
Pasteurella
Panasonic
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Faculty Rep

Classification

- Family: *Pasteurella*
- Species: *Pasteurella sensu stricto*
  - *P. multocida* subsp. *multocida*
  - *P. multocida* subsp. *gallacida*
  - *P. multocida* subsp. *septica*
  - *P. dagmatis*
  - *P. gallinarum*
  - *P. canis*
  - *P. stomatis*
  - *P. avium*

General characteristics

- Small, Gram-negative rods or coccobacilli
- Facultative anaerobes
- Non motile
- Non-sporing
- Capsulated(*P.multocida*)
- Bipolar-staining
- Fermenters
- Oxidase positive

Virulence factors

1. **Iron acquisition** mechanism
2. **Membrane LPS**– confers serum complement resistance
3. **Capsule** prevents phagocytosis and complement–mediated opsonization
4. **Surface components** that provide adherence properties e.g. FHA
5. **Extracellular matrix-degrading enzymes** e.g. Hyaluronidase, neuraminidase and proteases. Facilitate colonization and/or dissemination

Virulence factors

6. **Dermonecrotic toxin**(in highly virulent strains)- causes dermonecrosis and modulates the immune system
7. *Pasteurella multocida* toxin(PMT)

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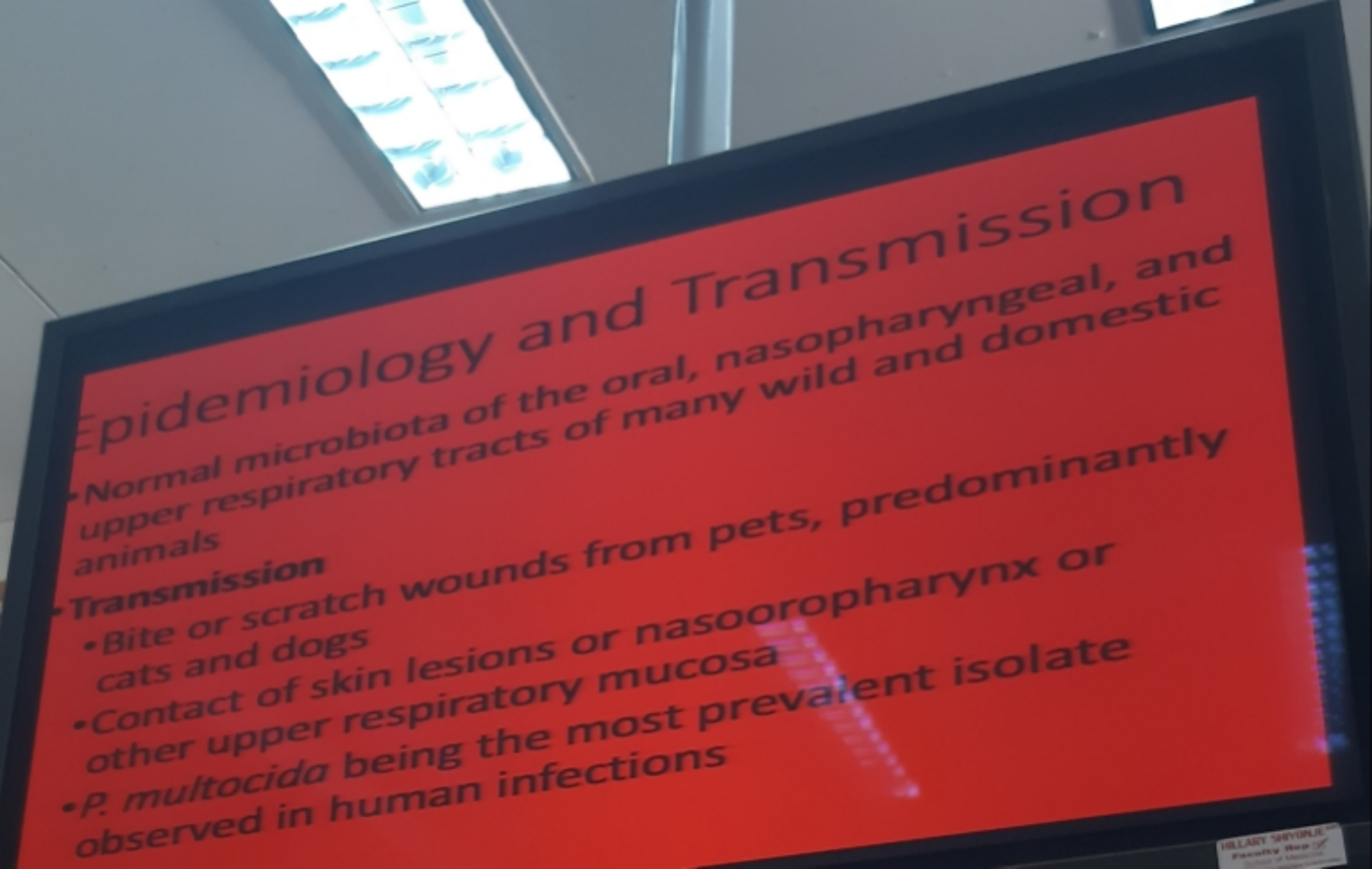

Epidemiology and Transmission
• Normal microbiota of the oral, nasopharyngeal, and upper respiratory tracts of many wild and domestic animals
• Transmission
• Bite or scratch wounds from pets, predominantly cats and dogs
• Contact of skin lesions or nasooropharynx or other upper respiratory mucosa
• P. multocida being the most prevalent isolate observed in human infections

Clinical implications

- **Cellulitis** and **localized superficial abscesses** following an animal bite or scratch
- Oedema, cellulitis, bloody or suppurative/purulent exudate at the wound site
- Inflammation develops very rapidly

Clinical implications

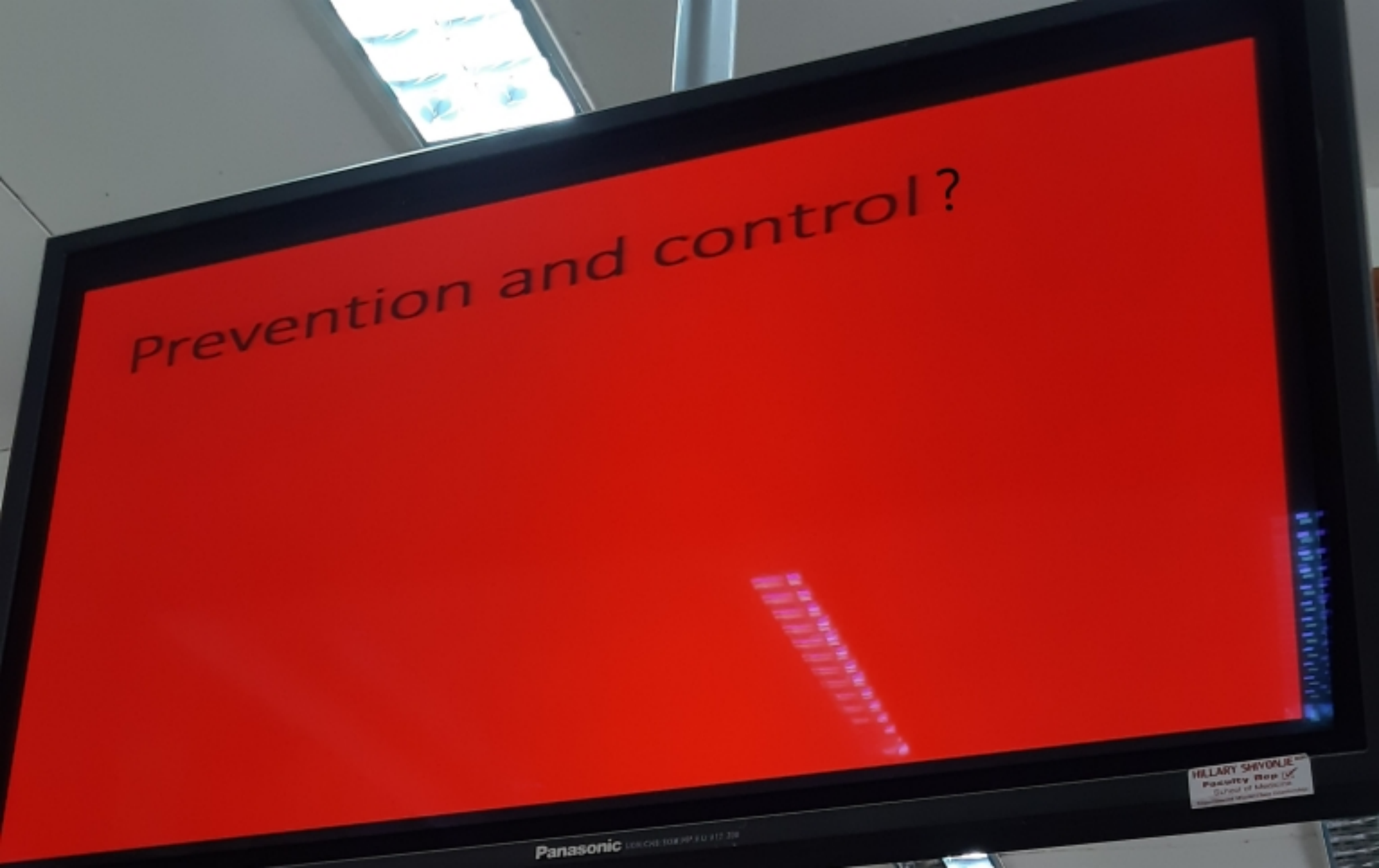
- Second most common site is the **respiratory tract**
- Mostly occurs in the **elderly**, underlying **chronic** lower **RT disease**
- Route of infection is **inhalation**
- Others: Osteomyelitis, intra-abdominal infections, septic arthritis, sepsis and meningitis

Laboratory diagnosis

- Specimen: swabs, sputum etc
- Gram stain: Gram negative coccobacilli
- Culture: BA- produce grey colonies
- PCR

Treatment

- Combination therapy
  - Amoxicillin /Clavulanic acid
  - Doxycycline + Metronidazole(pen. allergies)
  - Clindamycin + a fluoroquinolone


Prevention and control?
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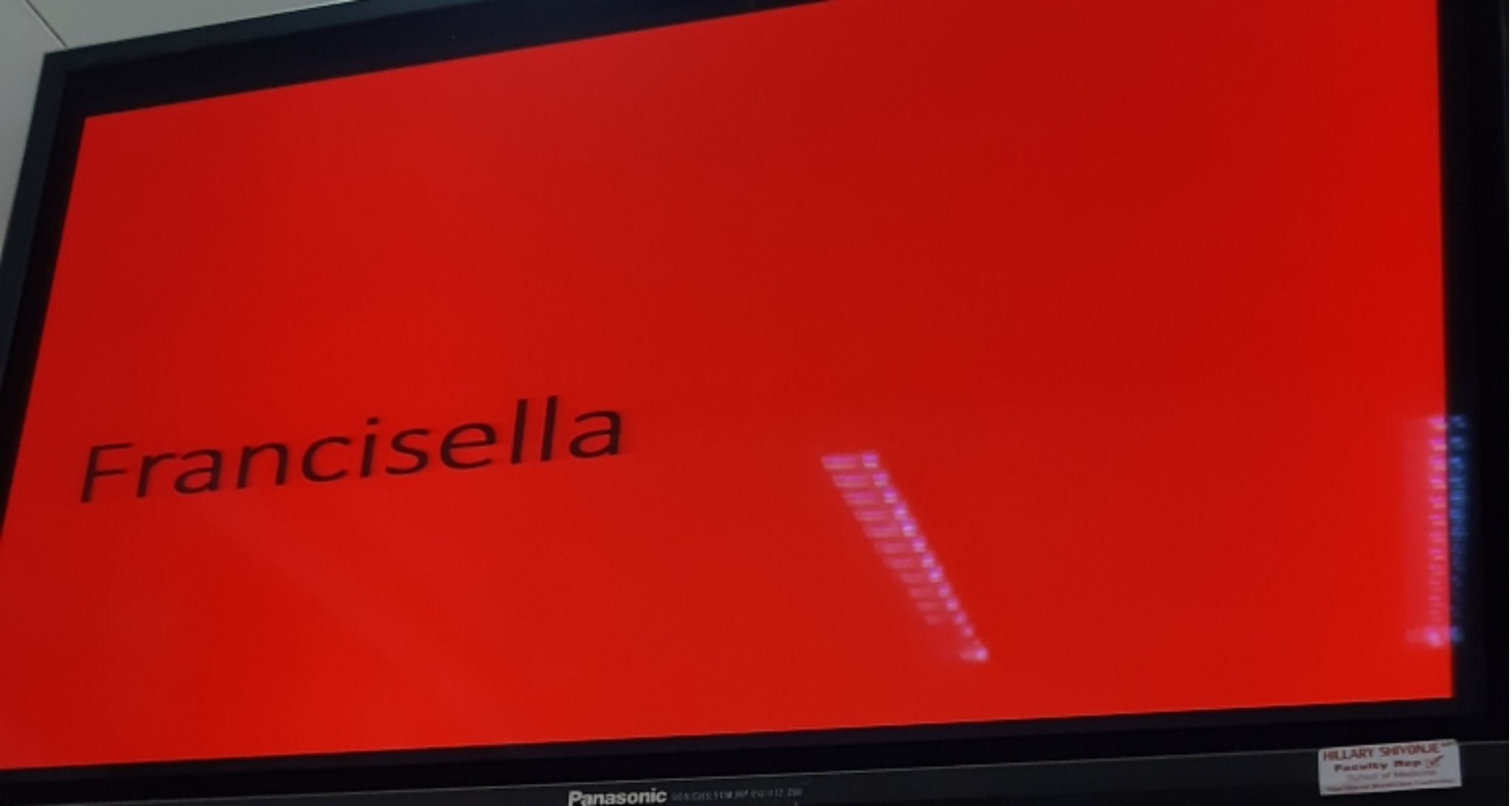
Francisella
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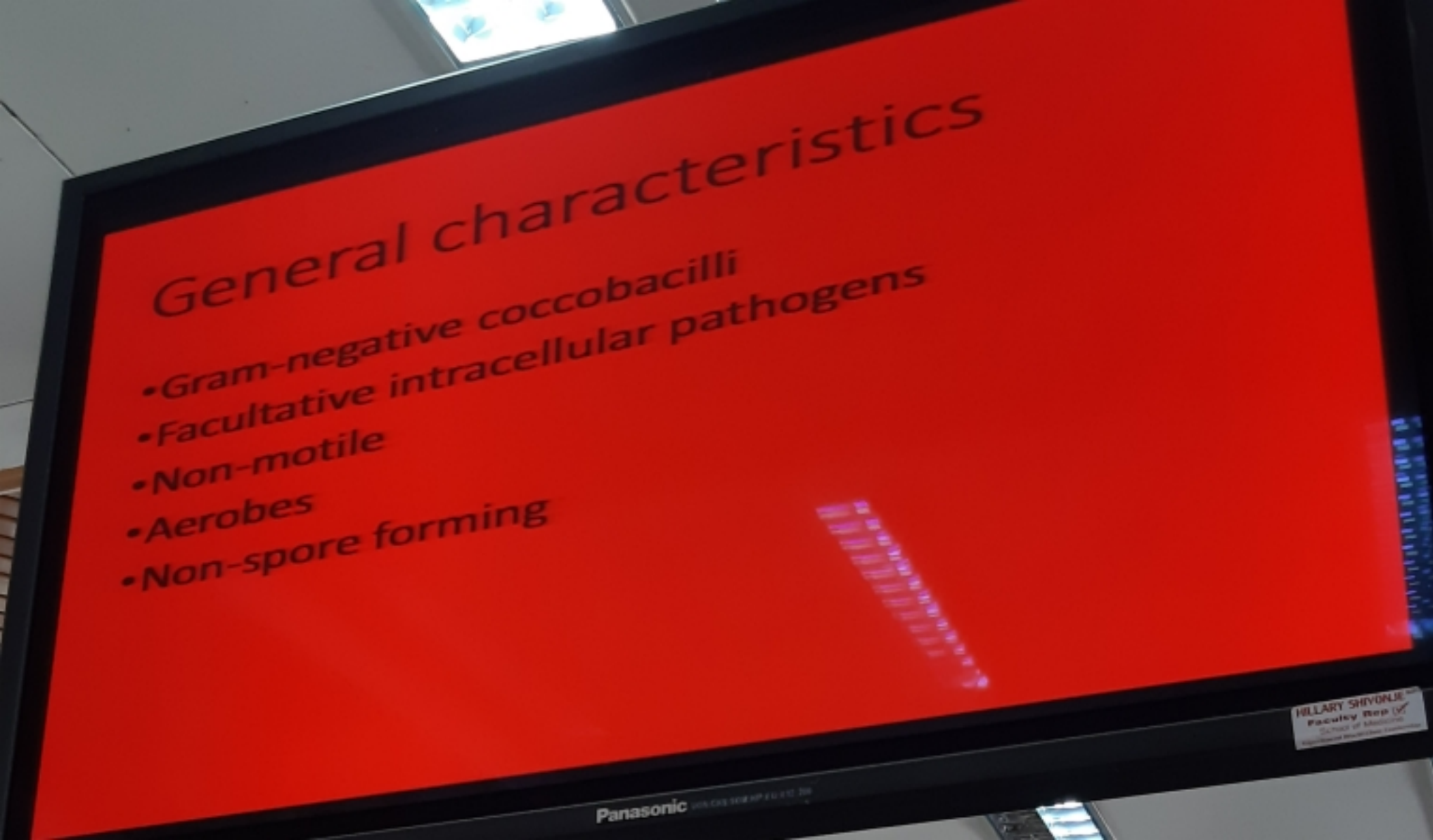
Classification

- Family: Francisellaceae
- Genus: Francisella
  - Francisella tularensis
    - F.tularensis subsp.tularensis
    - F.tularensis subsp.holarctica
    - F.tularensis subsp. mediasiatica
- Francisella philomiragia
- Francisella novicida


General characteristics
•Gram-negative coccobacilli
•Facultative intracellular pathogens
•Non-motile
•Aerobes
•Non-spore forming
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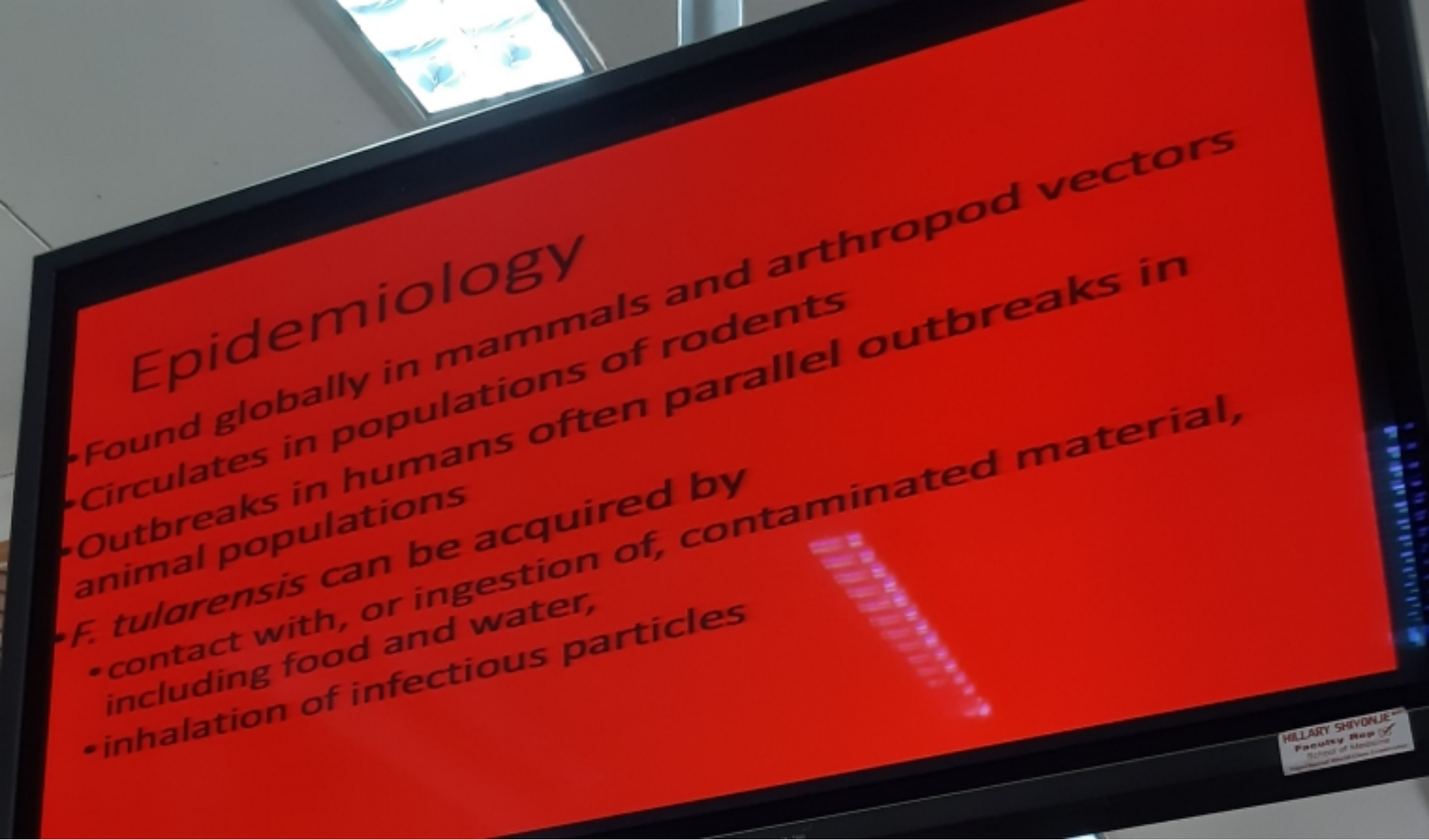
Virulence factors

- No classical virulence factors
- Virulence stems from ability to proliferate within various host tissues and organs
- Disrupts their normal functions and induces a significant host inflammatory response that contributes to the disease


Epidemiology
Found globally in mammals and arthropod vectors
Circulates in populations of rodents
Outbreaks in humans often parallel outbreaks in animal populations
F. tularensis can be acquired by
contact with, or ingestion of, contaminated material, including food and water,
inhalation of infectious particles
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Epidemiology

- A wide range of arthropod vectors implicated in transmission
  - mosquitoes
  - ticks
  - deer flies
- *F. tularensis* subspecies *tularensis* and *holarctica* cause the majority of reported cases
- Subspecies *tularensis* causes the more severe disease of the two

Pathogenesis

- Major target organs:
  - lymph nodes,
  - lungs,
  - pleura,
  - spleen,
  - liver,
  - kidney
- If untreated, bacteria spread from the skin and mucous membranes to regional LNs
- In LNs: further multiplication then dissemination to other organs

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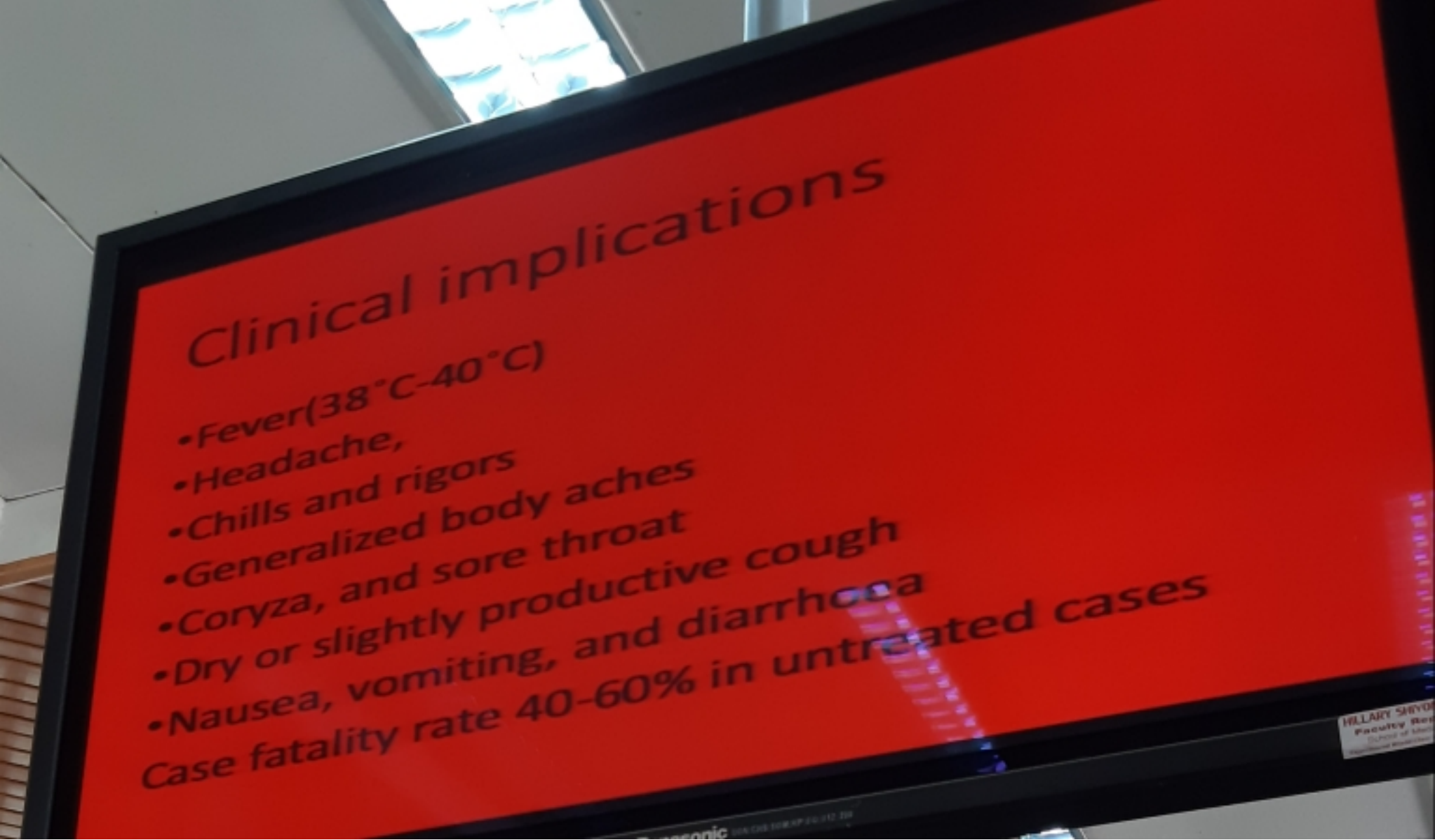
Clinical manifestations

- Causes a spectrum of clinical illnesses termed **tularaemia(glandular fever, rabbit fever, tick fever**, and **deer fly fever**)
  - Ulceroglandular
  - Glandular
  - Oculoglandular
  - Oropharyngeal
  - Pneumonic
  - Typhoidal
  - Septic


Clinical implications
•Fever(38˚C-40˚C)
•Headache,
•Chills and rigors
•Generalized body aches
•Coryza, and sore throat
•Dry or slightly productive cough
•Nausea, vomiting, and diarrhoea
Case fatality rate 40-60% in untreated cases

Clinical manifestations

- *Francisella tularensis*, is one of the most infectious pathogenic bacteria known, requiring inoculation or inhalation of as few as **10 organisms** to cause disease
- Therefore can be used as a biological weapon of terrorism

Laboratory investigations

Specimen: *Secretions, exudates,sputum,gastric aspirate,biopsy specimen,blood*

Gram stain

Culture:

- *Culture media: Cysteine heart blood agar; Buffered charcoal-yeast agar; CBA*
- *Incubate at 37˚C*
  - *Growth visible from 24-48 hours*
  - *Hold at least for 10 days before discarding*

Laboratory investigations

- Colonial morphology:
  - CBA- tiny, grey-white, opaque colonies
  - Cysteine Heart Agar (CHA)-greenish-blue colonies
- Direct fluorescent antibody
- Immunohistochemical staining
- PCR

Treatment

- Streptomycin
- Gentamicin
- Tetracycline
- Chloramphenicol