

# Pharmacological Principles

## *Presentation guide*

*CC = Statement of the competence for a core competence*

*E = Elements of the competence for a specific statement of competence*

*P = Performance criteria for competency; associated with a specific element of the competence*

### **Core Competence CC.4**

*Explain the pharmacological principles as they pertain to respiratory therapy*

#### **E.1 Explain the fundamental characteristics associated with the application of medications**

- P1.1 Discuss the basic sources of medications
- P1.2 Define the following as they pertain to medications: chemical, experimental, generic official and trade.
- P1.3 Outline the characteristics of the following formulations: oral, injectable, aerosol, micronized powder, suppository, sublingual and topical
- P1.4 Explain the advantages and disadvantages of the following routes of administration: enteral, parenteral, topical and inhalational

#### **E.2 Explain the pharmacokinetics of medications**

- P2.1 Define the following terms: affinity, agonist, partial agonist, competitive and non-competitive and antagonist drugs
- P2.2 Explain the concept of half-life and clearance of a drug
- P2.3 Define tolerance and tachyphylaxis
- P2.4 Describe drug elimination
- P2.5 Describe pharmacological receptor
- P2.5 Identify cellular sites where pharmacologic receptors are found
- P2.6 Define the following pharmacological terms: toxicity, median effective dose and median lethal dose
- P2.7 Explain drug potency and efficacy
- P2.8 Explain the concept of therapeutic index and relate this to the safety of the drug

**E.3 Compare the pharmacologic response of adrenergic and cholinergic drugs**

- P3.1 Describe drug classification based on the Autonomic Nervous System (ANS) divisions
- P3.2 Describe the location and action of adrenergic receptors
- P3.3 Compare adrenergic and anti-adrenergic drug action
- P3.4 Describe the location and action of cholinergic receptors
- P3.5 Compare cholinergic and anti-cholinergic drug action

**E.4 Describe the indications, mechanism of action, routes of administration and side effects particular to each class of medications**

- P4.1 Describe sympathomimetic bronchodilators
- P4.2 Describe parasympathomimetic bronchodilators
- P4.3 Describe xanthine bronchodilators
- P4.4 Describe mucolytic agents
- P4.5 Describe anti-inflammatories
- P4.6 Describe anti-asthmatic medications
- P4.7 Describe anti-histamine drugs
- P4.8 Describe antibiotic, anti-viral and anti-fungal drugs
- P4.9 Describe diuretics

**E.5 Describe the indications, mechanism of action, routes of administration and side effects particular to specific classes of cardiovascular medications**

- P5.1 Describe cardiotoxic therapeutic agent
- P5.2 Describe antianginal therapeutic agents
- P5.3 Describe diuretic therapeutic agents
- P5.4 Describe antiarrhythmic therapeutic agents
- P5.5 Describe the mode of action of antihypertensive agents
- P5.6 Describe antithrombotic and thrombolytic therapeutic agents

**E.6 Describe the indications, mechanism of action, routes of administration and side effects particular to drugs utilized in anesthesia**

- P6.1 Describe the general principles of intravenous anesthetic drugs, including their pharmacokinetics
- P6.2 Describe the narcotic antagonists
- P6.3 Describe benzodiazepines, barbiturates and benzodiazepine antagonists
- P6.4 Describe depolarizing and non-depolarizing muscle relaxants, including their neuromuscular transmission, structure, metabolism and excretion
- P6.5 Describe cholinesterase inhibitors, including their physical structure and role as reversal agents
- P6.6 Describe muscarinic antagonists, including their physical structure and their use in conjunction with cholinesterase inhibitors
- P6.7 Describe local anesthetics

**E.7 Explain the pharmacokinetics and pharmacodynamics of inhalational anesthetic agents**

- P7.1 Discuss inhalational anesthetic agents
  - P7.2 Discuss diffusion hypoxia, solubility, second gas effect, compartments of anesthesia, balanced anesthesia and interaction with CO<sub>2</sub> absorbents
  - P7.3 Describe the characteristics of inhalational anesthetics agents
  - P7.4 Describe the factors which alter the effects of inhaled anesthetic agents
  - P7.5 Explain the effects of inhalational agents on the pulmonary ventilation
  - P7.6 Explain the effects of inhalational agents on the cardiovascular system
-