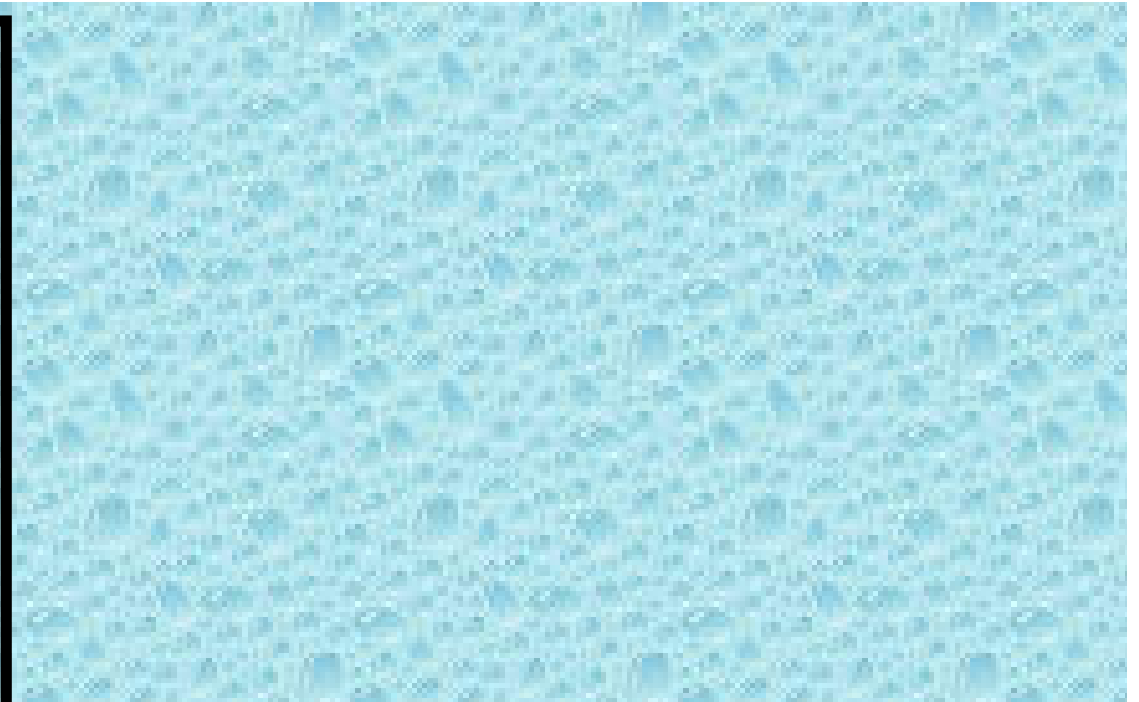
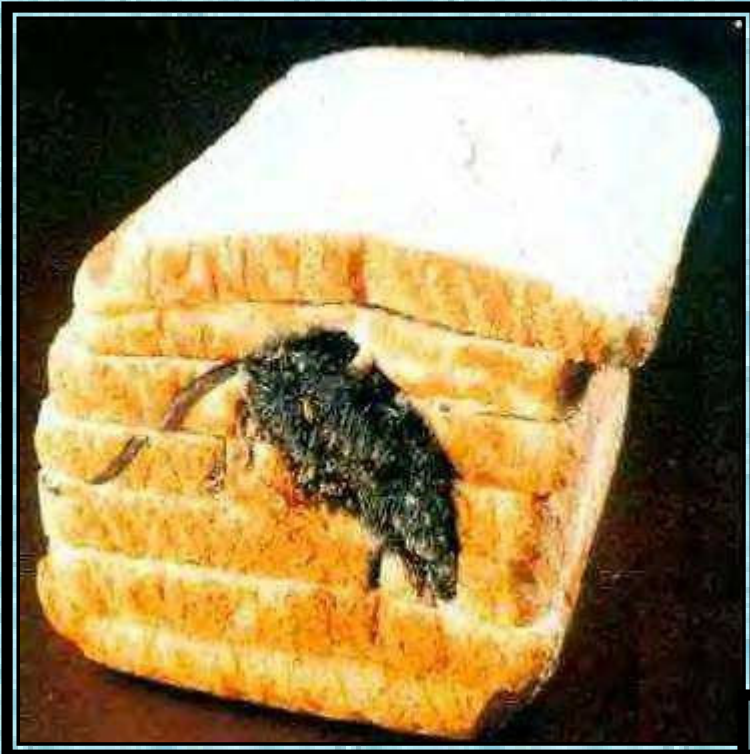


Microbiology

Keep Food Safe From Bacteria.
Fight BACI®







Florette

Canónigos

Fresco, Lavado

13/05



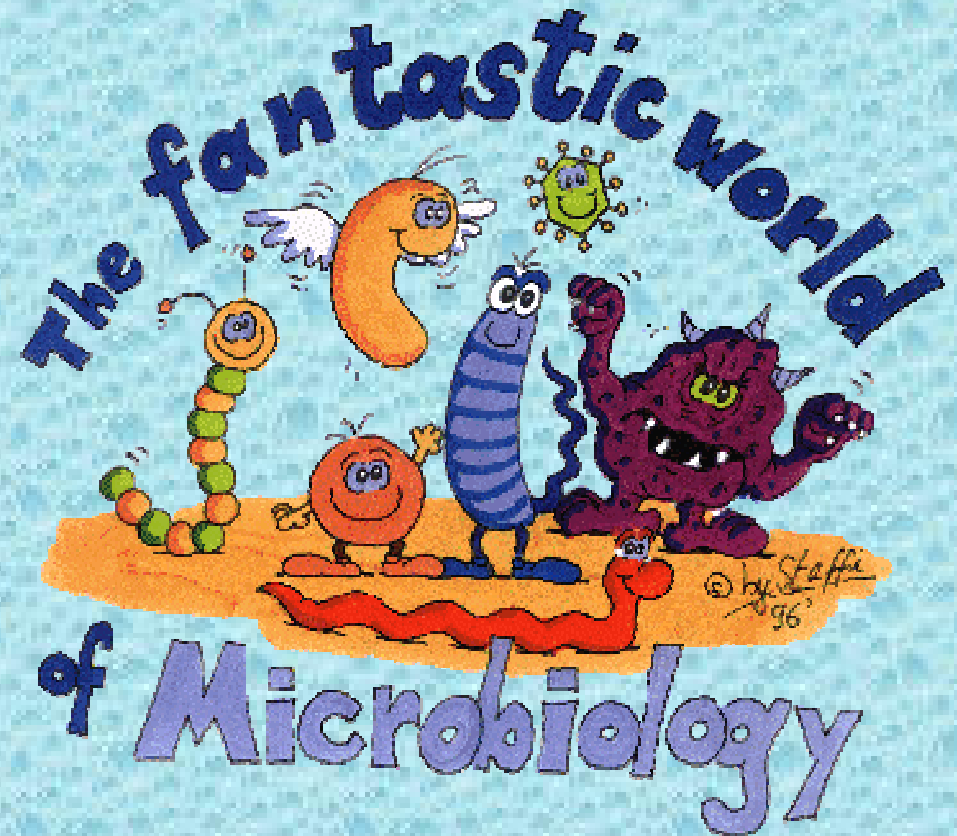
Para mayor información
visite nuestro sitio web

Peso líquido: 125g



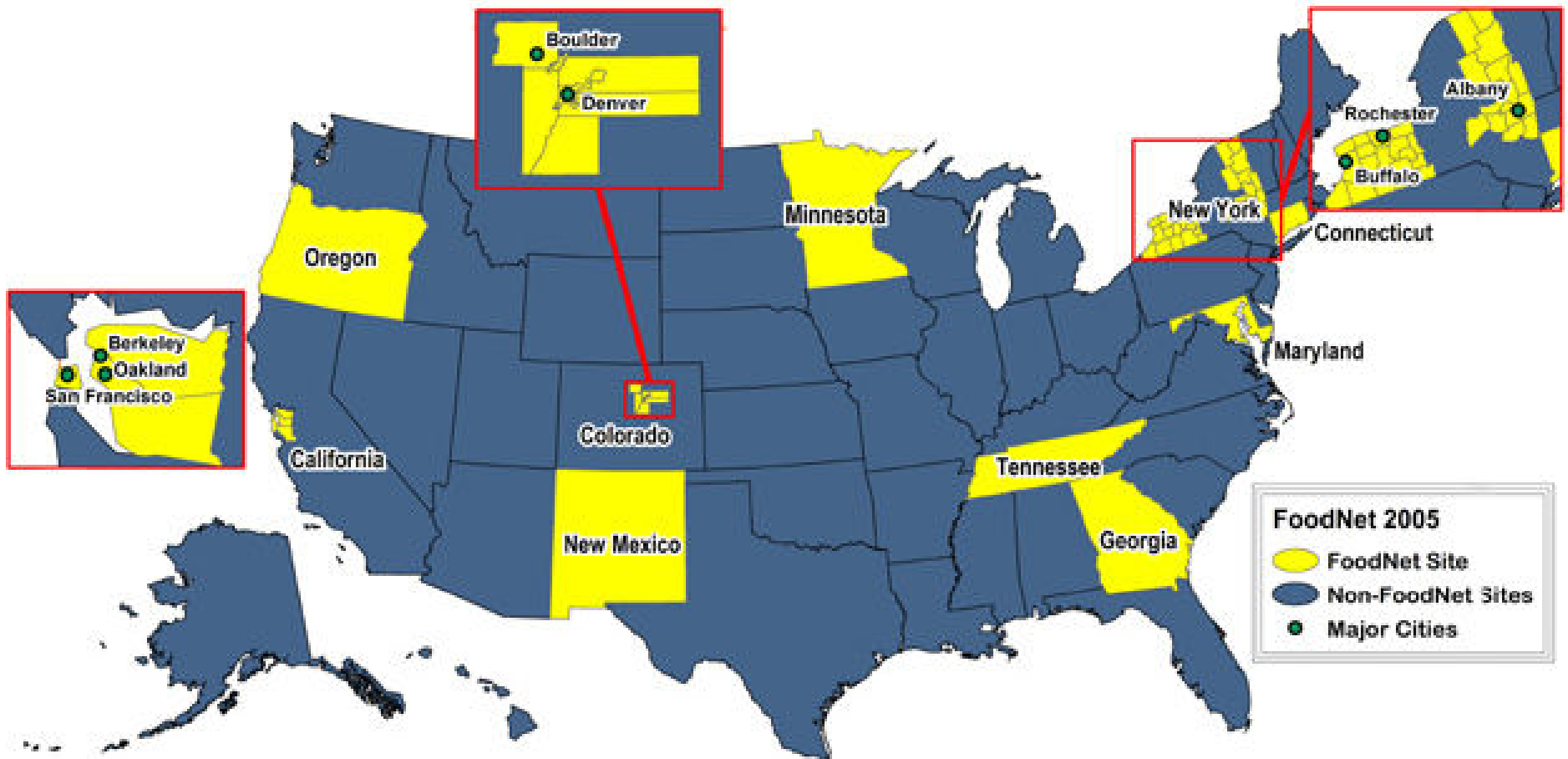
Microbiology

- Eat over 1,800lbs of food per year
- 200 known diseases transmitted through food
- 2009; 6 to 81 million food born illnesses
- Over 9,000 deaths
- Food Safety has been identified as a major concern of consumers



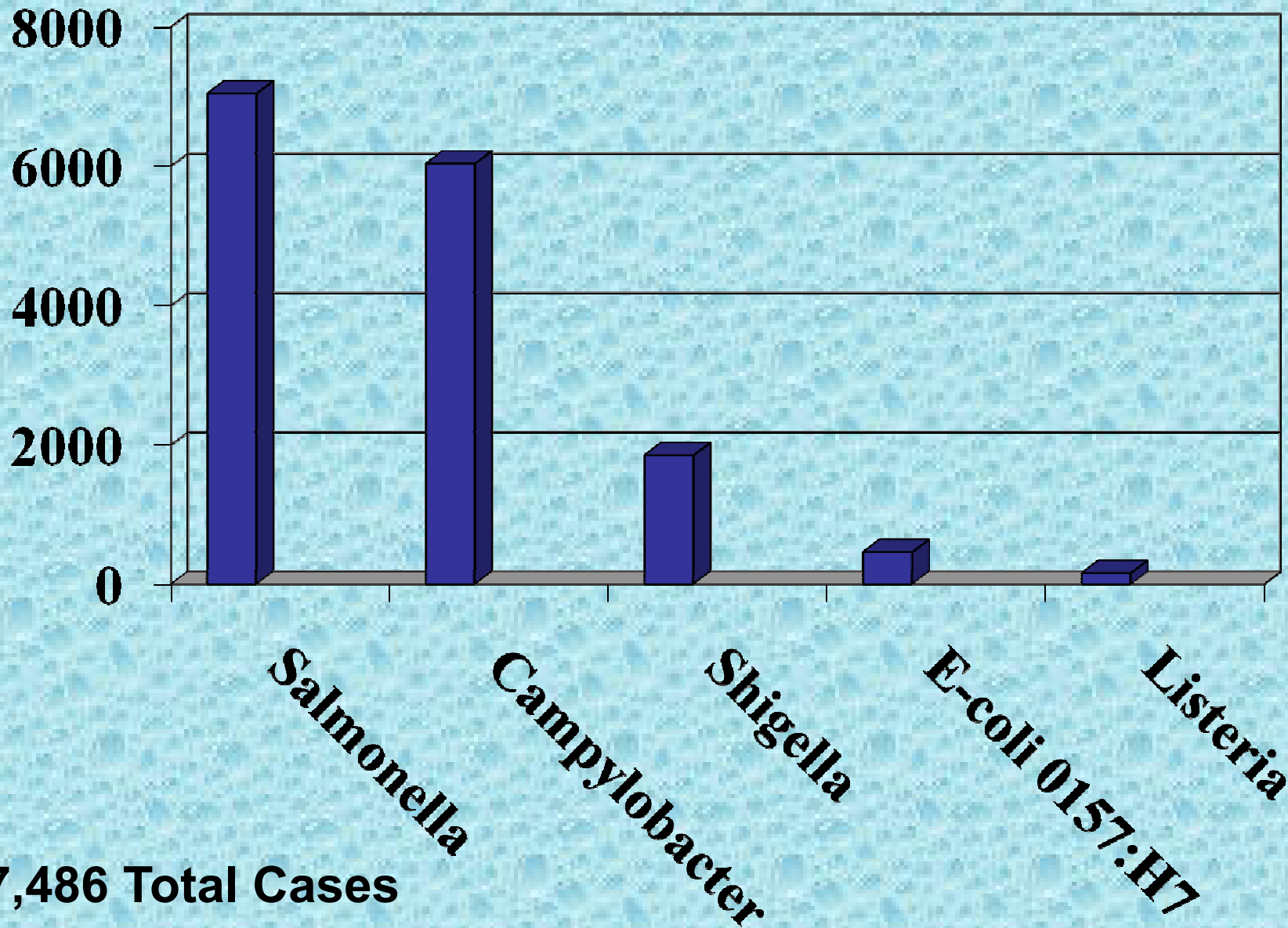
FoodNet

- **FoodNet Surveillance System (FDA, CDC, and the USDA) 1996**
- **Track pathogens; Campylobacter, E-coli 0157:H7, Lysteria monocytogenes, Salmonella, Shigella, Yersina enterocolitica, and Vibrio**
- **1997 added Cyclospora, and Cryptosporidium; parasitic protozoa**



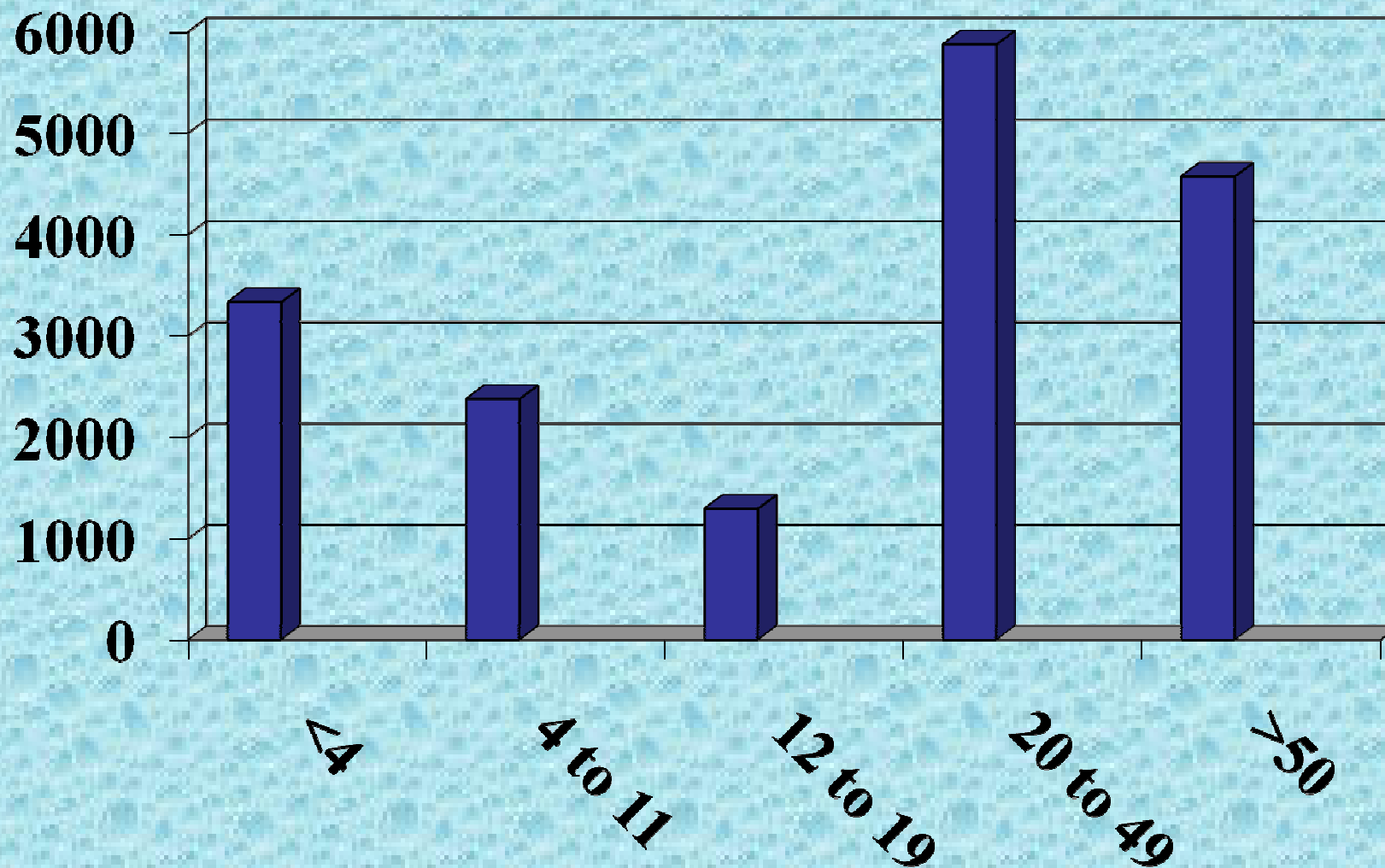
States: MN, OR, CA, CT, GA, TN, NY, MD, CO, NM
44.1 million people; 15.3% of the population
2004 tracks worldwide incidence of NV-CJD

2009 Statistics



17,486 Total Cases

2009; by age



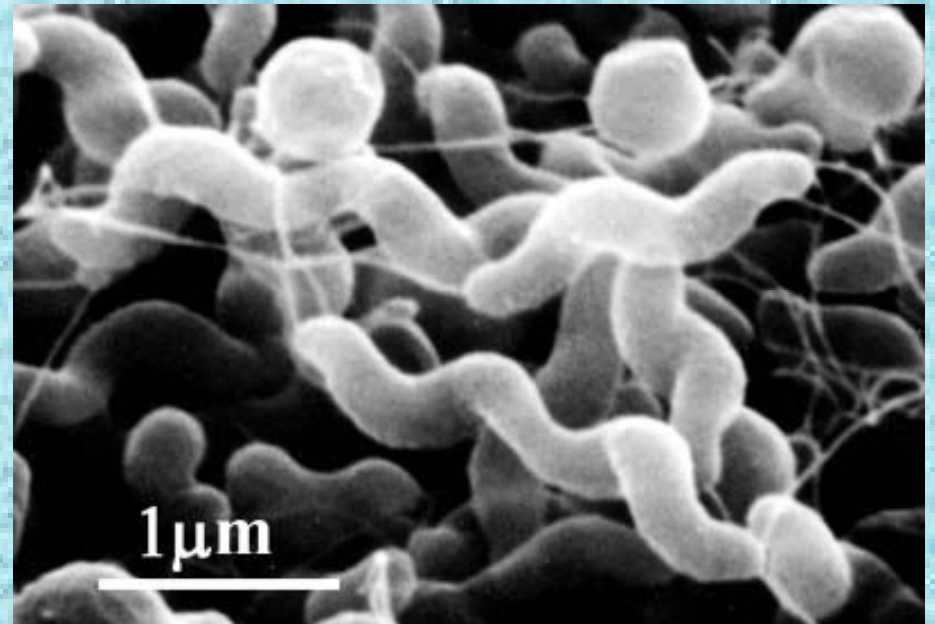
Statistics

- **Campylobacter and Salmonella**
 - Majority of cases in people under 9
 - Vast majority less than 1 year of age
- **More males than females**
- **Spike of food born illness in the summer months**



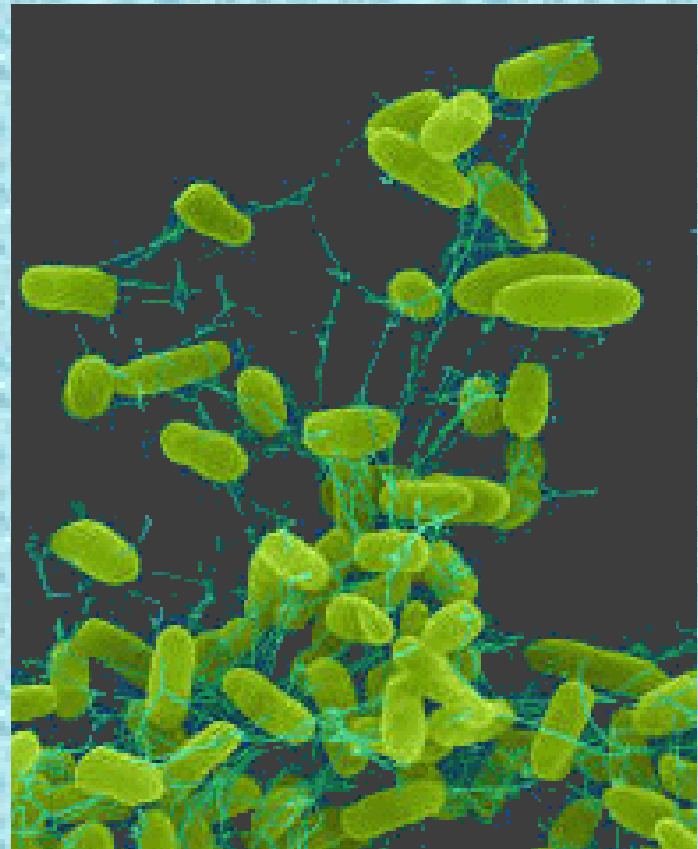
Campylobacter jejuni

- **2nd most common cause of sickness**
- **Raw chicken, meats, sushi, etc**
- **Nausea, vomiting, diarrhea, cramps, and bloody diarrhea (sometimes)**
- **Children under 5; problem in day cares**
- **Onset 2-5d lasts a week**

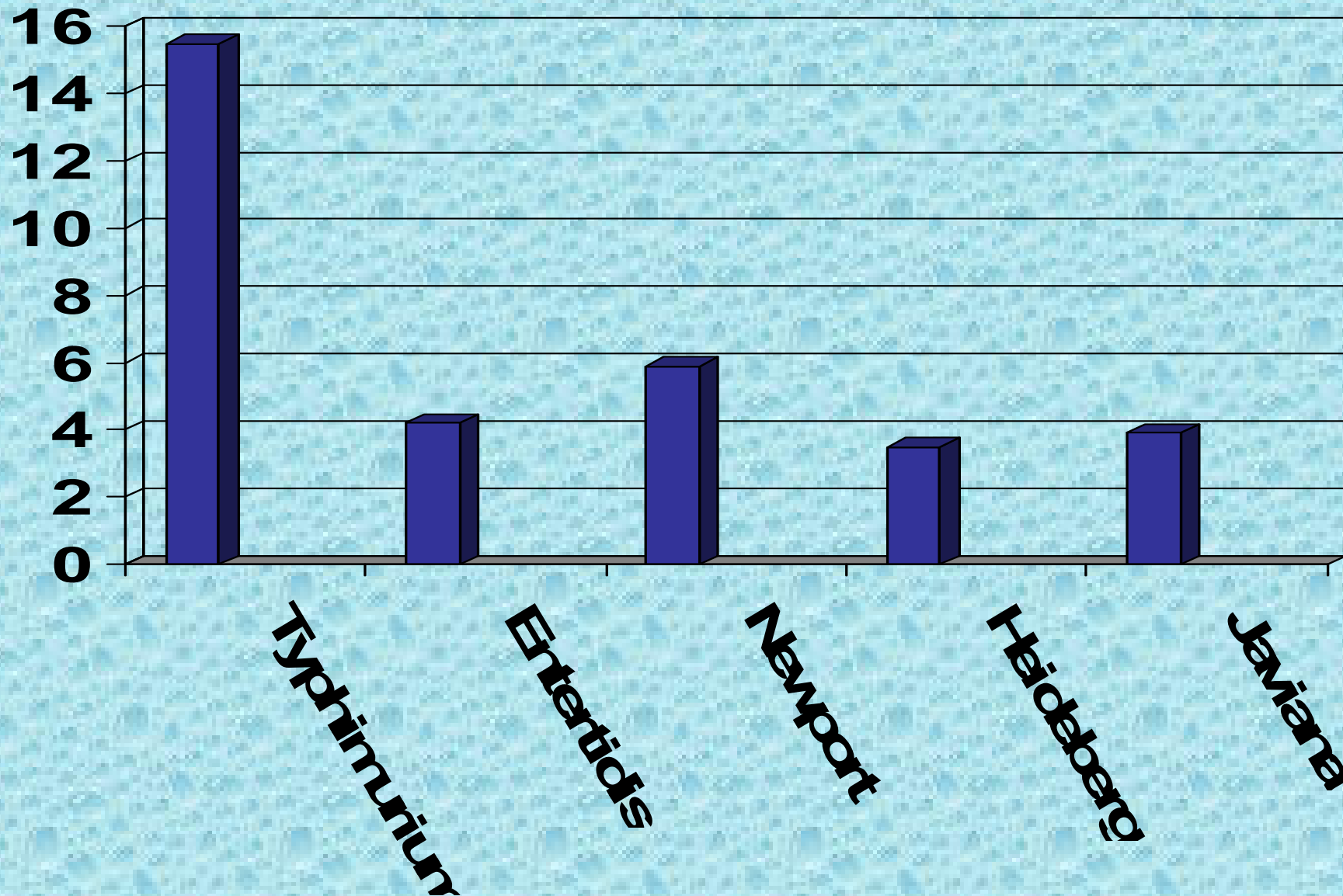


Salmonella ssp

- Many types
- *S. typhi* = Typhoid Fever
- Nausea, vomiting, abdominal cramps, diarrhea, fever, headache
- 12-72 h onset
- Few as 100 cells; lasting 1-2 d
- Poultry, raw meats



Top Salmonella Ssp; per 100,000 cases



Escherichia-coli O157-H7

- **Most E-coli are harmless**
- **O157-H7 most harmful**
 - **Enterohemorrhagic**
- **Severe abdominal cramping, watery diarrhea followed by bloody diarrhea, some vomiting**
- **Occasional Kidney Failure**
- **As few as 10 cells, lasts up to 8 days**
- **2 – 8 days after exposure**



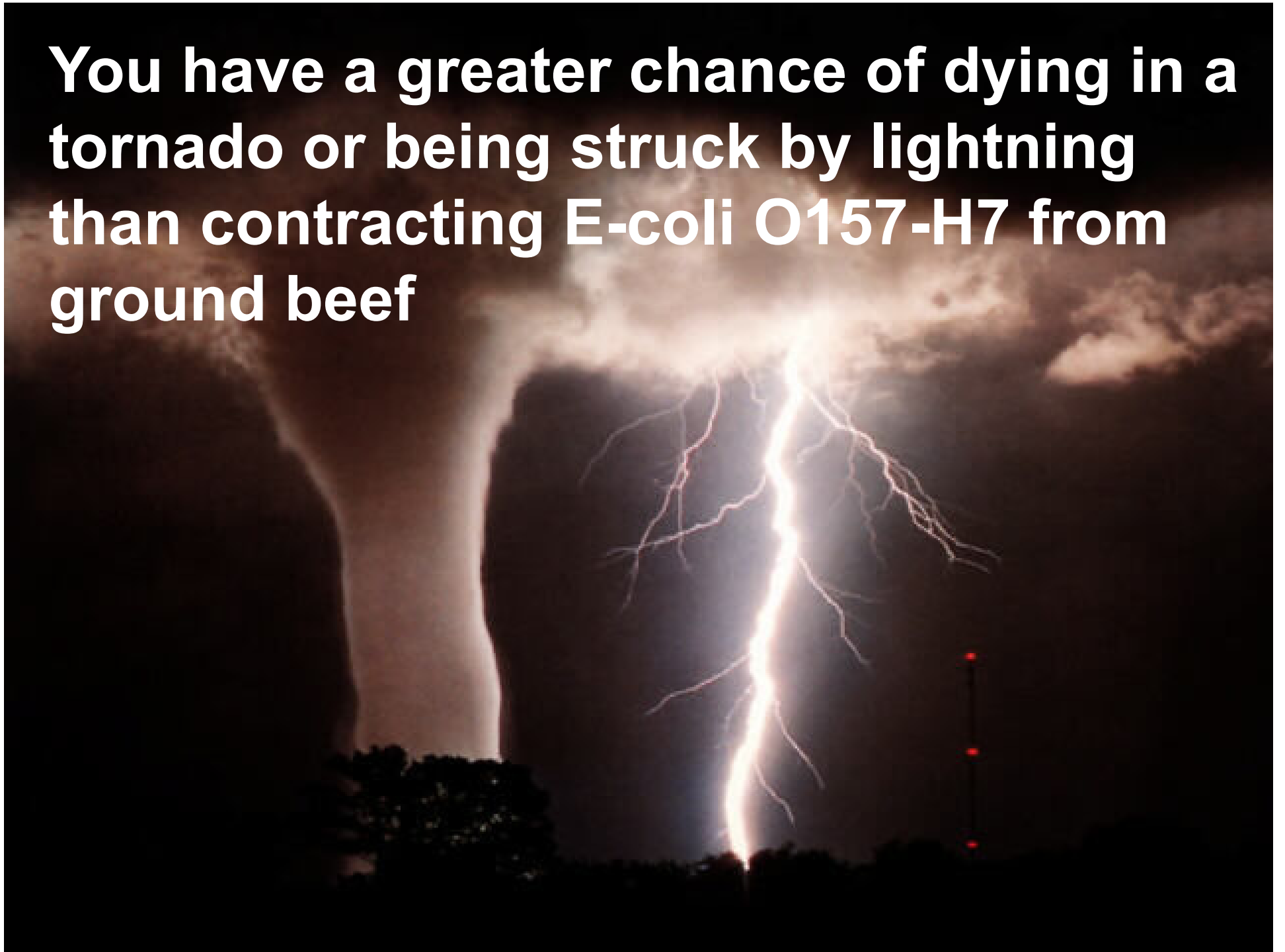
E-coli 0157:H7

***E-coli* 0157:H7 and Ground Beef**

- **Jack-in-the-Box made E-coli a household name**
- **An adulterant if one cell is found in ground beef**
- ***E-coli* ssp. & *Salmonella* are constantly tested in ground beef**

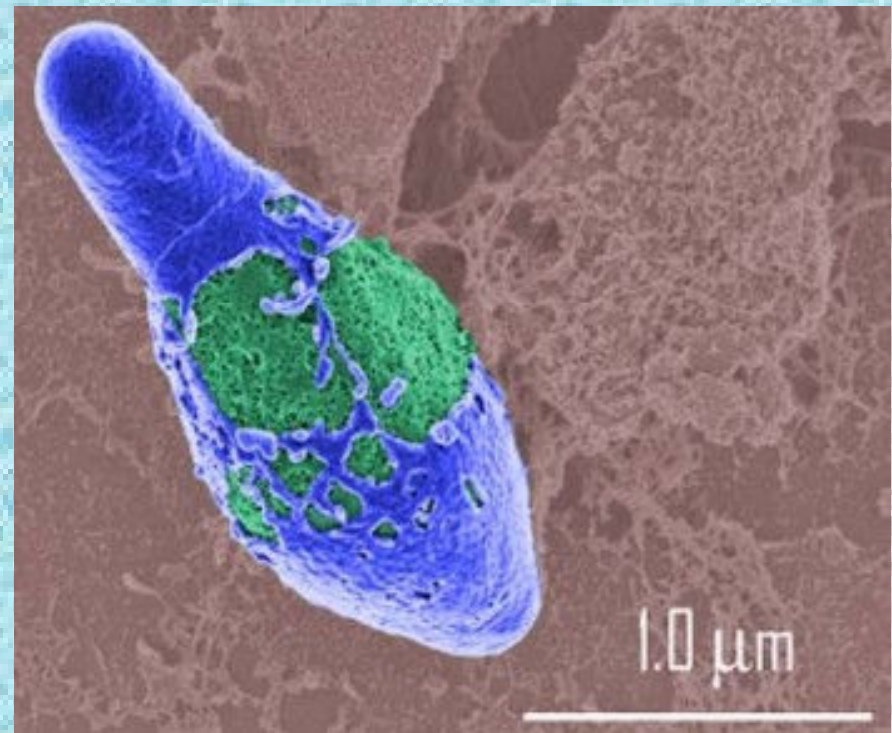


You have a greater chance of dying in a tornado or being struck by lightning than contracting E-coli O157-H7 from ground beef



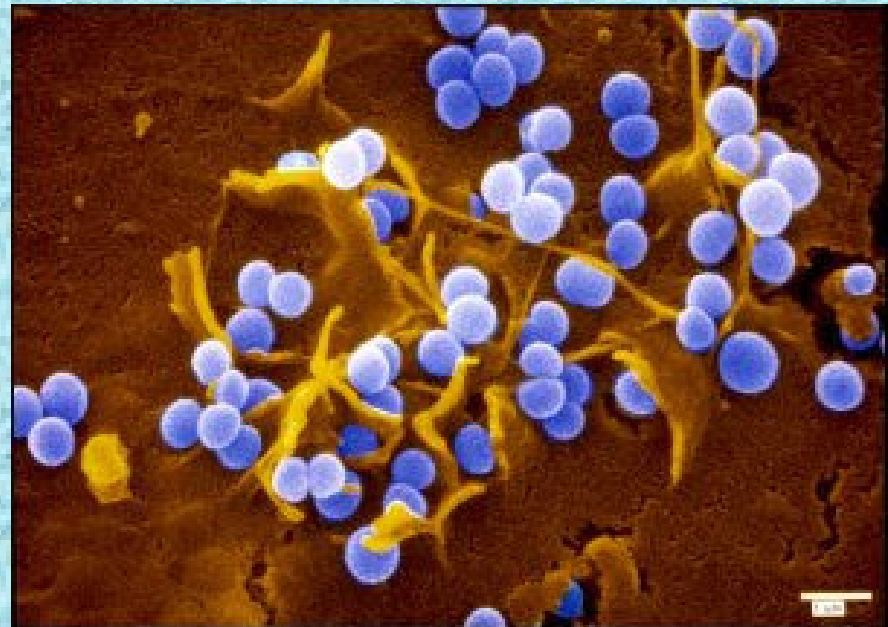
Clostridium botulinum

- **Very deadly toxin (nerve toxin)**
- **18-36 h**
- **Resembles Drunkenness**
- **General weakness, vertigo followed by double vision, difficulty speaking, breathing, and swallowing, drooping eyelids, and constipation**
- **COD Asphyxia**
- **Cured meat, cans, canning vegetables**
- **Nitrite/ Nitrate**



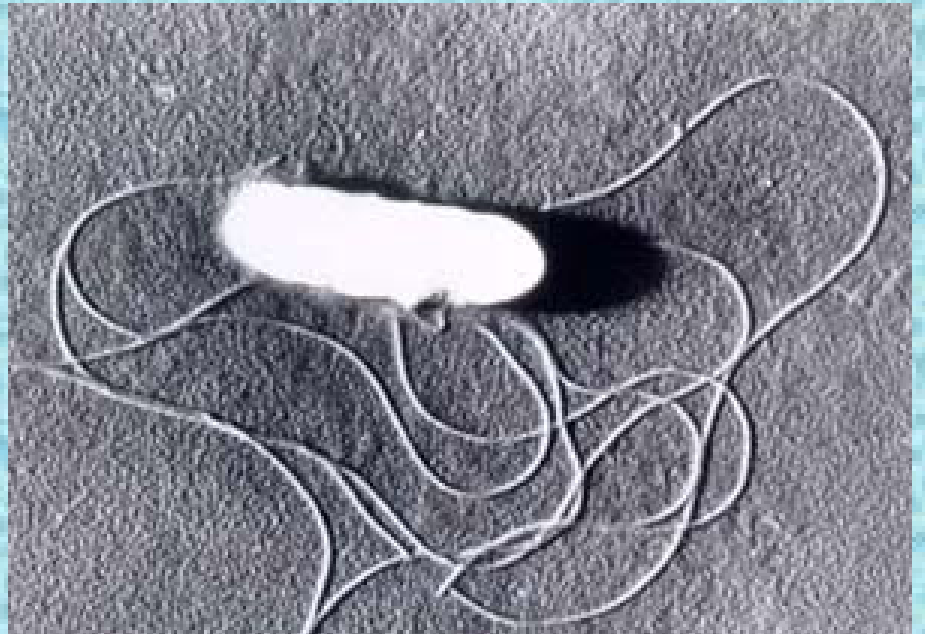
Staphylococcus aureus

- **Food Handlers Disease**
- **Can make 7 different toxins**
- **Nausea, vomiting, diarrhea, abdominal cramping**
- **Rapid onset; 12 h duration**
- **Nose, throat, hair, and skin of 50% of Americans**



Listeria monocytogenes

- Major concern in Ready-to-eat foods
- Can cause pregnant women to spontaneously abort or stillbirth
- Flu-like symptoms, persistent fever, gastrointestinal problems
- Few days to three weeks
- Can grow in refrigeration as low as 35-37° F



Types of Food Born Illness

- **Food born intoxication**
- **Food born infection**
- **Toxico-infections**
- **Opportunistic Pathogens**

Types of Food Born Illness

- **Food born Intoxication**
 - The toxin must be ingested
 - *Staph gastroenteritis*
 - *C. botulinum*

- **Food born Infection**
 - Cells have to be alive
 - Cells colonize in the body and then release toxin
 - *Salmonella, Campylobacter, E-coli 0157:H7*

Types of Food Born Illness

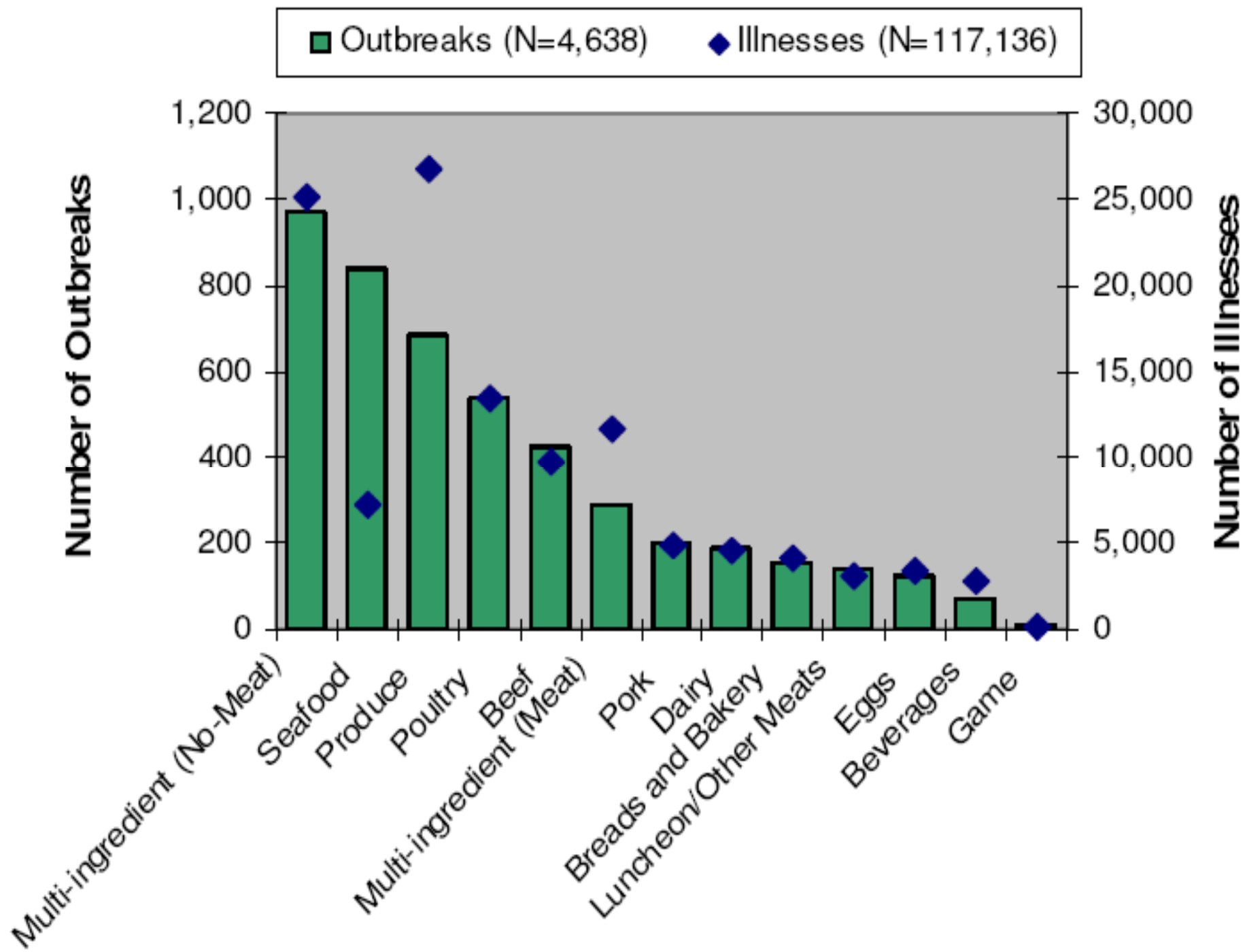
- **Toxico-Infection**
 - Live cells are ingested, produce spores, die, then release toxin as they die
 - *Clostridium perfringes, Bacillus cereus, Bacillus anthracis*

- **Opportunistic Pathogen**
 - Not commonly pathogens
 - Attack immuno-compromised people
 - *Citrobactor, Kleibsella, and Aeromonas*

How to Prevent Contamination

- **Thermal Pasteurization**
- **Feed Additives**
- **Steam Vacuums**
- **Animal and Carcass Washes**
 - Dehairing (not used)
 - Lactic Acid Wash
 - Acetic Acid Wash
 - Hot Water Wash





Top Foods

- Foods that have caused illness

Unpasteurized Juices

Fresh Vegetables

Raw or Undercooked Eggs

Chicken

Tuna

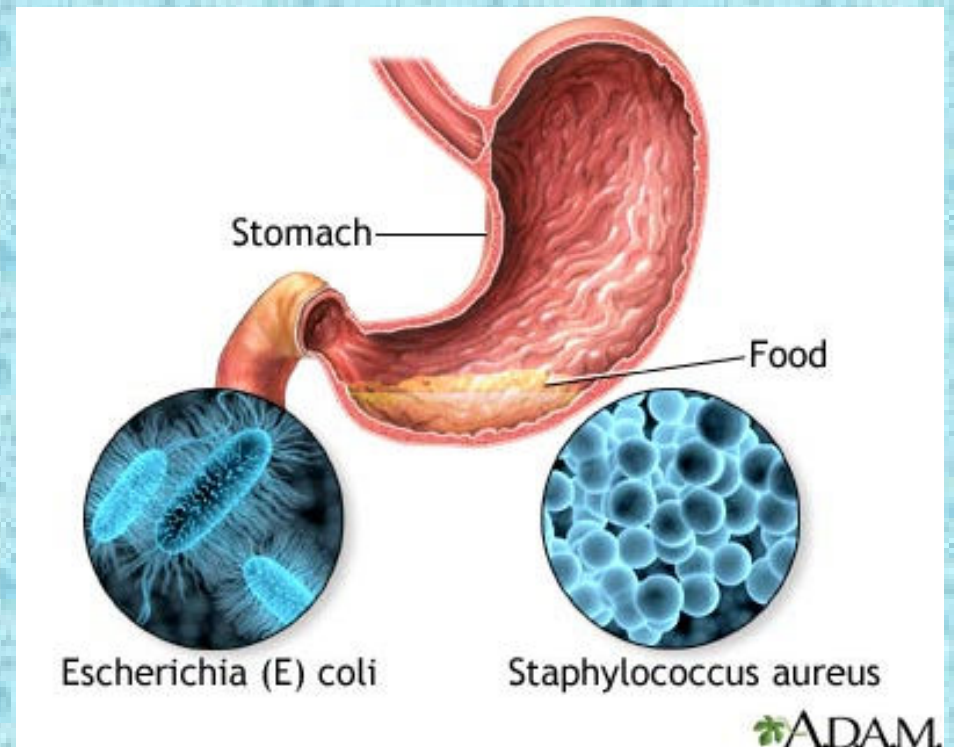
Potato or Macaroni Salads

Cream-filled Pastries

Alfalfa Sprouts

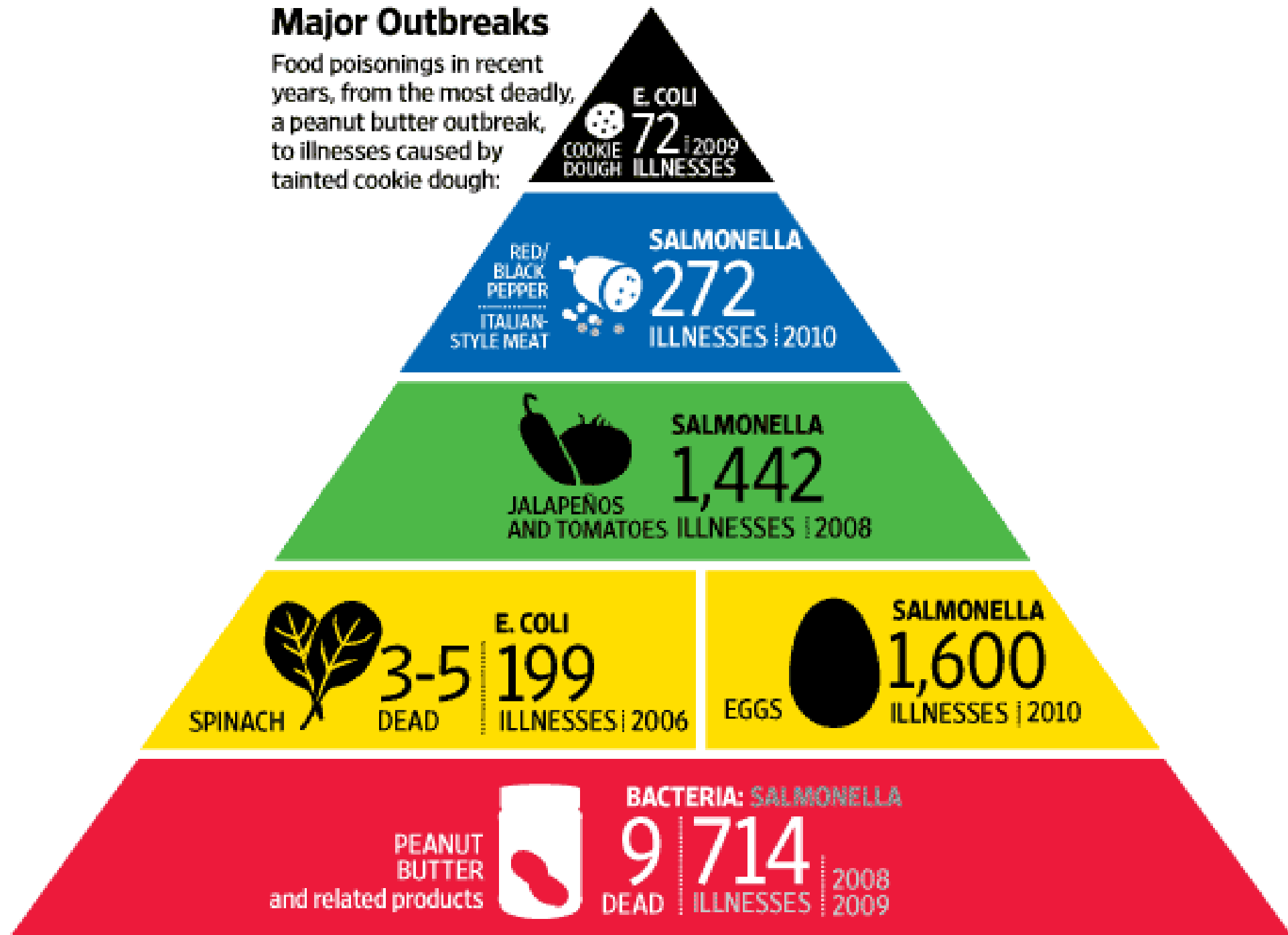
Fresh Fruits

Bottom feeding Shellfish



Major Outbreaks

Food poisonings in recent years, from the most deadly, a peanut butter outbreak, to illnesses caused by tainted cookie dough:



Sources: Centers for Disease Control and Prevention; Food and Drug Administration

Main Causes

- **Undercooking**
- **Interrupted Cooking**
- **Cross Contamination**
 - Not washing cutting board
 - Not cleaning counter
- **Not keeping hot food hot or cold food cold**
- **Not washing hands**
 - Bathroom
 - After handling raw meat
 - Snotty noses
- **Generally not using common sense**