

## FOODBORNE ILLNESS GLOSSARY

**2 x 2 table** - a tabular cross-classification of data such that subcategories of one characteristic are indicated horizontally (in rows) and subcategories of another characteristic are indicated vertically (in columns). Tests of association between characteristics in the columns and rows can be readily applied. Also known as contingency tables.

**Asymptomatic** - without symptoms.

**Attack rate** - the proportion of a well-defined population that develops illness over a limited period of time, as during an epidemic or outbreak. It is often expressed as a percentage. The difference between attack rates for those exposed and non-exposed to a particular food provides important clues in the investigation of the etiology of an acute outbreak.

**Carrier** - a person or animal that harbors a specific infectious agent, is asymptomatic, and is a potential source of infection for man or animals

**Case** - in epidemiology, a person in the population or study group identified as having the particular disease, health disorder, or condition under investigation. A variety of criteria may be used to identify cases (e.g., individual physicians' diagnoses, registries and notifications, abstracts of clinical records, surveys of the general population, population screening, reporting of defects such as in a dental record).

**Case-control study** - a type of observational analytic study. Enrollment into the study is based on the presence ("case") or absence ("control") of disease. Characteristics such as previous exposures are then compared between cases and controls.

**Case definition** - a set of criteria used for investigative purposes to decide whether a person has a particular disease or whether a person is to be included in a "case" category by specifying clinical and laboratory criteria and by specifying limitations on time, place and person. This definition may be used differently in various phases of an investigation. For example, a broad definition might be used early in an investigation to capture all possible cases, while later in the investigation, the definition might be narrowed to capture only definite cases. Often, a "possible" and "confirmed" case definition are generated, with the latter being cases with, for example, a positive laboratory test in addition to symptoms.

**Chain of custody** - a record that establishes the complete chronological disposition of an entity of concern (e.g., laboratory specimen, document).

**Cluster** - aggregation of cases of a disease or other health-related condition, which are closely grouped in space and time. The number of cases may or may not exceed the expected number.

**Cohort study** -type of observational analytic study. Enrollment in the study is based on exposure characteristics or membership in a group. Disease, death, or other health related outcomes are then ascertained and compared.

**Commercial confidential** - trade secrets protected by law from public disclosure (e.g., monitoring records, customer lists, traceback information). Unlawful release of this information can result in legal punishment, including imprisonment.

**Common source outbreak** - outbreak that results from a group of persons being exposed to an infectious agent or toxin from a single source.

**Confidence intervals (CI)** - the computed interval with a given probability (e.g., 95%, that the true value of a variable such as a mean, proportion, or rate is contained within the interval). This is a measure of statistical significance; if a confidence interval includes the value 1.0, it means that there is no association between the exposure in question and the outcome.

**Confirmed cases** - a case that has met the case definition and with a laboratory identified etiology.

**Contact** - exposure to a source of an infection, or a person so exposed.

**Confirmed outbreak** - clusters (see above) which are confirmed by laboratory or epidemiologic study to be caused by a common agent or among persons who have shared a common exposure.

**Contact** - exposure to a source of an infection, or a person so exposed.

**Contaminant** - an infectious agent or a chemical or physical hazard.

**Contamination** - the presence of an infectious, chemical, or physical agent or substances in or on water, milk, and food that has the potential to cause harm, including illness or injury.

**Controls** - in a case-control study, comparison group of persons without disease/illness.

**Epidemic** - the occurrence of more cases of disease than expected in a given area or among a specific group of people during a particular period of time.

**Epidemic curve (Epi curve)** - a histogram that shows the course of a disease outbreak or epidemic by plotting the number of cases by time of onset. Epidemic curves help characterize an outbreak and give clues about the source of the outbreak (e.g., common or point source, secondary spread, etc.)

**Epidemiology** - the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.

**Firm** - any individual, partnership, corporation, or association that deals in articles subject to the FD&C Act.

**Food-specific attack rate** - the food-specific attack rate table compares the illness rate among those who ingested specific foods at an event or meal to the illness rate of those who were at the event or meal but did not ingest these food items.

**Food worker** - person directly involved in producing, harvesting, processing, packaging, preparing, or storing the food under investigation.

**HACCP** (Hazard Analysis and Critical Control Point) - a prevention-based food safety system. HACCP is a system that identifies and monitors specific foodborne hazards - biological, chemical, or physical properties - that can adversely affect the safety of the food product. This hazard analysis serves as the basis for establishing critical control points (CCPs). CCPs identify those points in the process that must be controlled to assure the safety of the food. Further, critical limits are established that document the appropriate parameters that must be met at each CCP. Monitoring and verification steps are included in the system, again, to assure that potential risks are controlled. The hazard analysis, critical control points, critical limits, and monitoring and verification steps are documented in a HACCP plan.

**Host** - a person or other living organism that can be infected by an infectious agent under natural conditions.

**Hypothesis** - A supposition arrived at from observation or reflection that leads to refutable predictions. Any conjecture cast in a form that will allow it to be tested and refuted.

**Implicated food** - Food thought to be the outbreak vehicle (i.e. food thought to have made people ill, based on laboratory results and/or epidemiological evidence).

**Incubation period** - The time period between exposure to an infectious agent and the onset of signs and symptoms of disease.

**Index case** - the first case among a number of similar cases that are epidemiologically related.

**Infection** - the entry and development of multiplication of an infectious agent in the body of man or animals. Infection is not synonymous with infectious disease: the result may not be apparent or manifest. The presence of living infectious agents on exterior surfaces of the body is called "infestation" (e.g., pediculosis, scabies). The presence of living infectious agents upon articles of apparel or soiled articles is not infection, but represents contamination of such articles.

**Line List** - a table listing case names, age, sex, onset time, residence, symptoms, employment, etc., which facilitates comparisons of many characteristics for possible similarities or associations.

**Matching** - the process of making a study and comparison group comparable with respect to extraneous factors. Individual matching relies on identifying individual subjects for comparison, each resembling a study subject on the matched variables (e.g., age, gender). Studies using matching in the interview phase use matching in the statistical analysis.

**Measure of association** - a quantified relationship between exposure and disease. Commonly used measures of association are differences between means, proportions or rates, rate ratio, odds ratio, relative risk, and correlation and regression coefficients.

**Odds Ratio (OR)** - a measure of association which quantifies the relationship between an exposure and health outcome from a comparative study. The term odds is defined differently according to the situation under discussion. Using a standard 2 x 2 table, the odds ratio (cross-product ratio) is  $ad/bc$ .

|             | Ill | Not Ill |
|-------------|-----|---------|
| Exposed     | a   | B       |
| Not exposed | c   | D       |

**Onset** -the time the first clinical signs or symptoms begin to occur.

**Outbreak** - same as epidemic. Limited to localized increases in the incidence of a disease (e.g., in a village, town, or closed institution).

**Pathogen** - organism capable of causing disease (literally, causing a pathological process).

**Pesticide** - any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests can be insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses. Though often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides and various other substances used to control pests. Under United States law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant. Common pesticides include: algacides, antifouling agents, anti-microbials, attractants, biocides, disinfectants and Gnitizers, fungicides, fumigants, herbicides, insecticides, miticides, microbial pesticides, molluscicides, nematicides, ovicides, pheromones, repellents, rodenticides, defoliants, desiccants, insect growth regulators and plant growth regulators.

**Point source outbreak** - see common source outbreak.

**Probable Cause** - a case without laboratory confirmation that has typical clinical features of the particular disease under investigation without laboratory confirmation.

**Proliferation/amplification factors** - factors that allow proliferation of the etiologic agents:

1. Allowing foods to remain at room or warm-outdoor temperature for several hours
2. Slow cooling
3. Inadequate cold-holding temperature
4. Preparing foods a half-day or more before serving
5. Prolonged cold storage for several weeks
6. Prolonged time and/or insufficient temperature during hot holding
7. Insufficient acidification
8. Insufficiently low water activity
9. Inadequate thawing of frozen products
10. Anaerobic packaging or modified atmosphere
11. Inadequate fermentation

**p-value** - a measure of the chance the observed results would occur if the null hypothesis were true. The probability associated with a statistical hypothesis will help decide if there is a significant association between exposure and illness or if the results are due to chance (coincidence).

**Questionnaire** - a predetermined set of questions used to collect data (e.g., demographics, clinical data, social status, occupational group).

**Rate** - an expression of the frequency with which an event occurs in a defined population.

**Recall** - A firm's voluntary removal or correction of a marketed product(s), including its labeling and/or promotional materials, that FDA or FSIS considers to be in violation of the laws it administers, and which the agency would initiate legal action (e.g., seizure or the full range of administrative and civil actions available to the agency). "Recall" does not include a market withdrawal or stock recovery.

**Regulatory authority** - Agency that regulates (permits/licenses and inspects) the substance or establishment under consideration.

**Relative Risk (RR)** -

1. The ratio of the risk of disease or death among the exposed to the risk among the unexposed; this usage is synonymous with risk ratio.
2. Alternatively, the ratio of the cumulative incidence rate in the exposed to the cumulative incidence rate in the unexposed (i.e., the cumulative incidence ratio).
3. The term relative risk has also been used synonymously with odds ratio. The use of the term relative risk for several different quantities arises from the fact that for "rare" disease (e.g., most cancers) all the quantities approximate one another. For common occurrences (e.g., neonatal mortality in infants under 1500g birth weight), the approximations do not hold.
- 4.

**Reservoir** - the habitat, in which an infectious agent normally lives, grows and multiplies; reservoirs include human reservoirs, animal reservoirs, and environmental reservoirs.

**Sample size determination** - the mathematical process of deciding, before a study begins, how many subjects should be studied. The factors to be taken into account include the incidence or prevalence of the condition being studied, the estimated or putative relationship among the variable in the study, the power that is desired, and the allowable magnitude of type I error.

**Serotype** (or serovar) - a subdivision of a species or subspecies distinguishable from other strains therein on the basis of antigenic character.

**Source** (point of contamination) - the person, animal, object, or substance from which an infectious agent passes to a host. Source of infection should be clearly distinguished from source

of contamination, such as overflow of a septic tank contaminating a water supply or an infected cook contaminating a salad.

**Sporadic case** - occurring irregularly and infrequently (e.g., cases of certain infectious diseases) also, a case NOT associated with a known outbreak.

**Statistically significant association** - statistical methods allow an estimate to be made of the probability of the observed or greater degree of association between independent and dependent variables under the null hypothesis. From this estimate, in a sample of given size, the statistical "significance" of a result can be state. Usually the level of statistical significance is stated by the p-value.

**Strength of association** -the magnitude of the measure of association (see above); for example, the size or value of the odds ratio is a measure of the strength of association between an exposure and an illness or other outcome. The larger the odds ratio, the stronger the association.

**Study design** - the procedures and methods, predetermined by an investigator, to be adhered to in conducting a research project.

**Subtype** - see serotype

**Surveillance** -the detection of health problems through the appropriate collection of data, followed by its collation, analysis, interpretation, and dissemination.

**Active surveillance** - agencies regularly contact reporting sources to elicit reports of illnesses. An active surveillance system is likely to provide more complete illness reporting but is more labor intensive and costly to operate.

**Passive surveillance** - agencies receive disease reports from physicians, laboratories, the public, and institutions as mandated by state law.

**Susceptible** - a person lacking sufficient resistance to a particular disease agent to prevent disease if or when exposed.

**Survival factors** - factors that allow survival or fail to inactivate the contaminant: -

1. Insufficient time andlor temperature during cooking or heat processing
2. Insufficient time andlor temperature during reheating
3. Inadequate acidification
4. Insufficient thawing followed by insufficient cooking

**Suspect Cases**- persons meeting part of the case definition (see above); for example, persons with specific symptoms (and, perhaps, exposure to a food item of interest) who do not have a laboratory test confirming the cause of their illness; can also refer to persons with laboratory-confirmed illness who are not known to have the exposure of interest.

**Suspect Outbreak** - a cluster of cases linked by time or space which has not been confirmed to be caused by the same agent or item (exposure) but which have characteristics (e.g., an unusual organism or exposure) which makes it likely that the cases are linked not by chance alone.

**Suspect food** - food from the implicated meal that is a likely vehicle for the causative agent. These foods are often identified by the Food Specific Attack Rate Table.

**Symptomatic** - demonstrating clinical signs or symptoms (e.g., diarrhea, abdominal pain, fever).

**Time/temperature abuse** - Insufficient time and/or temperature during cooking or heat processing, insufficient time and/or temperature during reheating.

**Traceback** - the method used to determine the source and scope of the product/processes associated with the outbreak and document the distribution and production chain of the product that has been implicated in a foodborne illness or outbreak.

**Traceforward** - once the source of an implicated food item is established, investigators may do a "traceforward" to document the distribution of all implicated lots of food from the source. This can help epidemiologists with case finding and can be used to test hypotheses about the outbreak. Traceforwards should only be used when there is a reasonable degree of confidence that the traceback correctly identified the source of the implicated product.

**Vector** - an animate intermediary in the indirect transmission of an agent that carries the agent from a reservoir to a susceptible host.

**Vehicle** (of infection transmission) - an inanimate intermediary in the indirect transmission of an agent that carries the agent from a reservoir to a susceptible host.

#### **Sources for Glossary**

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