

The NCFOODSAFE Project

Developing a Foodborne Events Data Integration and Analysis Tool for North Carolina (NCFEDA)

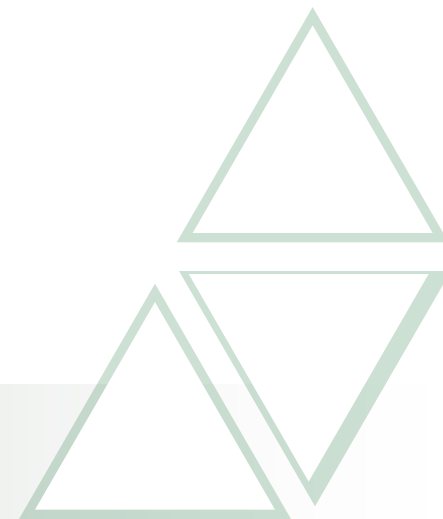
Noel Greis and Monica Nogueira

*Center for Logistics and Digital Strategy
Kenan-Flagler Business School*

Pia MacDonald and Rachel Wilfert

*North Carolina Center for Public Health Preparedness
Gillings School of Global Public Health*

University of North Carolina at Chapel Hill



Food Safety Challenges

Underlying premise

- Our national security depends on a safe and secure food supply—whether the contamination is **unintentional** or the result of a **terrorist act**.
- Currently, **15 federal agencies** collectively administer at least **30 laws** related to food safety.
- Meeting this challenge depends on :
 - **New process models** reflecting new stakeholders (consumers, private sector)
 - **New, non-traditional data sources** that support real-time monitoring and response; and
 - **New informatics tools** that enhance our ability to collect, interpret and disseminate electronic information across organizational boundaries.

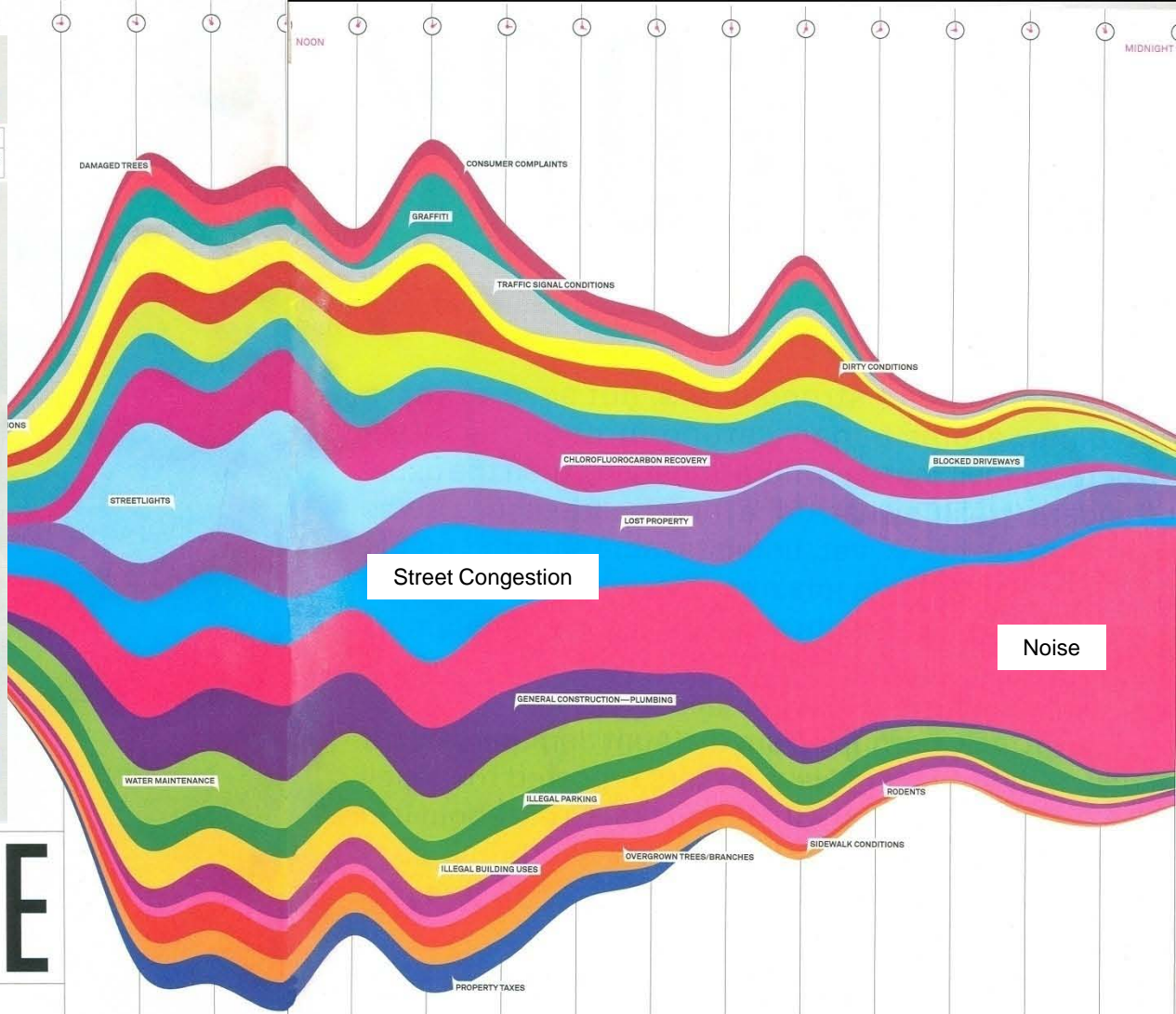
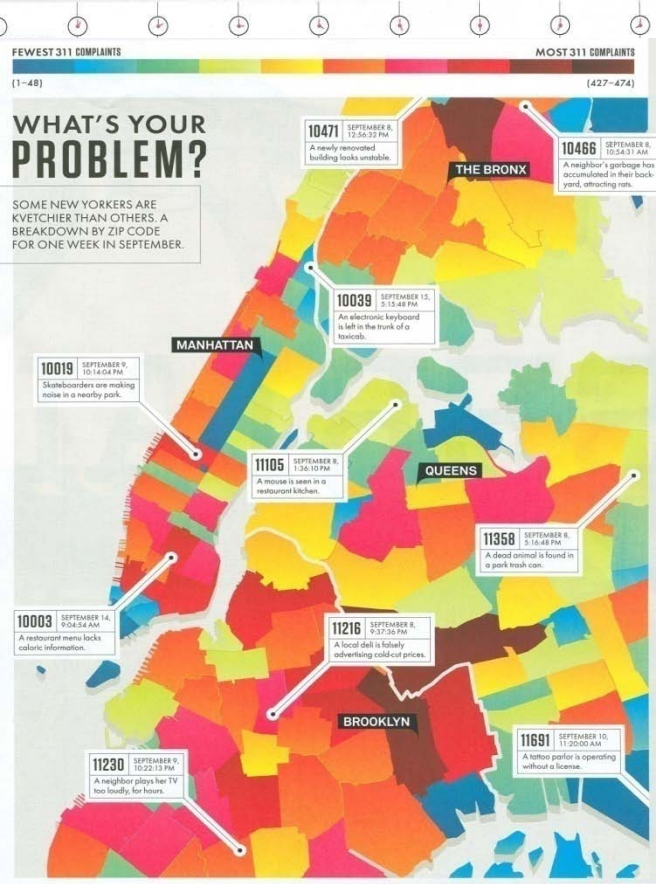
NO SINGLE PATTERN OF FOOD CONTAMINATION

A 2005 study from Stanford University estimated that the addition of only **4 grams of botulinum** into a milk production facility could cause as many as **50,000 fatalities within 24 hours** [Wein and Liu, 2005].

The recent **PCA peanut butter** event was the **largest food contamination event in US history** based on insurance claims. Estimates of nearly \$1B have been suggested including \$500M due to a 25% decline in peanut sales—as well as loss of consumer confidence in the government's ability to protect its citizens.

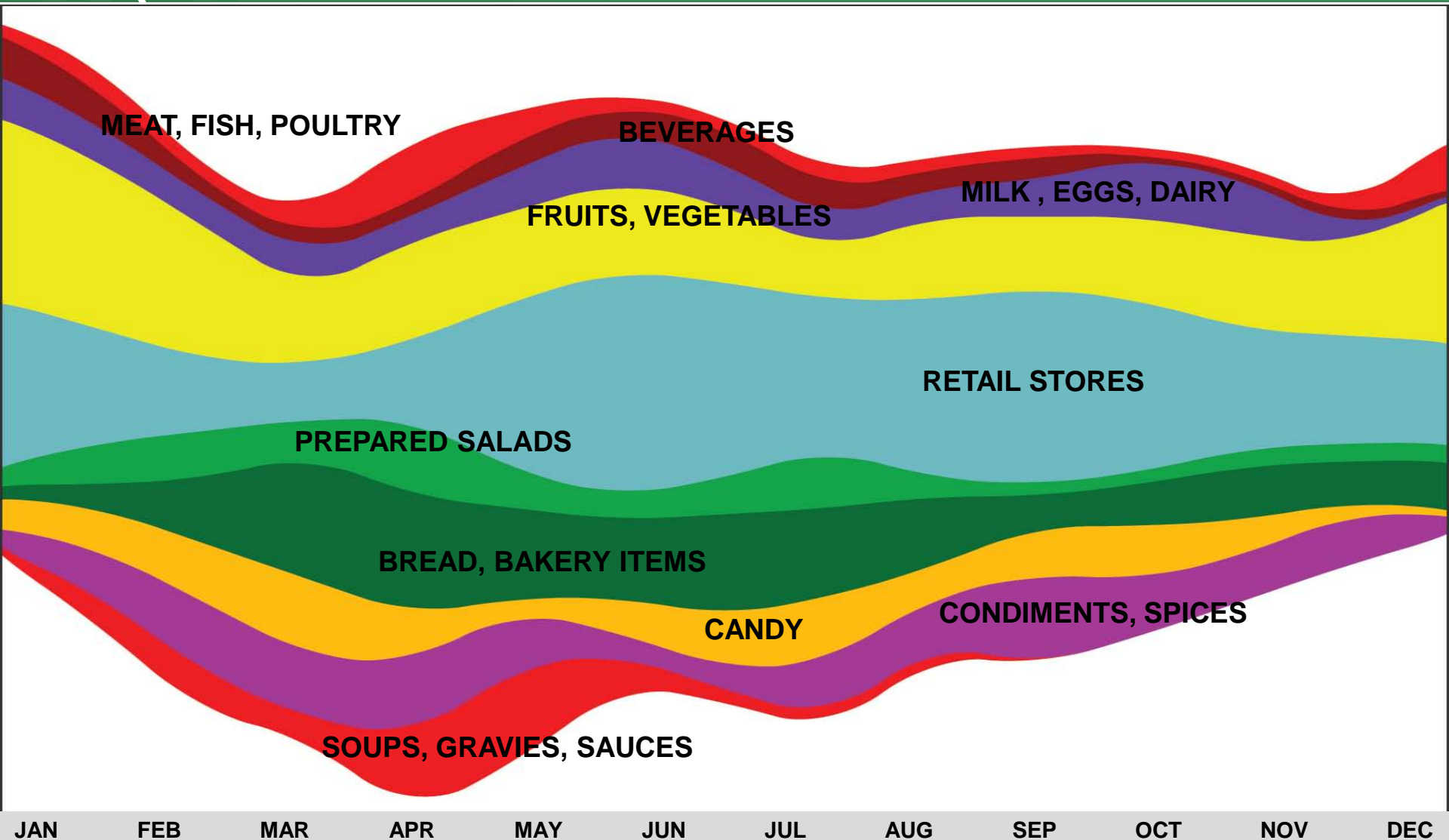


What One Hundred Million Calls Reveal About New York City



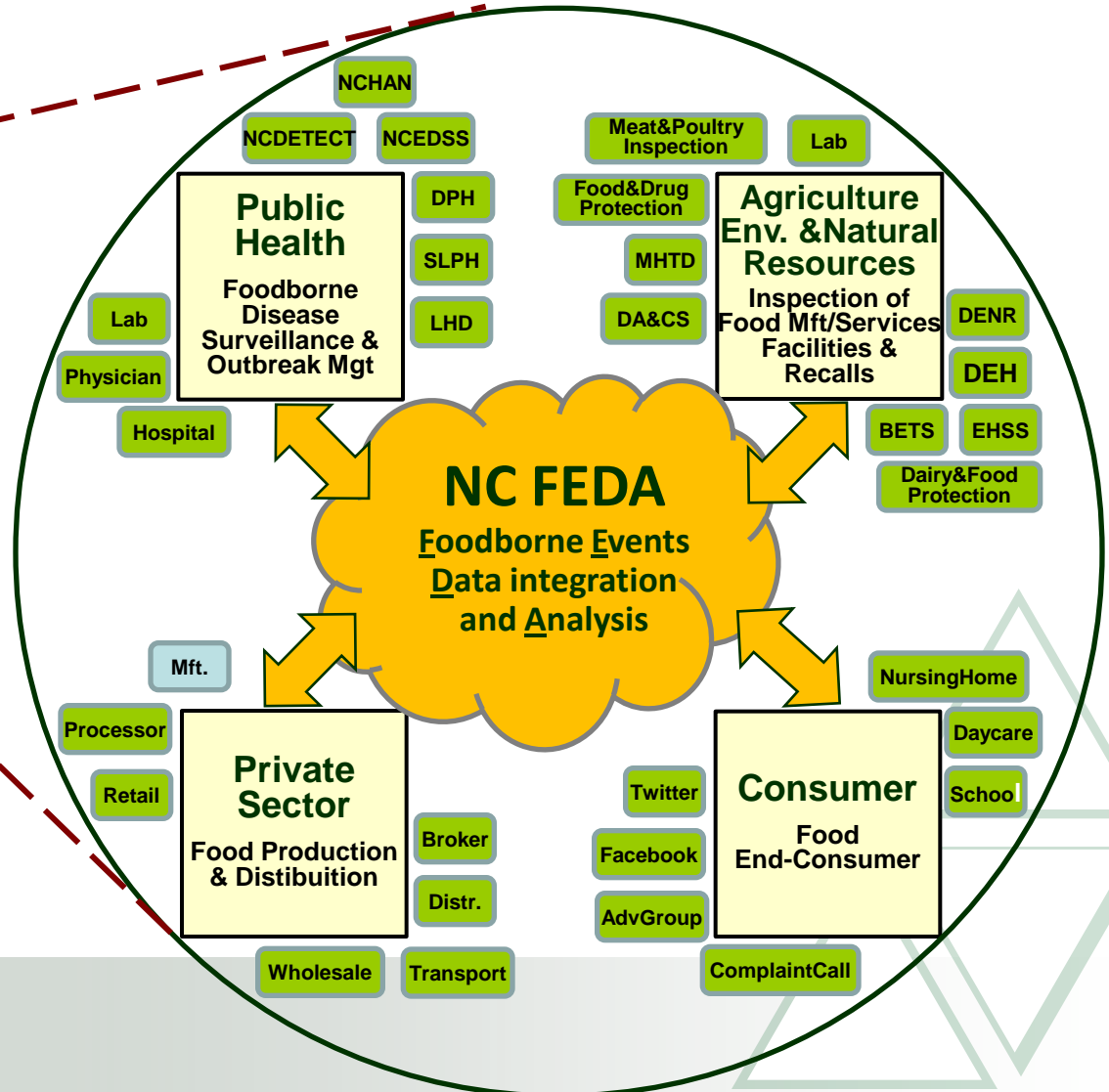
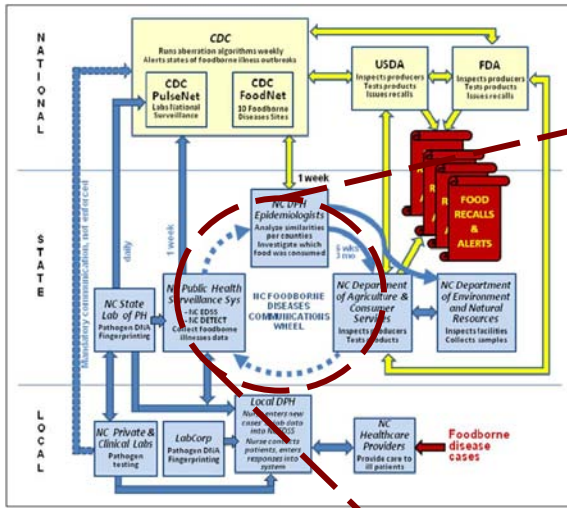
INVISIBLE CITY

What Five Hundred Calls Reveal about North Carolina Food Safety in 2009



New Stakeholder Model for Food Safety

Building Collaborative Information Processes



Four Main Capabilities of NCFEDA Bridge

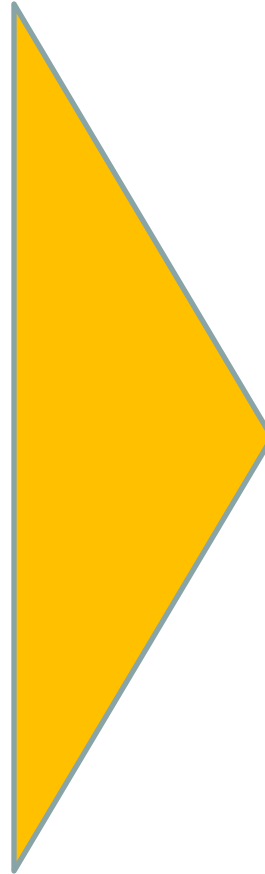
Current Gaps in System

Data Fusion. Combine relevant information into a single situational picture (New and nontraditional data sources; private sector data).

Visualization. Provide a visual representation of data as a problem-solving technique.

Analytics. Find patterns in data to speed up the process of identifying source, scale and scope of contamination.

Collaboration. Enable anytime, anywhere exchange of information in (near) real time among all stakeholders.

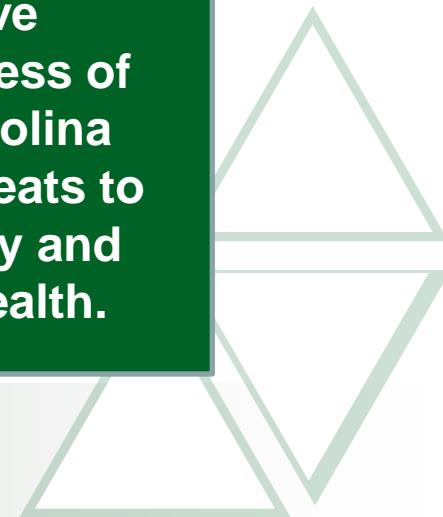


NCFEDA GOALS

Reduce latencies in the surveillance and response to foodborne disease and contamination

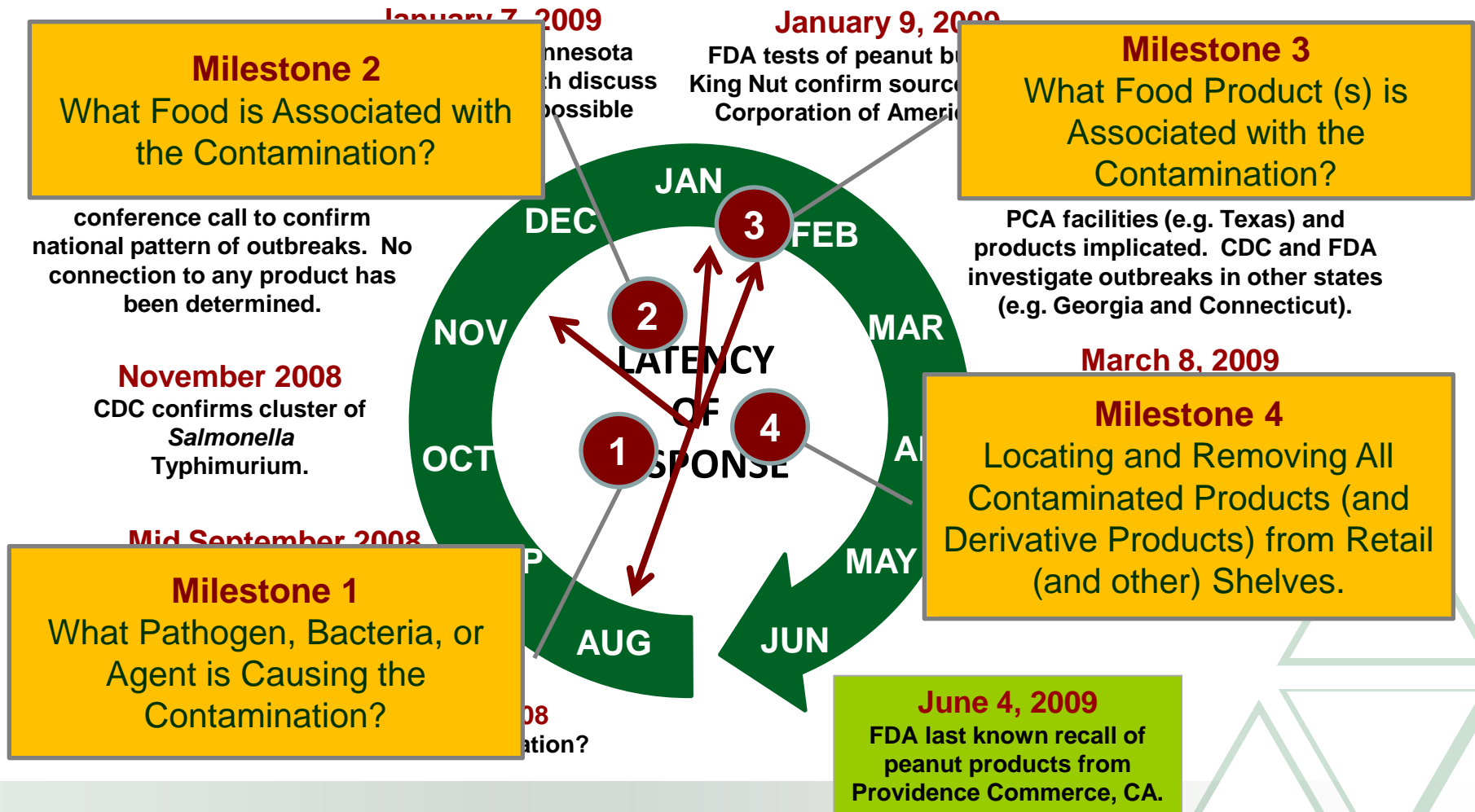
and

Improve preparedness of North Carolina against threats to food safety and human health.



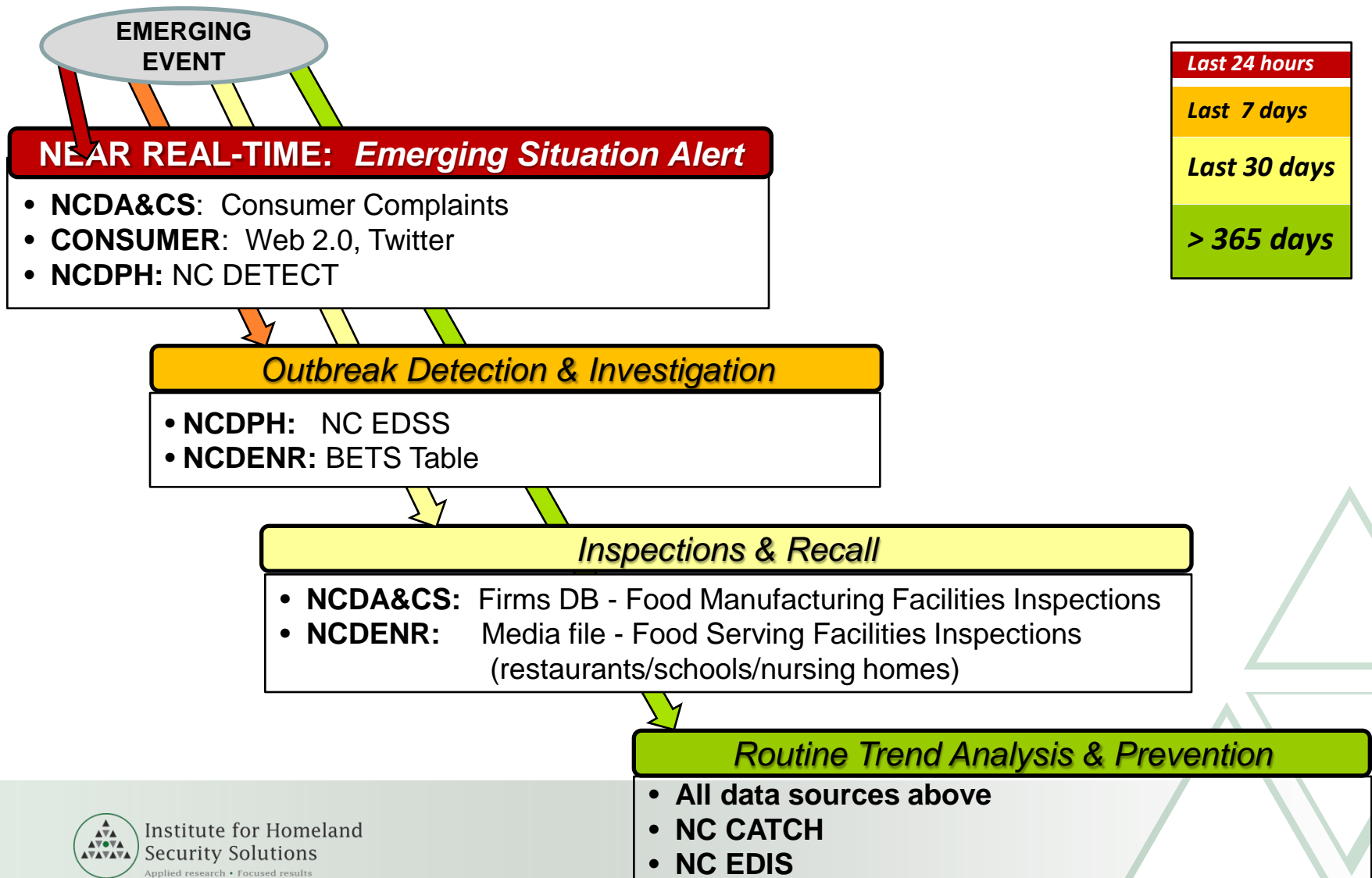
Reducing Latency Of Response

2008-2009 PCA Peanut Butter Contamination

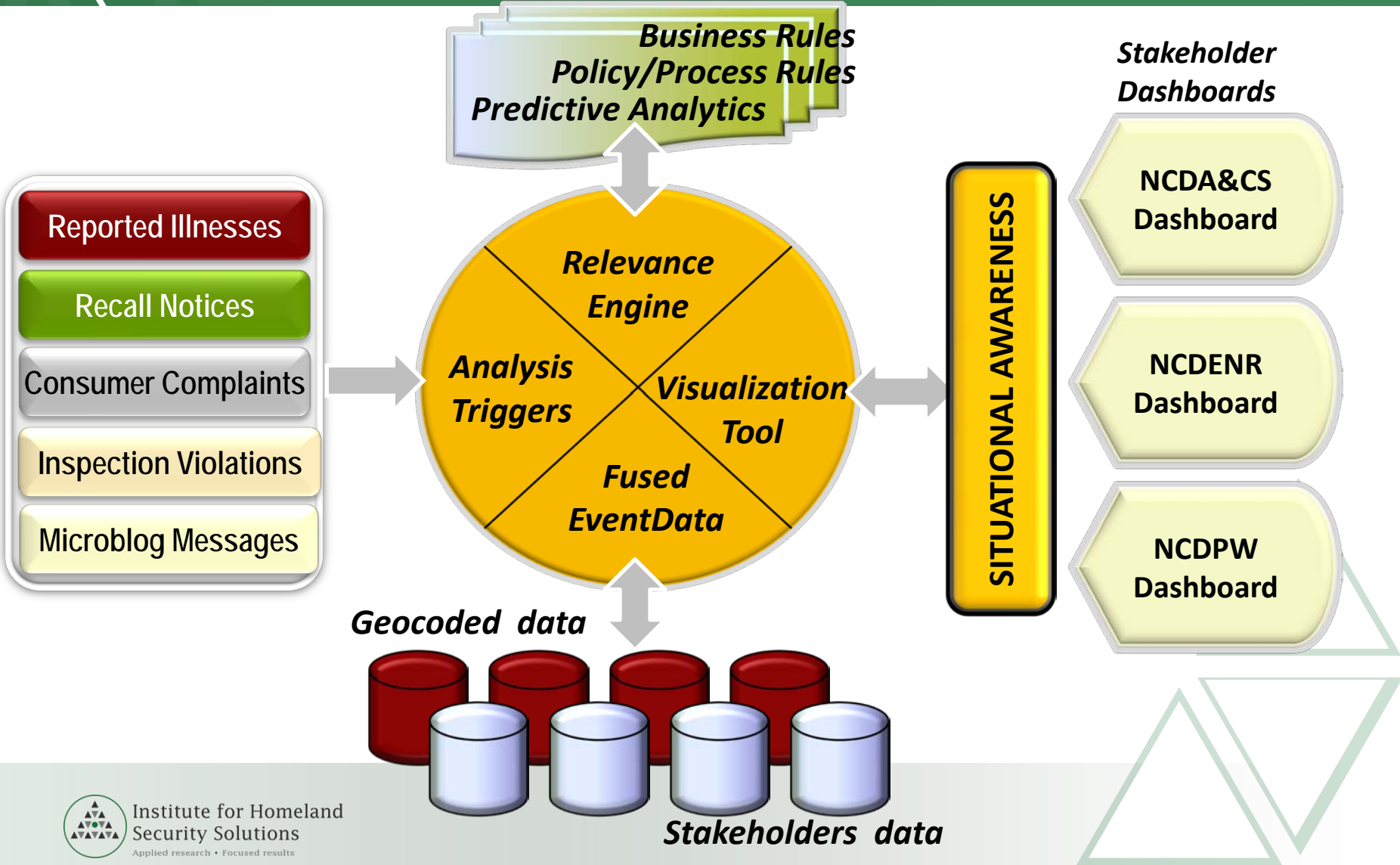


Building Situational Awareness

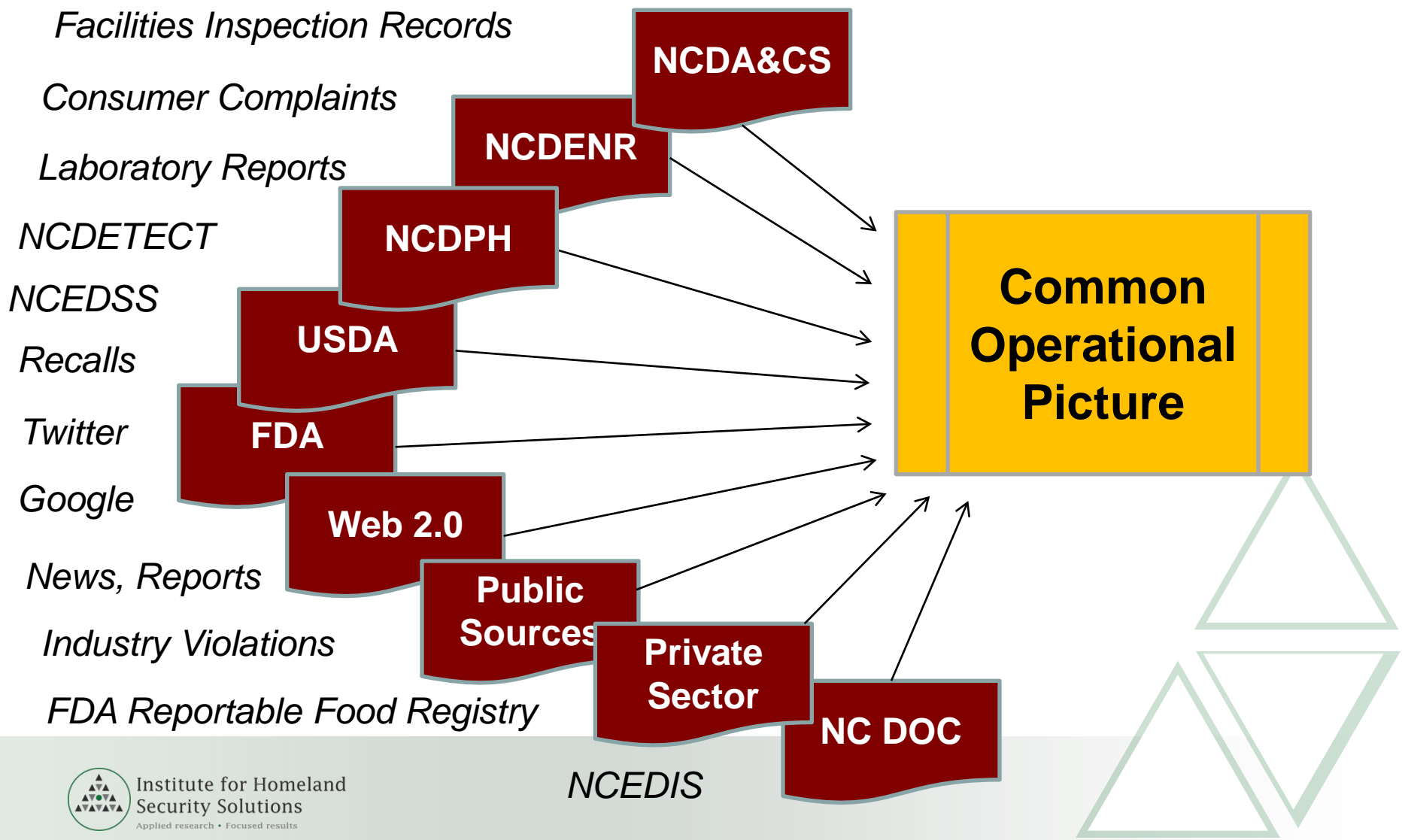
Leveraging (Near) Real-Time Information



NCFEDA Architecture



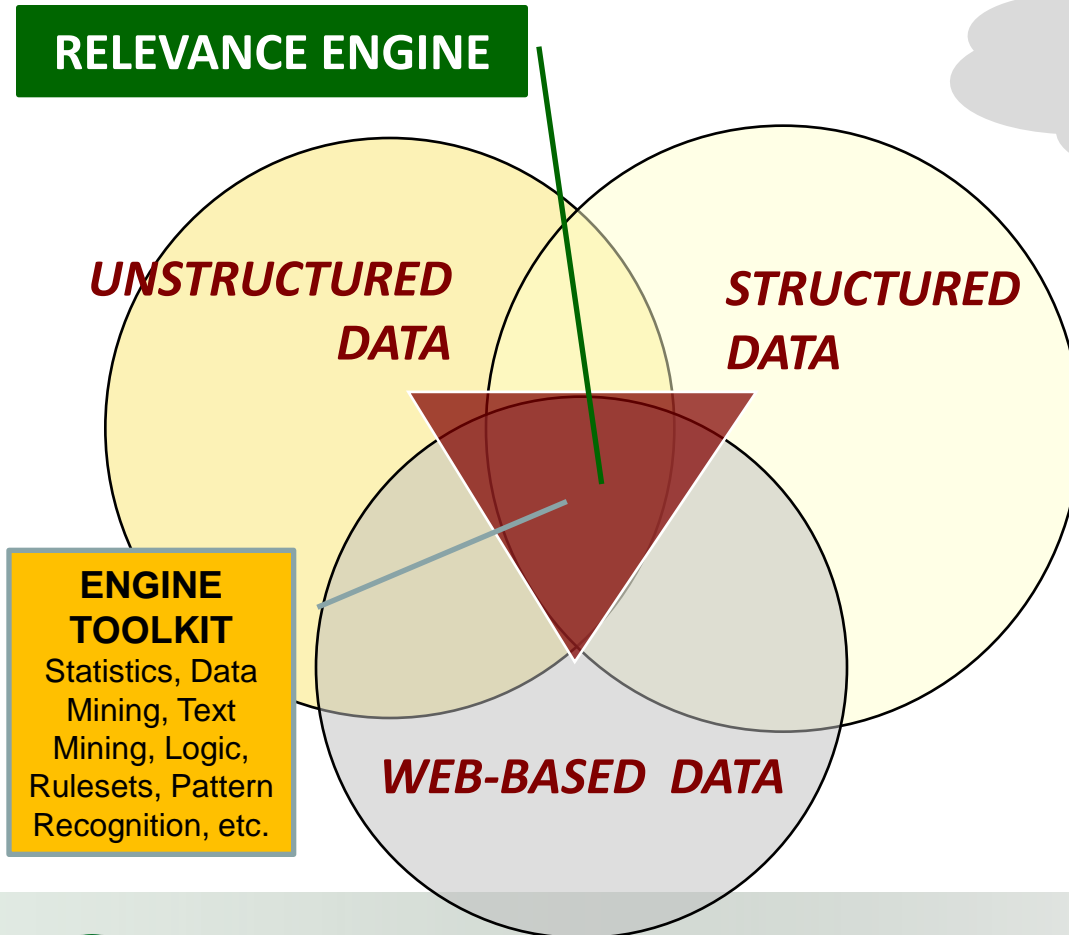
Data Fusion for Situational Awareness and Common Operational Picture



Relevance Engine & Sample Analytics

Linking "Related" Events Across Agencies

RELEVANCE ENGINE

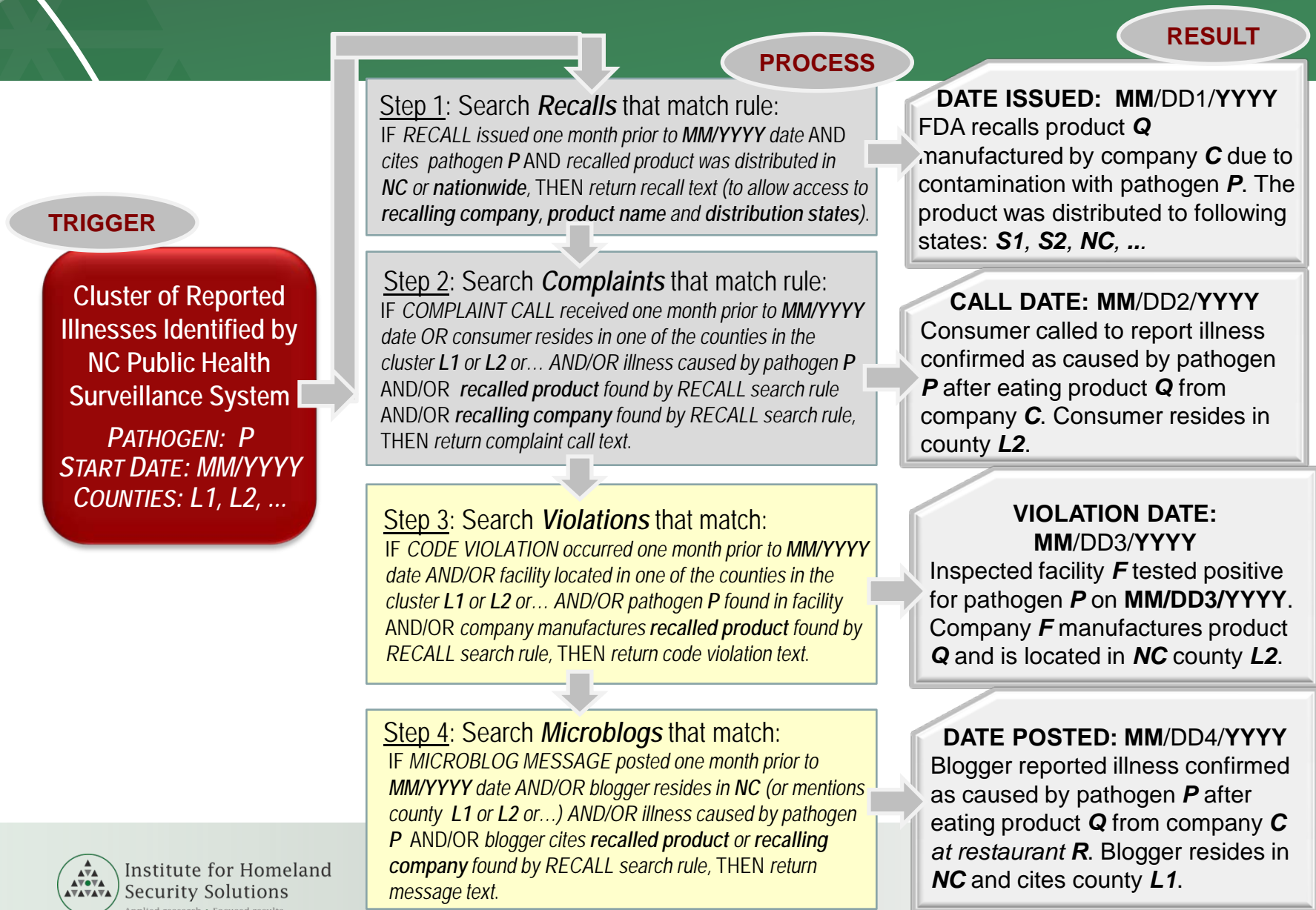


What is the likelihood that "Event X" is related to

ELI RATINGS

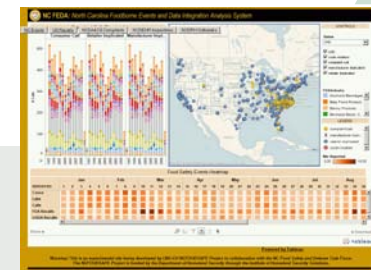
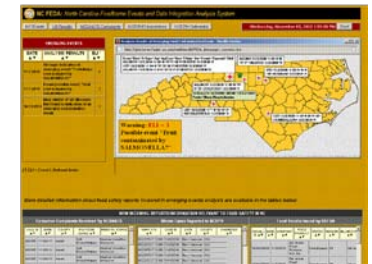
Level	Description
0	No Likelihood
1	Possible Likelihood
2	Low Likelihood
3	Some Likelihood
4	Moderate Likelihood
5	Significant Likelihood
6	High Likelihood
7	Highest Likelihood

Sample Logic for Relevance Engine



A BRIEF DEMONSTRATION

- Location: Offices of NCDA&CS
- Timeline: Start 9AM on November 4, 2010
- Duration: 3 days in 3 minutes
- Event: Possible *Salmonella* contamination
- Situational Awareness [Endsley, 1995]:
 - **Perception:** *North Carolina Common Operational Picture*
 - **Sensemaking:** *Placing Emerging Event in National Context*
 - **Projection:** *Trend Analysis Based on History*



CAUTION: FEDA is still a work in progress!

