



KEY POINTS

for Successful Foodborne Outbreak Detection and Investigation

INVESTIGATING ESTABLISHMENT SUB-CLUSTERS

Multi-state foodborne outbreaks due to commercially distributed foods are usually first recognized as clusters of cases with isolates that match by PFGE or another subtyping method. When these clusters are investigated by interviewing the cases, there often are groups of cases that identify exposure to the same individual points of service such as restaurants, cafeterias, or institutions. These groups of cases are termed establishment sub-clusters and represent an invaluable opportunity to solve the outbreak because the outbreak vehicle was most likely served by the common establishment. All available resources should be committed to rapidly and comprehensively investigate these sub-clusters because of the high chance for success of the investigation. If resources are not available to conduct an investigation fully and rapidly, assistance should be sought from other agencies. The following key points are applicable to the majority of establishment sub-cluster investigations.

1. Identify potential establishment sub-clusters

- In their initial interview, all newly identified cluster cases should be asked to identify all dining locations eaten at during the exposure period.
- Cases often do not recall eating at some locations outside the home when asked open-ended questions on initial interview (e.g., "What restaurants did you eat at?").
- After the first few cases in a cluster are interviewed, it is fruitful to re-interview cases about a list of all dining locations outside the home named by any of the cases.
- All newly identified cluster cases should be asked specifically about the list of dining locations named by previous cases.

2. Ascertain additional cases associated with sub-cluster locations

- Once a sub-cluster is identified, cases that were previously interviewed should be re-interviewed and asked specifically about the sub-cluster establishment.
- All newly identified cluster cases should be asked specifically about the sub-cluster establishment during their first interview.
- Cases should be asked to check credit/debit card statements to improve recall.
- It is very important to pinpoint the meal date to the extent feasible (if a receipt or credit card statement is not available, record how confident the case is about the meal date).
- Additional sub-cluster cases may be ascertained by contacting additional patrons of the sub-cluster establishment (e.g., via credit card receipts, on-line orders, or reservations).

3. Gather detailed food consumption data for sub-cluster cases

- Sub-cluster cases should be interviewed using the sub-cluster venue's menu, or a more defined menu if an event cohort with a limited, discrete menu is identified.

- Ask cases about additions or subtractions to the menu item(s) they ordered.
- The establishment manager and/or chef should be interviewed to obtain ingredient lists for menu items.
- A frequency distribution of ingredients consumed by cases should be compiled.
 - Include **every** ingredient consumed by at least one case.

4. Conduct an analytic study at the sub-clusters establishment

- An ingredient specific case-control study should be conducted. There is no rule as to a minimum # of cases necessary to initiate such a study, but it is reasonable to do so with as few as 3 cases
- Identify additional cases and enroll controls by:
 - Asking cases for meal companions.
 - Getting credit card receipts, reservation lists, take-out orders, and/or lists of workers or students (if a cafeteria) for patrons who dined at the establishment on the implicated meal dates.
 - Ascertaining additional cases (and increasing the number of controls) increases the likelihood of meaningful results and the confidence you can have in those results.
 - Make the clinical case definition specific for the pathogen of interest (e.g., for *Salmonella* use "fever and diarrhea" or "diarrhea duration ≥ 3 days"). This will minimize the likelihood that unrelated illness will dilute associations.
- **Every** plausible ingredient should be included in the study. Be systematic - don't focus solely on one or two ingredients that were commonly reported by cases. Some ingredients (e.g., spices, garnishes) may be used in multiple menu items and thus could be overlooked.

5. Trace back suspected vehicle(s)

- If there are multiple sub-clusters (i.e., multiple points of service), trace back ingredients implicated in analytic studies or, if analytic studies cannot be done, those that were most frequently consumed by cases.
 - This can be a useful tool and is worth pursuing even if there are few cases in a sub-cluster or if statistically significant results are not found.
- Do **not** exclude food ingredients from an analytic study based on apparent differences in distributors for ingredients used by the sub-cluster establishments, as commonalities in the source of food items might not occur until farther back in the distribution chain.
- Trace backs are not a substitute for thorough epidemiologic investigation (#s 3 and 4 above). Only when results of the two approaches are combined can you have the highest level of confidence in your data and maximize the likelihood of reaching the right conclusion.

