

Multistate salmonellosis investigations related to backyard poultry exposure and detected through whole genome sequencing, 2022

Allison Holmes, MPH Candidate

Department of Epidemiology, Columbia University Mailman School of Public Health

BACKGROUND

- Salmonellosis infection is caused by *Salmonella* bacteria and transmitted through contaminated food consumption or contact with infected humans or animals, including poultry.¹
- The New York City (NYC) Health Code requires medical providers and laboratories to report salmonellosis cases to the Department of Health and Mental Hygiene (DOHMH).
- Clinical isolates are sent to the NYC Public Health Laboratory for subtyping, including whole genome sequencing (WGS).
- In June 2022, the Centers for Disease Control and Prevention (CDC) identified multistate salmonellosis clusters of multiple serotypes through WGS, thought to be related to backyard (domesticated) poultry exposure (Figure 1),² which include NYC cases.

Study Aim: To identify the most likely common source of infection among cluster patients.

Figure 1. Backyard poultry



Holmes, R. (2019). Cape Cod Health News. <https://www.capecohealth.org/media-services/infectious-disease/is-raising-backyard-chickens-safe-for-your-family/>

METHODS

Interviews:

- Hypothesis-Generating Questionnaires (HGQs):
 - Asks about food, travel, and animal exposures
 - If patients traveled internationally during their entire incubation period, other exposures are not collected
 - DOHMH attempts interview with all reported salmonellosis cases using HGQs
- CDC Supplemental Questionnaire:
 - Further assesses patients' exposures to live poultry

Cluster Summaries:

- Among cases related by WGS, reported exposures are reviewed to identify commonalities

STUDENT CONTRIBUTION

- Conducted interview with HGQ for one NYC case.
- Conducted interview with CDC supplemental questionnaire for one NYC case.
- Prepared summary report of exposure information for NYC cases included in the multistate outbreak.
- Presented findings to NYCDOHMH Bureau of Communicable Disease staff at cluster update meetings.

REFERENCES AND ACKNOWLEDGEMENT

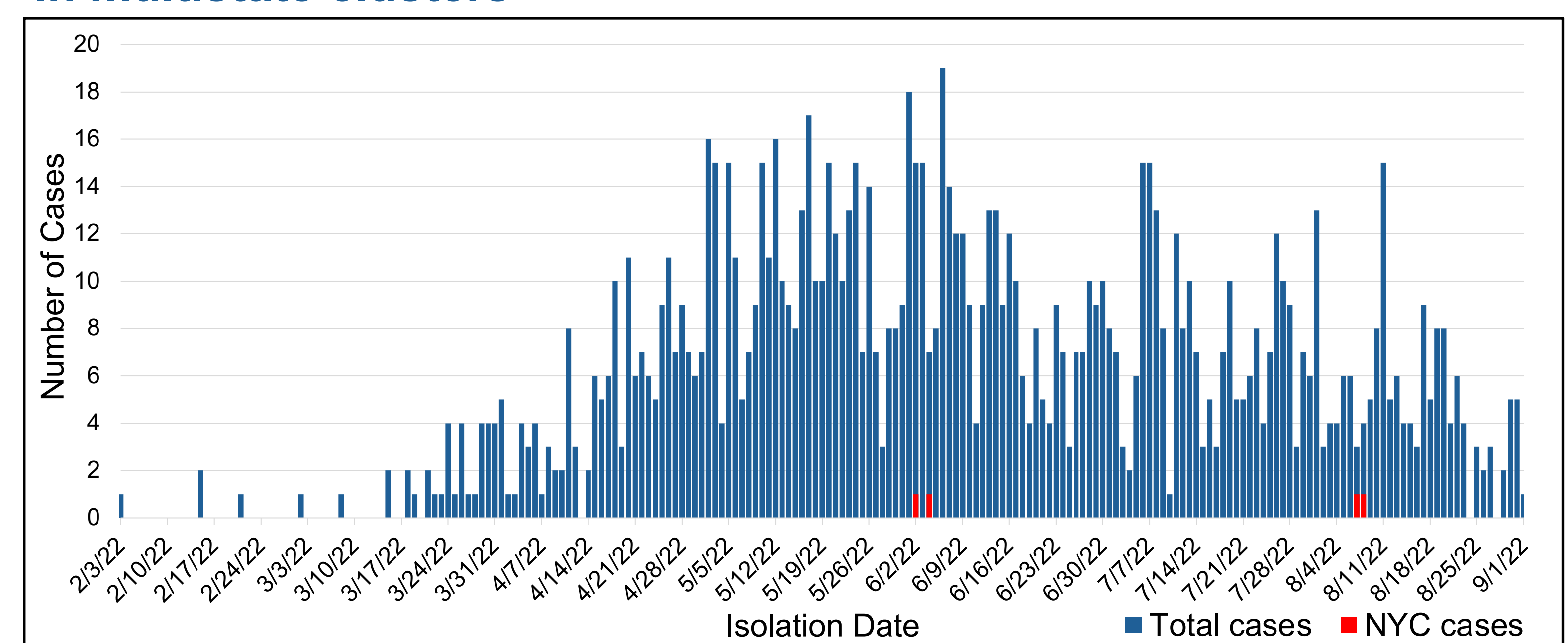
Thank you to the NYC DOHMH Bureau of Communicable Disease and Team Salmonella supervisors: Julia Latash, Lan Li, HaeNa Waechter, Lenka Malec, and John Croft.

- Linam, W. M., & Gerber, M. A. (2007). Changing Epidemiology and Prevention of Salmonella Infections. *The Pediatric Infectious Disease Journal*, 26(8), 747–748. <https://doi.org/10.1097/INF.0b013e3181376abc>
- CDC. (2022, September 22). CDC: Salmonella Outbreaks Linked to Backyard Poultry. Centers for Disease Control and Prevention. <https://www.cdc.gov/salmonella/backyardpoultry-06-22/index.html>

RESULTS

- As of September 22, 2022, 1,191 cases have been linked to these clusters (Figure 2) with ages ranging from <1–102 (median: 36).²
- Of 685 interviewed cases nationwide, 58% reported contact with backyard poultry prior to symptom onset.²
- Of the 681 people with health outcome information, 211 (31%) have been hospitalized. Two deaths have been reported.

Figure 2. Isolation dates of confirmed *Salmonella* cases included in multistate clusters²



As of September 22, 2022. Recent illnesses may be 3–4 weeks delayed in reporting.

- Four cases are NYC residents; all were interviewed with HGQs (Table 1), and one was interviewed with the CDC supplemental questionnaire.
- Three NYC cases traveled internationally during the entire exposure period; therefore, food and animal exposures were not collected.
- The other NYC case denied any live poultry exposure but reported maybe consuming chicken.

Table 1. Demographic characteristics and exposures of NYC cases

Characteristic		N (%)
Age:	<1–73 (median: 33)	
Sex:	Female	1 (25%)
	Male	3 (75%)
Race/Ethnicity:	Black/Hispanic	1 (25%)
	Other/Hispanic	1 (25%)
	Asian/non-Hispanic	1 (25%)
	Unknown	1 (25%)
Borough:	Bronx	1 (25%)
	Brooklyn	1 (25%)
	Queens	2 (50%)
Hospitalized:	Yes	3 (75%)
	No	1 (25%)
Exposure		N (%)
Travel:	Dominican Republic	2 (50%)
	Ecuador	1 (25%)
	None	1 (25%)
Live poultry:	Unknown	3 (75%)
	None	1 (25%)

CONCLUSIONS

- NYC cases did not report domestic backyard poultry exposure, despite their inclusion in these clusters.
- Since exposure to backyard poultry is uncommon in NYC, these *Salmonella* strains may also be present downstream in the food supply chain and abroad.
- Patient recall may limit the ability to attribute common exposures
- These investigations are ongoing. CDC recommends safe food handling practices to prevent salmonellosis (Figure 3).

Figure 3. CDC Food handling recommendations graphic



CDC (2022). <https://www.cdc.gov/foodsafety/keep-food-safe.html>