How International Surveillance of Foodborne Infections is Performed –

The Role of The WHO Global Foodborne Infections Network, PulseNet International, WHO-INFOSAN and WHO-IHR

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Today Their Problem- Tomorrow Ours: Impact of International Trade on Food Safety,
IAFP 2012, Providence, RI, July 22-25, 2012
Continuous Timely Surveillance Is Critical to Monitor the Global Spread of Foodborne Pathogens, and to Detect, Investigate and Control Outbreaks of Foodborne Infections

- Mandatory Reporting (WHO IHR)
- International Reporting and Alerts of Food Safety Emergencies (WHO INFOSAN)
- International Capacity Building of Foodborne Pathogen Surveillance (WHO GFN)
- International Molecular Surveillance of Foodborne Infections (PulseNet International)
WHO International Health Regulations (2005) (IHR)

- A global framework to prevent, detect, assess and provide a coordinated response to events that may constitute a public health emergency of international concern (PHEIC)
  - Not just infectious diseases
  - Not only foodborne events

- A legally binding agreement that requires countries to build surveillance infrastructure and legislation
Current Status for WHO IHR Implementation

- 194 countries have signed the agreement
- As of March 2012 20% of the countries have not reported on their implementation of IHR
- National IHR focal points reports to WHO IHR contact points in the WHO Regional Centers
- WHO determines if reported events constitutes public health emergencies of international concern (PHEIC)
WHO IHR Notification Decision Tree

Events detected by national surveillance system (see Annex 1)

- A case of the following diseases is unusual or unexpected and may have serious public health impact, and thus shall be notified:\(^1\);  
  - Smallpox
  - Poliomyelitis due to wild-type poliovirus
  - Human influenza caused by a new subtype
  - Severe acute respiratory syndrome (SARS).

- Any event of potential international public health concern, including those of unknown causes or sources and those involving other events or diseases than those listed in the box on the left and the box on the right shall lead to utilization of the algorithm.

- An event involving the following diseases shall always lead to utilization of the algorithm, because they have demonstrated the ability to cause serious public health impact and to spread rapidly internationally:\(^2\);  
  - Cholera
  - Pneumonic plague
  - Yellow fever
  - Viral hemorrhagic fevers (Ebola, Lassa, Marburg)
  - West Nile fever
  - Other diseases that are of special national or regional concern, e.g. dengue fever, Rift Valley fever, and meningococcal disease.

Is the public health impact of the event serious?

- Yes
  - Is the event unusual or unexpected?
    - Yes
      - Is there a significant risk of international spread?
        - Yes
          - Is there a significant risk of international travel or trade restrictions?
            - Yes
              - EVENT SHALL BE NOTIFIED TO WHO UNDER THE INTERNATIONAL HEALTH REGULATIONS
            - No
        - No
    - No
  - No

- No
  - Is there a significant risk of international spread?
    - Yes
      - EVENT SHALL BE NOTIFIED TO WHO UNDER THE INTERNATIONAL HEALTH REGULATIONS
    - No

EVENT SHALL BE NOTIFIED TO WHO UNDER THE INTERNATIONAL HEALTH REGULATIONS

\(^1\) In extraordinary circumstances including severe acute respiratory syndrome (SARS).
\(^2\) For diseases with a documented ability to cause serious public health impact and spread rapidly internationally: cholera, pneumonic plague, yellow fever, viral hemorrhagic fevers (Ebola, Lassa, Marburg), West Nile fever, and other diseases that are of special national or regional concern, e.g., dengue fever, Rift Valley fever, and meningococcal disease.
Only one event, a new influenza strain A (H1N1) pdm09, was deemed a PHEIC by WHO.

<table>
<thead>
<tr>
<th>Event</th>
<th>Number of events</th>
</tr>
</thead>
<tbody>
<tr>
<td>New influenza strains</td>
<td>12</td>
</tr>
<tr>
<td>Salmonella outbreaks</td>
<td>5</td>
</tr>
<tr>
<td>Botulism outbreak</td>
<td>1</td>
</tr>
<tr>
<td>O157:H7 outbreak</td>
<td>1</td>
</tr>
<tr>
<td>Guillan-Barré Syndrome outbreak</td>
<td>1</td>
</tr>
<tr>
<td>Contaminated heparin</td>
<td>1</td>
</tr>
<tr>
<td>Lassa fever</td>
<td>1</td>
</tr>
<tr>
<td>Oil spill</td>
<td>1</td>
</tr>
<tr>
<td>Typhoid fever outbreak</td>
<td>1</td>
</tr>
</tbody>
</table>

Kohl et al. 2012 EID 18 1047-53
The International Food Safety Authorities Network (INFOSAN)

- Global network of national food safety authorities
- Managed by FAO and WHO
- **Aims:**
  - Rapid exchange of information during food safety events
    - *NOT just infectious diseases*
  - Share information of global interest
  - Promote partnerships and collaboration
  - Building and strengthening country capacity

http://www.who.int/foodsafety/fs_management/infosan/en/
INFOSAN Activities

- **Monitor** information sources to detect food safety events
- **Assess** and **verify** events
- Facilitate information gathering and dissemination
- Share **alerts** on urgent issues
- **Information notes**
- Develop **guidance** and **training tools**
- Key element of FAO’s Emergency Prevention Programme on Food Safety (EMPRES Food Safety)

[http://www.who.int/foodsafety/fs_management/infosan/en/]
INFOSAN Members

- **Emergency Contact Points**
  - National food safety authorities
    - FDA in the United States
  - Coordinate activities with relevant national agencies involved with food safety and emergency response

- **Focal Points**
  - National food safety and public health authorities
  - 2-way information sharing
    - *With INFOSAN from food safety entities and networks*
    - *From INFOSAN with food safety entities and networks*
  - Respond to urgent questions and alerts
WHO Global Foodborne Infections Network (GFN)

A network of professionals and institutions working in veterinary, food and public health disciplines committed to enhancing capacity of countries to conduct integrated surveillance of foodborne and other enteric infections

GFN Steering Committee

http://www.who.int/gfn/en/
GFN Main Activities

- (Inter)national Training
- External Quality System (EQAS)
- Country Data Bank (CDB)
- Focused Regional and National Projects
- Reference Services
- Onsite Problem Solving
- Communication
  - Email list & Web-site
Training & Capacity Building

- Progressive training cycles increasing capacity

**Microbiology Bench Training**
- Global/Region-specific pathogens (e.g., *Salmonella*, *Campylobacter*, *E. coli*, *V. cholerae*, *S. Typhi*, *Brucella*, *Shigella*, *Listeria*, *C. botulinum*)
- Quality assurance
- Biosafety
- Antimicrobial Susceptibility Testing
- Advanced methods

**Epidemiology Training**
- Outbreak detection and response
- Evaluation of surveillance systems
- Study design
- Source attribution
- Burden of disease
- Data management

**Joint Epidemiology and Laboratory**
- Integrated surveillance
- Risk assessment
- Country Plans of Action
- Advocacy and communication
- Information sharing networks
- Project proposal writing
(Inter)national Training Courses

Cumulative Number of GFN Training Participants

*Missing country training participant information
PulseNet International

A network of 7 national and regional networks utilizing standardized identification and isolate characterization methods and sharing information in real-time to provide early warning on foodborne disease outbreaks, emerging foodborne infections, and acts of food bioterrorism.
Objectives

- Building molecular surveillance capacity for foodborne infections
  - Partnering with WHO GFN
- International outbreak detection and response
  - Partnering with WHO GFN, INFOSAN & ECDC
  - Communicating on suspicion of international spread and without confirmed source
- Development, validation and implementation of global standardized subtyping methods
- Collaborative studies

Governance

- Steering Committee
PulseNet International Communication

• Steering Committee
  – Conference calls
  – Face-to-face meetings
  – Email

• All Members
  – Conference calls, Webinars

• The Public
  – www.pulsenetinternational.org

www.pulsenetinternational.org
An example of an ongoing investigation...

- The Russian outbreak
  - January 2012
  - 13 infants, 1 child, 2 adults
  - *Salmonella* ser. Oranienburg
  - Associated with infant formula imported from Belgium

Reference

XbaI

BlnI
European CDC is notified by PulseNet and INFOSAN

**For Information**

- **Attachments**
  - File
    - 16 cases of salmonellosis in Lusioye RF from dry infant formula from Belgium.pdf
    - Bnl_2012-01-27_CRIE.tif
    - Xba1_2012-01-27_CRIE_D.tif

**Post**

*Salmonella Oranienburg (suspicion of) in dried milk formula from Belgium*

INFOSAN informed us about 16 cases (including 13 infants) of Salmonellosis that occurred in Russia and that would be due to consumption of infant formula originated from Belgium. INFOSAN alert’s enclosed. A RASFF notification (2012.0094) was issued on 17 January. The Belgium authorities traced back the product under suspicion and investigations on trace forward are ongoing. To date, company’s own checks of the suspicious lot show favourable results. Please report through EPIS any case of Salmonella Oranienburg in infant that would be due to consumption of the suspected product.

*Posted: 18/01/2012 12:37 by Celine Gossner  ECDC*

*In Belgium only three human cases of Salmonella Oranienburg were detected between October 2011 and January 2012 (1 in one baby and two adults). No Salmonella Oranienburg was isolated in milk during the monitoring program of the Belgian Food Agency. Salmonella Oranienburg is a rare serotype in Belgium (11 human cases detected on 3660 in 2010 and 17 cases on 3297 in 2011).*

*Knd Regards*

Sophie Bertrand
Responsible of the Belgian NRC for Salmonella
Fast forwarding to the beginning of June...

**Recalls and Alerts: June 7, 2012**

Here is today’s list of food safety recalls, product withdrawals, allergy alerts and miscellaneous compliance issues. The live links will take you directly to the official recall notices and company news releases that contain detailed information for each recall and alert.

If you would like to receive automatic email alerts for all new articles posted on efoodalert, please submit your request using the sidebar link.

**United States**

- **Allergy Alert: Windsor Quality Food Co (Toluca, IL) recalls Safeway Select Five Cheese Lasagna (Retail cartons; Package code April 4, 2013) and Safeway Select Meat Lasagna (Shipping cases; Best by date products contain undeclared egg and soy. The manufactured on April 4, 2012 and shipped to California, Delaware, the District of Columbia, Montana, Nevada, Oregon, Texas, Washington, and Wisconsin.**

- **Food Safety Recall: Bay Valley Foods recalls products manufactured by its subsidiary, ST Specialty Foods Inc., because the recalled products include a seasoning blend manufactured by Kerry Ingredients & Flavours that may potentially contain small metal fragments. Affected products were packaged under the Aldi, Coborns, H-E-B, King Soopers, Kroger, Meijer, Mid-Mountain Foods, Mitchell Grocery and Walmart brands. Please refer to the recall notice for a detailed list of products and lot codes.**

- **Food Safety Recall (FDA Enforcement Report): Corn Products International, Inc. (Westchester, IL) recalls Purimune galactooligosaccharide powder derived from milk lactose (20kg/44.1-lb plastic bags; Product code 113001-156; Lot Nos. 0000117369, 0000117370 and 0000117371; Manufactured by Corn Products Korea, Inc., Icheon-City, Korea), because the product was found to be contaminated with Salmonella. Customers were notified of the recall by telephone on May 10th and May 15th-16th, 2012. The recalled product was distributed to Arizona, California, Nebraska, New Jersey, Pennsylvania, Utah, Vermont, and Washington, as well as to Canada (Ontario and Quebec, only), Czech Republic, New Zealand and the United Kingdom.**
Westchester firm recalls salmonella-contaminated supplement ingredient

No illnesses have been reported
FDA investigating

July 19, 2012 | By Trine Tsouderos, Chicago Tribune reporter

Concern over salmonella contamination has prompted a Chicago-area firm to recall nearly 40,000 pounds of a dietary ingredient, a move that in turn prompted several recalls of supplements containing the suspect material.

U.S. Food and Drug Administration officials said they are investigating whether the ingredient, sold by Westchester-based Ingredion and made in a subsidiary’s plant in South Korea, wound up in other dietary supplements sold to consumers and whether more recalls are necessary.

Sold by Ingredion under the brand name Purimune, the recalled galactooligosaccharides are an undigestible fiber made from milk that are marketed as an aid to both the immune system and digestive health.
7/20/2012
INFOSAN Alert
Current U.S. Data

- In PulseNet 12 isolates with “Russian” PFGE pattern in 2012:
  - Six human isolates
    - 1/28 – 5/29
    - 2-86 years old
    - 5 states
  - Five isolates from GOS – manufacturer?
  - One isolate from prebiotic food

- Follow-up ongoing by FDA and CDC
Where do we go from here?

- IHR notified
- Confirmation of the extent of the incident
  - Awaiting PFGE of *Salmonella* ser. Oranienburg globally
    - Both human and product samples
    - Ascertaining local outbreaks will NOT provide the full picture
PFGE is critical to delineate dispersed foodborne outbreaks

Example: *Salmonella* Heidelberg outbreak in 2011
Where do we go from here?

- **IHR notified**
- **Confirmation of the extent of the incident**
  - Awaiting PFGE of *Salmonella* ser. Oranienburg globally
    - Both human and product samples
    - Ascertaining local outbreaks will NOT provide the full picture
- **Root cause analysis**
  - How did the contamination happen at the GOS plant?
  - How did it spread?
  - What can be done to prevent contamination/spread in the future?
    - At manufacturer
    - At secondary processors

*Although WHO-GFN is not currently directly involved members & people who has been trained and are involved in that network are*
Thank You!

Acknowledgements

Disclaimers:

“*The findings and conclusions in this presentation have not been formally disseminated by the Centers for Disease Control and Prevention and should not be construed to represent any agency determination or policy.*”