HERE'S WHAT THE PUBLIC HEALTH OFFICIALS DID ...

The Real-life Step-by-Step Investigation

1994 *Shigella* Outbreak in Suffolk County, New York

Pathogen Identified

1. Between November 8 and December 8, 1994, 21 people experiencing symptoms (nausea, vomiting, diarrhea, cramps, and fever) go to the doctor.
2. Doctors make an initial diagnosis, and stool cultures from the patients are sent to a clinical laboratory.
3. At the lab, medical tests are done on the stool cultures. The lab determines the presence of the *Shigella* bacterium.
4. An isolate of the bacterial culture is sent to the state health department lab for further testing.
5. The health department sends the results to the Bureau of Infectious Disease Control in Suffolk County.

Investigation Expanded

6. Due to the unusual cluster of cases, the Bureau realizes that this is not an isolated case, but an outbreak. On December 12, 1994, the investigation begins.
7. Health officials interview the 21 sick people. They discover that 17 of the 21 people affected fell into one of three categories:
   - They ate at the same fast-food restaurant 1 or 2 days prior to the symptoms occurring;
   - They were members of a family who ate foods prepared at the restaurant 1 or 2 days before a family member became ill;
   - They had close personal contact with families who had eaten at the restaurant 1 or 2 days before a family member became ill, but they did not, personally, eat at the restaurant.

Possible Location and Food Identified

8. Officials give the affected families a questionnaire. Two of the 5 families return the questionnaire. The questionnaire reveals that 4 of the 5 families who had eaten at the restaurant developed symptoms within the 2-to-3 day incubation period. The fifth family had close personal contact with one of the families that had eaten at the restaurant. French fries were the only common food eaten by the sick people and their families.
9. Health officials interview the employees who worked in the afternoon, because the suspect meals were served in the afternoon.
10. Health officials take stool samples from the afternoon employees for bacteriological examination.
11. Health officials inspect the restaurant. During the inspection, they discover that the rear kitchen handwashing sink and the customer and employee restrooms lack sanitary hand towels.

Location and Food Verified

12. Health inspectors request that the restaurant's operators advise all employees who worked on the days in question to submit to a stool sample. Four employees quit rather than submit a sample.
13. Fifty-one stool samples were provided. All but 3 samples were negative. One was positive for *Streptococcus*, one was positive for *Salmonella*, and one was positive for *Shigella*. These 3 employees were restricted from work until 3 consecutive, negative stool samples were obtained. The one positive sample for *Shigella* was collected from the store manager who had first stated that he had not been ill. He later admitted that he had experienced gastrointestinal illness on December 8, 1994.
14. When a positive test result for *Shigella* was obtained from the manager, a copy of his work schedule was obtained to determine if he worked on the dates and times of the suspect meal. It was found that his work schedule matched 2 of the 4 suspect meals.

Conclusion

15. The health department makes a conclusion that the illnesses originated at the restaurant based on the following factors:
    - *Shigella* outbreaks are usually caused by sick food workers who, after using the bathroom, don't wash their hands and then handle food.
    - The sick food worker first said that he was not sick and later stated that he experienced symptoms on December 8, 1994. This was several days after the last customer in the outbreak became sick, indicating that he may have been spreading the bacterium before he actually experienced the symptoms. The food worker may also have been mildly sick, but didn't realize it.
    - French fries were the only product common to all the sick people. Normally, very little hand contact occurs in preparing and dispensing French fries, because the fries are scooped with a utensil. However, the product is handled by front-counter personnel who do not use disposable gloves as a barrier to hand contact with the food. It's not unusual for fries that fall out of the cardboard holders to be picked up with bare hands and tossed back into the French fry bin. Furthermore, the cardboard containers are stored flat and must be "opened" to accept fries. These containers are frequently opened and carried with bare hands that touch the outside and inside of the container.

Note: This investigation did not *confirm* the association between the restaurant and the *Shigella* bacterium. However, the bacteria test results and the presence of an employee in the restaurant who tested positive for the same type of *Shigella* that infected the families who ate at the restaurant *suggest* that the outbreak was caused by foods eaten at the restaurant. Foodborne illness outbreaks are very difficult to track and public health officials can only draw conclusions based on the information they obtain from sick persons, food establishments, and test results.