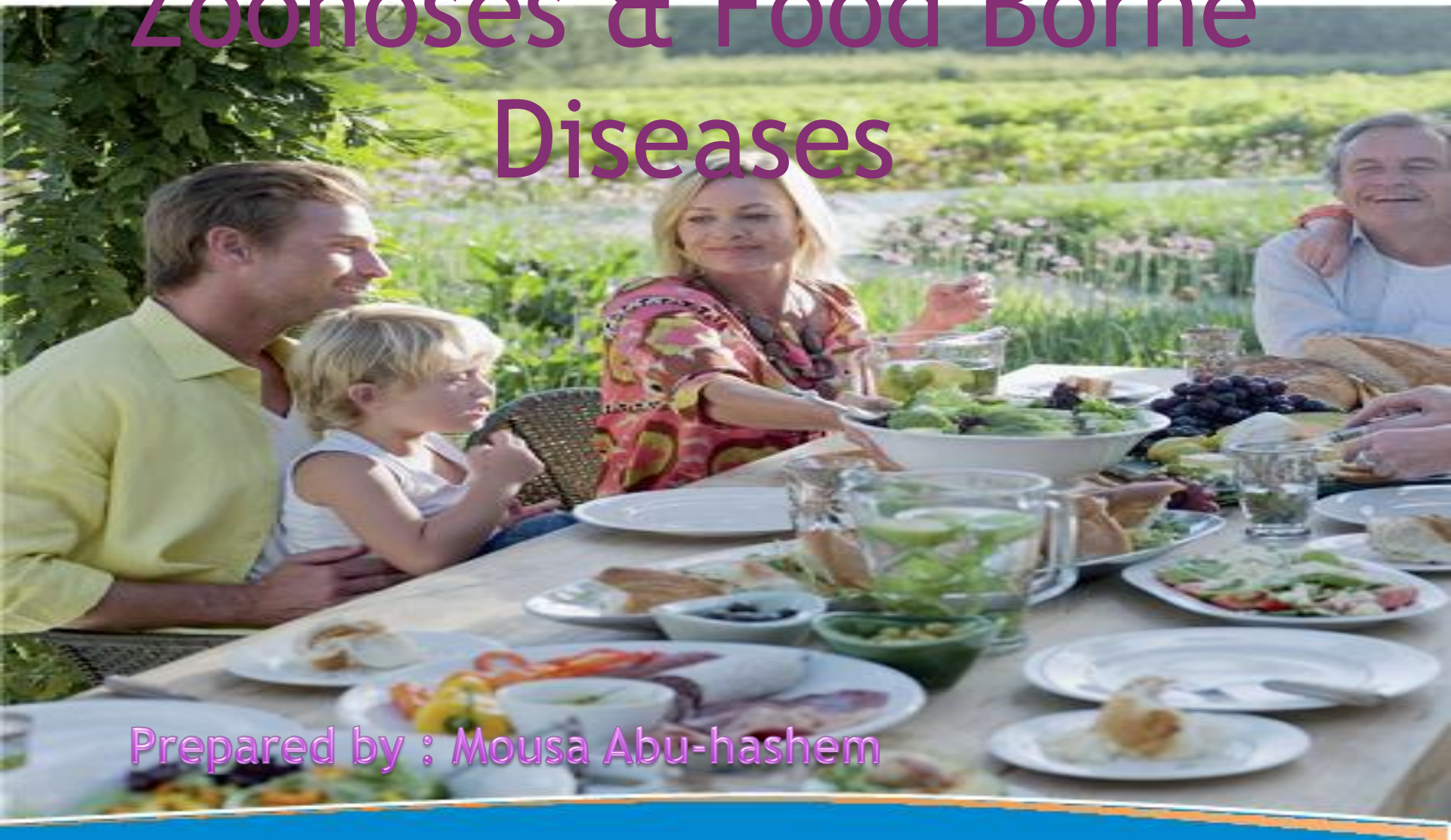
Zoonoses & Food Borne Diseases



Prepared by : Mousa Abu-hashem

FOOD BORNE DISEASES

- Food borne diseases (FBD) are acute illnesses associated with the recent consumption of food .

- The food involved is usually contaminated with a disease pathogen or toxicant.

CLASSIFICATION OF FOOD BORNE DISEASES

Food borne diseases are classified into:

1. Food borne infections
2. Food borne intoxications

FOOD BORNE INFECTIONS

- Food borne infections are caused by the entrance of pathogenic microorganisms contaminating food into the body, and the reaction of the body tissues to their presence.

- These can either be fungal, bacterial, viral or parasitic.

FOOD BORNE INFECTIONS

Bacterial food borne infections include : Cholera, salmonellosis, typhoid fever, shigellosis, Yersiniosis *Escherichia coli* infection Campylobacteriosis, *Vibrio parahemolyticus and Listeriosis*

Mycotic food borne infections include *Candida spp., Sporothrix spp., Wangiella spp.* etc),

Viral food borne infections include hepatitis A , Norwak virus and poliomyelitis virus

Parasitic borne infection : *Trichinella, toxoplasma*


Salmonellosis

SALMONELLOSIS

- Overall, in the EU, S. Enteritidis and S. Typhimurium are the serovars most frequently associated with human illness.
- Human S. Enteritidis cases are most commonly associated with the consumption of contaminated eggs and poultry meat, while S. Typhimurium cases are mostly associated with the consumption of contaminated pig, poultry and bovine meat.

- The common reservoir of Salmonella is the intestinal tract of a wide range of domestic and wild animals which result in a variety of foodstuffs covering both food of animal and plant origin as sources of infections.

FACTORS ASSOCIATED WITH SALMONELLA FOOD POISONING OUTBREAKS

- Consumption of inadequately cooked or thawed meat or poultry.
- Cross-contamination of food from infected food handlers.
- Presence of flies, cockroaches, rats, in the food environment that act as vectors of the disease.

TRANSMISSION

- Salmonellae reach food in many different ways;
  a) Directly from slaughter animals to food
  b) From human excreta, and transferred to food through hands, equipments, flies etc.

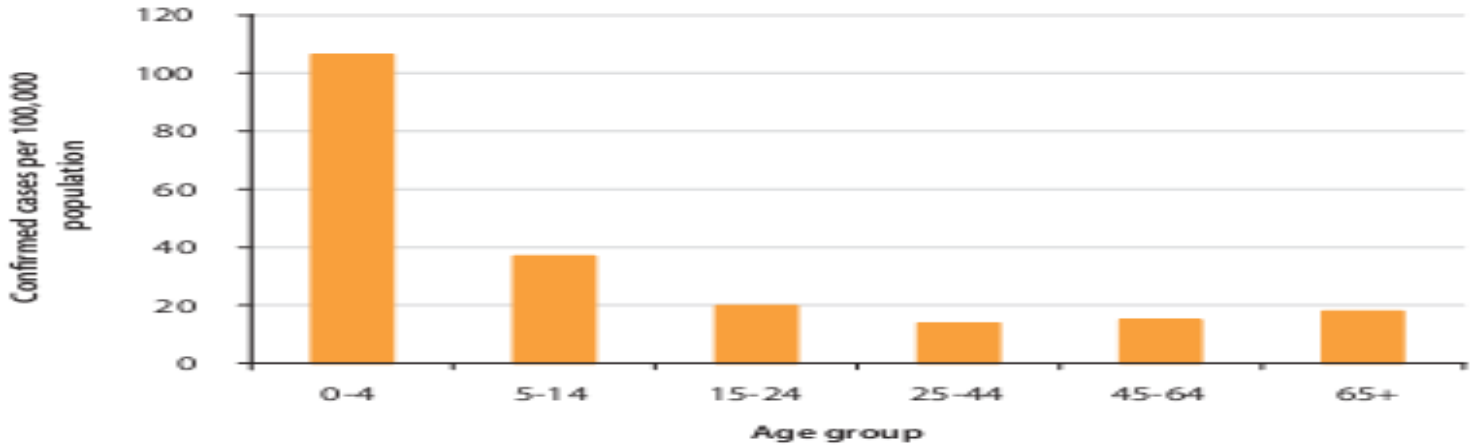
FOODS INVOLVED

- foods commonly involved are animal derived foods such as:
  a. meat and meat products .
  b. milk and milk products.
  c. egg and egg products.

-A heavy dose up to 10,000 -1,000,000 organisms per gram of food is required to cause infection .

CLINICAL SYMPTOMS

- The ordinary symptoms include abdominal pain, headache, diarrhea, fever, vomiting,, prostration .
- In severe cases there is septicaemia with leucopenia, endocarditis, pericarditis.
- Severe cases are encountered in babies, young children .
- A peak in the number of reported Salmonella cases occurs in the summer and autumn, with a rapid decline in winter months .



SALMONELLA FOOD POISONING OUTBREAKS

Outbreaks occur in different forms:

a). Sporadic cases involving only one or two persons in a household

b). Family outbreaks in which several members of the family are affected

c). Large outbreaks caused by a widely distributed infective food item

d). Institutional outbreaks which may be caused by a contaminated single food item.


Campylobacteriosis

CAMPYLOBACTERIOSIS

- Campylobacteriosis in humans is caused by thermotolerant Campylobacter spp.
- The infective dose of these bacteria is generally low.
- The species most commonly associated with human infection are C. jejuni followed by C. coli, and C. lari, but other Campylobacter species are also known to cause human infection.

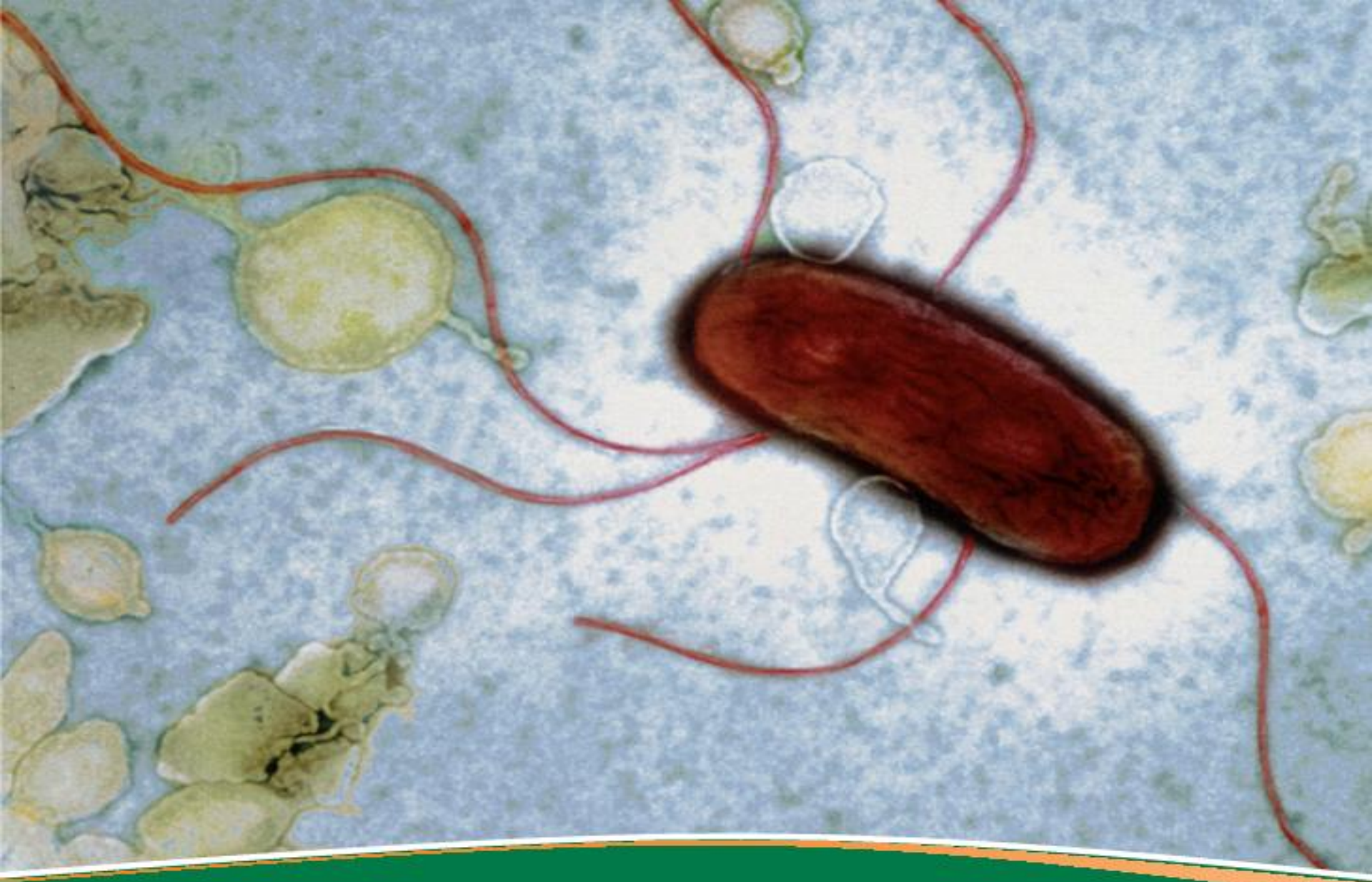
- Thermotolerant Campylobacter spp. are widespread in nature.
- The principal reservoirs are the alimentary tracts of wild and domesticated birds and mammals.
- They are prevalent in food animals such as poultry, cattle, pigs and sheep; in pets, including cats and dogs; in wild birds and in environmental water sources.
- The bacteria can readily contaminate various foodstuffs, including meat, raw milk and dairy products, and less frequently fish and fishery products, mussels and fresh vegetables.

CLINICAL SIGNS

- Incubation period ranges between 2-11 days with an average of 3-5 days.
- It is preceded by fever, followed by foul smelling and watery diarrhea, which runs for 3-4 days.
- The diarrhea may sometimes contain blood and mucus in feces.
- Abdominal pain is associated with backache.

MODE OF TRANSMISSION

- contact with live poultry
- consumption of poultry meat
- drinking water from untreated water Sources.
- contact with pets and other animals have been identified
- Raw milk and contaminated drinking water have been causes of larger outbreaks.



Verotoxigenic *Escherichia coli* | 3.7.

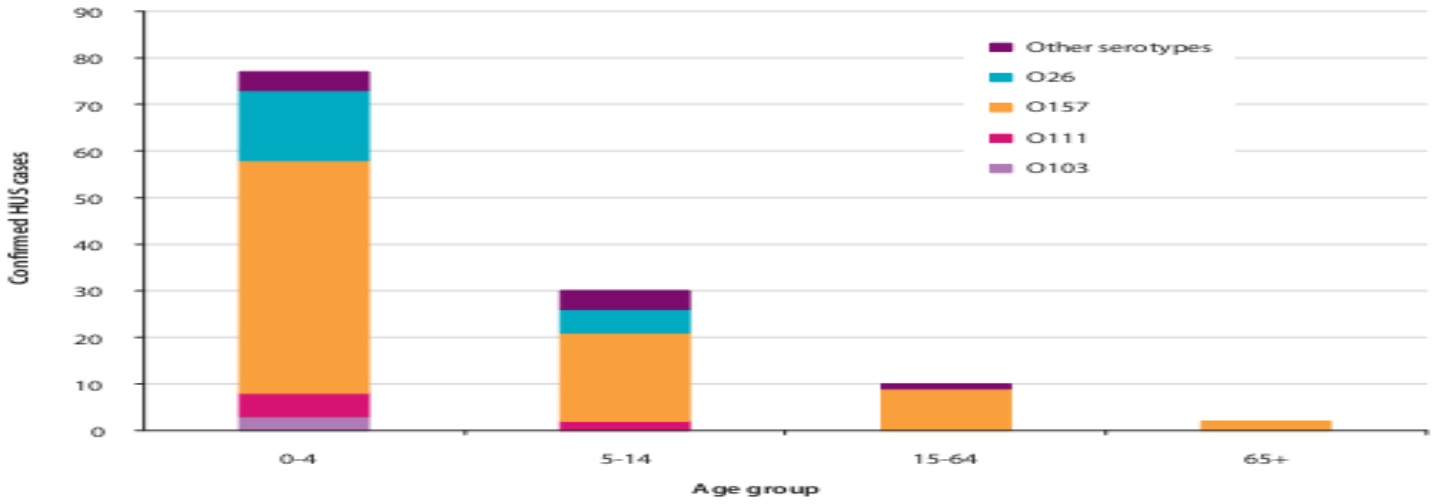
VEROTOXIGENIC ESCHERICHIA COLI (VTEC)

- Escherichia coli (E. coli) is a bacterium that is found in the intestines of healthy humans and animals, and which is part of the normal bacterial flora. However, some E. coli strains can cause diseases and lead to serious infection.
- Verotoxigenic Escherichia coli (VTEC) are a group of E. coli that are characterised by the ability to produce toxins that are designated verocytotoxins
- VTEC (verocytotoxin-producing Escherichia coli) is a group of pathogenic E. coli bacteria that can cause bloody diarrhoea and haemolytic uremic syndrome in humans, a serious condition that can lead to kidney failure and be fatal.

TRANSMISSION

- People get infected with VTEC by consuming or handling contaminated food or water or through contact with infected animals.
- Person-to-person transmission is also possible among close contacts (in families, childcare centres, nursing homes, etc.).

Figure VT2. | ***Haemolytic Uremic Syndrome (HUS) by age and serogroup in reporting MSs[1], 2008***



VEROTOXIGENIC ESCHERICHIA COLI (VTEC)

- VTEC strains have been found in raw (unpasteurised) milk and cheese, undercooked beef and a variety of fresh produce (such as sprouts, spinach and lettuce).
- The main source of such strains is cattle. Meat can become contaminated by faecal matter due to poor processing methods during slaughter.
- Faeces from infected animals can contaminate other foods and water.

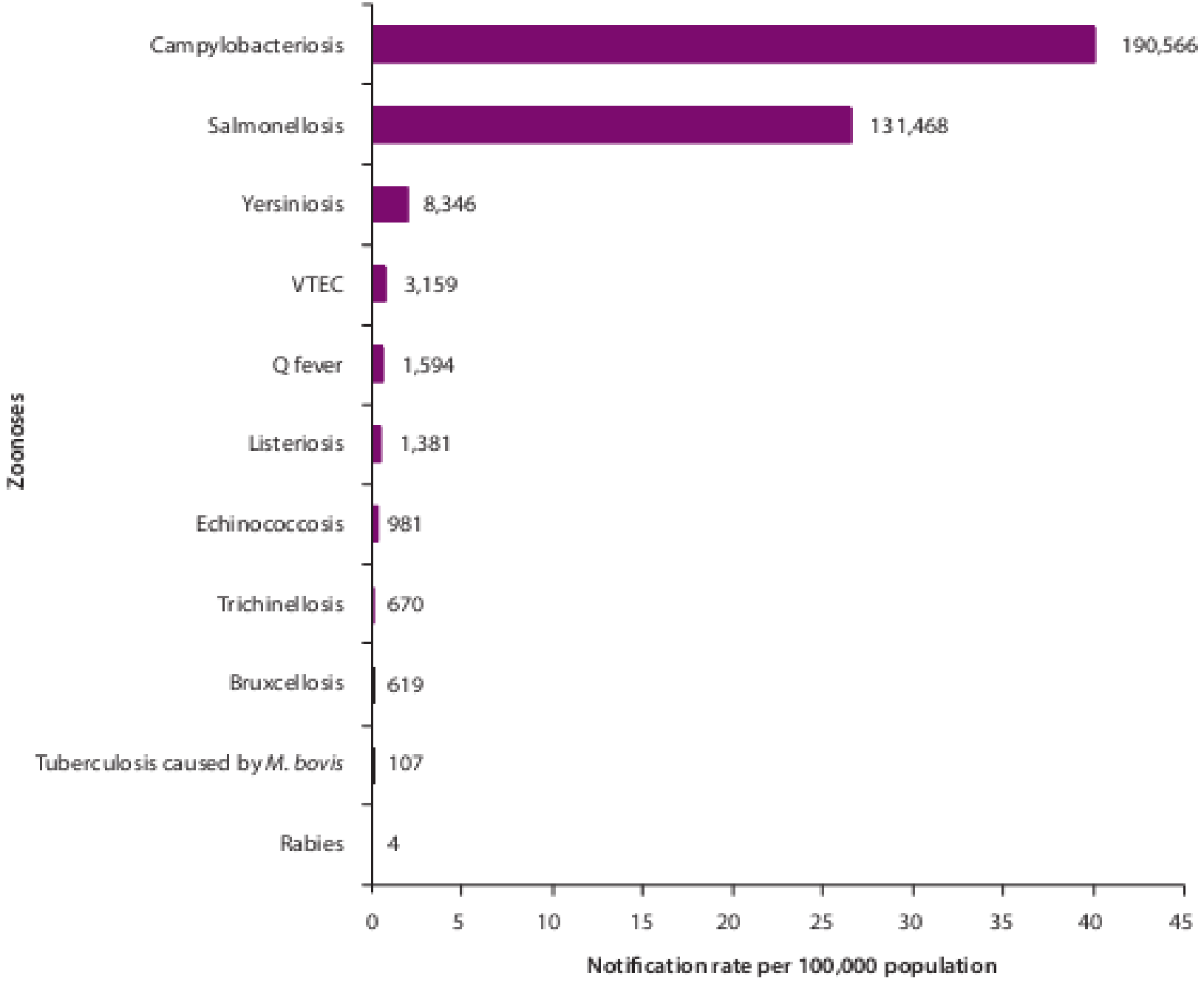
LISTERIOSIS

- Listeria is a group of bacteria that contains ten species. One of these, Listeria monocytogenes, causes the disease “listeriosis” in humans and animals.
- Although listeriosis is rare, the disease is often severe with high hospitalization and mortality rates.
- Unlike many other food-borne bacteria, Listeria survives in salty environments and cold temperatures, as low as 2 to 4 °C.
- Listeria is found in soil, plants and water.
- Animals, including cattle, sheep and goats, can also carry the bacteria.
- Listeriosis is usually contracted by eating contaminated foods.

LISTERIOSIS

- Ready to eat foods such as smoked fish, ready to eat deli meats and soft cheeses are often the source of Listeria infections as their long
- Symptoms of human listeriosis vary, ranging from mild flu - like
- People who are most susceptible to Listeria infections are the elderly, pregnant women, newborn infants and people with weak immune systems.

Figure SU1. | ***Reported notification zoonoses rates in confirmed human cases in the EU, 2008***



FOOD BORNE INTOXICATIONS

These are diseases caused by consumption of food containing:

1. Biotoxicants which are found in tissues of certain plants and animals.
2. Metabolic products (toxins) formed and excreted by microorganisms (such as bacteria, fungi and algae), while they multiply in food, or in gastrointestinal tract of man.
3. Poisonous substances, which may be intentionally or unintentionally added to food during production, processing, transportation or storage.

FOOD BORNE INTOXICATIONS

Food borne intoxications have **short incubation** periods (minutes to hours) and are characterized by **lack of fever**.

Food borne intoxications can be classified into:

a. Bacterial intoxications
b. Fungal intoxications
c. Chemical intoxication
d. Plant toxicants.
e. Poisonous animals.

BACTERIAL FOOD BORNE INTOXICATIONS

1. *Staphylococcus aureus* intoxication
2. *Bacillus cereus* food borne intoxication
3. *Clostridium perfringens* food borne intoxication
4. *Clostridium botulinum* food borne intoxication