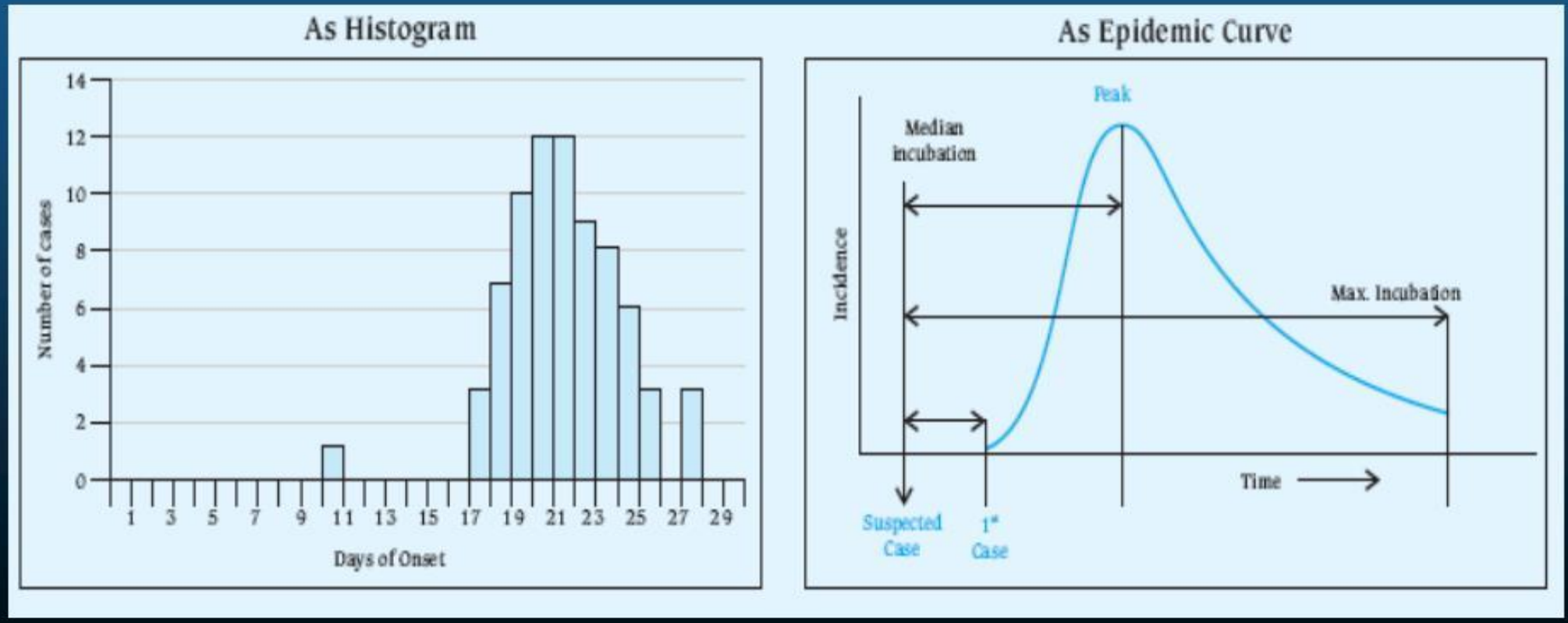
Common Source (Vehicle), Single (Point) Exposure



WHICH DISEASE CAN CAUSE THIS TYPE OF EPIDEMIC?

A village leader organized house warming ceremony and invited entire village for the same. After dinner, some guests complained of uneasiness and started vomiting. More than 70 people, including children, arrived at CHC with same complaint. Some of them were even unconscious

In 1993, Jack in the Box, a fast-food hamburger chain, sold hamburgers with under-cooked beef patties that infected many customers with E. coli bacteria. The outbreak involved 73 restaurants across the US in the states of Idaho, Washington, Nevada and California.

Sadly, the under-cooked burger patties were responsible for the deaths of 4 children and the serious injury of 178 other victims, including permanent kidney and brain damage.

FOOD POISONING

SPECIFIC LEARNING OBJECTIVES

- What is food poisoning?
- Different types food poisoning
- Strategies to control and prevent food poisoning.

INTRODUCTION

An acute gastroenteritis caused by ingestion of food or drink contaminated with either living bacteria or their toxins or inorganic chemical substances and poisons derived from plants and animals.

FOOD POISONING: INTRODUCTION

The condition is characterized by:

† history of ingestion of a common food
† attack of many persons at the same time, and
† similarity of signs and symptoms in the majority of cases.

TYPES OF FOOD POISONING

1. Non-bacterial : Caused by chemicals such as arsenic, certain plant and sea foods. In recent years, contamination of food by chemicals, e.g., fertilizers , pesticides, cadmium, mercury etc.
2. Bacterial : Caused by the ingestion of foods contaminated by living bacteria or their toxins. The conventional classification of bacterial food poisoning into toxic and infective types is becoming increasingly blurred with the knowledge that in some types both multiplication and toxin production are involved

BACTERIAL FOOD POISONING

SALMONELLA FOOD POISONING

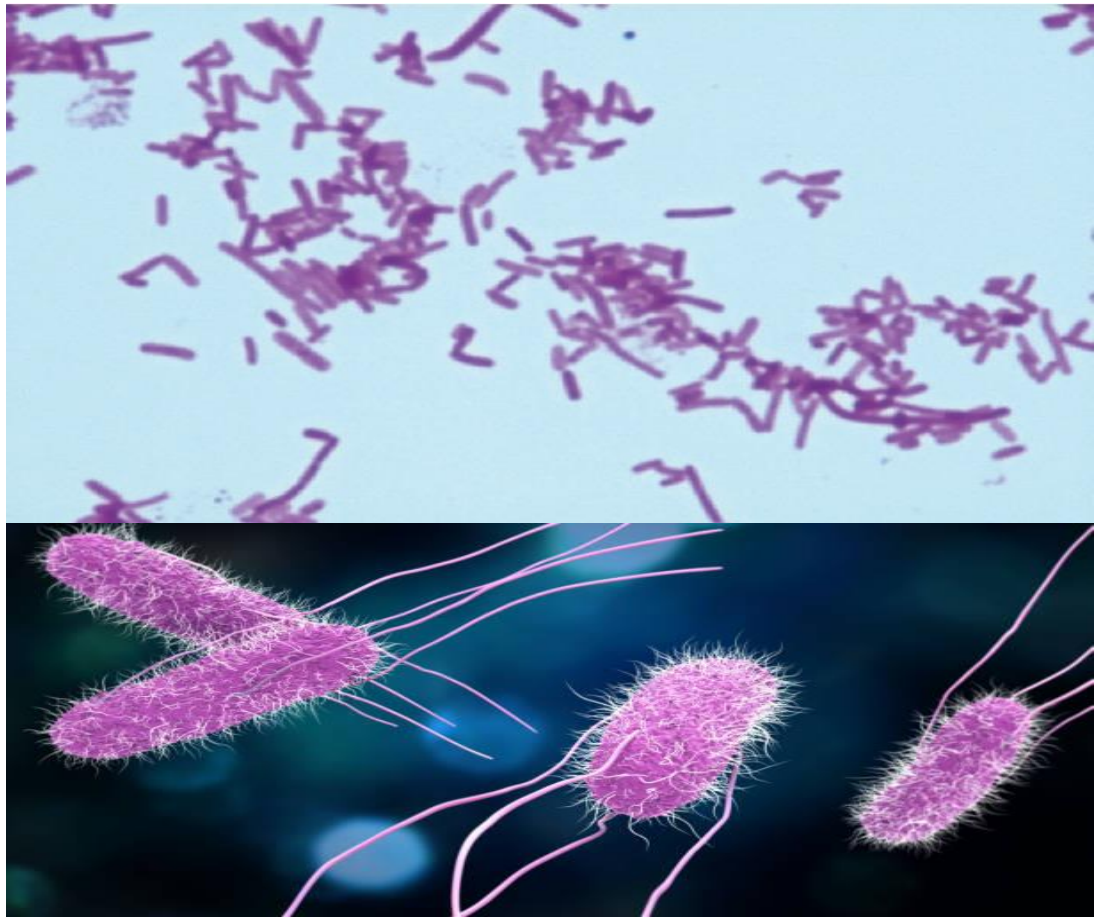
SALMONELLA FOOD POISONING

- An extremely common form of food poisoning. Five reasons have been given for its increase in recent years :

1. An increase in community feeding
2. Increase in international trade in human food
3. A higher incidence of salmonellosis in farm animals
4. Widespread use of household detergents interfering with sewage treatment
5. Wide distribution of "prepared foods"

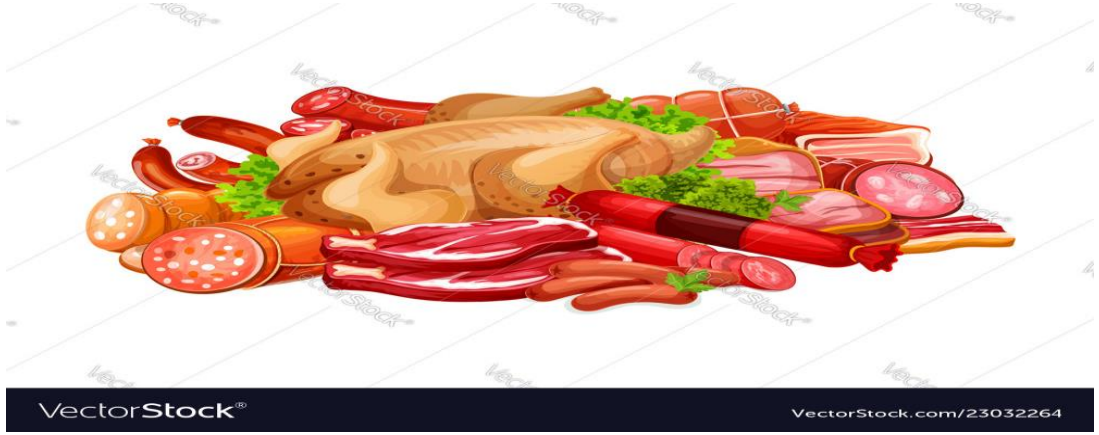
AGENT

- Salmonella typhimurium
- S. cholera-suis
- S. enterit idis,



EPIDEMIOLOGICAL DETERMINANTS

- Salmonellosis is primarily a disease of animals.
- Man gets the infection from farm animals and poultry – through contaminated meat, milk and milk products, sausages, custards, egg and egg products.
- Rats and mice are another source; they are often heavily infected and contaminate foodstuffs by their urine and faeces.
- Temporary human carriers can also contribute to the problem



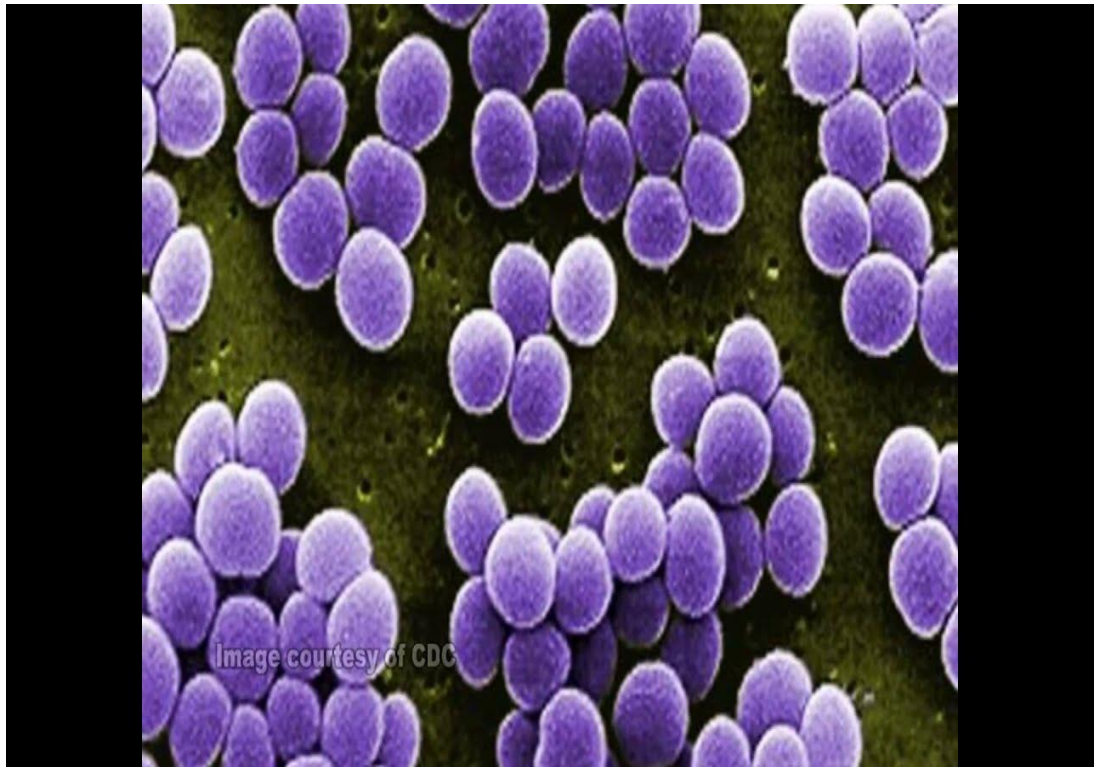
EPIDEMIOLOGICAL DETERMINANTS

- INCUBATION PERIOD : 12 to 24 hours commonly.
- MECHANISM OF FOOD POISONING :
- The causative organisms, on ingestion, multiply in the intestine and give rise to acute enteritis and colitis.
- The onset is generally sudden with chills, fever, nausea, vomiting, and a profuse watery diarrhoea which usually lasts 2-3 days.
- Mortality is about 1 per cent.
- A convalescent carrier state lasting for several weeks may occur

STAPHYLOCOCCAL FOOD POISONING

AGENT

- Enterotoxins of certain strains of coagulase positive Staphylococcus aureus.
- At least 5 different enterotoxins have been identified,
- Toxins can be formed at optimum temperatures of 35 deg. to 37 deg. C.
- These toxins are relatively heat stable and resist boiling for 30 minutes or more.



SOURCE AND INCUBATION PERIOD

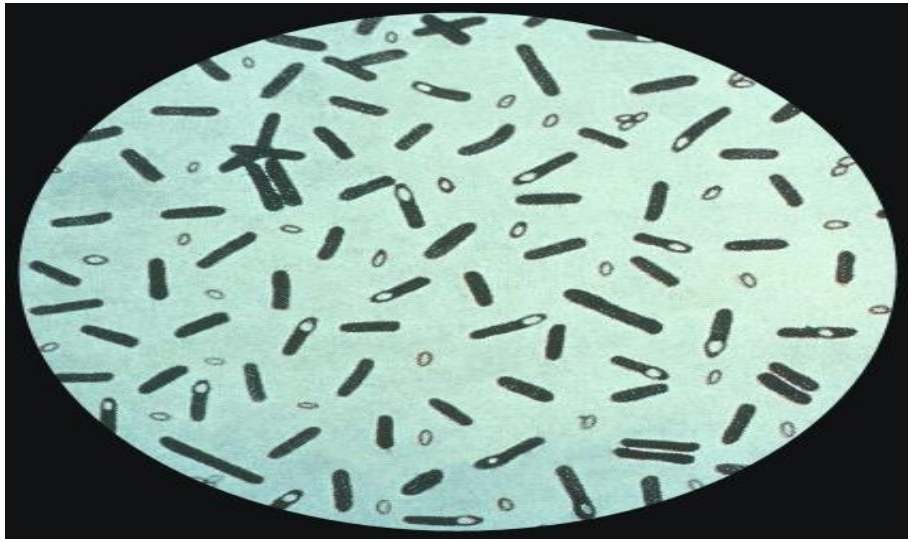
- SOURCE: Cows suffering from mastitis have been responsible for outbreaks of food poisoning involving milk and milk products. The foods involved are salads, custards, milk and milk products which get contaminated by staphylococci.
- INCUBATION PERIOD : 1- 8 hours. The incubation period is short because of "preformed" toxin

- MECHANISM OF FOOD POISONING : Food poisoning results from ingestion of toxins preformed in the food in which bacteria have grown ("intradietetic" toxins). Since the toxin is heat-resistant, it can remain in food after the organisms have died. The toxins act directly on the intestine and CNS.
- The illness becomes manifest by the sudden onset of vomiting, abdominal cramps and diarrhoea.
- In severe cases, blood and mucus may appear. Unlike salmonella food poisoning, staphylococcal food poisoning rarely causes fever. Death is uncommon

BOTULISM

EPIDEMIOLOGICAL DETERMINANTS

- AGENT : Exotoxin of Clostridium botulinum generally Type A, B or E.
- SOURCE : The organism is widely distributed in soil, dust and the intestinal tract of animals and enters food as spores. The foods most frequently responsible for botulism are home preserved foods such as home- canned vegetables, smoked or pickled fish , homemade cheese and similar low acid foods.
- INCUBATION PERIOD 18 to 36 hours.



EPIDEMIOLOGICAL DETERMINANTS

- The toxin is preformed in food ("intradietetic") under suitable anaerobic conditions. It acts on the parasympathetic nervous system.
- Botulism differs from other forms of food poisoning in that the gastrointestinal symptoms are very slight. The prominent symptoms are dysphagia, diplopia, ptosis, dysarthria, blurring of vision, muscle weakness and even quadriplegia. Fever is generally absent, and consciousness is retained. The condition is frequently fatal , death occurring 4-8 days later due to respiratory or cardiac failure. Patients who recover do not develop antitoxin in the blood.
- The toxin is thermolabile, the heating of food to 100 deg. C for a few minutes before use will make it quite safe for consumption.

MANAGEMENT

- Antitoxin is of considerable value in the prophylaxis of botulism. When a case of botulism has occurred, antitoxin should be given to all individuals partaking of the food. The dose varies from 50,000 to 100,000 units IV .
- The antitoxin will be of no avail if the toxin is already fixed to the nervous tissue.
- Guanidine hydrochloride given orally in doses of 15 to 40 mg/kg of body weight has been shown to reverse the neuromuscular block of botulism. When combined with good medical and nursing care, the drug can be a useful adjunct in the treatment of botulism.
- Active immunization with botulinum toxoid to prevent botulism is also available

CL. PERFRINGENS FOOD POISONING

- AGENT : Clostridium (Cl.) perfringens (welchii) .
- SOURCE : The organism has been found in faeces of humans and animals, and in soil, water and air. The majority of outbreaks have been associated with the ingestion of meat, meat dishes and poultry. The usual story is that the food has been prepared and cooked 24 hours or more before consumption, and allowed to cool slowly at room temperature and then heated immediately prior to serving.
- INCUBATION PERIOD : 6 to 24 hours, with a peak from 10 to 14 hours

MECHANISM OF FOOD POISONING

- The spores are able to survive cooking, and if the cooked meat and poultry are not cooled enough, they will germinate. The organisms multiply between 30 deg. And 50 deg. C and produce a variety of toxins, e.g., alpha toxin, theta toxin , etc.
- Prevention consists either by cooking food just prior to its consumption or, if it has to be stored, by rapid and adequate cooling.
- CLINICAL SYMPTOMS : The most common symptoms are diarrhoea, abdominal cramps and little or no fever, occurring 8 to 24 hours after consumption of the food. Nausea and vomiting are rare. Illness is usually of short duration, usually 1 day or less.
- Recovery is rapid and no deaths have been reported.

CEREUS FOOD POISONING

- Bacillus cereus is an aerobic, spore-bearing, motile, gram positive rod. It is ubiquitous in soil, and in raw, dried and processed foods.
- The spores can survive cooking and germinate and multiply rapidly when the food is held at favourable temperatures.
- B. cereus has been recognized as a cause of food poisoning, with increasing frequency in recent years.

- B. cereus produces at least 2 distinct enterotoxins, causing 2 distinct forms of food poisoning. One, the emetic form with a short incubation period (1-6 hours) characterized by predominantly upper gastro-intestinal tract symptoms, rather like staphylococcal food poisoning.
- The other, the diarrhoeal form, with a longer incubation period (12-24 hours) characterized by predominantly lower intestinal tract symptoms like Cl. perfringens food poisoning (diarrhoea, abdominal pain, nausea with little or no vomiting and no fever. Recovery within 24 hours is usual).
- The toxins are preformed and stable.
- Diagnosis can be confirmed by isolation of 10^5 or more B. cereus organisms per gram of epidemiologically incriminated food.
- Treatment is symptomatic.

PREVENTION AND CONTROL

FOOD SANITATION

- Meat inspection : The food animals must be free from infection . This can be ensured by their examination by veterinary staff, both before and after slaughter.
- Personal hygiene : A high standard of personal hygiene among individuals engaged in the handling, preparation and cooking of food is needed.
- Food handlers : Those suffering from infected wounds, boils, diarrhoea, dysentery, throat infection, etc should be excluded from food handling.
- The medical inspection of food handlers is required in many countries; this is of limited value in the detection of carriers, although it will remove some sources of infection

FOOD INSPECTION

- Food handling techniques : The handling of ready-to-eat foods with bare hands should be reduced to a minimum. Time between preparation and consumption of food should be kept short.
- The importance of rapid cooling and cold storage must be stressed.
- Milk, milk products and egg products should be pasteurized.
- Food must be thoroughly cooked. The heat must penetrate the centre of the food leaving thereby no cool spots. Most food poisoning organisms are killed at temperatures over 60 deg. C.
- Sanitary improvements: Sanitization of all work surfaces, utensils and equipments must be ensured.

FOOD INSPECTION

- Food premises should be kept free from rats, mice, flies and dust.
- Health education : Food handlers should be educated in matters of clean habits and personal hygiene, such as frequent and thorough hand washing.

- REFRIGERATION: In the prevention of bacterial food poisoning, emphasis must be placed on proper temperature control. Food should not be left in warm pantries; a few germs can multiply to millions by the next morning. Foods not eaten immediately should be kept in cold storage to prevent bacterial multiplication and toxin production.
- Cook and eat the same day" is a golden rule. When foods are held between 10 deg. C (50 deg. F) and 49 deg. C (120 deg.F) they are in the danger zone for bacterial growth. Cold is bacteriostatic at temperature below 4 deg. C, and refrigeration temperature should not exceed this level.

- SURVEILLANCE : Food samples must be obtained from the food establishments periodically and subjected to laboratory analysis if they were unsatisfactory. Continuing surveillance is necessary to avoid outbreaks of food-borne diseases.

QUESTION

THANK YOU