

# **ANAESTHESIOLOGY, PAIN AND INTENSIVE CARE MEDICINE**

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*SYLLABUS TO THE POSTGRADUATE TRAINING PROGRAM*

*FROM THE STANDING COMMITTEE ON EDUCATION AND TRAINING OF THE  
SECTION AND BOARD OF ANAESTHESIOLOGY*

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## *Domains and Competencies: a reminder*

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In the new UEMS/EBA postgraduate training program, a list of domains of expertise and competencies in these domains has been identified.

These domains of expertise can be divided into **“Domains of general core competencies”** and **“Domains of specific core competencies”** (see detailed list below). Throughout the course of their training, residents will progressively achieve the required level of competence **in every domain**.

As a reminder, the total training time of a specialist lasts a minimum of 5 years in the light of the broadened competences required nowadays, of which at least 1 year can be specifically directed to Intensive Care Medicine training.

### **10 domains of general core competencies**

- 1.1 Disease Management, Patient Assessment and Preparation
- 1.2 Intraoperative patient care and Anaesthetic techniques
- 1.3 Postoperative patient care and Acute pain management
- 1.4 Emergency medicine: management of critical conditions including trauma and initial burn management
- 1.5 Medical and perioperative care of critically ill patients / General Intensive Care
- 1.6 Practical anaesthetic procedures / Invasive and Imaging techniques / Regional blocks
- 1.7 Quality - Management - Health economics
- 1.8 Anaesthesia Non-Technical Skills (ANTS)
- 1.9 Professionalism and Ethics
- 1.10 Education, self-directed learning, research

### **7 domains of specific core competencies**

- 2.1. Obstetric Anaesthesiology
- 2.2. Airway Management and Surgery
- 2.3. Thoracic and Cardiovascular Anaesthesiology
- 2.4. Neuroanaesthesiology
- 2.5. Paediatric Anaesthesiology
- 2.6. Anaesthesiology in remote locations / Ambulatory Anaesthesiology
- 2.7. Multidisciplinary Pain management

Both general and specific core competencies in each domain have been expressed in the form of a list of **“competence statements”**.

The level of acquisition/expertise for each competence defined in each domain ranges from “A” to “D”:

- **A:** Has knowledge of, describes...
- **B:** Performs, manages, demonstrates under supervision
- **C:** Performs, manages, demonstrates independently
- **D:** Teaches or supervises others in performing, managing, demonstrating.

For each domain of expertise, a detailed list of “**learning objectives**” has been identified, that constitute the present syllabus.

These learning objectives have been broken down into “**Knowledge, Skills and Attitudes**” that are deemed necessary to achieve the required level of competencies in each domain.

The “learning objectives” are realistic endpoints that should be attained by the end of the anaesthesia residency period. They are built upon previous knowledge, skills and attitudes acquired during the undergraduate education in medicine, that are required to hold a diploma/master degree in human medicine.

The “learning objectives” also represent measurable endpoints that should serve as a basis for the development of future evaluation modalities in order to objectively and reliably measure the acquisition of competencies throughout the curriculum.

## ***Part 1: General Core Competencies, Learning objectives***

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### ***Domain 1.1: Disease Management, Patient Assessment and Preoperative Preparation***

#### **a. Knowledge**

- Anatomy, physiology, physiopathology of following organs systems
  - Airway
  - Respiratory
  - Cardiovascular
  - Nervous and muscular
  - Urinary/excretory
  - Endocrine
  - Digestive
  
- Knowledge and experience of the aetiology, natural history, diagnosis, treatment and complications of:
  - Respiratory
    - Obstructive lung disease (COPD and asthma)
    - Respiratory infection like pneumonia, tuberculosis
    - Restrictive lung disease
    - Malignancies
    - Pulmonary hypertension (primary and secondary)
    - Acute respiratory failure (see ICU domain)
  - Cardiovascular:
    - Congestive heart failure
    - Coronary artery disease
    - Hypertension
    - Arrhythmias
    - Valvular heart disease and cardiac shunt
    - Cardiomyopathies
    - Thromboembolic disease and acquired coagulation disorders
  - Nervous and muscular
    - Cerebrovascular diseases
      - TIA, carotid artery disease, stroke
    - Intracranial tumour and raised IC pressure
    - Chronic spinal cord transection
    - Muscular and myotonic dystrophy
    - Myasthenia Gravis, myasthenic syndrome
    - Epilepsy
  - Urinary/excretory
    - Renal failure and common causes
    - Disorder of acid-base balance
    - Electrolyte disorders
  - Digestive
    - Oesophageal disease ( reflux, hiatus hernia)
    - Gastric disease ( peptic ulcer disease)
    - Carcinoid tumours
    - Disease of liver
      - Acute hepatitis (toxic, infectious) and chronic hepatitis

- Cirrhosis and complications
- Endocrine
  - Diabetes mellitus and complications (hyperglycaemia, hypoglycaemia, ketoacidosis)
  - Obesity
  - Thyroid gland dysfunction (hyperthyroidism, hypothyroidism)
  - Parathyroid gland dysfunction
  - Adrenal gland dysfunction
    - Hypoadrenocorticism
    - Pheochromocytoma
  - Diabetes insipidus
  - Thermoregulation
- Understanding disease processes, natural evolution and knowing the influence on the management of perioperative period
- Knowledge of the effects of anaesthetic agents on physiology of major systems such as cardiac, respiratory, neurologic
- Treatment of above-mentioned diseases, in order to optimize patients before anaesthesia and surgery in cooperation with other physicians
- Pharmacology and interactions of perioperative drugs
- Fasting guidelines
- Airway assessment including bedside tests to assess difficult ventilation and intubation
- Other medical history (personal and family history of previous anaesthesia, allergy, drug abuse, habits)
- The transplant patient undergoing general surgery
- The elderly comorbid patient, with declining organ function and decreased physiologic reserve, undergoing general surgery

### **b. Clinical skills**

- Patient assessment based on history and physical examination, use of appropriate examinations and laboratory tests
- Evaluation of the preoperative ASA physical status
- Specific consideration in airway management (c.f. domain airway)
- Interpretation, considering the value and limitation of:
  - Electrocardiogram, and other methods assessing cardiovascular function (echocardiography, ergometry myocardial scintigraphy, coronography)
  - Pulmonary function test and arterial blood gas analysis
  - Common radiological testing with special emphasis on chest X-ray
  - Coagulation
  - Liver and renal function test
  - Endocrine function
  - Drug monitoring
- Selection and planning of the anaesthesia technique, including monitoring and other equipments required for the procedure
- Decision-making relating to postponement or cancellation of surgery
- Accurate preoperative record keeping

### **c. Specific attitudes**

- Effectively communicate with patients, let patients know of risks and benefits of various techniques used, and treat patients with respect and courtesy in answering all questions and concerns they may have

- Establishing effective interaction with patients and their relatives
- Develop strategies to provide informed consent and disclosure of risk (information leaflets, multimedia)
- Discuss alternatives with the patient, the surgeons and other team colleagues

## **Domain 1.2: Intraoperative patient care and Anaesthetic techniques**

### **a. Knowledge**

- Physics and clinical measurement (Behaviour of fluids (gases and liquids); flow of fluids; measurement of volumes, flows, and pressures; measurement of temperature; humidification; oximetry; analysis of gases; capnography; electrical safety; fires and explosions)
- Equipment and apparatus (Equipment design and standards; gas supply; anaesthesia delivery system, including pressure valves and regulator; vaporizer; breathing system; devices to maintain the airway such as laryngoscopes, endotracheal tubes, tracheotomy tubes, face masks, airway devices; information systems)
- Minimum monitoring standards, and additional monitoring when appropriate (including central venous pressure, invasive arterial pressure, cardiac output monitoring, cerebral function, coagulation, blood gas analyses, urinary output)
- Planning and physical layout of operating rooms and post-anaesthesia recovery room; lighting; safety; infection and pollution control in operating rooms; sharps policies
- Principles of safety such as lifting and positioning patients
- Conduct of anaesthesia:
  - Management of the airway and intraoperative complications
  - Applied cardiac and respiratory physiology
  - Routine inhalation and intravenous inductions; maintenance of anaesthesia
  - Application of mechanical ventilation
  - Correct use of anaesthesia delivery systems
  - Applied pharmacology and variability in drug response
  - Correct use of muscle relaxants, neuromuscular blockade monitoring
  - Application and interpretation of monitored variables
  - Fluid management, including blood replacement therapy
  - Common regional anaesthesia techniques (epidural and spinal anaesthesia and upper/lower limb blocks)
  - Maintenance of accurate records

### **b. Skills**

#### ***Technical skills:***

- Rapid sequence induction
- Maintenance of an adequate airway
- Advanced Life Support
- Aseptic techniques
- Peripheral and central venous access for volume resuscitation, arterial catheterization and arterial blood gas collection
- ECG recording and interpretation
- Lumbar puncture, thoracic and lumbar epidural, and spinal anaesthesia
- Blood salvage and conservation

***Clinical and case management skills:***

Trainees are expected to identify and manage the co-existing medical conditions relevant to anaesthesia, which have already been stated under basic knowledge in Domain 1.1.

These include disorders of the airway and respiratory system, of the cardiovascular system, of the nervous system, renal disorders along with water, electrolyte and acid-base disturbances, haematological disorders including coagulopathies, disorders of the liver, biliary tract and gastrointestinal system, endocrine disorders such as phaeochromocytoma, hyperthyroidism, hypothyroidism, diabetes mellitus and obesity; finally skin and musculoskeletal disorders, including rheumatoid arthritis and ankylosing spondylitis, psychiatric disorders and substance abuse, ageing.

Trainees are further expected to identify and manage the following major intraoperative problems:

- Inadequate airway: obstructed airway, failed intubation, oesophageal intubation, endobronchial intubation, and unplanned extubation
- Laryngospasm and bronchospasm
- Gas embolism, Pulmonary aspiration, and pneumothorax
- Hypoxia, hypocarbia, hypercarbia, hypoventilation, hyperventilation, and high ventilator peak inspiratory pressures
- Hypertension, hypotension, arrhythmias, myocardial ischemia
- Oliguria and anuria
- Hypothermia, Hyperthermia, and Malignant hyperthermia
- Anaphylaxis
- Residual neuromuscular blockade (or regional anaesthesia)
- Inadequate neuraxial blockade
- Intraoperative awareness
- Seizures

**c. Specific attitudes**

- Effective communication: with other members of the operating room and with patients;
- Team work: working together with other health care professionals to ensure smooth patient care and safety.
- Vigilance and situational awareness

**Domain 1.3: Postoperative patient care and Acute pain management****a. Knowledge**

- Transport to PACU (Post Anaesthesia Care Unit) or ICU:
  - a) Positioning/Transportation of the patient
  - b) Oxygenation (diffusion hypoxia, etc.)
  - c) Monitoring and care of venous and arterial lines, care of drains
  - d) Standard PACU monitoring: Blood pressure- pulse-respiratory rate-temperature-pulse oxymeter-ECG- VAS; as well as other non invasive and invasive modalities
- PACU scoring systems for care and discharge (Alderete Score, etc...)
- Airway:
  - a) Extubation- criteria for postoperative extubation



- b) Maintenance of patent oral and nasal airway
- c) Airway complications: stridor/laryngospasm, airway obstruction
- Breathing:
  - a) Postoperative respiratory physiology
  - b) Residual muscular block
  - c) Postoperative respiratory depression
  - d) Modes of ventilation and weaning from ventilator in the postoperative period when required
  - e) Respiratory complications: hypoxia, hypercarbia, bronchospasm; atelectasis; aspiration pneumonia; pulmonary oedema, pneumothorax.
- Circulation:
  - a) Fluid and electrolyte management
  - b) Arrhythmias
  - c) Postoperative ischemia
  - d) Hemodynamic complications: shock of different aetiologies, sepsis, hypertension
  - e) Resuscitation, transfusion and coagulation disorders
  - f) Oliguria and renal failure
- Postoperative pain treatment
  - a) Pre-emptive multimodal analgesia
  - b) Pain assessment: VAPS (Visual Analogue Pain Scale)
  - c) Pharmacology of opioids, NSAIDs (Non Steroidal Anti-Inflammatory Drugs), local anaesthetics, alpha-2 agonists
  - d) PCA (Patient Controlled Analgesia), advantages of one pain relief delivery system over another, of specific doses, rates and details of these delivery systems
  - e) Regional anaesthesia and analgesia in pain management
  - f) Paediatric postoperative pain treatment
  - g) Knowledge of side-effects and complications of regional techniques (PDPH, nerve damage)
- Postoperative Nausea and Vomiting (PONV)
  - a) Physiology
  - b) Management (Pharmacology- and treatment)
- Haemorrhage (Postoperative bleeding)
- Postoperative confusion and altered mental states
- TURP syndrome
- Nerve and muscular damage through malpositioning

## **b. Skills**

### ***Technical skills:***

- Basic vascular access
- Basic airway management
- BLS, ALS
- Management of arrhythmias and DC
- Regional anaesthesia techniques: neuraxial and peripheral nerve blocks

### ***Clinical and case management skills:***

Trainees are expected to understand relevant principles, apply knowledge in practice and to demonstrate clinical skills and case management in the following areas:

- Indications and interpretation of common laboratory and radiological exams, performed in the context of postoperative recovery and care

- Manage common and life threatening adverse reactions to medications used during anaesthesia and to treat acute pain
- Management of PDPH (post-dural puncture headache), including the indications for, and side effects of, an epidural blood patch
- Specific management of transplant patients or elderly patients, with regards to decreased or altered physiological reserve, declining organ function and presence of chronic disease states

### **c. Specific Attitudes**

- Demonstrate knowledge of the policies to safely and effectively treat postoperative pain, monitor its efficacy and promote safety within a multidisciplinary team
- Demonstrate responsibility for the Acute Pain Service and management of patients in a timely and professional manner; follow up on patients who experienced complications and/or side effects in PACU

## ***Domain 1.4: Emergency medicine: management of critical conditions including trauma and initial burn management***

### **a. Knowledge**

- Epidemiology, diagnosis and treatment of pre and in-hospital critical medical emergencies
- Epidemiology, diagnosis and treatment of trauma patients
- Diagnostic/therapeutic principles in emergency medicine
- Algorithms in BLS, ALS, ATLS and PALS
- Rapid Response Systems principles and rules
- Pain therapy for emergency
- Basic and advanced treatment of acute poisonings and intoxications
- Basic and advanced treatment of burns, including advanced medications
- Pre and inter-hospital transport
- Helicopter rescue
- Mass accidents and disasters, including terrorist related mass disasters with biological and chemical victims
- Basic and advanced hyperbaric treatment (according to the necessity of each country)
- Coordination of an emergency department, a burn centre, an anti-poisoning centre, a pre-hospital emergency system including a helicopter base, wherever applicable
- Satisfactory knowledge of the methodology of a global approach to health care complex problems

### **b. Skills**

#### ***Technical skills:***

- Basic and advanced cardiopulmonary resuscitation in adults, children, and neonates: BLS, ALS, ATLS, PALS
- Ability to safely perform invasive procedures in emergency such as: central vascular access, intraosseous access, arterial access, cardiac pacing, pleural drainage, spinal stabilizations; when necessary and under supervision: pericardiocentesis, paracentesis

### ***Clinical and case management skills:***

- Diagnosis and treatment of critical medical emergency pathologies, including endocrinological, gastroenterological, haematological, infectious and oncological emergencies
  - Neurological: coma, stroke, epilepsy
  - Cardiovascular: myocardial infarction, fatal arrhythmias, hypertensive emergencies, cardiogenic shock, hypovolaemic, hemorrhagic, and septic shock
  - Respiratory: acute respiratory failure, asthma and COPD, pulmonary embolism, pulmonary oedema, pneumothorax
  - Gastrointestinal: gastrointestinal bleeding, acute hepatic failure, acute pancreatitis
  - Renal: acute renal failure
  - Metabolic: diabetic ketoacidosis, hypoglycaemia, hypercalcaemia, acid-base alterations
- Intoxications
  - Poisonings with alcohol, salicylates, paracetamol, antidepressants, opioids, benzodiazepines, carbon monoxide
  - Implication of addiction, dependence and withdrawal
  - Allergic reactions
- Basic and advanced airway management in emergency setting
- Basic and advanced monitoring in emergency setting
- Basic and advanced management of trauma patients (blunt or penetrating according to ATLS list of life threatening injuries): Head and spine injury, maxilla-facial trauma, chest trauma, abdominal and pelvic trauma, muscular and skeletal trauma, kinematics of trauma
- Triage
- Basic and advanced management of burns
- Basic and advanced management of poisoning

### **c. Specific attitudes**

- Communication and cooperation with other professionals in the field of emergency medicine, including paramedics, advanced acute care nurses, police and fire brigades; other fellow professionals from different specialties
- Support in the development and science of emergency medicine

## ***Domain 1.5: Medical and Perioperative Care of the Critically ill / General Intensive Care***

### **a. Knowledge**

- Organization of Intensive Care Units and ICU standards including:
  - Evaluating and taking into consideration the difficulty and complexity of the tasks in relation to resources, qualifications, as well as local organization.
  - Identifying patients with need for treatment beyond local competencies according to national organization and take initiative to organize transport for these patients
  - Coordinating the multidisciplinary approach of patients and providing cooperation with all relevant partners, with proper respect for their medical competences and roles in specific situations.
  - Contribute to the holistic vision of a homogeneous team interacting both with patients and peers, and providing consensual information.
  - Medical auditing in intensive care
- General principles of ICU management:

- Airway management and respiratory support including non-invasive techniques
- Hemodynamic management including advanced cardiovascular monitoring and inotropic and vasoactive therapy
- Fluid and electrolyte support including relevant aspects of blood product transfusion
- Renal replacement therapy
- Neurological management
- Enteral and parenteral nutritional support
- Infectious diseases and antibiotic therapy; antiviral therapy; rules for hospital hygiene
- Prevention of complications such as thromboembolism, ventilator associated injuries, stress ulceration, renal failure and nosocomial infection
- Transportation
- Sedation and pain management including treatment of delirium and anxiety of the critically ill patient using both pharmacologic and non-pharmacologic means
- Appropriate knowledge and use of use scoring systems (APACHE; SAPS; TISS; NEMS)
- Aetiology, pathophysiology, diagnosis and treatment plans according to international standards of specific critical conditions:
  - Acute circulatory failure
    - Shock
    - Cardio-respiratory arrest
    - Cardiac arrhythmias
    - Ischemic heart disease
    - Cardiomyopathy
    - Valvular heart disease including endocarditis
    - Pulmonary embolism
    - Anaphylaxis
  - Respiratory failure
    - ALI / ARDS
    - Pulmonary oedema
    - Airway obstruction and stenosis
    - Pneumothorax
    - Aspiration
    - Pneumonia
    - COLD/COPD and Asthma
  - Renal failure
    - Chronic and acute (RIFLE)
  - Gastrointestinal failure
    - Bleeding
    - Ileus
    - Peritonitis of various aetiologies (including colitis and intestinal ischemic disease)
    - Pancreatitis
    - Liver failure
    - Digestive fistulas
  - Neurological failure
    - Delirium and Coma
    - Cerebrovascular and bleeding diseases
    - Cerebral oedema
    - Increased intracranial pressure including monitoring

- Brain stem death
- Seizures
- Guillain Barré syndrome and Myasthenia gravis
- Trauma
  - Head/Face injury and spine injury
  - Airway and chest injuries
  - Aortic injuries
  - Abdominal trauma
  - Pelvic and long bone injuries
  - Massive transfusion
  - Burns and electrocution
  - Near-drowning
  - Hyper- and hypothermia
- Inflammatory diseases
  - SIRS/MODS
- Infectious diseases
  - Sepsis including sepsis bundle strategy
  - Severe community acquired infections (e.g. meningitis)
  - Severe nosocomial infections (e.g. MRSA)
  - Fungal infections
- Endocrine and metabolic disorders
  - Diabetes mellitus and insipidus
  - Addison's disease, Cushing and Conn syndrome
  - Thyroid disorders
  - Pheochromocytoma
  - Malnutrition
  - Carcinoid
- Coagulation disorders
  - DIC
  - Transfusion reaction
- Obstetric complications
  - HELLP syndrome, Pre-eclampsia, Eclampsia
  - Septic abortion
  - Amniotic fluid embolism
- Intoxications
- Organ donor and the transplanted patient

## **b. Skills**

### ***Technical skills:***

- Respiratory
  - Intubation under emergency situations
  - Bronchoscopy (including lavage and sampling)
  - Percutaneous tracheostomy
  - Pleural drainage
  - Ventilation in prone position
- Cardiovascular
  - Basic and advanced life support

- Central vascular access (including for haemodialysis)
- Arterial access
- PA catheterization (Swan-Ganz)
- Basic ultrasound techniques for:
  - Ultrasound-guided central venous line placement;
  - Recognition of severely abnormal ventricular function (right or left ventricle; hypo- or hyperkinesia);
  - Measurement of inferior vena cava diameter;
  - Recognition of large pericardial, pleural, or abdominal effusion;
  - Recognition of urinary retention (distended bladder).

***Clinical and case management skills:***

Trainees are expected to understand relevant principles, apply knowledge in practice and to demonstrate clinical skills and management in the following areas grouped by organ systems:

- General
  - Proper and clear documentation including list of differential diagnosis and priorities
  - Transportation both inter and intra-hospital of the critically ill patients
- Cardiovascular
  - Basic and advanced life support including resuscitation decisions and appropriate fluid-strategy
  - Use of vasoactive/catecholamine drugs and agents
  - Management of arrhythmias including pacemaker and cardioversion
  - Application of advanced hemodynamic monitoring (i.e. pulmonary artery catheter, less invasive monitoring such as ultrasound techniques)
  - Prevention of thromboembolism
- Respiratory
  - CPAP
  - Mechanical ventilation including NIV (Modes of mechanical ventilation, indications, contraindications, protective strategy etc)
  - Blood gas analysis
  - Prevention of lung injuries associated with mechanical ventilation
  - Prevention of aspiration
- Renal
  - Application of renal replacement therapy
  - Prevention of renal function deterioration
  - Drug-administration in according to renal function
- Neurological
  - Maintenance of cerebral perfusion
  - Management of the unconscious patient
  - Management of brain stem death
  - Management of organ donation
  - Management of critically ill polyneuropathy
- Gastrointestinal
  - Nutritional support
  - Prevention of stress ulceration
  - Management of gastroparesis, paralytic ileus, diarrhoea, constipation both pharmacologic and non-pharmacologic.
- Trauma

- Systematic priority-based approach to severe trauma
- Control of bleeding and management of complications
- Endocrinology
  - Management of critical illness-induced hyperglycaemia
  - Management of over- and under-activity of thyroid
  - Management of adrenal and pituitary disorders and sepsis-induced relative adrenal insufficiency

### **c. Specific attitudes**

- Establishing effective communication and interaction with ICU colleagues and other specialists
- Establishing effective communication and interaction with ICU patients and their relatives.
- Recognizing psychological issues relevant to ICU patients and their relatives.
- Strategies to provide informed consent and disclosure of risk when consulting with ICU patients and their relatives.

## ***Domain 1.6: Practical anaesthetic procedures / Invasive and Imaging techniques / Regional blocks***

### **a. Knowledge**

- Airway: anatomy:
  - Identification of the potential difficult airway (scores)
  - Algorithm for the difficult airway
  - Protocols for safe intubation and extubation
- Vascular access:
  - Anatomy,
  - Indications and contraindications,
  - Choice of techniques,
  - Risks and complications
- General anaesthesia:
  - Pharmacology of anaesthetics
  - Physiological changes following anaesthesia
  - Indications and contraindications
  - Choice of different techniques
  - Risks and complications
- Peripheral and central blocks: concerns spinal epidural caudal, paravertebral, plexus and single nerve blocks
  - Basic anatomy
  - Indications and contraindications of peripheral and central blocks, choice of techniques
  - Risks and complications
  - Recognition of systemic local anaesthetic toxicity, treatment and resuscitation measures
  - Use of regional blocks in pain management
- Appropriate use of invasive monitoring and intraoperative echocardiography and interpretation of data obtained

## **b. Skills**

- Airway management (Face mask, laryngoscope and different blades, LMA and other supraglottic airways, endotracheal tubes, double lumen tubes, fibrotic intubation):
  - Routine airway management
  - Drills in the algorithm for the difficult mask ventilation
  - The rapid sequence induction
  - Drills in the handling of the difficult airway (including fibrotic intubation asleep and awake)
  - Drills in cricothyroidotomy and jet ventilation
- Insertion of arterial and central venous lines, pulmonary artery catheter insertion and interpretation
- General anaesthesia:
  - Conscious sedation
  - Inhalational induction of anaesthesia
  - Resuscitative techniques (BLS, ALS, ATLS, PALS)
- Check and operate following monitoring and technical devices: gas supply, anaesthesia delivery systems, vaporizers, breathing systems, anaesthetic ventilator machines, infusion pumps/rapid infusion devices, CNS monitoring, warming devices, blood salvaging devices, EEG and anaesthesia depth monitors
- Performs following regional anaesthetic techniques:
  - Patient positioning, according to surgical procedures, in the pregnant patient as well as in specific pathological conditions (e.g., rheumatic patient)
  - Peripheral blocks of the upper extremity (single shot and catheter techniques), Including intravenous, axillary and interscalene blocks
  - Peripheral blocks of the lower extremity (single shot and catheter techniques) including intravenous, femoral, obturator
  - Common central neuraxial blocks such as spinal, epidural (thoracic/lumbar) and combined spinal/epidural
- Placement and insertion of chest drains

## **c. Specific attitudes**

- Safe delivery of perioperative anaesthesia care, being aware of one's own limits when performing procedures, anticipates problems and can act accordingly, including calling for help early
- Complies with national and European minimum standards of monitoring
- Has knowledge and uses protocols developed by the European and National specialist bodies

## **Domain 1.7: Quality, Safety, Management and Health economics**

### **a. Knowledge**

- Standards of quality and safety, and recommendations of the National, European and International bodies:
  - Definitions, magnitude of the problem, epidemiology
  - Fundamentals
    - Error-model, system failure
    - The so called Swiss cheese model by James Reason or nowadays the threat and error model
    - Human limitations



- Stress, fatigue, decision making, fixation errors, prospective memory
  - The role of the teams, hierarchy
  - Safety culture, principles of High Reliability Organizations (HROs), the five common principles of HROs:
    - Preoccupation with failure
    - Reluctance to simplify interpretation
    - Sensitivity to operations
    - Commitment to resilience
    - Deference to expertise
- Tools for quality assurance (local and national critical incident monitoring and reporting systems, errors recognition and management, etc...):
  - Analyzing the problem:
    - Reporting systems,
    - Different methods of event-analysis,
    - Root-cause analysis,
    - London-protocol
  - Tackling the problem:
    - Main topics in safety problems,
    - Medication error (prescribing: wrong drug, wrong site, wrong dose),
    - Wrong side/site procedures,
    - Hospital acquired infections,
    - Patient-handover
    - Open disclosure communication
- Governmental regulations relevant for anaesthesia practice
- Economic aspects:
  - Demographic data and resource utilization data relevant for anaesthesia practice
  - Basic knowledge on financial aspects of anaesthesia practice
  - Basic knowledge on organizational and budgeting aspects of anaesthesia practice (Principles of business management)

### **b. Skills**

- Understands and applies standards of quality, security and recommendations in daily practice
- Understands the importance and uses checklists and follows guidelines
- Supports and provides data for both local and national data systems
- Applies standards of quality and safety with respect to organizational aspects (time management strategies, etc...)
- Applies organizational knowledge to provide a cost-effective organization

### **c. Specific Attitudes**

- Demonstrates awareness for critical incidents and reports them
- Demonstrates favourable attitudes towards patient safety

## **Domain 1.8: Anaesthesia Non-Technical Skills (ANTS)**

### **a. Knowledge**

- Psychological aspects of team performance for successful task performance
- Crisis resource management
- Human error research, relevant for the perioperative setting

- Behavioural marker systems, relevant for successful training

### **b. Skills** (Aberdeen)

- Task management
  - Planning and preparing
  - Prioritizing
  - Providing and maintaining standards
  - Identifying and utilizing resources
- Team working
  - Coordinating activities with team members
  - Exchanging information
  - Using authority and assertiveness
  - Assessing capabilities
  - Supporting others
- Situation Awareness
  - Gathering information
  - Recognizing and understanding
  - Anticipating
- Decision making
  - Identifying options
  - Balancing risks and selecting options
  - Re-evaluating
- Leadership
  - To work as a team member but to assume responsibilities and to delegate duties as a team leader when necessary

## **Domain 1.9: Professionalism and Ethics**

### **a. Knowledge**

#### ***Professional Attributes:***

- Principles of medical ethics : autonomy, beneficence, non-maleficence, and justice
- The Geneva Declaration and Helsinki protocol
- Legal principles and medicolegal obligations defining medical practice and the use of patient data
- Principles of communication with patients and physician-patient “contract” including:
  - Rights and responsibilities of patient, doctors and other medical staff
  - Informed consent
  - Patient confidentiality and privacy
  - Error and incidents disclosure
- Principles of communication with colleagues including:
  - Methods (verbal, written, consultation or referral)
  - Manner (courtesy, integrity, respect)
  - Adequate record keeping (including medicolegal implications)
- Personal issues including:
  - Balancing family and work, and the importance of non-professional activities
  - Depression; recognition and care plans
  - Substance abuse; recognition and access to appropriate referral
  - Mentoring and teaching

- Leadership responsibilities and styles; team behaviours
- Stress and crisis management
- Principles underpinning conflict resolution
- Use and influence of role model

## **b. Skills**

### ***Clinical and case management skills:***

Trainees are expected to integrate and demonstrate the application of the above knowledge and attributes to their clinical practice by:

- Applying principles of medical ethics to problem solving; for example in the following areas: end-of-life and palliative care; withholding and withdrawing treatment; Jehovah's witnesses; NTBR order; patient unable to display judgment; minor patient.
- Effective communication with patients and their relatives; for example, breaking bad news, error and incident disclosure, diagnosing and explaining brain death, requesting organ donation.
- Effective communication with colleagues and other actors of the multidisciplinary team through appropriate handover, patient referral, consultation request or assistance.
- Appropriate behaviours and communications in the case of tensions and conflicts arising among members of the multidisciplinary team.
- Displaying optimal maintenance of anaesthesia and other medical records.

## **c. Specific Attitudes**

### ***Specialist practice***

- Trainees are expected to develop and attain attributes in the 4 roles a specialist in anaesthesiology: Medical expert; Leader; Scholar; Professional
- To work as a team member but to assume responsibilities and to delegate duties as a team leader when necessary
- To commit to lifelong continuing professional education and to maintain an inquisitive attitude

### ***Professionalism, Ethics and the Law***

- To be aware and act according to medico-legal obligations related to medical practice
- To commit and believe in the four main ethical principles and in professional values such as altruism, fidelity, social justice, honour and integrity, and accountability

### ***Patient considerations***

- To commit and believe in the rights of patients to autonomy, confidentiality, informed consent, comprehension of the risks of anaesthesia techniques (patient-centeredness)
- To appropriately and respectfully care for patients irrespectively of race, culture, gender, sexual orientation, and socio-economic status
- To commit to ethical principles of research

## **Domain 1.10: Education, Self-directed Learning, Research**

### **a. Knowledge**

Trainees will understand the scientific approach to analysis and solving questions worthy of scientific investigation.

- Information search and literature review

- Proposing a hypothesis; research design, bias and appropriate methods of measurement; data collection and storage; good record keeping
- Common statistical tests and application of statistics relevant to the project; Interpretation of results
- Monitoring of studies and post study surveillance
- Copyright and intellectual property
- Responsibilities of Institutional Review Board/independent ethics committee, and of investigator to the ethics committee; ethical principles
- Principles of writing a scientific paper, and of oral or poster presentation of a paper
- Principles of evidence-based medicine (including levels of evidence)
- The process of obtaining funding and writing a basic grant application

### **b. Skills**

Trainees are encouraged to identify their learning needs; they will also acquire skills in scientific learning as a medical specialist including:

- Conducting and appraising literature searches
- Appraising journal articles including the application of statistics
- Applying the principles of evidence-based medicine to clinical practice
- Carrying out oral presentations and professional communication
- Presenting quality assurance exercises or projects
- Developing facilitation skills, such as tutoring in small-group learning and conducting small-group meetings

### **c. Specific Attitudes**

Trainees will develop an appreciation of and commitment to continuing education and scientific enquiry, including:

- Valuing rigorous educational and scientific processes
- Distinguishing between practice with a sound scientific basis and that which requires further objective assessment
- Committing to informed consent, confidentiality and all other ethical principles of research
- Critical appraisal: to have insight into one's own limitations, abilities and areas of expertise
- Committing to lifelong continuing professional development

### **Domain 2.1: Obstetric Anaesthesiology**

#### **a. Knowledge**

- Physiological and anatomical changes associated with a normal pregnancy
- Physiology of labour and delivery
- Foetal and placental physiology and pathophysiology
  - Placental transfer
  - Foeto-maternal circulation
  - The effects of pharmacologic agents and anaesthetic techniques on uterine blood flow and foetal development
- Embryology and teratogenicity
- Neonatal physiology and neonatal resuscitation
  - Foetal heart rate monitoring
  - Doppler umbilical blood flow
  - Apgar score and neuro-adaptive scores and their prognostic significance
- Obstetric management of labour (normal and abnormal)
- Pain of labour and pain pathways
- Tocolytic therapy, indications and contra-indications
- Local anaesthetic use in obstetrics
- Regional anaesthetic techniques in obstetrics:
  - Neuraxial use of opioids in obstetrics
- Methods of analgesia during labour: indications and contraindications (Psychological methods, complementary methods, systemic analgesia, epidural, combined spinal-epidural, paracervical and pudendal blocks, continuous spinal)
- Complications of regional anaesthesia
  - hypotension
  - accidental dural puncture, post-dural puncture headache
  - total spinal block
  - neurological complications
  - backache
  - central nervous system infections
  - spinal and epidural hematomas
- General anaesthesia in obstetrics
- Airway management in the parturient
- Medical disease and pregnancy:
  - Pre-eclampsia/eclampsia
  - HELLP
  - Fatty liver of pregnancy and liver diseases
  - Gestational diabetes
  - Heart disease
  - Neurological diseases
  - Obesity
  - Bleeding disorders
  - Thyroid diseases
  - Substance abuse
  - Immunological diseases

- Renal diseases
- Anaesthetic care of the high risk obstetrical patient, including trauma
- Anaesthetic management of complications:
  - Obstetric haemorrhage: Ante partum, peripartum and postpartum
  - Pulmonary embolism
  - Amniotic fluid embolism
  - Foetal death
- Cardiopulmonary resuscitation and advanced cardiac life support of the parturient
- Post-operative pain management in obstetrics
- Maternal medications and breastfeeding
- Anaesthesia for non-obstetric surgery during pregnancy
- Anaesthesia for assisted reproductive technologies
- Intrauterine and neonatal surgery
- Maternal mortality

### **b. Skills**

- Pre-assessment skills, including an appropriate history, physical examination (including airway assessment, cardiovascular, respiratory and neurological examination)
- Airway assessment
- Rapid sequence induction
- Emergency airway management
- Epidural catheter placement for labour analgesia with a 80% success
- Spinal anaesthesia for caesarean section with more than 90% success
- Spinal and epidural techniques in difficult cases
- Combined spinal / epidural analgesia and anaesthesia
- Epidural blood patch
- Management of high regional block
- Management of local anaesthetic toxicity
- Management of severe obstetric haemorrhage
- Experience with the anaesthetic management of EXIT procedure is desirable

### ***Clinical drills for:***

1. Airway emergencies
2. Failure to intubate algorithm in obstetrics
3. Advanced life support in the obstetric patient
4. Resuscitation of the neonate
5. Management of pulmonary aspiration during general anaesthesia

### **c. Specific attitudes**

- The resident should be aware of the ethical issues (consent, foetal vs maternal rights, maternal/paternal conflicts)
- The resident must be able to discuss the available analgesia methods with the patient including risks and alternatives
- The resident must establish effective communications and interactions with obstetrician, midwife, neonatologist and labour and delivery nurse. Communication skills and exchange of information in this environment are essential for the best possible outcome.

## **Domain 2.2: Airway surgery and management**

### **a. Knowledge**

- Anatomy of the head and neck and face including important abnormalities (i.e., cleft palate, tumours, trauma, facial syndromes such as Pierre-Robin syndrome, Turner syndrome, etc...)
- Anatomy of the airway, nasal passages, larynx, pharynx and middle ear
- Physics of gases in closed body cavities
- Principles of monitoring nerve function during head and neck surgery
- Pharmacology of local anaesthetic agents and local vasoconstrictors
- Effects of surgery and radiation on the airway
- General principles for the management of a normal and a difficult airway
  - Airway devices and types of tracheal tubes
  - Algorithm for the management of the difficult airway
  - Equipment for difficult tracheal intubation
  - Surgical and percutaneous tracheotomy
  - Equipment for jet ventilation
  - Laser: types, uses in surgery, complications, precautions

### **b. Skills**

#### ***Technical skills:***

- Tracheal intubation
  - Oral and nasal intubation
  - Use of special tubes
  - Placement and removal of packs
- Securing the difficult airway
  - Recognizing the high-risk airway
  - Use of stylets and bougies
  - Fibrotic intubation (under sedation and awake)
  - Laryngeal mask airway intubation
  - Failed intubation or ventilation drill
  - Needle and surgical cricothyroidotomy
- Managing the extubation of the difficult airway patient
- Management of postoperative facial and airway swelling

#### ***Clinical and case management skills:***

Trainees are expected to understand relevant principles, apply knowledge in practice and to demonstrate clinical skills and case management in the following areas:

- Assessment of the airway of patients undergoing ENT and maxillofacial surgery and development of a airway management plan
- Partial airway obstruction including: Epiglottitis, foreign bodies, laryngeal and oropharyngeal tumours, cysts and abscesses
- Anaesthesia for major maxillofacial surgery involving prolonged anaesthesia, major blood loss, hypothermia and multiple procedures
- Anaesthesia for facial trauma in the emergency and semi-elective setting
- Dental procedures on the mentally handicapped
- Establishing, maintaining and protecting an airway in the face of abnormal anatomy and simultaneous surgical intervention

- Postoperative care of patients with airway surgery and/or difficult airway

### **c. Specific Attitudes**

- Establishing effective cooperation and communication with the surgeon in situations with a shared airway
- Strategies to anticipate difficult airway situation and to establish safe anaesthetic management plans

## **Domain 2.3: Thoracic and Cardiovascular Anaesthesiology**

### **a. Knowledge**

- Cardiovascular anatomy
- Physiology of respiration, circulation, fluid balance and thermoregulation
- Pharmacology of cardiovascular drugs, cardiovascular effects of anaesthetic agents
- General principles of perioperative anaesthetic and surgical management relevant to cardiac surgery patients emphasizing:
  - Aetiology, pathophysiology and clinical presentation of cardiovascular diseases requiring cardiac surgery
  - Hemodynamic monitoring including cardiac output measurement, detection of ischemia
- Specialized equipments such as cardiac pacemakers, defibrillators, mechanical assist devices for circulation (intra-aortic balloon pump), cardio-pulmonary bypass or extracorporeal membrane oxygenation
- Anatomy of upper airways, tracheobronchial tree, intrathoracic structures and their relationship
- Physiology of lung perfusion and ventilation in various patient positions (e.g., lateral decubitus)
- Physiology of one-lung ventilation and principles of hypoxic pulmonary vasoconstriction
- Various techniques of lung separation and control of tube positioning
- Differences in anaesthetic management regarding surgery (thoracotomy-thoracoscopy-mediastinoscopy)
- Common surgical procedures
  - Segmentectomy-lobectomy-pneumonectomy-lung metastasectomy
  - Pleurodesis, pleural decortication
  - Oesophageal surgery
  - Thymectomy
- Specific respiratory evaluation with regards to planned surgery (assessment of operability)
- Frequent or particular comorbid conditions associated to thoracic surgery:
  - COPD
  - Previous chemotherapy with pulmonary toxicity (bleomycin)
  - Pulmonary hypertension
  - Myasthenia gravis
  - Anterior mediastinal mass
- Postoperative pain control, including risk factor evaluation for postthoracotomy chronic pain (thoracic epidural analgesia and alternatives)
- Specific intra- and postoperative complications



## **b. Skills**

### ***Technical skills:***

- Performance of lung separation techniques
  - Double lumen tracheal intubation
  - Bronchial blockers
  - Clinical and fibrotic control of tube positioning
  - Lung separation in difficult airway patients (including tube exchange devices)
- Correct placement of thoracic epidural catheters
- Correct patient positioning, particularly in the lateral decubitus position
- Basic skills in the management of anaesthesia and perioperative care for cardiac operations performed on-pump and off-pump (valve corrections or replacements, myocardial revascularization, combined operations)

### ***Clinical and case management skills:***

- Evaluation of patients undergoing cardiac surgery and development of a anaesthetic management plan
- Anaesthetic management for pacemaker implantation
- Perform defibrillation
- Assessment of patients undergoing thoracic surgery and development of an anaesthetic management plan
- Understanding the principles, applied basic sciences, and management of anaesthesia and perioperative care for
  - Thoracotomy and:
    - Lung resection, including pneumonectomy and lung reduction surgery
    - Mediastinal mass resection
    - Oesophageal surgery
    - Surgery on the thoracic aorta
  - Tracheal and bronchial surgery (including use of lasers and stents)
  - Thoracoscopic procedures
  - Mediastinoscopy
- Management of hypoxia and ventilation during one-lung anaesthesia
- Recognition, differential diagnosis and management of postoperative respiratory distress
- Understanding chest tube drainage systems and suction
- Evaluation and management of postoperative pain

## **c. Specific Attitudes**

- Learn to establish effective communication with the surgical team during critical phases of the surgical procedure (for example: chest opening, on/off-pump, lung separation, etc...)
- Recognizing psychological issues relevant to patients scheduled for cardiac surgery

## **Domain 2.4: Neuroanesthesiology**

### **a. Knowledge**

- Neuroanatomy: Central nervous system, spinal cord and meninges. Ventricular system and flow of CSF. Blood supply to brain and spinal cord. Cranial vault and spinal column. Blood-brain barrier.
- Cerebral blood flow, cerebral blood volume, cerebral metabolism.

- Cerebrospinal fluid dynamics and physiology.
- Intracranial pressure.
- Physiological and metabolic effects of anaesthetic drugs and techniques on brain and spinal cord.
- Pharmacology relevant to neuroanaesthesia. Neuroprotection. Diuretics. Hypotensive agents. Corticosteroids. Anticonvulsants.
- Clinical measurement and monitoring. Cerebral blood flow, intracranial pressure and cerebral perfusion pressure. Cerebral metabolism. Transcranial Doppler sonometry. Electrophysiological monitoring (EEG and evoked potentials).
- Cerebral protection. Fluid and osmotic therapy. Sedation and ventilatory support.
- Management of intracranial hypertension.
- Anaesthesia and perioperative care of patients for cerebral vascular surgery, intra and extra cerebral.
- Principles of anaesthesia and perioperative care of patients for:
  - Supratentorial surgery
  - Posterior fossa surgery
  - Pituitary surgery
  - Epilepsy surgery
  - Awake craniotomy
  - Craniofacial and craniobasal surgery
  - Spinal surgery, including emergency cord decompression
  - Paediatric neurosurgery
  - Ventriculo-peritoneal shunts
  - Imaging and interventional radiological procedures
  - Procedures for the management of chronic pain; pain ablation
- Induced hypotension. Hypothermia. Sitting position. Air embolism
- Anaesthesia and intensive care for patients with head injury
- Anaesthesia and intensive care for spinal cord injury
- Intensive care of medical neurologic diseases

## **b. Skills**

### ***Technical skills:***

- Monitoring in neuroanaesthesia, setting up and calibration, placement of cannulae, interpretation of variables
- Fibrotic intubation will be emphasized

### ***Clinical and case management skills:***

- Pre-anaesthesia preparation for neuroanaesthesia
- Positioning of patients
- Reducing raised ICP
- Suspected cervical spine injury
- Intraoperative air embolism
- Management of a head injury

## **c. Specific Attitudes**

- Communicate and empathize with patients in order to relieve their anxiety
- Effectively communicate with other specialties in order to manage patients.
- Perform appropriately under stressful situations.

## **Domain 2.5: Paediatric Anaesthesiology**

### **a. Knowledge**

- Risk factors relevant to Morbidity and Mortality in paediatric anaesthesia
- Anatomy relevant to airway management and breathing, circulation and regional anaesthesia
- Physiology of respiration, circulation, fluid balance and thermoregulation
- Stages of physical and psychological development of the normal child
- Pharmacology of anaesthetic agents, analgesics, neuromuscular blocking agents and common paediatric medications and their variations with the child age
- General principles of perioperative management relevant to children emphasizing:
  - Common childhood illnesses and their influence on anaesthesia and surgery
  - Fasting guidelines
  - Fluid and electrolyte replacement
  - Temperature control
  - Laboratory issues (haemoglobin, BGA, Blood glucose, coagulation testing)
  - Specialized equipments
  - Perioperative monitoring
  - Congenital and acquired bleeding disorders
  - Dosage and administration of emergency drugs
  - Postoperative apnoea detection and management
  - Recognition of postoperative problems (PONV, Emergence delirium, post-extubation stridor, hypothermia)
  - Acute and chronic pain management
- Important diseases and syndromes that may affect the management of anaesthesia, such as:
  - Respiratory infections
  - Asthma
  - Prematurity and its complications
  - Facial anomalies affecting the airway
  - Neonatal emergencies (respiratory distress; tracheo-oesophageal fistula; diaphragmatic hernia; abdominal wall defects)
  - Congenital cardiac disease (ASD; VSD; tetralogy of Fallot)
  - Cerebral palsy and seizures
  - Muscular and neuromuscular diseases incl. malignant hyperthermia
  - Chronic diseases (cystic fibrosis...)
  - Congenital syndromes (Down's; Pierre-Robin-Sequence)
  - Malignancies and their treatments.
- General principles of paediatric intensive care and paediatric emergency medicine, including resuscitation of the neonate, infant and child and general principles of the management of the neonate and the premature baby.

### **b. Skills**

#### ***Technical skills:***

- Airway management (ventilation, laryngeal mask and intubation) in all age groups
  - Fibrotic intubation through the LMA
  - Nasal-pharyngeal tube CPAP/assisted ventilation
- Peripheral vascular (venous and arterial) access
- Intra-osseous access
- Regional anaesthesia and analgesia, including caudal anaesthesia

### ***Clinical and case management skills:***

- Preoperative evaluation and premedication
- Postoperative recovery room management and the initial stabilization of vital parameters of children who require intensive care management
- Management of airway and breathing problems such as: cannot ventilate, cannot intubate, hypoxia, hypercarbia, bronchospasm; apnoea; upper airway obstruction; upper airway infections; inhaled foreign body; laryngospasm; stridor; aspiration of gastric contents; seizures
- Principles and management of the child at risk for regurgitation
- Volume and blood replacement including homeostasis control
- Management of difficult venous access
- Stabilization and transportation of the emergency case, performs drills such as paediatric advanced life support to manage emergencies

### **c. Specific Attitudes**

- Establishes effective communication and interaction with children and their parents, takes into account psychological issues of the hospitalized child
- Medico-legal issues specific to paediatric practice, for example informed consent, consent for clinical research, disclosure of risk when relevant

## **Domain 2.6 Anaesthesiology in remote locations / Ambulatory Anaesthesiology**

### **a. Knowledge**

Apart from knowledge, skills and attitudes required for anaesthesia practice as defined in both general and specific domains above, the residents are expected to have additional specific knowledge in:

- Procedures requiring anaesthetic management outside the OR, e.g., radiology, nuclear medicine, endoscopy, cardiology, dentistry, ECT, other office-based settings
- Appropriate anaesthetic techniques for adults and children managed outside the OR : sedation (monitored anaesthesia care), general anaesthesia, regional anaesthesia
- Pharmacology of anaesthetic agents suitable for short procedures (rapidly acting agents, including opioids, sedative-hypnotics, volatile anaesthetics and muscle relaxants)
- Safety standards required for practice of anaesthesia in remote locations
- Safety standards required for transport of patients to and from remote locations
- Typical clinical and organizational problems associated with anaesthesia outside the OR: distant airway and vascular access, precarious monitoring, non-exhaustive material, distant help
- Specific complications associated with sedation (airway obstruction, apnoea)
- Principles of safety during x-ray, nuclear medicine and MRI procedures

### **b. Skills**

#### ***Organization skills***

- Organization of the remote locations to have the standards that adhere to operating room, including appropriate human resource
- Organization and management of a location for post anaesthesia surveillance and monitoring

### **Technical skills**

- Preanaesthetic preparation of the equipment in remote site (anaesthesia machine, disposable material, drugs),
- Challenges of anaesthesia in remote locations:
  - Vascular access with specific consideration for potential distant access
  - Airway management with specific consideration for potential difficult airway access

### **Clinical and case management skills**

- Appropriate patient evaluation and selection for anaesthesia
- Safe transport of the patient to and from the remote location
- Appropriate monitoring of the patient with specific consideration for potential distant monitoring (window, camera)
- Detection and treatment of potential anaesthetic complications, in particular those associated with sedation (airway obstruction, apnoea)
- Anaesthetic practice in a variety of remote locations :
  - i. Radiology : CT, MRI, angiography, embolization
  - ii. Nuclear medicine : radiation therapy (children)
  - iii. Endoscopy : upper gastro-intestinal endoscopy, colonoscopy, laryngoscopy, bronchoscopy
  - iv. Cardiology : angiography, cardioversion, catheter placement
  - v. Dentistry : dental care under general anaesthesia (children)
  - vi. ECT (electroconvulsive therapy)
  - vii. Emergency room
- Self protection (x-ray, nuclear medicine and MRI procedures)

### **c. Specific attitudes**

- Organizational aspects and logistics in remote location or an ambulatory practice
- Multidisciplinary team work and effective communication

## **Domain 2.7: Multidisciplinary pain management**

### **a. Knowledge**

During the course of training, anaesthesiology residents must acquire knowledge on the mechanisms of pain and analgesia, as well as all relevant pathologies and conditions that cause acute or chronic pain

#### **Anatomy and Physiology**

- Pain transmission and modulation. Development of the pain systems
- Pain sensitization: Progression from acute to chronic pain (Pain chronification)
- Types of pain: classification
- Mechanisms to block or impede pain transmission and induce analgesia
- The placebo effect

#### **Assessment**

- Pain history, physical examination. Request and interpret additional tests
- Socioeconomic factors: work / compensation, family, personal
- Pain evaluation in humans: relevance
- Scales, questionnaires and quantitative sensory testing
- Clinical nerve functional studies and imaging
- Follow-up: Patient's pain diary

### **Epidemiology, Psychology and Research**

- Pain management as a fundamental human right
- Epidemiology of pain. Sex differences
- Psychosocial and cultural aspects of pain
- Designing, performing, and reporting clinical trials on pain and analgesia
- Comprehend the preclinical models of pain as essential tools to improve pain management in humans
- Ethical standards in pain management and research

### **Pain Management: Drugs**

Comprehensive knowledge on the mechanisms, effects (beneficial and unwanted), clinical use, routes (non-invasive and invasive), doses, and drug interactions, of the following drugs and adjuvants:

- Opioids
- Non steroidal anti-inflammatory drugs (NSAIDs) and antipyretic analgesics
- Antidepressants and anticonvulsants
- Local anaesthetics and glucocorticoids
- Miscellaneous agents
- Multimodal or balanced analgesia
- Patient controlled analgesia
- Implantable intrathecal devices for drug administration

### **Pain Management: Non-Pharmacological methods**

Understanding the mechanisms and the risk/benefit of the methods in order to recommend and enforce their use whenever appropriate:

- Interventional procedures including nerve blocks and neurolysis
- Neuromodulation and neurostimulation (TNS, peripheral, central)
- Radiofrequency
- Surgical procedures
- Physical medicine and rehabilitation. Work rehabilitation
- Psychological: Cognitive and behavioral interventions. Psychiatric treatment
- Complementary therapies
- Basic knowledge of patient management in palliative care

### **Clinical states:**

- Somatic pain
  - Acute pain: procedural, postoperative, emergency / transport
  - Chronic post-surgical pain
  - Musculoskeletal pains: Cervical, lumbar
  - Muscle, tendon and myofascial pains
- Visceral pain
  - Urogenital pain
  - Pelvic pain
  - Chronic gastrointestinal pain
  - Pancreatic pain
  - Thoracic pain (cardiac and non-cardiac). Post-thoracotomy pain.
  - Referred pain and visceral hyperalgesia
- Neuropathic and mixed pains
  - Radicular pain: lumbar, cervical
  - Post-laminectomy pain
  - Peripheral neuropathies

- Central pain
- Post-amputation pain
- Complex regional pain syndromes
- Cancer pain
- Headaches and oral and facial pains
- Pain in special situations:
  - Pain in pregnancy and labour
  - Pain in infants, children and adolescents
  - Pain in older adults
  - Pain relief in patients with cognitive impairment
  - Pain relief in substance abusers
  - Pain relief in areas of deprivation and conflict

### **Multidisciplinary Pain Clinics**

Organization of a pain clinic, referrals, circuit and flux of patients. Role of the different medical specialties and healthcare professionals in Pain Clinics

### **b. Skills**

- Evaluation and effective management of acute pain: procedural, postoperative, emergency services and during transport. Reach expertise in peripheral blocks and placement of catheters for acute pain management
- Evaluation of patients with chronic pain: history, physical examination and requesting and interpretation of additional tests
- Knowing the options for treating patients with chronic cancer and non-cancer pains
- Proficiency in the pharmacological management of patients with chronic pain, with special emphasis in multimodal analgesia and the adequate use of opioids
- Perform central, plexus, and peripheral blocks and tissue infiltrations, for diagnostic or pain management purposes. Placement of catheters for long term use
- Knowing when other interventional and non-interventional therapies are required, requesting assistance from pain specialists
- Effective communication with patients and their families. Informs and discusses treatment options and clinical goals
- Accurate record keeping (logbook), including treatments and procedures. Documentation of pain evolution

### **c. Specific Attitudes**

- Establish effective interactions with the multidisciplinary team of health professionals working in the Pain Clinic
- Consider that patients have the right to be heard, believed, and informed, regarding their pain and its management
- Recognize the principle of minimum intervention, using the simplest and safest techniques likely to be effective to achieve the clinical goal
- Develop skills to inform patients about the best treatment options based on the available medical evidence. Explain the risk / benefit of the treatments, and obtain verbal or written agreement for the use of opioids. Kindly answers all questions and concerns patients may have
- Become skilled at discerning pain from simulation, often related to drug abuse or worker's compensation
- Effectively communicates with the primary care physician discussing treatment options and the follow-up of the patient.