

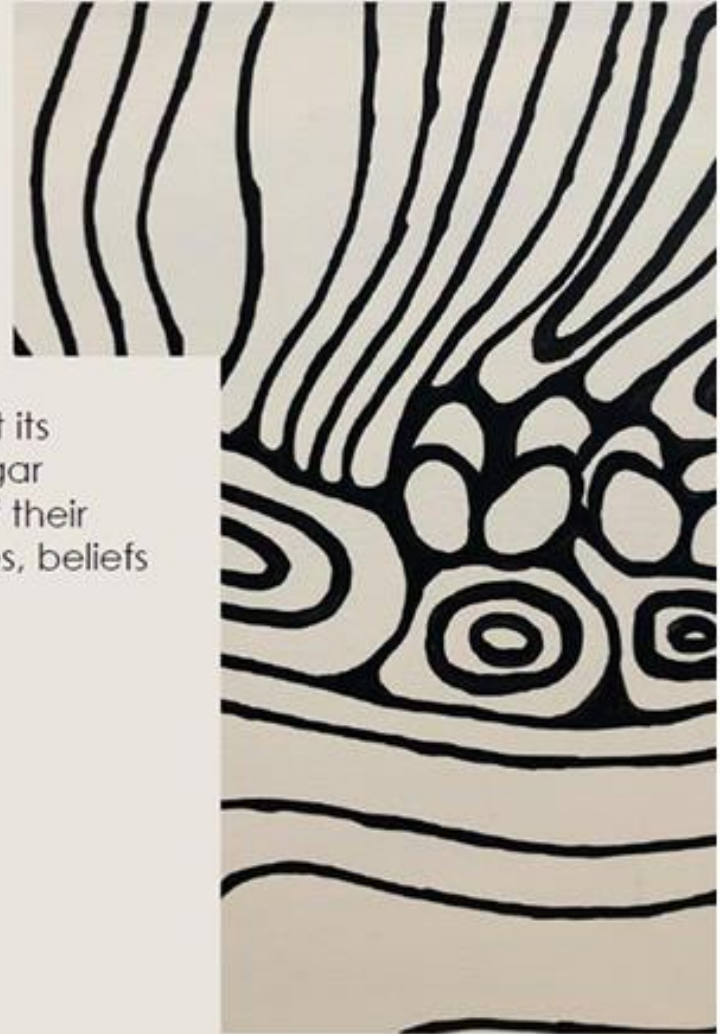
# DENT 3005: Introduction to Pharmacology

## **Infection control in dental practice**

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# Acknowledgement of country

The University of Western Australia acknowledges that its campus is situated on Noongar land, and that Noongar people remain the spiritual and cultural custodians of their land, and continue to practise their values, languages, beliefs and knowledge.



# Learning Outcomes

## Learning objectives

- 1) Explain pathogenicity and virulence of oral microorganisms
- 2) Identify sources and routes of infection transmission in dentistry
- 3) Broadly understand the key microbial virulence factors and their effects
- 4) Discuss the role of vaccines in preventing communicable diseases
- 5) Apply infection control principles in dental practice
- 6) Understand the role of pharmacological agents appropriately to manage oral infections



# Pathogenicity and Virulence of Microorganisms

- **Pathogenicity** refers to a microorganism's ability to cause disease
- **Virulence** refers to the degree or severity of the disease a pathogen can cause

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## Key virulence factors

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Virulence Factor	Function	Example
Adhesins	Enable bacteria to attach to host tissues	Streptococcus mutans in dental plaque
Invasins	Allow penetration into tissues	Listeria monocytogenes
Toxins	Damage or kill host cells	Clostridium tetani, E. coli
Enzymes	Degrade tissue, aid spread	Collagenase, hyaluronidase
Immune Evasion	Avoid detection or destruction	Capsule in Streptococcus pneumoniae

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# Sources of Infection and Routes of Transmission

- **Sources of infection**
  - **Patients:** carriers of bacteria, viruses (e.g., HBV, HCV, HIV)
  - **Dental instruments and surfaces:** if improperly sterilized
  - **Aerosols and droplets:** generated during dental procedures
- **Routes of transmission**
  - **Direct contact:** with blood, saliva, or mucosa
  - **Indirect contact:** via contaminated instruments, gloves, or surfaces
  - **Droplet transmission:** coughing, sneezing, ultrasonic scalers
  - **Airborne:** fine aerosols staying suspended and inhaled
  - **Sharps injuries:** needle-stick or instrument-related injuries

# Infection control in dental practices

- Personal Protective Equipment (PPE)
- Hand hygiene
- Sterilization of instruments
- Surface disinfection
- Proper waste disposal
- Vaccination of staff



# Role of vaccines in preventing infectious diseases

- **Vaccines** stimulate the immune system to develop memory against specific pathogens without causing disease
- **Important vaccines for dental professionals**
  - Hepatitis B (mandatory for dental workers)
  - Influenza (annual)
  - COVID-19
  - Tetanus, Diphtheria, Pertussis
  - Measles, Mumps, Rubella (MMR)
- **Mechanism of action:** vaccines introduce antigens that mimic the pathogen, leading to an immune response. This results in antibody production and immune memory

# Pharmacological considerations in infectious disease management

- **Antibiotic prophylaxis:** for selected patients at risk of infective endocarditis before invasive dental procedures
- **Antiviral medications:** management of oral herpes or HIV-related conditions
- **Antifungals:** for treating oral candidiasis (e.g., *nystatin*, *fluconazole*)
- **Vaccination history review:** consider interactions with immunosuppressive medications or compromised immune states



# Take home message

- Microorganisms cause disease through **pathogenicity** and **virulence**
- Understanding **transmission routes** is essential for infection control in clinical settings
- **Vaccines** are a vital preventive tool for both practitioners and patients
- **Pharmacological interventions** (antibiotics, antifungals, antivirals) support infection management
- Clinical decisions must always **balance efficacy, patient comfort, and safety**

# Review



## References

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