

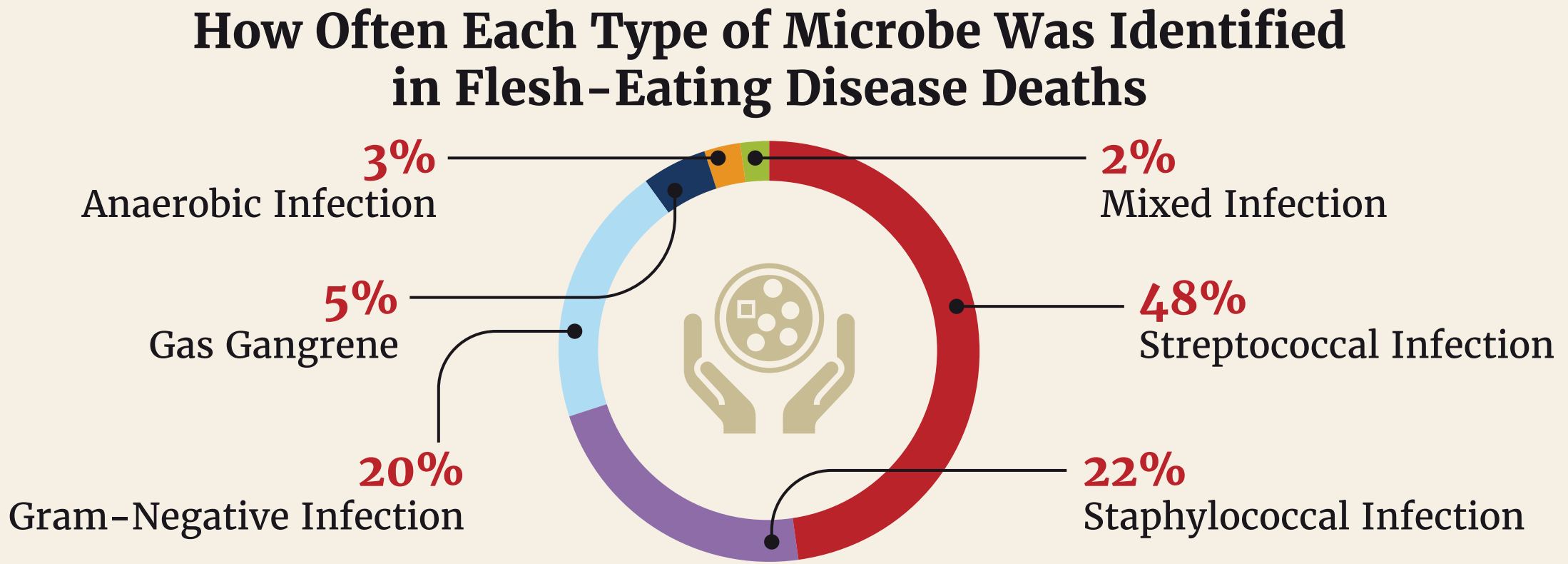


THE MICROBES THAT CAUSE FLESH-EATING DISEASE AND HOW DEADLY THEY ARE

 **600-700 cases of flesh-eating diseases are diagnosed in the U.S each year**

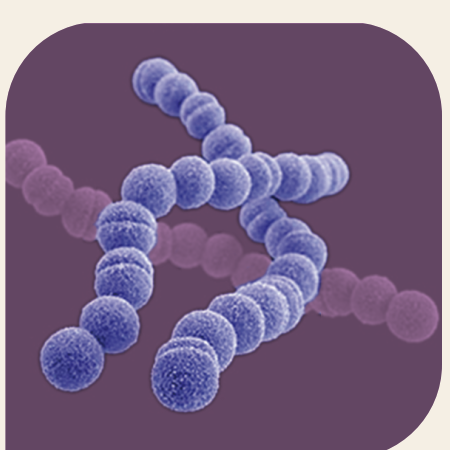
 **Of these cases, 25%-30% result in death.**



The Microbes That Cause Necrotizing Fasciitis (Flesh-Eating Disease)


GRAM-POSITIVE BACTERIUM

- Resistant to almost all available antibiotics
- No outer lipid membrane



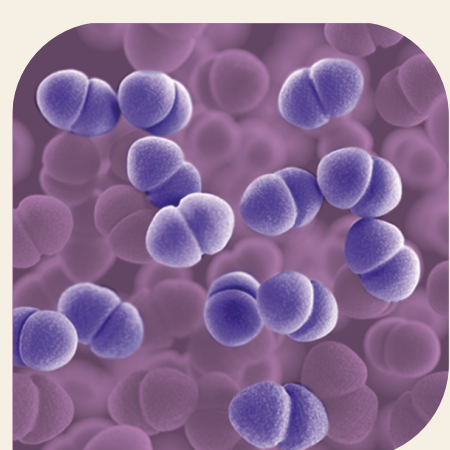
Group A Streptococci

- Most common cause of necrotizing fasciitis
- Commonly carried in the nose, throat, and on skin
- Causes strep throat, but when it penetrates the body, it can lead to flesh-eating disease



Staphylococcus Aureus

- The second most common cause of necrotizing fasciitis
- Commonly carried in the nose and on skin
- Generally cause boils and food poisoning, but it's a major source of hospital infections and can cause flesh-eating disease
- Methicillin-resistant staphylococcus aureus (MRSA) is the deadliest form

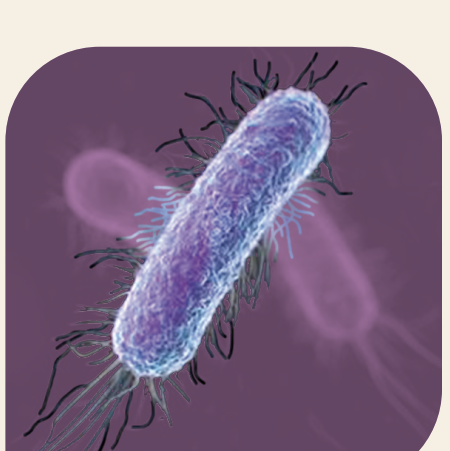


Enterococci

- A less common cause of necrotizing fasciitis, complications usually occur in the abdomen
- Commonly causes infections in the urinary tract, or in the lining of the heart, digestive system, or brain


GRAM-NEGATIVE BACTERIUM

- Increasingly resistant to many drugs and antibiotics
- Has an outer lipid membrane that adds extra protection, making it difficult to penetrate




Escherichia Coli

- Often found in the large intestine where it prevents harmful bacteria from establishing
- When outside of the large intestine, it can cause food poisoning or an infection that could lead to necrotizing fasciitis




Klebsiella Pneumoniae

- Usually found in the human gastrointestinal tract.
- It most commonly causes urinary tract infections, pneumonia, bacteremia, and, on rare occasions, necrotizing fasciitis.




Prevotella

- Usually found in the mouth, female genitals, and digestive tract
- Commonly causes respiratory tract infections and periodontal diseases, and can lead to necrotizing gingivitis.



Pseudomonas Aeruginosa

- Commonly found on the skin
- Causes skin infections, pneumonia, and numerous other types of infections.
- Not a common cause of necrotizing fasciitis and is more likely to occur in someone with an immunodeficiency




Vibrio vulnificus

- Lives in saltwater and enters through a skin injury or by eating raw or undercooked infected seafood.

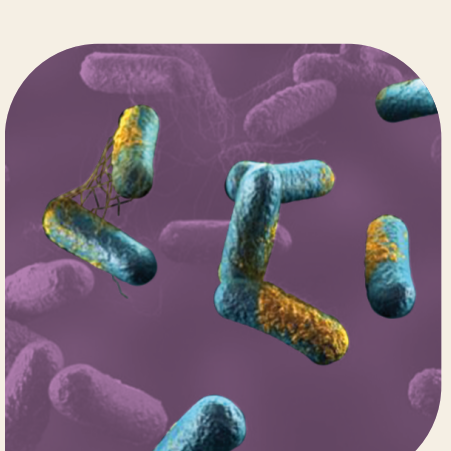
ANAEROBES

- Bacteria that can live in an environment without oxygen




Bacteroides

- Commonly found in the mouth, intestines, and genitals
- Fights harmful pathogens, but if it enters the skin through a perforation it can lead to necrotizing fasciitis.




Clostridium Perfringens

- Found in human and animal intestines, and in soil.
- Causes numerous issues such as food poisoning, cellulitis, or fasciitis; and has been known to cause necrotizing fasciitis and gas gangrene on rare occasions.




Clostridium Septicum



Clostridium Sordellii

FUNGI




Mucoralean fungi

- Commonly found on moldy bread; as well as in soil, manure, or decomposing organic matter
- Can cause a serious fungal infection of the skin or around the sinuses that can form into necrotizing fasciitis

The 4 Types of Necrotizing Fasciitis


TYPE I INFECTION

- Polymicrobial: combination of Gram-positive, Gram-negative, and anaerobic microbes
- Typically affects older people with a comorbidity, immunodeficiency, or infection
- Occuring together with streptococcal toxic shock syndrome (TSS) accelerates the speed and deadliness of the disease

 **Mortality 20-40%**


TYPE II INFECTION

- Monomicrobial: caused by group A streptococci, can occur with or without a coexisting staph infection
- Commonly affects young, healthy adults with a recent trauma or operation

 **Mortality >32%**


TYPE III INFECTION

- Caused by Vibrio vulnificus
- Rare type of infection, most commonly found in the Gulf of Mexico

 **Mortality 30-40%**

TYPE IV INFECTION

- Fungal in nature, caused by the Mucoralean fungi
- Very rare type of infection
- Mostly affects those with immunodeficiency or traumatic wounds

 **Mortality >47%**

How Flesh-Eating Microbes Can Enter the Body



Surgical wounds



Puncture wounds or other injuries



Burns



Minor cuts



Insect bites

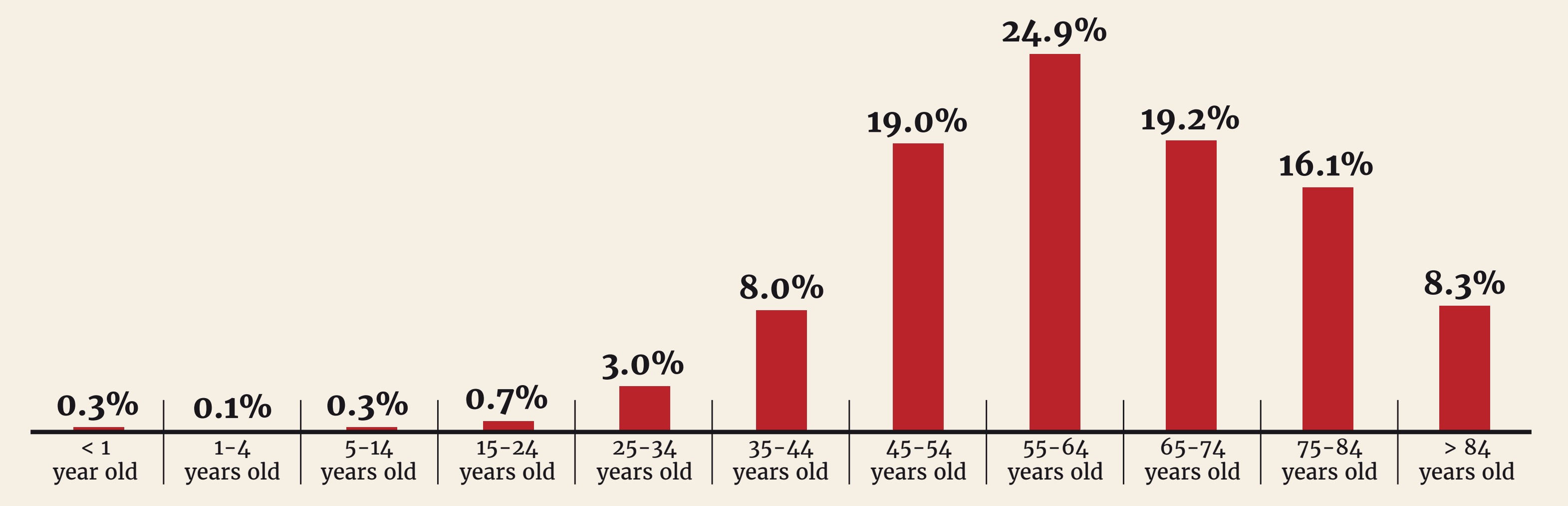


Punctured/perforated internal organs (particularly the colon, rectum, or anus) or sexual organs



Abrasions

Percent of Flesh-Eating Disease-related Deaths by Age



Medical Conditions Associated With Flesh-Eating Disease Deaths in the United States

