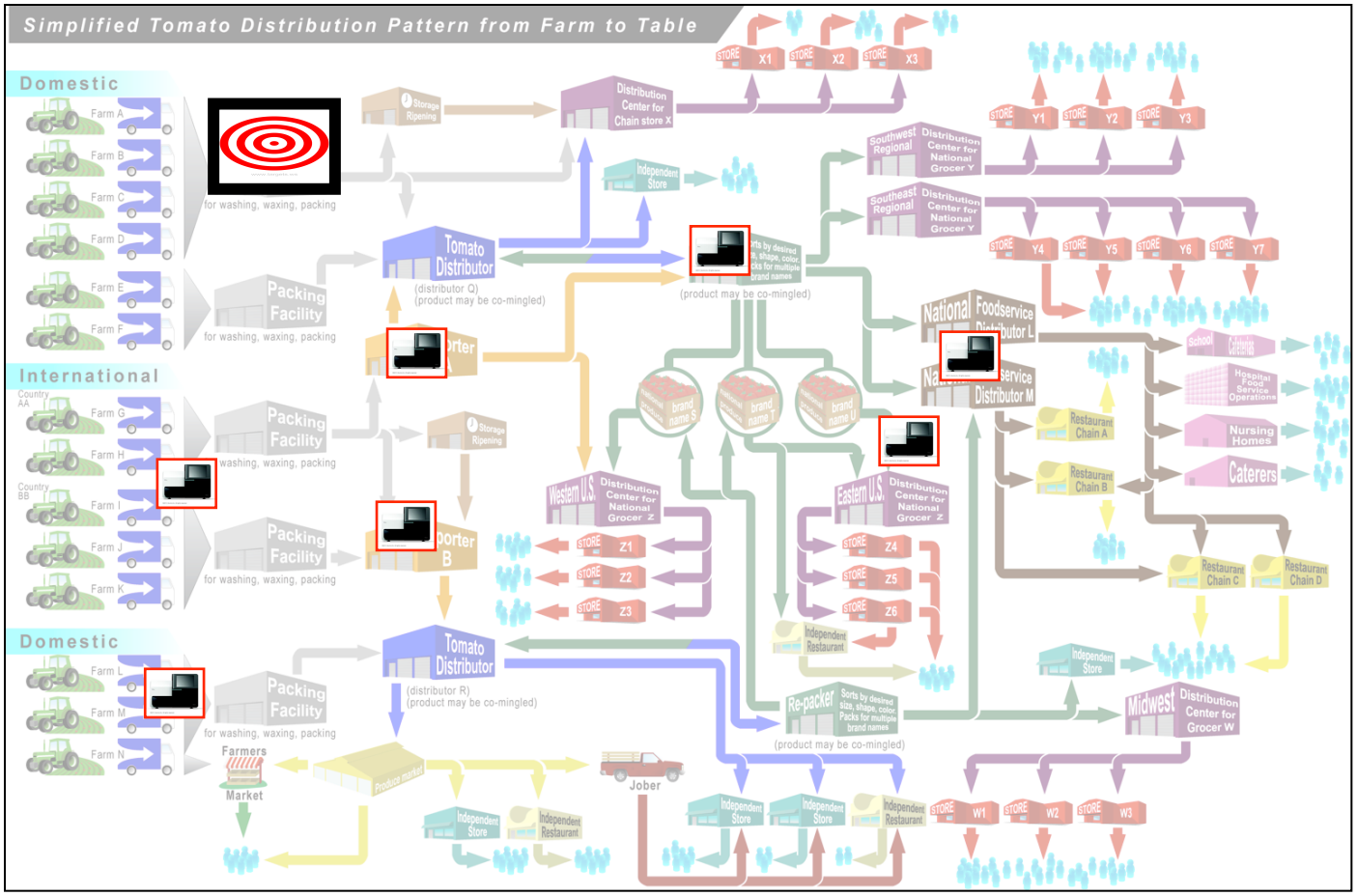
- Earlier intervention means:

1) Reduced amount of recalled product;
2) fewer sick patients
3) less impact overall and minimal damage to brand recognition.

The Fresh-cut Tomato Supply Chain, for example, Is complex



WGS-based monitoring can pinpoint root causes in the Fresh-cut Tomato Supply Chain



Benefits to industry, growers, and distributers (continued).

- **Regular testing throughout network:**

1) **identifies specific suppliers that are introducing contaminants;**
2) **identifies whether contaminant is resident to a facility or transient;**
3) **knowledge of where contaminant is coming from allows industry to fix the problem based on scientific evidence.**
   - –Shift costs to the supplier who has introduced the contaminant.
   - –How often is the root cause of the problem left unresolved to occur again at a later date?

Acknowledgements

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  - Arizona
  - California
  - Florida
  - Hawaii
  - Maryland
  - Minnesota
  - New Mexico
  - New York
  - South Dakota
  - Texas
  - Virginia
  - Washington
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  - Eastern Laboratory
- **CDC**
  - Enteric Diseases Laboratory
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- **CLC Bio**
- **APHL**