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**SANITARIANS
MANUAL**

EPIDEMIOLOGY OF FOOD BORNE DISEASES.

**STANDARD
OPERATING PROCEDURES**
for Institutions and Agencies

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STATE OF NEW JERSEY

N.J. DEPARTMENT OF INSTITUTIONS AND AGENCIES
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Division of
Mental Health and Hospitals
Environmental Sanitation
Committee.

**STANDARD OPERATING PROCEDURES FOR
INSTITUTIONS AND AGENCIES**

EPIDEMIOLOGY OF FOOD BORNE DISEASES.

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STANDARD OPERATING PROCEDURES FOR INSTITUTIONS AND AGENCIES

EPIDEMIOLOGY OF FOOD BORNE DISEASES

December 15, 1960

INTRODUCTION

The occurrence of an outbreak of food poisoning and other food borne diseases is indicative of a breakdown in some facet of the sanitary environment. The presence of such an occurrence calls for the immediate implementation of a prepared plan of investigation. Such a plan must be known by each member of the Institutional Epidemiology Committee and constructed so as to produce (1) immediate reporting, (2) obtainance of specimens prior to their being discarded and/or medications given, and (3) means for individual but coordinated lines of investigative action by members of the Epidemiological Committee.

REPORTING:- In the event of a widespread disturbance of gastroenteritis among patients or inmates in an institution or section of an institution, ward or correctional personnel are usually the first to be aware of the condition. Hence, ward personnel and correction officers should be indoctrinated in the necessity of immediate reporting to the medical officer, either directly or through an intermediate channel if such is the policy of the specific institution. It is the medical officer who is charged with the responsibility for determining if food poisoning is involved or suspected. If food poisoning is indicated, he must notify the Medical Director or Superintendent immediately so as to appraise the administration of the situation. The Medical Director, in turn, should immediately commission the epidemiological team to investigate the source and cause of the disturbance.

The external causes of the most common illnesses of this type are:

- (1) Parasites, such as amoebae, tapeworms and/or trichinae. These are not likely to cause explosive outbreaks.
- (2) Bacteria, such as typhoid, paratyphoid and others of the Salmonella and Shigella groups. These are frequently the cause of many cases of sudden illness and diagnosis is usually easy from the patients' stools. Carriers are likely to be meat, fish, egg products and sauces. Contamination comes from fecal sources.
- (3) Bacteria of the Staphylococcus group which produce toxins and often get into food from pus-carrying sores on the person of the handlers. Cream puffs, eclairs and other creamed foods - especially if not adequately refrigerated - are the usual means of transmittal.
- (4) Bacteria of the Botulinum group - usually associated with home canned foods and therefore are of little concern to institutions.
- (5) Poisonous plants such as toadstools - not likely to be the cause of many cases in institutions.
- (6) Poisons such as those in use for rodent and insect control, cleaning solutions, and spray residues on fruits.
- (7) Rodent contamination of food (Infectious Jaundice) not often explosive or wide spread.

(2) "Virus" infection or other ill defined source. The differential diagnosis and means of spread may be very difficult, or impossible, to determine.

Groups (2) & (3) above are by far the most likely to be encountered by the institutional Sanitarian. Prevention of trouble from these sources is best secured by personal cleanliness on the part of food handlers and by persistence in educating food handlers to: *"Keep them hot or keep them cold, or don't keep them."*

A tip as to diagnosis is the time after the suspected meal when the first symptoms occur. The attached table is taken from a more complete summary of *"Factors Involved in Food Poisoning"* as distributed by a person from the Public Health Service at the time of his lecture at an institute on Epidemiology.

COMPOSITION OF TEAM:- The epidemiological team should consist of a medical officer, a pathologist or medical technologist, and the sanitarian. In some institutions a supervisory nurse or other person may be included on the team. The epidemiological team may be constituted as a separate group or may be a subgroup of the Hospital Infections Committee.

DUTIES OF THE INVESTIGATORS:- The purpose of an investigation of an outbreak of gastroenteritis is to determine the circumstances leading to the outbreak, and to supply information that may be used to prevent a reoccurrence. It must be remembered that an investigator often has but one opportunity to collect the facts which may point to the cause of an outbreak. Ordinarily, it is not practicable to return several times over a period of days to obtain information which could have been collected earlier. The food involved may be consumed or discarded. The persons involved may forget some essential facts. Therefore, it is essential that all the facts be collected as soon as possible after an outbreak.

1. *The Medical Officer*

The Medical Officer will be the nominal leader of the investigations group. He will contact the attending physician to determine the immediate prevailing condition, determine the advisability of an investigation, and appraise other members of the team of the situation and his decision.

If an investigation is to be conducted the medical officer will (a) take, or have taken, stool and vomitus specimens from all or from a representative number of the victims for use by the laboratory technologist, utilizing advice from the laboratory representative as to number and volume of specimens, (b) obtain from the Sanitarian a list of foods served in the ward or building during the preceding 24 hours, and (c) conduct a personal interview with each patient or inmate on the wards or building affected. The latter shall include names; identification numbers; sex; age; history of case, including symptoms and time of onset; foods and drinks consumed; medications taken or applied; and whether the victim was served individually or served at a group meal.

It is necessary for the investigating officer to conduct personal interviews with the victims whenever possible. A standardized form, such as Table I, should be used for such interviews. The questioning should be detailed and as persistent as the condition of the victim permits. Itemize all foods and beverages consumed, grouping them by meals, in an effort to determine the one food eaten by the greater percentage of the victims.

2. *The Pathologist or Medical Technologist*

The pathologist or medical technologist shall prepare the culture media, make the cultures of patient specimens and foods, and determine the causative organism, toxin, or chemical if possible. He shall advise on the size of the specimens to be collected and provide containers for their collection.

3. *The Sanitarian*

The Sanitarian shall be responsible for (a) providing the Medical Officer with a list of foods prepared and/or served by the Dietary Department during the preceding 24 hours and a list of foods prepared on the ward, (b) collecting samples of foods and beverages for laboratory culturing, (c) inspection of the food preparation areas and equipment, (d) inspection of warehousing and food storage areas, and (e) interviewing personnel in the Dietary Department.

Food Sampling: Special efforts should be made to obtain samples of suspected foods and drinks, particularly any remaining portions of foods served at meals immediately preceding the onset of symptoms. Some institutions keep a sample of each food served for a period of 48 hours. Samples obtained from open containers should be placed in sterile sample containers, and if perishable be iced or refrigerated as quickly as possible. Make special efforts to obtain empty containers from which the food came. When empty containers are obtained, make a search for identifying code or marks for use in following up any remaining stocks. Examine such stocks for swelling of the cans or "springers". Collect all such abnormal or swollen cans as well as a representative number of normal cans. If the causative agent can be definitely suspected, all remaining stocks should be located and embargoed.

Inspection of Food Processing and Preparation Area, and Serving Technique: The places where the food was both prepared and eaten should be visited and minutely inspected. (Use State Health Department Form ES-3 as a guide). Pay particular attention to the general cleanliness and orderliness of the premises; the care with which the foods are stored, and proximity of insecticidal materials, cleaning compounds or other noxious materials. Note also the refrigeration facilities, and consider the possibilities of poisonous gases from mechanical refrigerators. Evidence of insect or rodent infestation should be looked for. Warehousing and food storage areas should be inspected also.

Personal Interviews with Food Service Personnel: Interviews with chefs, cooks, stewards, waiters, etc. are made with the purpose of determining the "how" and "when" the suspected foods were prepared and served; length of time between preparation and eating; sources of supply; observations

as to quality, freshness, color, etc. of the foods. Inquire particularly about color and odor of foods and the appearance of cans before opening. Inquiry should also be made to determine current and recently past health status of food handlers, Table III.

SUMMATION OF INTERVIEWS WITH VICTIMS:- A summation of data in Table I may provide a suspected vehicle of transmission, a time lapse that may indicate the causative organism or toxicant, corroborate laboratory findings, and guide the Sanitarian toward more intensive investigations in a specific area to determine the means by which the causative organism or toxicant entered the vehicle. (See Table IV).

ETIOLOGY:- It is not enough that the investigating officer be capable of pinpointing the probable cause. There is the added responsibility for determining the means by which such a contamination occurred; the source and/or reservoir of cause, whatever it may be; the correction of the sanitary infraction if any; and the formation of policy to prevent such an outbreak from occurring again. Therefore, it will be necessary for the investigating officers to perform a supplementary investigation to determine the means and source of such a contamination. This may be outlined in the following manner:

1. Source from which Contamination Occurred

A. Human - (Depending on) the specific nature of the outbreak, all food handlers most closely associated with it should receive a competent medical examination. A detailed history is essential with emphasis on recent acute illness and chronic digestive disturbances, as well as skin and respiratory disease. This should include observation of the skin, eyes, ears, nose, throat and perianal region. The taking of nose and throat cultures and fecal specimens for bacterial culture from all food handlers must be routine. Should a bacteriologic study on the contaminated food reveal Salmonella or Shigella, at least three successive negative stool cultures must be taken from each food handler to eliminate a possible carrier.

B. Inanimate Objects - The investigating officers should be aware that oftentimes, the contrivances used in the preparation of a food may be a source or reservoir of the causative organism, as well as the means by which the causative organism was introduced within the food. Swab Tests should be performed with particular attention to such items as beaters and mixers, dicers, peelers, cutting boards and chop blocks, spatulas and silverware, bowls, containers and cooking pots. It is well also to consider the utensils and dinnerware used in the eating of the suspect meal.

The means and methods used in the washing of the utensils and dinnerware in which the food was served, as well as the means and methods used in the scullery operations, should be seriously considered in the determination of the means by which infecting organisms may be introduced, or permitted to remain and incubate causing contamination. Mainly though, through the examination of the facts elicited from

the personal interviews with the cooks, chefs, waiters, etc., and an interpretation of the time factor regarding the incubation time required of the causative organisms, the investigating officers may well be able to make a considered judgment as to "how" the causative organisms were introduced into the food. A further investigation into that particular method should tend to confirm that judgment.

CONCLUSION:- From the perusal of the established facts gleaned throughout the investigation, the investigating officer may well draw a considered opinion, based on facts and laboratory determination, as to the particular contaminated food or drink, the vehicle instrumental in the transmission of the organism, the source and/or reservoir, and the means by which the organism was introduced into the food or drink. By virtue of such detail and the application of the principles of environmental sanitation, the investigating officer may instigate the necessary recommendations or policies required to correct the sanitary infraction.

INSTITUTION ADMINISTRATION DURING AN OUTBREAK:- The investigating officer should keep the medical director or superintendent of the institution well informed as to the progress of the investigation at all times, particularly so, if the investigation is carried on for several days. It is advisable also to allow all comments regarding the outbreak to originate from the administration. In no way should the investigating officer be instrumental in creating a general hysteria or a blown-up picture as to the seriousness of the outbreak. Throughout the investigation, he should inspire confidence in his work and reassure the institutional population as to the effectiveness of the administration's established policies in force. At the conclusion of the investigation, and with the permission of the medical director or superintendent, a complete copy of the report of the investigation should be made available to all department heads in any way involved in the outbreak. This will tend to show the necessity of good sanitary practices and the need for all institutional personnel to be continually on the alert to prevent a breakdown occurring in these practices.

FOOD SERVICE PERSONNEL, INTERVIEWS

Table III - Sanitarian

NAME	POSITION	NOTES

SUMMARY OF FACTORS INVOLVED IN FOOD POISONING

FOOD POISONING

EXOTOXIN (Neurotoxin)	EXOTOXIN (Enterotoxin)	BACTERIAL INFECTION	ENDOTOXIN (Food Borne Intoxication)	DISEASED ANIMALS	ACCIDENTAL OR CHEMICAL	FOOD BORNE	FOOD BORNE	FOOD BORNE	PARASITIC	POISONING FOODS
Clostridium Botulinum	Staphylococcus Aureus	Alpha Hemolytic Streptococci (Green Producing)	Salmonella Typhimurium	Tularemia (Pasteurella Tularensis) Brucellosis (Brucella Melitensis) Wells Disease (Leptospira Icterohaemorrhagiae)	Fluoride Cadmium Antimony Arsenicals Cyanide Lead	Typhoid (Salmonella Typhose)	Bacillary Dysentery (Shigella)	Anoebic Dysentery (Entamoeba Hystolytica)	Trichinosis (Trichinella spiralis)	Wild mushrooms 1) Inedible (Boletus) 2) Poisonous (Amanita) Mussels (Plankton)
18 to 36 hrs. Shortest 4 hrs As long as 6 days	2-4 hours	4-12 hours	6-12 hours As long as 72 hours	3-5 days 10-18 days 5-7 days	15 min to 1 hr 15 min to 1/2 hr 15 min to 1/2 hr - - Chronic	3-28 days	2-7 days	10-14 days variable months	Primary 24-72 hours Sec: 4-5 days	Several Hours 6-14 hours 5-30 minutes
Death in 4 to 8 days 70%	24-36 hours	12-24 hours	1-3 days	Several Months 5 Months or more Several Months	Several Hours Several Hours Several Hours - - -	3-4 months	Self limited Several weeks	Chronic	As long as a year or more	24 hours Muscarine 15 min. 2-4 days followed by death Several days

Cause or Organisms

Incubation Period

Duration