

# SWISS CATALOGUE OF OBJECTIVES IN ANESTHESIA AND REANIMATION (SCOAR)

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## A. Roles

Anesthesia is a medical specialty which tasks include patient assessment and evaluation, maintenance of organ function as well as analgesia and amnesia of all patients undergoing diagnostic, therapeutic or surgical procedures.

To fulfill these tasks as doctor the following roles have been identified as the most important for any specialist in anesthesia:

### 1. Medical Expert

The main field of an expert in anesthesia is the perioperative and peri-interventional medical field for all patient categories. He/she should acquire all necessary competences enabling him/her to fulfil this expert role and function in an interdisciplinary and interprofessional setting.

Other relevant fields of competence include emergency medicine, resuscitation, intensive and intermediate care, acute/chronic pain and palliative care.

### 2. Communicator

The specialist in anesthesia should have competences in communication, both oral and written, which enables him/her to deal with the different aspects of human interactions and relationships.

- Effective communication with patient, family/relatives.
- Effective communication with colleagues and other members of the interprofessional team, in order to ensure optimal patient care, including providing effective and structured feedback.

### 3. Collaborator

The specialist in anesthesia should have competences in collaboration, which enable him/her to be an expert in each of the multidisciplinary and interprofessional team in which he/she is involved.

- Masters interdisciplinary and interprofessional teamwork in acute care (operating theatre, emergency, intensive care and recovery room, labor wards), as well as in the context of resuscitation.
- Effective skills in the setting of interdisciplinary and interprofessional teams in the resolution of conflicts; takes and assumes leadership when necessary.

### 4. Manager

The specialist in anesthesia should have competences which permit effective organization and management tasks to take place during professional activities.

- Implementation of quality assurance programs and use of recognized standards.
- Promotion and participation in better and safer patient care.
- Knowledge of administrative and economic aspects of anesthesia practice, including human resources and operating room management.
- Implementation and use of practice guidelines and standards both local and national (SSAR/SGAR, national healthcare policy)
- Cost-effective and efficient use of all diagnostic, prophylactic and therapeutic means and measures (health economics)
- Development of skills to achieve balance between professional practice and personal life.

### 5. Health Advocate

The specialist in anesthesia responsibly uses his/her expertise and influence to advance the health and well-being of individual patients, communities, and populations.

- Responds to individual patient health needs and issues as part of patient care
- Identifies the determinants and responds to the health needs of the communities that he/she serves
- Promotes the health of individual patients, communities, and populations by considering optimal interdisciplinary and multiprofessional processes and allocation of resources

### 6. Scholar

It is the specialist's responsibility to maintain a high degree of professional competence, to facilitate development of colleagues and other groups of professionals, as well as favor development of the specialty itself.

- Maintain life-long learning; critical reading and appraisal of information, evaluation of new information and technologies.
- Acquisition of basic pedagogical tools for education, skills for research and presentations, teaching of students, residents, nurses.
- Contributes to research, development, and implementation/transmission of new medical knowledge.
- Contributes to patient education.

## 7. Professional

The specialist in anesthesia will exhibit irreproachable behavior and be aware of duties and responsibilities inherent to his/her role as a professional.

- Delivers quality care with integrity, honesty and compassion.
- Recognition of his/her personal limits by appropriate consultation with others when caring for the patient.
- Competences in ethical decision-making when linked to patient care, and management of ethical conflicts.
- Knowledge of medico-legal aspects of anesthesia practice, in particular in the management and prevention of conflicts of interest, as well as in the management of anesthetic incidents and accidents.

## B. Domains and Competencies

In order to fulfill these seven professional roles of a specialist in clinical anesthesia, a list of *domains of expertise* and *competencies* have been identified.

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

### 9 domains of general core competencies have been identified:

- Domain 1.1: Disease Management, Patient Assessment and Preoperative Preparation
- Domain 1.2: Intraoperative Care
- Domain 1.3.: Postoperative patient care and pain management
- Domain 1.4: Emergency Medicine & Resuscitation
- Domain 1.5: Procedures & Skills for anaesthesia practice
- Domain 1.6: Quality Management and Health Economics
- Domain 1.7: Anesthesia Non-Technical Skills (ANTS)
- Domain 1.8: Professionalism, Ethics
- Domain 1.9: Education, Self-directed Learning, Research

### 8 domains of specific core competencies have been identified:

- Domain 2.1: Obstetrics
- Domain 2.2: Airway management
- Domain 2.3: Thoracic and Cardiovascular Anesthesia
- Domain 2.4: Neuroanesthesia
- Domain 2.5: Pediatric Anesthesia
- Domain 2.6: Intensive, Intermediate and Perioperative Care of the Critically Ill Patient
- Domain 2.7: Anesthesia outside the operating room (OR)
- Domain 2.8: Multidisciplinary chronic, palliative, interventional Pain Management and Palliative Care

## C. Phases in the postgraduate training program:

### Phase I

- Up to 24 months
- The trainees are expected to acquire mainly general core competences.

### Phase II:

- >24 months
- The trainees are expected to deepen their level of competences of the general core competences and to acquire more specific competencies.

## D. Level of acquisition/expertise

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

The *minimum* level of acquisition/expertise for the competence statements in each domain is defined from “A” to “D” and differentiate between the two phases in the postgraduate training. In other words, throughout the course of the training, residents will progressively achieve the required level of competence in each domain.

- A: Demonstrates knowledge of, describes or performs under direct supervision (1:1 proactive supervision, supervisor present in the room)
- B: Performs, manages, demonstrates under direct or indirect supervision (is allowed to act under reactive supervision, supervisor is readily available)
- C: Performs, manages, demonstrates under distant supervision (is allowed to act under supervision available on phone)
- D: Performs, manages, demonstrates independently and acts as supervisor or instructor

## E. Learning objectives (see syllabus)

For each domain of expertise, a detailed list of “learning objectives” has been identified:

- These learning objectives have been broken down into “Knowledge, Skills and Attitudes”. They 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 anesthesia residency.
- 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.

## F. Competence statements: General Core Competencies

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

1.1.1	Identifies, optimizes and treats all for planned interventions relevant pathologies	<b>B</b>	<b>D</b>
1.1.2	Identifies pathologies with high risk for anesthesia, including rational adaption of anesthesia plan, further evaluation and optimization in collaboration with specialists (e.g. liver cirrhosis, mediastinal mass, pulmonary hypertension, compromised cardiac patients, respiratory insufficiencies)	<b>B</b>	<b>D</b>
1.1.3	Assesses perioperative risk	<b>B</b>	<b>D</b>
1.1.4	Uses and interprets preoperative investigations appropriately and rationally	<b>B</b>	<b>D</b>
1.1.5	Assesses airway for potential difficulties with intubation and / or ventilation	<b>B</b>	<b>D</b>
1.1.6	Knows and applies the principals involved in pre-operative medication, fasting guidelines and pre-medication	<b>B</b>	<b>D</b>
1.1.7	Elaborates an individualized anesthetic strategy, including rational use of drugs and techniques	<b>B</b>	<b>D</b>
1.1.8	Provides adequate information to patient and / or relatives and obtains informed consent for anesthesia	<b>B</b>	<b>D</b>

### Domain 1.2: Intraoperative Care

1.2.1	Prepares the workplace according to local checklists (equipment and anesthesia machine, drugs, monitoring, etc ...)	<b>C</b>	<b>D</b>
1.2.2	Uses appropriately all standard safety (electrical, laser, X-ray) and infection control (HIV, Hepatitis, resistant organism infection) measures	<b>C</b>	<b>D</b>
1.2.3	uses and monitors patient’s positioning safely	<b>B</b>	<b>D</b>

1.2.4	Masters knowledge of pharmacology relevant to general and regional anesthesia, including preparation, administration and monitoring of drug effects.	B	D
1.2.5	Provides a safe induction, maintenance, and emergence from general anesthesia, including choice of drugs, airway management, ventilation techniques and monitoring	B	D
1.2.6	Provides a safe conduct of regional anesthesia, including choice of drugs, choice of regional technique and monitoring	B	D
1.2.7	Uses appropriate skills for safe provision of general or regional anesthetic techniques	B	D
1.2.8	Maintains homeostasis of organ systems of patients throughout different procedures, including adequate fluid and volume management, safe use of blood and blood products, and maintains normothermia	B	D
1.2.9	Provides adequate record keeping of anesthetic procedures	C	D
1.2.10	Recognizes, diagnoses and manages intraoperative critical incidents	B	D

### Domain 1.3.: Postoperative patient care and pain management

1.3.1	provides appropriate handover of a patient to the next postoperative care team (ward/PACU/IMC/ICU)	C	D
1.3.2	Provides adequate patient monitoring in PACU/IMC	C	D
1.3.3	Assesses and adequately treats post-operative pain and post-operative nausea and vomiting in PACU	C	D
1.3.4	Anticipates recognizes, diagnoses and manages postoperative critical incidents, including indication for transfer to ICU	B	D
1.3.5	uses correct discharge criteria from both in- and outpatient setting	B	D

### Domain 1.4: Emergency Medicine & Resuscitation

1.4.1	Adopts a structured and timely approach to the recognition, assessment and stabilization of the acutely ill and the trauma patient	B	D
1.4.2	Recognition of the critical ill adult or child and initiation of adult and pediatric resuscitation.	B	D
1.4.3	Triages and prioritizes patients appropriately, including timely admission to ICU, OR and adequately transfers to tertiary centers	A	D
1.4.4	Is able to manage mass casualties (has access to local disaster algorithms)	A	B

### Domain 1.5: Procedures & Skills for anaesthesia practice

1.5.1	Provides basic airway management	C	D
1.5.2	Provides advanced airway management	B	D
1.5.3	Provides basic vascular access	C	D
1.5.4	Provides advanced vascular access	B	C
1.5.5	Provides basic peripheral and central blocks	B	D
1.5.6	Provides advanced peripheral and central blocks	B	C
1.5.7	Checks and operates technical monitors and machines and trouble- shoots basic technical malfunctions	C	D
1.5.8	adequate use of ultrasound techniques for vascular and peripheral/central blocks	B	D

### Domain 1.6: Quality Management and Health Economics

1.6.1	Provides the best anesthetic care in accordance to standards and recommendations of the SSAR/SGAR	B	D
1.6.2	Applies in his work the local in-hospital guidelines of the quality and safety programs (checklists, standards of hygiene, safe surgery programs, etc.)	C	D
1.6.3	Is aware of his own limits and is capable of seeking help, when required	C	D
1.6.4	Organizes effectively his work with a multidisciplinary team	B	D

<b>1.6.5</b>	Ensures continuity of care through effective handover of clinical information	<b>C</b>	<b>D</b>
<b>1.6.6</b>	Demonstrates an understanding of the managerial and administrative responsibilities	<b>A</b>	<b>C</b>
<b>1.6.7</b>	Engages in consensus finding how to best organize and allocate the resources to the communities	<b>A</b>	<b>B</b>

#### **Domain 1.7: Anesthesia Non-Technical Skills (ANTS)**

<b>1.7.1</b>	Situation Awareness shows situation awareness in gathering information, recognizing & understanding and anticipating	<b>B</b>	<b>D</b>
<b>1.7.2</b>	Decision Making is able to make decisions by identifying options, balancing risks & selecting options, re-Evaluation	<b>B</b>	<b>D</b>
<b>1.7.3</b>	Task Management manages tasks by planning & preparing, prioritising, providing & maintaining standards, identifying & utilising resources	<b>B</b>	<b>D</b>
<b>1.7.4</b>	Team Working works in a team by coordinating activities with the team, exchanging information, using authority & assertiveness, assessing capabilities, supporting others is able to demonstrate leadership	<b>B</b>	<b>D</b>

#### **Domain 1.8: Professionalism, Ethics**

<b>1.8.1</b>	Formulates clinical decisions with respect of ethical and legal principles	<b>C</b>	<b>D</b>
<b>1.8.2</b>	Communicates effectively with patients and relatives (doctor-patient relationship); involves patients and/or their surrogates in decisions about care and treatment	<b>B</b>	<b>D</b>
<b>1.8.3</b>	involves multidisciplinary and interprofessionality into decision making about patient care and treatment	<b>B</b>	<b>D</b>
<b>1.8.4</b>	Maintains accurate and legible records, and documentations of clinical activities	<b>C</b>	<b>D</b>
<b>1.8.5</b>	Respect privacy, dignity, confidentiality and legal constraints on the use of patient data	<b>C</b>	<b>D</b>
<b>1.8.6</b>	Supports and participates in activities regarding professional and specialty development	<b>A</b>	<b>D</b>
<b>1.8.7</b>	Within the context of a multidisciplinary team, provides end-of-life and palliative care and applies the ethical and legal guided process of withholding and withdrawing treatment	<b>A</b>	<b>D</b>

#### **Domain 1.9: Education, Self-directed Learning, Research**

<b>1.9.1</b>	demonstrates life-long learning habits and fulfils requirements of the program of further education (Weiterbildungsprogramm Anästhesiologie; formation pour la spécialisation en anesthésiologie)	<b>C</b>	<b>D</b>
<b>1.9.2</b>	contributes actively to education of trainee and healthcare professionals	<b>A</b>	<b>C</b>
<b>1.9.3</b>	demonstrates knowledge of basic statistics, criteria for good clinical practice and critical appraisal of an article	<b>A</b>	<b>C</b>
<b>1.9.4</b>	demonstrates basic knowledge in ethics in health care applied to research	<b>A</b>	<b>C</b>
<b>1.9.5</b>	participates in basic or clinical science research	<b>A</b>	<b>B</b>

### **G. Competence statements Specific Core Competencies**

#### **Domain 2.1: Obstetrics**

2.1.1	Masters anatomy, physiology, pathophysiology and pharmacology of pregnancy and labor	B	D
2.1.2	Masters fetal physiology, ante partum and intra partum fetal assessment	B	C
2.1.3	Masters techniques, indications and contraindications for labor analgesia	B	D
2.1.4	Masters the anesthetic management of cesarean section and other operative deliveries under regional or general anesthesia	B	D
2.1.5	Prevents and treat specific anesthetic complications, including parturient resuscitation	B	C
2.1.6	Manages the high-risk obstetric situations, including appropriate transfer to a maternity with a higher level of care	B	C
2.1.7	Manages the anesthetic of non-obstetric surgery during pregnancy	B	D
2.1.8	Recognition of the critical ill neonate and initiation of neonatal resuscitation	B	D

### Domain 2.2: Airway Management

2.2.1	Appropriately manages anesthesia for surgery with shared airway	B	D
2.2.2	Manages airway in patients with both expected and unexpected difficult airway, including use of different devices and techniques and proper application of existing algorithms during intubation and extubation; manages the airway in trauma situations	B	D
2.2.3	Safely provides anesthesia for laryngeal surgery, tracheotomy and laryngoscopy/ bronchoscopy in adult patients	A	C
2.2.4	Manages the anesthetic for laser surgery in the airway, including jet-ventilation	A	B

### Domain 2.3: Thoracic and Cardiovascular Anesthesia

2.3.1	Evaluates risk for lung resection and selects patients, who need preoperative preparation and treatment Is aware of the perioperative risk factors and specific postoperative complications of thoracic surgery	A	C
2.3.2	Describes and performs the anesthetic aspects of one lung ventilation	A	C
2.3.3	Manages acute pain for thoracic surgery including regional anesthesia techniques	A	C
2.3.4	Recognizes cardiac and thoracic emergencies and initiates treatment	A	D
2.3.5	Possesses basic knowledge of cardiopulmonary bypass and other circulatory assistance devices relevant to the anesthesiologist	A	B
2.3.6	Can apply principles of invasive monitoring of circulation and hemostasis	A	B
2.3.7	Manages anesthesia for elective and urgent peripheral vascular surgery including appropriate preoperative risk evaluation and optimization	B	D
2.3.8	Manages anesthesia for major vascular surgery including emergency procedures	A	C

### Domain 2.4: Neuroanesthesia

2.4.1	Masters the basics of pre- and postoperative neurological assessments	A	C
2.4.2	Appropriately manages the anesthetic of patients with raised intracranial pressure	A	C
2.4.3	Applies strategies for the prevention of secondary brain injury	A	C
2.4.4	Masters anesthetic aspects and applies preventive measures for specific risks for prone, sitting or other neurosurgical positioning	A	C
2.4.5	Uses monitoring techniques for brain perfusion and function	A	B
2.4.6	Manages the anesthetic of patients with CNS and spine bleeding or injury, with non-surgical neurological disorders (stroke, seizures, ...) and those undergoing diagnostic interventions	A	C

### Domain 2.5: Pediatric Anesthesia

2.5.1	Masters pediatric aspects of monitoring and equipment, including peripheral vascular access (including intra-osseous)	A	C
2.5.2	Anticipates, recognizes and understands the implications of pediatric specificities including airway management, anatomy, physiology and pharmacology	A	C
2.5.3	Provides a safe induction, maintenance and emergence of general anesthesia and manages perioperative care (pain, PONV, emergence delirium) in pediatric patients (including regional anesthesia) in otherwise healthy children $\geq 3$ years and ASA I/II, undergoing routine procedures	A	C
2.5.4	Provides a safe induction, maintenance and emergence of general anesthesia in children $< 3$ years or ASA $> II$	A	A
2.5.5	Recognition of the critical ill child and initiation of pediatric basic life support	A	D

#### Domain 2.6: Intensive, Intermediate and Perioperative Care of the Critically Ill Patient

2.6.1	Defines clinical problems, develops diagnostic and specific management and treatment plans/bundles according to international standards of specific critical conditions	A	C
2.6.2	Develops adequate responses to life-threatening problems	A	D
2.6.3	Recognizes and masters specific aspects of monitoring and equipment	A	C
2.6.4	Recognizes Intensive Care specific syndromes (Delir, critical-illness myopathy, etc.) and is able to consider these entities in the therapy	A	C
2.6.5	Manages critically ill patients and initiates adequate treatment for failing organ systems	A	C
2.6.6	Contributes to the multidisciplinary care of patients in cooperation with all the relevant partners including patients and their relatives	A	C

#### Domain 2.7: Anesthesia outside the Operating Room (OR)

2.7.1	Anticipates, recognizes and adequately manages problems and organizational aspects associated with deep sedation and anesthesia in an isolated site (e.g. MRI, Angiology, Endoscopy, interventional radiology) as well as in an office-based setting	A	D
2.7.2	Applies standards and recommendations of the SSAR / SGAR for safe practice of anesthesia outside the OR or in an office-based structure	A	D

#### Domain 2.8: Multidisciplinary chronic, palliative, interventional Pain Management and Palliative Care

	<b>Chronic pain</b>		
2.8.1	Applies the knowledge of physiology, pathophysiology, psychological and psychosocial aspects of chronic pain, including postoperative persistent pain and establishes effective interactions with the multidisciplinary team of health professionals working in the pain clinic	A	C
2.8.2	Uses appropriate techniques for measurement and documentation of chronic pain (Pain history and evolution, physical examination, neuropathic pain) including treatments and procedures.	A	C
2.8.3	Identifies patients in the process of pain chronification and knows when multidisciplinary procedures are required	A	C
2.8.4	Pain Management: Pharmacological methods: Has comprehensive knowledge and applies basics of pharmacological therapies on the mechanisms, therapeutic and side effects, clinical use, routes (non-invasive and invasive), doses, and drug interactions. Furthermore, is aware of the limitations of pharmacological pain therapy in acute and chronic pain conditions.	A	C
2.8.5	Pain Management: Non-Pharmacological methods: Knows and applies the mechanisms, limitations and the risk/benefit of the methods in order to recommend and enforce their use whenever appropriate:	A	B

	<ul style="list-style-type: none"> <li>– Interventional procedures including nerve blocks and neurolysis, and radiofrequency</li> <li>– Neuromodulation and neurostimulation (TENS, spinal cord and peripheral stimulation)</li> <li>– Radiofrequency</li> <li>– Surgical procedures</li> <li>– Physical medicine and rehabilitation. Work rehabilitation</li> <li>– Psychological pain education</li> <li>– Complementary therapies including acupuncture</li> </ul>		
	<b>Palliative care</b>		
<b>2.8.6</b>	Identifies patients with life-limiting illness and patient at risk of dying within the next months and responds to the challenges of clinical and ethical decision making in those patients.	<b>A</b>	<b>C</b>
<b>2.8.7</b>	Is aware of the individual needs (physical, comfort, psychological, social and spiritual) of patients and their families and is able to evaluate the determinants of quality of life in these individual patients.	<b>A</b>	<b>C</b>
<b>2.8.8</b>	Identifies the goals and values of an individual patient and adapts suggested treatments to these goals and to developing situations.	<b>A</b>	<b>C</b>
<b>2.8.9</b>	Identifies patients in their dying process and supports their terminal care, as well as the support of relatives with grief reactions.	<b>A</b>	<b>C</b>
<b>2.8.10</b>	Assists an interdisciplinary and multiprofessional team in the complex management of palliative patients (e.g. pain, nausea and vomiting, fatigue, nutritional support and palliative sedation)	<b>A</b>	<b>C</b>

## Appendix: Syllabus

### Learning objectives of Competence statements: General Core Competencies

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

##### Learning Objectives

###### 1. Basic knowledge

During the course of the training, anesthesia residents must acquire knowledge on all relevant medical pathologies and those with direct impact on anesthetic techniques.

- Anatomy, physiology, physiopathology of following organs systems (c.f. syllabus)
  - o Airway
  - o Respiratory
  - o Cardiovascular
  - o Nervous and muscular
  - o Urinary/excretory
  - o Endocrine
  - o Digestive
- Knowledge and experience of the etiology, natural history, diagnosis, treatment and complications:
  - o 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 2.3)
  - o Cardiovascular:
    - Congestive heart failure
    - Coronary artery disease
    - Hypertension
    - Arrhythmias
    - Valvular heart disease and cardiac shunt
    - Cardiomyopathies
    - Thromboembolic disease
  - o Nervous and muscular
    - Cerebrovascular diseases (TIA, carotid artery disease, stroke)
    - Intracranial tumor and raised IC pressure
    - Chronic spinal cord transection
    - Muscular and myotonic dystrophy
    - Myasthenia Gravis, myasthenic syndrome
    - Epilepsy
  - o Urinary/excretory
    - Renal failure and common causes
    - Disorder of acid-base balance
    - Electrolyte disorders
  - o Digestive
    - Esophageal disease (reflux, hiatus hernia)
    - Gastric disease (peptic ulcer disease)
    - Carcinoid tumors
    - Disease of liver (Acute hepatitis (toxic, infectious) and chronic hepatitis, cirrhosis and complications)
  - o Endocrine
    - Diabetes mellitus and complications (hyperglycemia, hypoglycemia, acidocetosis)
    - Thyroid gland dysfunction (hyperthyroidism, hypothyroidism)
    - Parathyroid gland dysfunction
    - Adrenal gland dysfunction (Hypoadrenocorticism, Pheochromocytoma)
    - Diabetes insipidus
- Understanding disease processes, natural evolution and knowing the influence on the management of perioperative period
- Treatment of above-mentioned diseases, in order to optimize patients before anesthesia and surgery in cooperation with other physicians
- Pharmacology of perioperative drugs (c.f. Syllabus)
- Fasting guidelines
- Airway assessment including bedside tests to assess difficult ventilation and intubation
- Other medical history (personal and family history of previous anesthesia, allergy, drug abuse, habits)
- The transplant patient undergoing general surgery

###### 2. 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:
  - o 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 anesthesia technique, including monitoring and other equipment required for the procedure
  - Decision-making relating to postponement or cancellation of surgery
  - Accurate preoperative record keeping
3. 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 Care

1. Basic knowledge
- Physics and Clinical measurement (Behavior 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 in bulk and cylinders; Anesthesia 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 an operating theatre suite (Operating rooms and postanesthesia recovery room; Lighting; Safety; Infection and pollution control in operating rooms; Sharps policies)
  - Principles of safety such as lifting and positioning patients
  - Conduct of anesthesia:
    - Management of the airway and intraoperative complications
    - Applied cardiac and respiratory physiology
    - Routine inhalation and intravenous inductions; Maintenance of anesthesia
    - Application of mechanical ventilation
    - Correct use of anesthesia 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 anesthesia techniques (epidural and spinal anesthesia and upper/lower limb blocks)
    - Maintenance of accurate records

2. Clinical skills

*Technical skills:*

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

*Clinical and case management skills:*

Trainees are expected to identify and manage the following co-existing medical conditions relevant to anesthesia:

- Disorders of the airway and respiratory system
- Disorders of the cardiovascular system
- Disorders of the nervous system
- Renal disorders; Water, electrolyte and acid-base disturbances
- Hematological disorders, including coagulopathies
- Disorders of the liver, biliary tract and gastrointestinal system
- Endocrine disorders such as Pheochromocytoma, hyperthyroidism, hypothyroidism, and diabetes mellitus
- Skin and musculoskeletal disorders, including rheumatoid arthritis and ankylosing spondylitis
- Psychiatric disorders and substance abuse
- Ageing
- Obesity

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, Hypocarbica, Hypercarbia, Hypoventilation, Hyperventilation, and High ventilator peak inspiratory pressures
- Hypertension, Hypotension, Arrhythmias, Myocardial Ischemia
- Hypothermia, Hyperthermia, and Malignant hyperthermia
- Anaphylaxis
- Residual neuromuscular blockade (or regional anesthesia)
- Inadequate neuraxial blockade
- Intraoperative awareness
- Seizures

3. Specific attitudes

- Effectively communicate with other members of the operating room in order to voice issues and concerns; work together with other health care professionals to ensure smooth patient care and safety

**Domain 1.3.: Postoperative patient care and pain management**

1. Basic knowledge

- Postoperative Care:
  - o Safe transport and handover of anesthetized patient
  - o Acute pain Management:
    - Anatomy and physiology of pain pathways, the neuroendocrine response to acute pain and its effects of major organ systems
    - Knowledge of the clinical pharmacology of medications used in treatment of acute pain, including:
      - Medications: opioids, local anesthetics, NSAIDS, alpha-2 agonists
      - Route of administration: oral, SC, IM, IV (including PCA), epidural, intrathecal, peripheral nerve blocks
      - Knowledge of the advantages of one pain relief delivery system over another, of specific doses, rates and details of these delivery systems
  - o Knowledge of common complications related to the anesthetic technique and the surgical procedure used, as well as therapeutic issues:
    - Bronchoaspiration / Pneumothorax
    - Hypoxemia
    - Hypercarbia
    - Hypotension/Bleeding/Shock of different aetiologies
    - Fluid requirements/Electrolyte disturbances
    - Arrhythmias
    - Residual neuromuscular blockade
    - Side-effects and complications of regional techniques (PDPH)
    - Postoperative confusion and altered mental states
    - TURP syndrome
    - PONV
    - Nerve and muscular damage
    - Patient malpositioning
  - o Knowledge of potential complications related to comorbid conditions of patients
    - Respiratory distress
    - Ischemic, rhythmic and hypertensive heart disease
    - Renal failure
    - Sepsis
    - Diabetes
    - Transfusion and coagulation disorders
- Appropriate monitoring techniques and their interpretation

2. Clinical skills

*Technical skills:*

- Basic vascular access and airway management
- CPR (basic and advanced life support)
- Regional anesthesia 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
- Manage common and life threatening adverse reactions to medications used during anesthesia and to treat acute pain
- Perform drills such as advanced life support to manage emergencies conditions (see above)
- Management of post-spinal syndrome, including the indications for, and side effects of, an epidural blood patch

3. Specific attitudes

- Demonstrate knowledge of the policies which must be in place to safely and effectively treat acute 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
- Recognition of life-threatening complications requiring ICU transfer

## Domain 1.4: Emergency Medicine & Resuscitation

### 1. Basic knowledge

*Knowledge and understanding of the pathophysiology and treatment of:*

*Trauma emergencies* (blunt or penetrating according to ATLS list of life threatening injuries):

- Mechanisms of injury and trauma scoring
- Head and spinal injury
- Maxillo-facial trauma
- Chest trauma
- Abdominal trauma
- Pelvic trauma
- Musculoskeletal trauma
- Burns

*Medical emergencies* (c.f. ACLS manual and ICU learning objectives)

- Respiratory
- Cardiac
- Neurology
- Endocrinology
- Acid Base and electrolyte disorders
- Intoxications
  - o Poisonings with alcohol, salicylates, paracetamol, antidepressants, opioids, benzodiazepines, carbon monoxide
  - o Implication of addiction, dependence and withdrawal

### 2. Clinical skills

Technical skills:

- CPR in adults, children and neonates
- Emergency airway management, including needle and surgical cricothyrotomy
- Emergency vascular and transosseous accesses
- Immediate chest needle decompression
- Needle thoracocentesis and intercostal chest drainage

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:

- Adopting a structured and prioritized approach to emergency situations (Adult and pediatric advanced life support)
- Knowing and applying the principles of triage
- Identifying patients with an immediate threat to life
- Dynamic and repetitive assessments (primary and secondary) in parallel with therapeutic interventions
- Appropriate use of resuscitative procedures and drugs
- Safe and effective use of pain therapy in an emergency environment
- Appropriate use of complementary exams (laboratory and radiology)

### 3. Specific attitudes

- Establishing effective communication and interaction with other specialists to ensure optimal care
- Developing and demonstrating effective teamwork skills
- Adapting to a physically and psychologically challenging environment, using debriefing and other coping strategies
- Exercise good judgment as to when resuscitation is futile or inappropriate
- Recognizing psychological issues and their implications for the patients and their families in the emergency environment

## Domain 1.5: Procedures & Skills for anaesthesia practice

### 1. Basic knowledge

*Airway management:*

- Anatomy of the upper airway
- Airway assessment and identification of the potential difficult airway (scores / grading)
- Knowledge of the algorithm for the difficult airway
- Knowledge of criteria for a safe extubation
- Protocol for extubation of a difficult airway
- Management of pulmonary aspiration during general anaesthesia

*Vascular accesses:*

- Basic anatomy relevant to the vascular accesses
- Knowledge of indications and contraindications of the different vascular accesses
- Knowledge of risks and complications of the different vascular accesses

*Peripheral and central blocks*

- Basic anatomy relevant to the peripheral and central blocks
- Early recognition of systemic local anesthetic toxicity, knowledge of symptoms and signs, as well as its prevention, treatment and resuscitation measures
- Knowledge of the physiological changes following regional anaesthesia
- Knowledge of indications and contraindications of peripheral and central blocks

- Knowledge of risks and complications of peripheral and central blocks with special emphasis on coagulation disorders.
  - Knowledge of appropriate use of peripheral and central blocks both intraoperatively, as an anesthetic technique, and postoperatively as an acute and chronic pain management technique
- Technical devices (c.f. intraoperative LOs)*

## 2. Clinical skills

### *Airway management*

- Uses different available maneuvers to clear the airway (head extension, jawthrust, oropharyngeal and nasopharyngeal airways)
- Airway management using the following devices:
  - o Face mask and self-inflating bag
  - o Laryngoscope and different blades
  - o LMA and other supraglottic airways
  - o Endotracheal tubes
  - o Fiberoptic devices
- Performs routine preparation of equipment
- Performs equipment setup for the difficult intubation
- Performs routine airway management (mask ventilation, intubation and extubation)
- Performs drills in the algorithm for the difficult mask ventilation
- Performs the rapid sequence induction
- Performs drills in the handling of the difficult airway (including fiberoptic intubation asleep and awake)
- Performs drills in cricothyroidotomy and jet ventilation
- Performs the emergency management of a pneumothorax and placement of a chest tube
- Performs the extubation protocol in the difficult airway, with a plan to "not lose the airway"
- Performs intraoperative bronchoscopy and bronchial lavage in case of problems with secretion or pulmonary aspiration

### *Vascular accesses*

- Correct identification of landmarks and positioning of patient
- Demonstrates effective skin antisepsis and site preparation
- Insertion of peripheral, central venous, and arterial lines
- Is able to recognize and treat complications related to vascular accesses

### *Peripheral and central blocks*

- Is able to position the patient appropriately for the performance of the blocks
- Demonstrates effective skin antisepsis and site preparation
- Performs peripheral blocks of the upper extremity (single shot and catheter techniques), including intravenous, axillary and interscalene blocks
- Performs peripheral blocks of the lower extremity (single shot and catheter techniques) including intravenous, femoral, obturator

### *Uses appropriate equipment including needles, devices for nerve location and catheters*

- Performs the common central neuraxial blocks such as spinal, epidural (thoracic/lumbar) and combined spinal/epidural
- Assesses the extent and degree of a block with an appropriate method

### *Technical devices*

- Is able to check and operate the following equipment and machines:
  - o Gas supply
  - o Anesthesia delivery systems
  - o Vaporizers
  - o Breathing systems
  - o Anesthetic ventilator machines
  - o Infusion pumps/rapid infusion devices
  - o CNS monitoring
  - o Warming devices
  - o Blood salvaging devices

*Selects the appropriate monitoring methods, both invasive and non-invasive, and provides a critical interpretation of the monitored variables*

## 3. Specific attitudes

- Is aware of his own limits when performing technical procedures, anticipates problems and can act accordingly, including calling for help early

## **Domain 1.6: Quality Management and Health Economics**

### 1. Basic knowledge

- Standards of quality and security, and recommendations of the SSAR/SGAR
- Tools for quality assurance (Cirmet, local reporting systems, ADS, Stiftung für Patientensicherheit)
- Governmental Regulations relevant for anesthesia practice (both cantonal and federal)
- Economic aspects:
  - o Demographic data and resource utilization data relevant for anesthesia practice (DRG, TarMed, OFSP-BAG, etc...)
  - o Basic knowledge on financial aspects of anesthesia practice
  - o Basic knowledge on organizational and budgeting aspects of anesthesia practice

### 2. Clinical skills

- Understands and applies standards of quality, security and recommendations in daily practice
  - o Understands the importance and uses checklists and follows guidelines
  - o Supports and provides data for both local and national ADS
  - o Demonstrates awareness for critical incidents and reports them
- Applies standards of quality and safety with respect to organizational aspects
  - o Applies organizational knowledge to provide a cost-effective organization

### Domain 1.7: Anesthesia Non-Technical Skills (ANTS)

1. Basic knowledge
  - Psychological aspects of team performance for successful task performance
  - Crisis resource management
  - Human error research, relevant for the perioperative setting
  - Behavioral marker systems, relevant for successful training
2. Clinical skills
  - 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 1.8: Professionalism, Ethics

1. Basic 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:
      - o Rights and responsibilities of patient, doctors and other medical staff
      - o Informed consent
      - o Patient confidentiality and privacy
      - o Error and incidents disclosure
    - Principles of communication with colleagues including:
      - o Methods (verbal, written, consultation or referral)
      - o Manner (courtesy, integrity, respect)
      - o Adequate record keeping (including medicolegal implications)
    - Personal issues including:
      - o Balancing family and work, and the importance of non-professional activities
      - o Depression; recognition and care plans
      - o Substance abuse; recognition and access to appropriate referral
      - o Mentoring; types and their applications
      - o Leadership responsibilities and styles; team behaviors
      - o Stress and crisis management
      - o Principles underpinning conflict resolution
      - o Use and influence of role model
2. Clinical 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 behaviors and communications in the case of tensions and conflicts arising among members of the multidisciplinary team.
- Displaying optimal maintenance of anesthesia and other medical records.

### 3. Specific attitudes

#### *Specialist practice*

- Trainees are expected to develop and attain attributes in the 5 roles a specialist in anesthesiology: Medical expert; Communicator /team expert; Manager; Scholar; Professional
- To work as a team member but to assume responsibilities and to delegate duties as a team leader when necessary
- To accept that medical knowledge and skills are not only the requirements of specialists practice
- Critical appraisal: to have insight into one's own limitations, abilities and areas of expertise
- To commit to lifelong continuing professional education and to maintain an inquisitive attitude

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

- To be aware act according to medicolegal obligations relating to medical practice
- To commit and believe in the four main ethical principles and in professional values such as altruism, fidelity, social justice, honor 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 anesthesia techniques
- To appropriately care for patients irrespectively of race, culture, gender, sexual orientation, and socio-economic status
- To commit to ethical principles of research

## **Domain 1.9: Education, Self-directed Learning, Research**

### 1. Basic knowledge

- Basic concepts of evidence based medicine
- Statistical Methods:
  - o Data collection:
    - defining outcome measures and the uncertainty of measuring them
  - o Descriptive statistics:
    - types of data and their representation
    - normal distribution: an example of parametric distribution
    - indices of central tendency and variability
  - o Deductive and inferential statistics:
    - simple probability theory / relation to confidence intervals
    - the null hypothesis
    - type I and type II errors
- Scientific basis of clinical practice
- Methodology and processes of clinical research including:
  - o importance of study design in clinical research
  - o importance of statistical analyses
  - o ethical considerations related to research
- Audit cycle and critical incident reporting: purpose, methods
- Basic concepts related to economics in health care and research
- Basic concepts in ethics

### 2. Clinical skills

- Ability to locate published research in a systematic manner
- Critical interpretation and evaluation of the value of published clinical research
- Planning and preparation of presentations to a live audience
- Participation in a basic science or clinical research project

### 3. Specific attitudes

- Achieve and maintain a questioning approach to clinical practice
- Maintain a Learning Portfolio; reflect on previous learning experiences with the aid of the Learning Portfolio
- Develop an informed critical approach to the scientific literature; conduct and appraise literature searches
- Cultivate an evidence based practice of anesthesia; appraise journal articles including the application of statistics
- Demonstrate a constant willingness to teach and learn
- Develop a readiness to both listen and learn
- Carry out oral presentations and professional communication

## Appendix: Syllabus

### Learning objectives of Competence statements: Specific Core Competencies

#### Domain 2.1: Obstetrics

##### 1. Basic knowledge

- Basic knowledge in obstetrics:
  - o Alterations in anatomy and physiology during pregnancy and their implications for anesthesia
  - o Placental development and physiology, fetal development and physiology
  - o Neonatal physiology and adaptation to extra-uterine life
  - o Physiology of normal labor and delivery
  - o Fetal and maternal assessment during labor
- High-risk conditions in the pregnant women:
  - o General:
    - Diabetes
    - Obesity
    - Cardiopathies
    - Thromboembolic diseases
  - o Specific:
    - Pre-eclampsia and its complications (HELLP syndrome, eclampsia); other hypertensive diseases
    - Abnormalities of placenta (praevia, accreta /increta/ percreta)
    - Pre-, intra- and post-partum causes of hemorrhage: risk factors and possible causes according to the term of pregnancy (ectopic pregnancy included) and main steps of their prevention and treatment
    - Multiple pregnancy
    - Breech presentation
    - Prematurity
- In utero fetal death
- Pharmacology during pregnancy: modification of pharmacodynamics and kinetics of currently used anesthetic drugs during pregnancy, placental transfer of drugs and their effect on the gravid uterus and/or fetus, specific obstetrics and post-partum drugs (tocolytics, uterotonics)
- Basic principles of neonatal assessment and resuscitation
- Indications and contra-indications to various methods for labor analgesia (epidural, continuous spinal-epidural, iv analgesia); choice of local anesthetic, adjuvant or iv drug
- Knowledge of the potential complications of regional analgesia for labor and C-section (unsatisfactory analgesia or anesthesia, neurological complications, postdural puncture headaches, toxicity of local anesthetics, high block)
- Knowledge of the possible indications for C-sections and their level of emergency
- Anesthetic techniques for C-section: spinal, epidural (uploading of a pre-existing catheter), continuous spinal epidural, general anesthesia (and choice of appropriate drugs with regards to each situation)
- Knowledge of the potential complications of general anesthesia for C-section: difficult airway management, pulmonary aspiration, awareness

##### 2. Clinical skills

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

- C-section anesthesia for simple cases
- Rapid sequence induction with specific consideration for difficult airway in the pregnant patient
- Management of anesthesia for non obstetric surgery during pregnancy
- Management of obstetric hemorrhage
- Labor analgesia for simple obstetric patients
- Management of specific complications of regional anesthesia/analgesia
  - o Postdural puncture headache
  - o Neurological complications
  - o Systemic toxicity of local anesthetics
  - o Unsatisfactory analgesia during labor
  - o Unsatisfactory anesthesia during C-section (spinal or epidural)
- Management of a patient with pre-eclampsia (mild to severe and its complications)
- Management of basic neonatal resuscitation
- Trauma management in the pregnant women

###### *Drills*

- CPR
- Neonatal resuscitation

##### 3. Specific attitudes

- Multidisciplinary work and effective communication in labor room
- The place and respect to give to the father
- Communication and attitude in the context of fetal death or late abortions

#### Domain 2.2: Airway Management

### 1. Basic knowledge

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

### 2. Clinical skills

#### *Technical skills:*

- Tracheal intubation
  - o Oral and nasal intubation
  - o Use of special tubes
  - o Placement and removal of packs
- Securing the difficult airway
  - o Recognizing the high-risk airway
  - o Use of stylets and bougies
  - o Fiberoptic intubation (sleeping and awake)
  - o Laryngeal mask airway intubation
  - o Failed intubation or ventilation drill
  - o 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 tumors, cysts and abscesses
- Anesthesia for major maxillofacial surgery involving prolonged anesthesia, major blood loss, hypothermia and multiple procedures
- Anesthesia 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

### 3. 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 anesthetic management plans

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

#### *Thoracic Learning Objectives:*

### 1. Basic knowledge

- Anatomy of upper airways, tracheobronchial tree, intrathoracic structures and their relationship
- Physiology of lung perfusion and ventilation in various patient positions (i.e., 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 anesthetic management regarding surgery (thoracotomy-thoracoscopy/mediastinoscopy)
- Common surgical procedures
  - o Segmentectomy-lobectomy-pneumonectomy-lung metastasectomy
  - o Pleurodesis, pleural decortication
  - o Oesophageal surgery
  - o Thymectomy
- Specific respiratory evaluation with regards to planned surgery (assessment of operability)
- Frequent or particular comorbid conditions associated to thoracic surgery:
  - o COPD
  - o Previous chemotherapy with pulmonary toxicity (bleomycin)
  - o Pulmonary hypertension
  - o Myasthenia gravis
  - o Anterior mediastinal mass
- Postoperative pain control, including risk factor evaluation for postthoracotomy chronic pain (thoracic epidural analgesia and alternatives)
- Specific intra- and postoperative complications

## 2. Clinical skills

### *Technical skills:*

- Performance of lung separation techniques
  - o Double lumen tracheal intubation
  - o Bronchial blockers
  - o Clinical and fibreoptic control of tube positioning
  - o 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

### *Clinical and case management skills:*

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

### *Cardiovascular Learning Objectives:*

#### 1. Basic knowledge

- Cardiovascular anatomy
- Physiology of respiration, circulation, fluid balance and thermoregulation
- Pharmacology of cardiovascular drugs, cardiovascular effects of anesthetic agents
- General principles of perioperative anesthetic and surgical management relevant to cardiac surgery patients emphasizing:
  - o Etiology, pathophysiology and clinical presentation of cardiovascular diseases requiring cardiac surgery
  - o Hemodynamic monitoring including cardiac output measurement, detection of ischemia
  - o Specialized equipments such as cardiac pacemakers, defibrillators, intra-aortic balloon pump, cardio-pulmonary bypass or extracorporeal membrane oxygenation

#### 2. Clinical skills

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

- Evaluation of patients undergoing cardiac surgery and development of an anesthetic management plan
- Anesthetic management of pacemaker implantation
- Perform cardioversion

#### 3. 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: Neuroanesthesia**

#### 1. Basic knowledge

- Neuroanatomy: central nervous system, spinal cord and blood supply, ventricular system and flow of CSF, cranium and spinal column
- Cerebral blood flow, blood volume, blood-brain barrier, intracranial pressure and cerebral vasospasm
- Pathophysiology of normal and abnormal metabolism of the brain and spinal cord, water and electrolyte homeostasis, temperature regulation
- Pharmacology: Influence of anesthetic agents and techniques on cerebral function, hemodynamics, metabolism and intracranial pressure, as well as drugs interacting with neuromuscular disorders
- Physical principles involved with modalities for neuro-monitoring: transcranial Doppler (TCD), intracranial pressure (ICP), electrophysiological monitoring (somato-sensory (SSEP), motor (MEP) and brain stem auditory evoked potentials (BAEP), electroencephalogram (EEG)
- General principles for the management of
  - o cerebral protection, intracranial hypertension and cerebral vasospasm
  - o hemodynamic stability, fluid homeostasis, sedation and ventilatory support
  - o intra and extra cerebral vascular surgery
  - o supratentorial, posterior fossa, pituitary and epilepsy surgery
  - o emergency spinal cord decompression and spinal column injury
  - o brain trauma damage control
  - o intracranial bleeding
  - o imaging and interventional radiological procedures
  - o patients with neurological/neuromuscular diseases
  - o neuroradiology and stereotaxic surgery
  - o positioning in neurosurgery
  - o air embolism

## 2. Clinical skills

### *Technical skills:*

- Positioning of neurosurgical patients

### *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 neurosurgical procedures
- To monitor and reduce raised ICP
- To monitor and treat intraoperative air embolism
- To perform the initial management of head and spine injured patient, and provide anesthesia for urgent surgery in these patients, including interventions to minimize cerebral and spinal cord damage
- Handling the handicapped and/or uncooperative patient and those with altered conscious states
- Postoperative care of neurosurgical patients

## 3. Specific attitudes

- Establishing effective cooperation, communication and an action plan with the surgeon in emergency situations of head and/or spine injured patients
- Strategies to anticipate difficulties with raised ICP, difficult airway situation and the uncooperative patient to establish safe anesthetic management plan
- Empathic participation in debriefing sessions after emergencies and brain death
- Rapid response to changing patient conditions and team approach

## **Domain 2.5: Pediatric Anesthesia**

### 1. Basic knowledge

- Anatomy relevant to airway management and breathing
- Physiology of respiration, circulation, fluid balance and thermoregulation
- Pharmacology of anesthetic agents, analgesics and common pediatric medications and their variations with the child age
- Stages of development of the normal child
- General principles of perioperative management relevant to children emphasizing:
  - o common childhood illnesses and their influence on anesthesia and surgery
  - o fasting guidelines
  - o fluid and electrolyte replacement
  - o temperature control
  - o specialized equipments
  - o perioperative monitoring
  - o dosage and administration of emergency drugs
  - o postoperative apnea detection and management
  - o acute and chronic pain management
- Relevant features of important childhood conditions, in particular:
  - o respiratory infections
  - o asthma
  - o prematurity and its complications
  - o facial anomalies affecting the airway
  - o neonatal emergencies (respiratory distress; tracheo-oesophageal fistula; diaphragmatic hernia; abdominal wall defects)
  - o congenital cardiac disease (ASD; VSD; tetralogy of Fallot)
  - o cerebral palsy and seizures
  - o chronic diseases (cystic fibrosis; muscular dystrophy)
  - o congenital syndromes (Down's; Pierre-Robin)
  - o malignancy and their treatments.

### 2. Clinical skills

#### *Technical skills:*

- Airway management (ventilation, laryngeal mask and intubation)
- Peripheral vascular access
- Intra-osseous access
- Caudal anesthesia

#### *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:

- Applying principles of pediatric anesthesia for some of the following surgery: General surgery; Abdominal surgery; Urology; Orthopedic surgery; Otolaryngology; Ophthalmology; Dental surgery; Plastic and reconstructive; Trauma and burns.
- Management of airway and breathing problems such as: Hypoxia, bronchospasm; apnea; upper airway obstruction; upper airway infections; inhaled foreign body; laryngospasm; stridor; aspiration of gastric contents; seizures.
- Perform drills such as pediatric advanced life support to manage emergencies conditions (see above plus: bradycardia, cardiac arrest; hypovolemia; fluid management; neurological compromise)

### 3. Specific attitudes

- Establishing effective communication and interaction with children at different ages and with their carers
- Recognizing psychological issues relevant to hospitalized children

- Strategies to provide informed consent and disclosure of risk when consulting with children and carers

## Domain 2.6: Intensive, Intermediate and Perioperative Care of the Critically Ill Patient

### 1. Basic knowledge

- Organization of Intensive Care Units and ICU standards
- General principles of ICU management:
  - o Basic and advanced life support
  - o Airway management and respiratory support including non-invasive techniques
  - o Hemodynamic management including advanced cardiovascular monitoring and inotropic therapy
  - o Fluid and electrolyte support including relevant aspects of blood product transfusion
  - o Renal replacement therapy
  - o Neurological management
  - o Enteral and parenteral nutritional support
  - o Antibiotic therapy
  - o Prevention of complications such as thromboembolism, ventilator associated injuries, stress ulceration, renal failure and nosocomial infection
  - o Transportation
  - o Sedation and pain management of the critically ill patient
- Etiology, pathophysiology, diagnosis and treatment plans according to international standards of specific critical conditions:
  - o Acute circulatory failure
    - Shock
    - Cardio-respiratory arrest
    - Cardiac arrhythmias
    - Ischemic heart disease
    - Valvular heart disease including endocarditis
    - Pulmonary embolism
    - Anaphylaxis
  - o Respiratory failure
    - Pulmonary edema and ARDS
    - Airway obstruction and stenosis
    - Pneumothorax
    - Aspiration
    - Pneumonia
    - COLD and Asthma
  - o Renal failure
    - Chronic and acute (RIFLE)
  - o Gastrointestinal failure
    - Bleeding
    - Ileus
    - Peritonitis
    - Pancreatitis
    - Liver failure
  - o Neurological failure
    - Delirium and Coma
    - Cerebrovascular and bleeding diseases
    - Cerebral edema
    - Increased intracranial pressure including monitoring
    - Brain stem death
    - Seizures
    - Guillain Barré syndrome and Myasthenia gravis
  - o 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
  - o Infectious diseases
    - Sepsis including sepsis bundle strategy
    - Severe community acquired infections (e.g. meningitis)
    - Severe nosocomial infections (e.g. MRSA)
  - o Endocrine and metabolic disorders
    - Diabetes mellitus and insipidus
    - Addison's disease, Cushing and Conn syndrome
    - Thyroid disorders
    - Pheochromocytoma
    - Metabolic stress syndrome
    - Malnutrition
  - o Coagulation disorders
    - DIC
    - Transfusion reaction
  - o Obstetric complications

- Pre-eclampsia, Eclampsia
- Septic abortion
- Amniotic fluid embolism
- o Intoxications
- o Organ donor

## 2. Clinical skills

### *Technical skills:*

- Respiratory
  - o Intubation under emergency situations
  - o Bronchoscopy
  - o Percutaneous tracheostomy
  - o Pleural drainage
- Cardiovascular
  - o Basic and advanced life support
  - o Central vascular access
  - o Arterial access

### *Clinical 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
  - o Proper and clear documentation including list of differential diagnosis and priorities
  - o Transportation of the critically ill patients
- Cardiovascular
  - o Basic and advanced life support including resuscitation decisions
  - o Use of vasoactive drugs
  - o Management of arrhythmias including pacemaker and cardioversion
  - o Application of advanced hemodynamic monitoring (i.e. pulmonary artery catheter, less invasive monitoring)
  - o Prevention of thromboembolism
- Respiratory
  - o CPAP
  - o NIV
  - o Mechanical ventilation
  - o Blood gas analysis
  - o Prevention of lung injuries associated with mechanical ventilation
  - o Prevention of aspiration
- Renal
  - o Application of renal replacement therapy
  - o Prevention of renal function deterioration
  - o Neurological
    - o Maintenance of cerebral perfusion
    - o Management of the unconscious patient
    - o Management of brain stem death
    - o Management of organ donation
- Gastrointestinal
  - o Nutritional support
  - o Prevention of stress ulceration (eg Trauma)
  - o Systematic priority-based approach to severe trauma
  - o Control of bleeding and management of complications

## 3. 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 2.7: Anesthesia outside the Operating Room (OR)**

### 1. Basic knowledge

- Procedures requiring anesthetic management outside the OR e.g., radiology, nuclear medicine, endoscopy, cardiology, dentistry, ECT, other office-based settings
- Appropriate anesthetic techniques for adults and children managed outside the OR : sedation (monitored anesthesia care), general anesthesia, regional anesthesia
- Safety standards required for practice of anesthesia in remote locations
- Safety standards required for transport of patients to and from remote locations
- Typical clinical and organizational problems associated with anesthesia outside the OR : distant airway and vascular access, precarious monitoring, non-exhaustive material, distant help
- Specific complications associated with sedation (airway obstruction, apnea)
- Principles of safety during x-ray, nuclear medicine and MRI procedures

### 2. Clinical skills

#### *Technical skills*

- Preanesthetic preparation of the remote site (anesthesia machine, material, drugs)

- 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 anesthesia outside the OR
  - 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)
  - Use of appropriate anesthetic techniques and agents
  - Detection and treatment of potential anesthetic complications, in particular those associated with sedation (airway obstruction, apnea)
  - Anesthetic practice in a variety of remote locations :
    - o Radiology : CT, MRI, angiography, embolization
    - o Nuclear medicine : radiation therapy (children)
    - o Endoscopy : upper gastro-intestinal endoscopy, colonoscopy, laryngoscopy, bronchoscopy
    - o Cardiology : angiography, cardioversion, catheter placement
    - o Dentistry : dental care under general anesthesia (children)
    - o ECT (electroconvulsive therapy)
    - o Emergency room
  - Self protection (x-ray, nuclear medicine and MRI procedures)
3. Specific attitudes
- Organizational aspects and logistics
  - Multidisciplinary team work and effective communication

## **Domain 2.8: Multidisciplinary chronic, palliative, interventional Pain Management and Palliative Care**

1. Basic knowledge
- Anatomy, physiology of different pain pathways
  - Multidimensional aspects of chronic pain, including the physiological, psychological and environmental factors
  - Different tools of pain evaluation (e.g. VAS, NRS and Brief Pain Inventory)
  - Principles of treatment of nociceptive and neuropathic pain, including pharmacokinetics, pharmacodynamics, indications and complications of commonly used analgesics and co-analgesics in patient with normal and abnormal organ system function or substance (ab-)use
  - Different routes of analgesic drug delivery, including factors governing choice of route, side effects relevant to particular route, principles of additive and synergistic effects when agents are combined
  - Indications, potential benefits and complications of common diagnostic, prognostic and therapeutic blocks and of implanted drug administration devices and electrical stimulators
  - Understanding the anatomy, technique, indications, contraindications and complications of above mentioned interventions
  - Principles of invasive diagnostic procedures, i.e. local anesthetic blocks and provocative procedures (discography)
  - Issue of false positive responses due to placebo effects or unspecific pain provocation, methods to increase the validity of the procedures, e.g. controlled blocks
  - Dimensions of suffering, including the physical, physiological, social and spiritual dimensions
  - Different tools of evaluation of quality of life
  - Assessment instruments for goals and values at the end of life
  - Inclusion criteria for specialized, palliative care, according to guidelines of BAG, GDK
  - Pathophysiology of nausea and vomiting
  - Principles of treatment of nausea and vomiting, including conservative treatment of ileus
  - pathophysiology of anorexia and cachexia
  - Indications, potential benefits and complications of enteral and parenteral nutrition
  - pathophysiology of fatigue and asthenia, including treatment options
  - Legal regulations of euthanasia (Sterbehilfe) and assisted suicide in Switzerland
  - Forms of grief reaction and corresponding treatment and support
2. Clinical skills
- Technical skills:
- Obtaining a specific pain history, including the following factors:
    - o Onset, location, nature, duration, intensity of pain
    - o Physical, psychological and social consequences of pain
    - o Current and past pain treatment
    - o Other relevant history: family history, medical history, substance abuse
  - Techniques for pain problem based musculoskeletal and neurological examination
  - Techniques of measurement and for documentation of pain
  - Competency in patient controlled analgesia (intravenous, peripheral and central blocks)
  - Competency in commonly used regional techniques
    - o Peripheral and plexus blocks of the upper and lower limb
    - o Intercostal block and other trunk blocks (i.e. TAP block, Serratus anterior block)
    - o Continuous catheters
  - Competency in neuraxial blocks
    - o Thoracic, lumbar and caudal epidural anesthesia

- Single shot and continuous spinal anesthesia
- Competency in imaging techniques, like ultrasound and fluoroscopy
- Handling of "port a cath" for parenteral supply of drugs and nutrition
- Insertion of a gastric tube in awake patients
- Techniques to evaluate bowel function (auscultation, physical examination, bowel movement pro-ocols)
- Techniques to ultrasound guided ascites drainage

3. Specific attitudes

- Establishing effective communication and interaction with patients in pain.
- Multidisciplinary work, value and importance of an interdisciplinary and interprofessional approach to pain assessment and treatment
- Being aware of limitations of interventional pain medicine
- Establishing effective communication and interaction in patients with advanced, incurable and progressive disease, as well as their family
- Multidisciplinary work, value and importance of an interdisciplinary approach to care for palliative patients
- Ensuring immediate and written feedback about changes of treatment to the care team