



Promoting patient safety by enhancing provider quality.

NCE Exam Content Outline

For NCE exams administered PRIOR to 1/1/2018

- I. Basic Sciences (25%)
 - A. Anatomy, physiology and pathophysiology
 - 1. Cardiovascular
 - a. Dysrhythmias
 - b. Ischemic heart disease/ angina
 - c. Myocardial infarction
 - d. Hypertension
 - e. Congestive heart failure
 - f. Endocarditis
 - g. Valvular heart disease
 - h. Cardiomyopathy
 - i. Peripheral vascular disease
 - j. Congenital heart disease
 - k. Pericardial diseases
 - 2. Respiratory
 - a. Bronchitis
 - b. COPD/emphysema
 - c. Asthma
 - d. Pneumonia
 - e. Tuberculosis
 - f. Pulmonary embolism
 - g. COR pulmonale
 - h. Pulmonary hypertension
 - i. Upper respiratory tract infection
 - j. Acidosis
 - k. Adult respiratory distress syndrome
 - l. Epiglottitis
 - m. Sleep apnea
 - 3. Central nervous system
 - a. Seizures
 - b. CVA
 - c. Hydrocephalus
 - d. Parkinson's
 - e. Multiple sclerosis
 - f. Myasthenia gravis
 - g. Alzheimer's/dementia
 - h. Demyelinating disease
 - i. Intracranial hypertension
 - j. Intracranial tumor
 - k. Intracranial aneurysm
 - l. Autonomic hyperreflexia
 - m. Neuropathy/myopathy
 - n. Psychiatric disorders
 - o. Cerebral palsy
 - p. Spinal cord injury
 - 4. Musculoskeletal
 - a. Fractures
 - b. Rheumatoid arthritis

- c. Lupus erythematosus
 - d. Muscular dystrophy
 - e. Scoliosis
 - f. Malignant hyperthermia
5. Endocrine
- a. Diabetes mellitus
 - b. Diabetes insipidus
 - c. Hypo/hyperthyroidism
 - d. Cushing's disease
 - e. Addison's disease
 - f. Pituitary dysfunction
 - g. Parathyroid dysfunction
 - h. Pheochromocytoma
 - i. Acromegaly
 - j. Hypo/hyperaldosteronism
6. Hepatic
- a. Hepatitis
 - b. Cirrhosis
 - c. Hepatic failure
 - d. Porphyria
7. Renal
- a. Kidney stones
 - b. Acute renal failure
 - c. Chronic renal failure
 - d. Uremia
 - e. Nephritis
8. Hematologic
- a. Anemia
 - b. Sickle cell/hemoglobinopathies
 - c. Polycythemia
 - d. Platelet disorders
 - e. Hemophilia
 - f. Von Willebrand's disease
 - g. Disseminated intravascular coagulation
9. Gastrointestinal
- a. Peptic ulcer disease
 - b. Ulcerative colitis
 - c. Diaphragmatic hernia
 - d. Hiatal hernia
 - e. Gastroesophageal reflux disorder (GERD)
 - f. Gallstones/gall bladder disease
 - g. Pancreatitis
 - h. Carcinoid syndrome
 - i. Pyloric stenosis
 - j. Bowel obstruction
10. Immune
- a. Allergic responses and anaphylaxis
 - b. AIDS/HIV

- c. Immunosuppression
- d. Latex allergy
- e. Sepsis
- f. Angioedema
- 11. Other conditions
 - a. Abnormal lab tests
 - b. Cancer
 - c. Glaucoma
 - d. Thermoregulation
 - e. Trauma
 - f. Shock
 - g. Substance abuse (alcohol, tobacco, other)
 - h. Airway difficulties
 - i. Diagnostic data
 - (1) Chest X-ray
 - (2) Pulmonary function tests
 - (3) Echocardiogram
 - (4) Cardiac catheterization
 - (5) CAT/MRI
 - (6) Ultrasound
 - (7) Electrocardiogram
 - (8) Stress tests
 - j. Burns
- B. Pharmacology
 - 1. General principles
 - a. Pharmacodynamics
 - b. Pharmacokinetics
 - c. Anaphylaxis
 - d. Drug interactions
 - 2. Inhalation anesthetics
 - a. Nitrous oxide
 - b. Isoflurane
 - c. Desflurane
 - d. Sevoflurane
 - 3. Intravenous agents
 - a. Barbiturates
 - (1) Thiopental
 - (2) Methohexital
 - b. Opioid agonists
 - (1) Morphine
 - (2) Fentanyl
 - (3) Alfentanil
 - (4) Sufentanil
 - (5) Meperidine
 - (6) Remifentanil
 - (7) Hydromorphone
 - c. Opioid agonist-antagonists
 - (1) Nalbuphine

- (2) Butorphanol
- d. Benzodiazepenes
 - (1) Diazepam
 - (2) Midazolam
 - (3) Lorazepam
- e. Other sedative/hypnotics
 - (1) Propofol
 - (2) Ketamine
 - (3) Etomidate
- f. Dexmedetomidine
- 4. Local anesthetics
 - a. Procaine
 - b. Chloroprocaine
 - c. Tetracaine
 - d. Cocaine
 - e. Benzocaine
 - f. EMLA
 - g. Bupivacaine
 - h. Lidocaine
 - i. Mepivacaine
 - j. Ropivacaine
- 5. Muscle relaxants
 - a. Succinylcholine
 - b. Pancuronium
 - c. Vecuronium
 - d. Atracurium
 - e. Rocuronium
 - f. Cisatracurium
- 6. Antagonists
 - a. Edrophonium
 - b. Neostigmine
 - c. Naloxone
 - d. Flumazenil
 - e. Pyridostigmine
 - f. Physostigmine
- 7. Neuraxial analgesics
 - a. Opioids
 - b. Clonidine
- 8. Anticholinergics / Cholinergic agonists
- 9. Nonsteroidal Antiinflammatory Drugs
- 10. Miscellaneous oral analgesics
 - (1) Acetaminophen
 - (2) Codeine
 - (3) Oxycodone
 - (4) Hydrocodone
 - (5) Tramadol
- 11. Sympathomimetics
- 12. Digitalis and related drugs

13. Alpha and beta receptor antagonists
14. Antihypertensives
 - a. Sympatholytics
 - b. Clonidine
 - c. ACE inhibitors
 - d. Angiotensin II receptor inhibitors
 - e. Nitrovasodilators
 - f. Nitric oxide
15. Antidysrhythmics
16. Calcium channel blockers
17. Bronchodilators
18. Psychopharmacologic therapy
 - a. Selective serotonin reuptake inhibitors
 - b. Tricyclic antidepressants
 - c. MAO inhibitors
 - d. Lithium
19. Prostaglandins
20. Histamine receptor antagonists
21. Serotonin antagonists
22. Insulin
23. Oral hypoglycemics
24. Diuretics
25. Antacids
26. Gastrointestinal prokinetic medications
27. Anticoagulants
 - a. Heparin
 - b. Heparin reversal – protamine
 - c. Low molecular weight heparins
 - d. Oral anticoagulants
 - e. Oral anticoagulants reversal
 - f. Thrombolytics
 - g. Thrombin inhibitors

- 28. Antimicrobials
- 29. Chemotherapeutics
- 30. Antiepileptic drugs including gabapentin
- 31. Antiparkinsonian drugs
- 32. Drugs used to treat lipid disorders
- 33. Herbal remedies and dietary supplements
- 34. Minerals and electrolytes
- 35. Dantrolene
- 36. Corticosteroids
- 37. Tocolytics
- 38. Uterotonics
- C. Applied chemistry, biochemistry, physics
 - 1. Chemistry
 - a. Aqueous solutions and concentrations
 - b. Acids, bases, and salts
 - 2. Biochemistry
 - a. Hepatic metabolism
 - b. Cellular mechanisms for action
 - c. Drug receptor interaction
 - 3. Physics
 - a. Units of measurement
 - b. Gases and gas laws
 - c. Solubility, diffusion and osmosis
 - d. Pressure and fluid flow
 - e. Electricity and electrical safety
 - f. Vaporization and humidification
 - g. Measurement of oxygen, carbon dioxide and hydrogen ion
- II. Equipment, Instrumentation and Technology (15%)
 - A. Anesthetic delivery systems
 - 1. High/low pressure gas sources
 - 2. Regulators/manifolds
 - 3. Flowmeters, valves, floats
 - 4. Vaporizers
 - 5. Proportioning systems
 - 6. Pressure failure safety devices
 - 7. Fail-safe devices
 - 8. Ventilator
 - 9. Carbon dioxide absorbent
 - 10. Anesthetic circuits
 - a. Rebreathing, circle system
 - b. Non-rebreathing
 - c. Modified non-rebreathing
 - 11. Pneumatic and electronic alarm devices
 - B. Airway equipment
 - 1. Face masks
 - 2. Laryngoscope
 - a. Rigid
 - b. Flexible/fiberoptic

- c. Videoscope
 - 3. Endotracheal tube
 - 4. Endobronchial tube including double lumen tubes
 - 5. Airways
 - a. Oral
 - b. Nasal
 - 6. Tracheostomy tubes
 - 7. Laryngeal mask airway
 - 8. Intubating laryngeal mask airway
 - 9. Jet ventilation
 - 10. Lighted stylet
 - 11. Other
 - a. Retrograde wire
 - b. Eschmann catheter
 - c. Combitube
 - d. Cook exchange catheter
- C. Monitoring devices
 - 1. Central nervous system
 - a. Evoked potential
 - b. Intracranial pressure
 - c. Modified EEG monitor (BIS, PSArray)
 - d. Cerebral Oximetry
 - 2. Cardiovascular
 - a. Electrocardiogram
 - b. Arterial pressure monitoring
 - c. Noninvasive blood pressure monitoring
 - d. Central venous pressure monitoring
 - e. Pulmonary artery pressure monitoring/ SvO2
 - f. Cardiac output
 - g. Precordial/esophageal stethoscope/Doppler
 - 3. Pulmonary/airway monitoring
 - a. Capnography
 - b. Airway gas analysis
 - c. Pulse oximetry
 - d. Airway pressure
 - e. Blood gas analysis
 - 4. Peripheral nerve stimulator
 - 5. Urinary output monitoring
 - 6. Temperature monitoring
 - 7. Maternal/fetal monitoring
 - 8. Others
 - a. Fluid/blood warmers
 - b. Forced air warming blanket
 - c. Heat and moisture exchanger (HME)
 - d. Blood salvage (cell saver)

III. Basic Principles of Anesthesia (30%)

- A. Preoperative assessment and preparation of patient
- B. Fluid/blood replacement

1. Fluid therapy (crystalloids and colloids)
2. Hemotherapy (blood component therapy)
- C. Positioning (Technique, Physiologic alterations, Complications)
 1. Prone
 2. Supine
 3. Lithotomy
 4. Lateral
 5. Sitting
 6. Beach chair
 7. Trendelenburg
 8. Reverse Trendelenburg
- D. Interpretation of data
 1. Lab tests
 2. Diagnostic data
 3. Intraoperative monitoring data
- E. Airway management, including difficult airway
 1. Mask
 2. Cricothyrotomy
 3. Fiberoptics
 4. Intubation
 5. Supralaryngeal management
- F. Local/regional anesthetics (Technique, Physiologic alterations, Complications)
 1. Infiltration
 2. Topical
 3. Regional blocks
 - a. Subarachnoid block
 - b. Epidural block
 - c. Combined spinal/epidural
 - d. Caudal block
 - e. Brachial plexus block
 - f. Airway blocks
 - g. IV regional (Bier) block
 - h. Retrobulbar/peribulbar block
 - i. Ankle block
 - j. Digital block
 - k. Wrist block
 - l. Sciatic block
 - m. Femoral block
 - n. Popliteal block
 4. Ultrasound guided nerve block
 5. Nerve stimulator guided nerve block
- G. Monitored anesthesia care/conscious sedation
- H. Pain management
 1. Epidural analgesia
 2. Infiltration nerve blocks
 3. Intrathecal narcotics
 4. PCA management
- I. Other techniques

1. Hypotensive
2. Hypothermia
- J. Postanesthesia care/respiratory therapy
- K. Pain Theory (Anatomy, physiology, and pathophysiology)
- IV. Advanced Principles of Anesthesia (30%)
 - A. Surgical procedures & procedures related to organ systems
 1. Intra-abdominal
 - a. Gall bladder
 - b. Liver
 - c. Pancreas
 - d. Spleen
 - e. Stomach
 - f. Renal
 - g. Diaphragm
 - h. Intestine
 - i. Herniorrhaphy
 - j. Bladder
 - k. Abdominal/gyn
 - l. Prostatectomy
 - m. Laparoscopy
 - n. Bariatrics
 2. Extrathoracic
 - a. Breast biopsy
 - b. Mastectomy
 - c. Plastic and/or reconstructive
 3. Extremities
 - a. Lower
 - b. Upper
 - c. Total joint replacements
 - d. Vein stripping
 4. Genital and urologic
 - a. Transurethral resection
 - b. Cystoscopy
 - c. Dilatation and curettage
 - d. Hysterectomy
 - e. Hysteroscopy
 - f. Anal/rectal
 - g. Penis/testes
 5. Head
 - a. Extracranial
 - (1) Cranioplasty
 - (2) Rhizotomy
 - (3) Ear
 - (4) Eye
 - (5) Face
 - (6) Nose
 - b. Intracranial
 - (1) Decompression (burr holes)

- (2) Space-occupying lesion
- (3) Vascular
- (4) Transsphenoidal hypophysectomy
- (5) Stereotatic procedures
- c. Oropharyngeal
 - (1) Fractures
 - (2) Reconstructive
 - (3) Orthodontic/dental
 - (4) Pharynx
 - (5) Reconstructive and/or plastic surgery
- 6. Intrathoracic
 - a. Diaphragm
 - b. Esophagus
 - c. Heart
 - d. Lung
 - e. Mediastinoscopy
 - f. Thoracoscopy
- 7. Neck
 - a. Cervical spine (anterior and posterior approach)
 - b. Larynx/trachea
 - c. Lymph node biopsies
 - d. Parathyroid/thyroid
 - e. Neck tumors
 - f. Radical neck
 - g. Rigid laryngoscopy
 - h. Tracheotomy
 - i. T&A
- 8. Neuroskeletal
 - a. Laminectomy
 - b. Fusions
 - c. Spinal cord procedures
 - d. Surgical sympathectomy
 - e. Vertebroplasty
- 9. Vascular
 - a. Carotid
 - b. Thoracic
 - c. Abdominal
 - d. Upper extremity
 - e. Lower extremity
 - f. Porto-systemic shunts
 - g. Renal artery
 - h. Vena cava filter
 - i. Endovascular procedures
- 10. Diagnostic/therapeutic
 - a. Venous/arterial catheterization
 - b. Cardioversion
 - c. CAT scan
 - d. MRI

- e. Electroconvulsive therapy
- f. Interventional radiology
- g. Electrophysiology
- h. Steroid therapy
- i. Radiation therapy
- j. Endoscopy
- k. Bronchoscopy
- l. Esophagoscopy/gastroscopy
- 11. Management of other complications
 - a. Anesthetic
 - b. Surgical
- 12. Other surgical procedures
 - a. Trauma
 - b. Burns
 - c. Resuscitation
 - d. Pacemakers
 - e. Lithotripsy
 - f. Organ transplants
 - g. Organ harvest
 - (1) Living donor
 - (2) Cadaver
 - h. Laser
- B. Pediatrics
 - 1. Anatomy, physiology, and pathophysiology
 - a. Normal
 - b. Prematurity
 - c. Congenital anomalies
 - 2. Pharmacology
 - 3. Anesthesia techniques/procedures
 - 4. Management of complications
- C. Obstetrics
 - 1. Anatomy, physiology, and pathophysiology
 - 2. Pharmacology
 - 3. Anesthesia techniques/procedures
 - a. Caesarean section
 - b. Vaginal delivery
 - c. Labor epidurals
 - d. Intrathecal
 - e. Postpartum tubal ligation
 - f. Vaginal birth after caesarean section
 - g. High risk
 - h. Non-obstetric surgery in the parturient
 - 4. Management of complications
- D. Geriatrics
 - 1. Anatomy, physiology, and pathophysiology
 - 2. Pharmacology
 - 3. Anesthesia techniques/procedures
 - 4. Management of complications

E. Obesity

1. Anatomy, physiology, and pathophysiology
2. Pharmacology
3. Anesthesia techniques/procedures
4. Management of complications

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