

The New York City Department of Health and Mental Hygiene Detected and Investigated Cluster of Salmonellosis Using Wide Array of Tools



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There continues to be a high burden of foodborne illness in New York City. The New York City Department of Health and Mental Hygiene (NYC Health Department) is tasked with detecting and responding to foodborne disease (including salmonellosis) outbreaks and has multiple systems in place to facilitate this work.

The “What”

The NYC Health Department’s multi-pronged approach ensures information from several, sometimes non-overlapping, streams are available to take public health action to control these outbreaks and prevent ongoing transmission:

- Routine disease reporting (i.e., laboratories and health care providers are required to report individual salmonellosis cases to the NYC Health Department, and health care providers are also required to report food poisoning occurring in two or more patients or any unusual occurrence of concern);
- Interviews of reported salmonellosis cases;
- Daily analyses using SaTScan™ software to detect spatio-temporal increases in reportable communicable diseases, including salmonellosis;
- Daily analyses using SaTScan to detect increases in syndromes (e.g., diarrheal illness) constructed using patient chief complaint and discharge diagnosis data received through the NYC Health Department’s emergency department syndromic surveillance system (at hospital and residential zip code levels);
- Whole genome sequencing (WGS) analyses conducted at the NYC Public Health Laboratory (PHL) to identify genetically related *Salmonella* isolates, which are required to be sent to PHL; and
- Requests and notifications from traditional media (news outlets) and social media (the NYC Health Department collaborates with computer scientists at Columbia University to create a text classifier that uses machine learning to analyze Yelp reviews of NYC restaurants and Twitter messages (tweets) from NYC users to identify possible outbreaks of foodborne illness).



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The “So What”

In August 2021, the NYC Health Department responded to a large cluster of salmonellosis among travelers returning from Europe by leveraging the use of multiple complementary cluster detection methods. These tools allowed for rapid detection, investigation and response to the outbreak.

For this investigation, the NYC Health Department found that using all its cluster identification methods assisted with the investigation. Traditional and social media notifications allowed for rapid identification of the cluster. Laboratory and provider reporting confirmed that salmonellosis was the agent that caused illness. Though the NYC Health Department received line lists of patients from hospitals, these lists were not comprehensive, as some patients sought care through their primary care providers or went to the hospital on different days, making salmonellosis patient interviews critical in identifying cases associated with the trip who were not included in hospital-provided line lists. SaTScan also identified cluster-associated cases not included in hospital-provided line lists and helped prioritize interviews. Syndromic surveillance flagged the increase in GI illness regardless of a salmonellosis diagnosis, which would have identified cluster-associated patients at Hospital X in the absence of the initial media reports. WGS analysis confirmed that patients’ isolates were highly related to each other (suggesting patients likely acquired their infections from a common source), regardless of an interview being performed, as not all patients agreed to be interviewed.

The “Now What”

This investigation highlighted the utility of health departments implementing a wide array of complementary tools for GI illness cluster detection, case finding and cluster response. The NYC Health Department is continuing to leverage these existing systems and tools, which require ongoing investment and support to ensure that the agency can continue to maintain robust cluster detection and investigation work to prevent ongoing transmission.

In addition, the NYC Health Department is considering how to incorporate additional systems and cluster detection methods that can further enhance its ability to rapidly detect and investigate foodborne disease clusters. As the NYC Health Department implements data modernization initiatives, having additional streams of data and infrastructure to support these systems and this important public health work remains critical.