

PEDIATRIC ANESTHESIA FELLOWSHIP



SUBSPECIALTIES PROGRAMS



2016

البحر العربي
البحر الأحمر



SAUDI FELLOWSHIP

Pediatric Anesthesia Curriculum

Preparation	
Curriculum Scientific Group	
Dr. Abdulaleem Alatassi Dr. Tarek Youssef	Dr. Wadha Alotaibi Dr. Abeer Arab
Fellow Representatives	
Dr. Mohammad AlSuhehani	Dr. Talal Eed Aljuhani
Supervision	
Curriculum Specialist	
Dr. Zubair Amin	Dr. Sami Alshammari
Reviewed and Approved	
Scientific Committee	
Dr. Abdulaleem Alatassi	Dr. Wadha Alotaibi
Dr. Tarek Youssef	Dr. Abeer Arab
Dr. Nezar Al-Zughaibi	Dr. Hussain Kareem

COPYRIGHTS AND AMENDMENTS

All rights reserved. © 2016 Saudi Commission for Health Specialties.

This material may not be reproduced, displayed, modified, distributed, or used in any other manner without prior written permission of the Saudi Commission for Health Specialties, Riyadh, Kingdom of Saudi Arabia.

Any amendment to this document shall be approved by the Specialty Scientific Council and the Executive Council of the commission and shall be considered effective from the date the updated electronic version of this curriculum was published on the commission Web site, unless a different implementation date has been mentioned.

Correspondence:

Saudi Commission for Health Specialties

P.O. Box: 94656

Postal Code: 11614

Contact Center: 920019393

E-mail: systemadmin@scfhs.org

Website: www.scfhs.org.sa

Formatted and Designed by:

Salem M Altamimi (SCFHS)/Manoj Thomas Varghese, CMT (SCFHS)

TABLE OF CONTENTS

SAUDI FELLOWSHIP 1

TABLE OF CONTENTS 3

ACKNOWLEDGEMENTS 6

INTRODUCTION 7

MISSION STATEMENT 7

I. ADMISSION CRITERIA 8

 Interviewing 8

 Application Requirements 8

II. OBJECTIVES 9

 Candidate Fellows 9

III. RESPONSIBILITIES 10

 Fellows’ Responsibilities 10

 Scientific Committee Responsibilities 10

 Hospital Program Director Responsibilities 10

 Hospital Teaching Staff Responsibilities 11

IV. CURRICULUM CRITERIA 12

 Introduction 12

 Training Program Structure 12

V. DESCRIPTION OF ROTATIONS IN THE PROGRAM 13

 Core Rotations 13

 Pediatric Intensive Care 18

 Neonatal Intensive Care 20

 Pediatric Cardiac Anesthesia 22

 Preanesthesia Clinic 24

 Acute Pain Service 26

 Remote Area Anesthesia 28

 Elective Rotation 29

VI. CONTENTS OF THE PROGRAM 30

TABLE OF CONTENTS

Educational Program.....	30
SCFHS Universal Postgraduate Topics (E-learning modules)	30
Workshops	31
Learning Portfolio	32
VII. ASSESSMENT	34
Annual Assessment.....	34
Continuous formative evaluation	34
Summative continuous evaluation	35
Final In-training Evaluation Report (FITER)/Comprehensive Competency Report (CCR) .	35
Final Pediatric Anesthesia Saudi Fellowship Examination	35
Certification.....	35
VIII. HOLIDAYS, VACATIONS, & INTERRUPTION OF TRAINING.....	36
Holidays, Vacations & Interruption of Training	36
IX. MENTORSHIP DURING FELLOWSHIP TRAINING.....	36
Guidelines for Mentors	36
Goals	36
X. STRESS DURING FELLOWSHIP TRAINING.....	36
Stress during Fellowship Training	36
Stress Counselling	36
XI. ACCREDITATION CRITERIA	37
Accrediting a Training Center	37
Fellowship Program Director Criteria.....	37
XII. REFERENCES.....	38

XIII. APPENDICES	39
Log Book: In-Training Monthly Evaluation Form	39
Pediatric Anesthesia Topics/Skills Checklist	40
Nutrition and nutritional challenges	47
In-Training Daily Evaluation Form.....	48
Fellow’s End Of Rotation Evaluation.....	49
Faculty Assessment Form	50

ACKNOWLEDGEMENTS

The Pediatric Anesthesia Fellowship team acknowledges the valuable contributions and feedback from the scientific committee members in the development of this program. We extend special appreciation and gratitude to all the members who have been pivotal in the completion of this booklet, especially the Scientific Council, Curriculum Group, and the Curriculum Specialists. We would also like to acknowledge that the CanMEDS framework is a copyright of the Royal College of Physicians and Surgeons of Canada, and many of the descriptions competencies have been acquired from their resources.

Also a special appreciation to the Fellowship Program Founders who established it in 2004:

- Dr. Johan Van Der Walt, Chairman
- Dr. Mohamed El-Gammal
- Dr. Hossam Al-Oufi
- Dr. Abdullah Halawani

INTRODUCTION

This document defines educational goals, objectives, and curriculum for the Pediatric Anesthesia Fellowship Program in accredited hospitals within the Kingdom of Saudi Arabia (KSA). The aim of the program is to provide an opportunity for pediatric anesthesia fellows to gain maximum benefit from both teaching and the clinical opportunities available at these centers.

The program is designed to fulfill criteria of the subspecialty issued by the Saudi Commission for Health Specialties (SCFHS). Educational standards will be applied in accordance with several internationally adopted frameworks.

In order to complement the curriculum for the pediatric anesthesia fellowship, participation in a research project was introduced as a requirement for completion of the program. A work-based assessment will be part of the evaluation process to track the progress of the trainee in both skills and knowledge acquisition.

The Scientific Committee and all program directors must abide by the content of the fellowship training program approved by the SCFHS. Upon successful completion of the program, fellows will have acquired the knowledge and skills essential for the safe practice of pediatric anesthesia. They will also be in a position to provide vision and leadership in the field.

MISSION STATEMENT

To set a national standard for perioperative anesthesia care of neonates, infants, and children in the Kingdom of Saudi Arabia through recruitment, accreditation, and evaluation of candidates, in collaboration with local training centers to graduate competent pediatric anesthesiologists.

I. ADMISSION CRITERIA

Interviewing

The commission will form a committee to interview candidates. Prospective fellows must have completed the admission application and fulfilled all admission criteria in order to be interviewed.

Application Requirements

- Completion of formal residency training in anesthesiology and certification by the Saudi Commission for Health Specialties or its equivalent Or a least pass Saudi or Arab Board final written examination.
- Passed an interview conducted by the scientific committee.
- Obtained three letters of recommendation from consultants with whom the candidate has recently worked.
- Provided written permission from a sponsor, allowing the candidate to work full time basis for the duration of the training program.

II. OBJECTIVES

Candidate Fellows

- The two-year fellowship program is intended to prepare candidates to practice independently as experts in the field.
- Upon successful completion of the program, fellows must display competence in perioperative anesthetic care for neonates, infants, children, and adolescents.
- Upon successful completion of the program, fellows must exhibit the following goals according to the Royal College of Physicians and Surgeons of Canada CanMEDS competencies:

CanMEDS COMPETENCIES The fellow must exhibit sound knowledge, skills, and attitudes that lead to optimal health and healthcare outcomes.	Medical Expert <ul style="list-style-type: none"> • Demonstrate knowledge for effective patient care • Demonstrate technical competence in operative procedures • Demonstrate effective consultation services with respect to patient care, education, and legal opinions 	Communicator <ul style="list-style-type: none"> • Establish an effective relationship with patients and families • Obtain and synthesize relevant history from patients and families • Listen effectively • Discuss appropriate information with patients and families and other members of the healthcare team • Age-appropriate involvement of children in anesthetic care 	Collaborator <ul style="list-style-type: none"> • Consult with other physicians and health care professionals as appropriate • Contribute effectively to multidisciplinary team discussion and plan to execution
	Manager <ul style="list-style-type: none"> • Display managerial skills and guidance where appropriate • Optimize work-life balance • Allocate finite health care resources wisely • Work efficiently within a health care organization • Utilization of information technology to optimize patient care and lifelong learning 	Health Advocate <ul style="list-style-type: none"> • Promote the safety profile of pediatric anesthesia at the public level • Identify the important determinants of health affecting patients • Contribute effectively to improved health of patients and communities • Recognize and respond to those issues where advocacy is appropriate 	Scholar <ul style="list-style-type: none"> • Develop, implement, and document a personal education strategy • Critically appraise sources of medical information • Facilitate learning of patients, students, and other health professional • Contribute to the development of new knowledge

III. RESPONSIBILITIES

Fellows' Responsibilities

Under the one-to-one supervision of the consultants, fellows are expected to:

- Be responsible for the anesthetic care of pediatric patients
- Perform daily preoperative assessment
- Communicate with supervising staff regarding upcoming cases
- Perform scheduled on-call pediatric anesthesia duties for at least twelve (12) months of their training. The nature of this schedule will be determined by the program director of the institute.
- General guidelines for on-call duties are as follows:
 - Total number of calls per month is 7-10 days (home calls)
 - Total number of calls per month should not exceed six (6) days (in-house calls)
 - Chief fellow will prepare the call schedule
 - It is mandatory to review all cases with the anesthesiologist on-call
 - Provide consultation to other services in the hospital
 - Participate in educational and academic activities in the department
 - Maintain a log book for all anesthetics administered and procedures performed (Appendix I)
 - Teach junior staff and attend all educational department activities
 - Perform clinical research/quality projects supervised by senior staff

Scientific Committee Responsibilities

- The Scientific Committee will supervise and guide the fellowship program in accordance with this document and the General Standards for Subspecialty Training Program
- The Scientific Committee sets educational standards for the training and certification of candidates
- The Scientific Committee prepares In-Training Evaluation Reports (ITER) and
- Final In-Training Evaluation Reports (FITER) for candidate fellows
- The Scientific Committee prepares end-of-year and final oral and written examinations for candidate fellows
- The Scientific Committee promotes pediatric anesthesia at the public level and assumes the responsibility of educating the lay society about pediatric perioperative care
- The Scientific Committee develops reference practice guidelines that can be adopted and modified by local hospitals as needed to promote a unified standard of care within KSA
- Committee members will appoint a chairperson by majority vote
- Members of the committee will be the fellowship program directors of their respective hospitals, if possible

Hospital Program Director Responsibilities

- Advise the chairperson and the committee as necessary
- Coordinate the fellowship program. This includes fostering projects, teaching, topic checklist, logbook, and liaising with teaching staff
- Revise and update the curriculum once a year
- Be responsible for scheduling the fellows at various departments and hospitals

RESPONSIBILITIES

- Receive the evaluations of fellows after each clinical rotation, collate, and report to the committee every three (3) months
- Report any concerns about the performance of the fellows to the committee
- Meet with fellows at least once a month and more frequently whenever possible

Hospital Teaching Staff Responsibilities

- The teaching staff will consist of experienced pediatric anesthesiologists who have finished Pediatric Anesthesia training in a recognized hospital
- Teaching staff may consist of general anesthesiologists with multiple years of continuous care of neonates, infants, and children
- Teaching staff are expected to supervise and teach fellows during their clinical duties
- Teaching staff are expected to debrief the fellows in regard to their level of performance and to follow up their daily evaluation
- Consultant in pediatric (PICU) and neonatal intensive care unit (NICU) will supervise fellows for the ICU components of their training.

IV. CURRICULUM CRITERIA

Introduction

The Topic Checklist (see Appendix I) serves as a representative guide and is not intended to cover all aspects of pediatric anesthesia

Training Program Structure

- Program duration will be twenty-four (24) months
- The total number of fellows will be reviewed annually and adjusted according to the number of recognized training centers and their capacity to admit fellows
- Non-Saudi fellows are expected to rotate from a minimum of three (3) and up to twelve (12) months in a different institute other than their primary sponsoring hospital

Rotation	Duration (in months)
Year One (1)	
Core Pediatric Anesthesia	09
Intensive Care	01
Pre-Anesthesia Clinic	01
Year Two (2)	
Core Pediatric Anesthesia	03
Pediatric Cardiac Anesthesia	03
Elective	01
Intensive Care	01
Acute Pain Service	01
Remote Area Anesthesia	02

V. DESCRIPTION OF ROTATIONS IN THE PROGRAM

Core Rotations

Objective

To develop competencies in providing anesthetic care for premature and term infants, children, and adolescents

Total Duration

Twelve (12) months-may be completed in more than one hospital

Outline of Training

- Year One: Nine (9) months
- Year Two: Three (3) months

During these rotations, fellows are expected to be involved in caring for pediatric cases with complicated congenital physiology and major surgical procedures using general and regional anesthesia techniques.

Medical Expert/Clinical Decision Maker

The fellows will acquire an understanding of the anatomic, physiologic, pharmacologic, and psychological differences between neonates, children, and adolescents in relation to anesthesia practice. They must demonstrate knowledge concerning:

- The Respiratory System
 - Anatomic differences of the neonate and pediatric airway
 - Age differences in control of respiration, compliance, lung volumes, oxygen consumption
 - Neonatal postoperative apnea
- The Cardiovascular System
 - Anatomy and physiology of transitional circulation
 - Maturation of the myocardium and autonomic nervous system
 - Normal vital signs for ages
- The Central Nervous System
 - Anatomic differences: fontanelles
 - Age differences: intracranial pressure, cerebral blood flow, and autoregulation
- The Genitourinary System
 - Renal Maturation
 - Fluids & electrolytes, maintenance requirements, hydration assessment
- The Gastrointestinal/Hepatic System
 - Feeding, fasting guidelines
 - Glucose control
 - Maturation of hepatic function
- Hematological System
 - Normal values in infants and children
 - Natural history of fetal hemoglobin
 - Blood component therapy

- Thermoregulation
 - Body surface area and heat loss
 - Differences and ability to thermoregulate
 - Heat loss & prevention
- Psychological Issues
 - Anxiety/fear at different ages
 - Separation anxiety and parental anxiety
 - Use of premeditations
- Pharmacology
 - Pediatric induction techniques, inhalation, intravenous, sedation
 - Age differences in: volume of distribution, pharmacokinetics, pharmacodynamics, and toxicity
- Pain Management
 - Options for regional and neuraxial analgesia, ultrasound guidance
 - Multi-modal analgesic techniques
 - Differences in performing epidural blocks in children vs. adults
- Anesthesia Equipment
 - Equipment specific to patient age, circuit ventilators
 - Sizes of masks, endotracheal tube, laryngeal mask airway, laryngoscopy blades, bronchoscope, GlideScope
 - Vascular access and invasive monitoring
 - Regional block equipment
 - Warming devices

Pediatric-Specific Diseases

The fellow should demonstrate understanding of coexisting diseases in pediatric patients to aid in providing safe anesthetic care for children. Such patients include:

- Full term infants, former preterm infants, and healthy children and adolescents presenting for common surgical procedures, as well as neonates and premature infants requiring anesthetic management
- Respiratory Disease
 - Upper respiratory tract infections
 - Asthma
 - Cystic fibrosis
 - Obstructive sleep apnea
 - Stridor (congenital and acquired), e.g., cystic hygroma, epiglottitis, croup, retropharyngeal abscess
- Gastrointestinal Disease
 - Hepatobiliary disease
 - Gastroesophageal reflux
 - Feeding disorders
- Neuromuscular Disease
 - Hydrocephalus
 - Repaired Spina Bifida
 - Cerebral palsy

- Muscular dystrophy
- Myotonic dystrophy
- Seizure disorders and developmental delay
- Infections
 - Hepatitis, tuberculosis, HIV
- Endocrine and Metabolic
 - Diabetes
 - Thyroid
 - Obesity
 - Mitochondrial Disease & mucopolysaccharidosis
- Hematologic/Oncologic
 - Anemias: sickle cell disease, thalassemia
 - Bleeding disorders: hemophilia, von Willebrand
 - Malignancies
 - Mediastinal masses
- Common Syndromes
 - Down syndrome
 - Other syndromes: e.g., Pierre Robin Sequence, Crouzon, Goldenhar, Treacher Collins, etc.

Pediatric-Specific Procedures

- Preterm infant and neonate
 - Tracheoesophageal fistula repair, omphalocele, gastroschisis, congenital diaphragmatic hernia
 - Bowel obstruction, necrotizing enterocolitis, duodenal atresia, malrotation, volvulus, imperforate anus
- Term infant
 - Hernia
 - Pyloromyotomy
- General Surgery
 - Appendectomy
 - Cholecystectomy
 - Thoracic surgery, thoracoscopy including the need for lung isolation
- Otolaryngology
 - Tonsillectomy and adenoidectomy, including post-tonsillectomy bleed
 - Myringotomy, mastoidectomy
 - Thyroidectomy, tympanoplasty
 - Laryngoscopy for diagnosis and treatment, airway papillomas, epiglottitis
 - Bronchoscopy, removal of foreign body from the airway
 - Laryngeal/tracheal reconstruction
 - Neonatal airway surgery
- Orthopedic Surgery
 - Fracture reduction
 - Soft tissue surgery
 - Clubfoot repair

- Congenital/acquired, e.g., cerebral palsy
- Spinal Surgery
 - Plastic surgery
 - Cleft lip/palate, isolated
 - Burn debridement/skin grafting
 - Craniofacial reconstruction surgery
- Neurosurgery
 - Ventriculoperitoneal shunt insertion, revision
 - Tumor resection
 - Myelomeningocele repair
- Urology
 - Circumcision
 - Hypospadias repair
 - Ureteric reimplantation
 - Cystoscopy, nephrectomy
 - Renal transplant
 - Bladder exstrophy repair
- Ophthalmology
 - Strabismus
 - Cataract
 - Laser for retinopathy of prematurity
 - Open globe injury repair
- Dental Surgery
 - Dental extraction/restorations
 - Orthognathic surgery
- Perioperative/postanesthesia care unit (PACU) issues
 - Delirium
 - Post-extubation stridor
 - Pain
 - Laryngospasm
 - Nausea and vomiting
- Regional
 - Single-shot caudal blocks
 - Ilioinguinal
 - Dorsal penile blocks
 - Neuraxial nerve block techniques
 - Ultrasound-guided regional blocks

Communicator

The provision of anesthesia in the pediatric setting is unique as the healthcare provider must be able to communicate in an appropriate and age-specific manner with the patients and their parents as well as other members of the healthcare team. The fellow will:

- Demonstrate application of knowledge of age-specific psychological concerns of pediatric patients and be able to respond to these concerns at an age-appropriate level

- Establish an effective relationship with both pediatric patients and parents emphasizing understanding, trust, empathy, and confidentiality
- Synthesize relevant information from the patient and family and be able to consider the impact of the child's age, gender, background, and emotional influences on illness
- Discuss an appropriate perioperative plan with the child and family and facilitate the optimal management of this plan for the benefit of the patient
- Communicate a succinct assessment and perioperative anesthetic management plan to attending staff
- Participate in pediatric anesthesia rounds to continue to develop formal presentation skills

Collaborator

The successful delivery of perioperative care requires the effective collaboration of the anesthetist, surgeon, nurses, and adjunct personnel. The fellow will:

- Effectively consult with other healthcare professionals and demonstrate appropriate judgment regarding the assessment of pediatric anesthetic risk
- Coordinate the care of pediatric patients with other health professionals in various departments
- Demonstrate skill in managing crises such as hemodynamic or respiratory instability and cardiac arrest as a team member or leader

Manager

The fellow will:

- Demonstrate efficient use of time regarding patient assessment, operating room (OR) set-up, anesthesia induction, and transfer to PACU or ICU, as well as operating room turnover
- Demonstrate the ability to make judgments regarding the cost-effective use of anesthesia resources with regards to drug and equipment options
- Demonstrate awareness of the principles and priorities for patient scheduling, OR lists (elective and emergent), as well as postoperative areas of disposition such as ICU, PACU, and ward
- Demonstrate the ability to manage after-hours scheduling of cases including prioritization, and to adapt to unanticipated scheduling changes

Scholar

The fellow will:

- Demonstrate development, implementation, and monitoring of a personal continuing education strategy
- Demonstrate the ability to critically appraise current anesthesia literature and apply new knowledge based on appropriate evidence
- Demonstrate effective oral presentation of case reports, journal club, or rounds, with synthesis of pertinent information
- Demonstrate effective teaching when assigned medical students or residents

Health Advocate

The fellow will:

- Demonstrate knowledge and recognition of broad health and societal issues with an effect on anesthetic care of the pediatric surgical patient
- Demonstrate safe anesthesia working practices such as effective anesthesia gas scavenging, handling of air-borne and blood-borne pathogens, and appropriate handling of narcotics.

Professional

The fellow will:

- Deliver anesthesia care with integrity, honesty, and compassion
- Demonstrate the attitude, behavior, and ethical standards expected of a practitioner of anesthesia
- Be aware of the ethical and legal aspects of the care of the pediatric patient
- Recognize personal limits through appropriate consultation with other healthcare professionals, and show appropriate respect to those consulted
- Demonstrate respect for patients by including the patient and family in discussions of care management
- Recognize potential conflicts in patient-care situations, professional relationships, and value systems, and demonstrate the ability to discuss and resolve differences of opinion
- Be able to accept constructive feedback and criticism and to implement appropriate advice

Pediatric Intensive Care

Objective

To develop competencies in managing ventilated and critically ill children with common congenital anomalies and postoperative pediatric patients

- Total duration: one (1) month
- Outline of Training: one (1) critical care rotation (NICU or PICU) must be completed during the first year of fellowship

The fellow should understand the pathophysiology and management of common serious pediatric problems in the PICU.

Medical Expert

- Understand normal physiology and pathophysiology of major organ systems
- Demonstrate thorough knowledge of etiology, pathophysiology, clinical features, diagnosis, complications, management, prognosis, and prevention of common PICU problems such as:
 - Cardiopulmonary failure and arrest
 - Respiratory failure
 - Septic shock and multiple organ dysfunction syndrome (MODS)
 - Nutrition: enteral and parenteral

- Renal failure, and electrolyte and acid-base abnormalities
- Hematologic dysfunction and blood product replacement therapy
- Neurological emergencies: coma, status epilepticus, intracranial hypertension
- Pain, anxiety, sedation
- Brain death and organ donation
- Toxicology
- Polytrauma, traumatic brain injury, and burns
- Understand the roles and implications of aggressive care, palliative care, and code status decision

Communicator

- Demonstrate effective tools for gathering historical information from patients and their families in the critical care setting
- Efficiently present patient problems, assessment, and treatment plan during rounds
- Discuss diagnoses, investigations, and management options with patients and their families
- Communicate and support patients and families confronted with critical illness
- Be able to communicate bad news to families of children with critical illness

Collaborator

- Recognize and respect the roles of allied healthcare professionals (physicians, nursing personnel, and supporting critical care personnel) in the management of critically ill patients
- Demonstrate appropriate use of consultations
- Work and communicate effectively in a team with other physicians and allied healthcare professionals to develop a care plan for the patient

Manager

- Develop time-management skills to balance priorities for patient care, work practice, and personal life
- Organize and prioritize the care of many sick patients with multiple problems
- Rationally use healthcare resources wisely

Health Advocate

- Identify opportunities for patient counseling and education regarding their medical condition
- Understand and adapt patient assessment and management based on important determinants of health (psychosocial, economic, and biologic)

Scholar

- Demonstrate the ability to generate clinical questions related to patient care
- Critically appraise the literature regarding issues in critical care medicine
- Utilize information technology to optimize patient care and life-long learning
- Adapt variable teaching skills

Professional

- Demonstrate professional attitudes, altruism, honesty, integrity, and respect in interactions with patients, families, and other healthcare professionals, or when facing ethical situations
- Deliver high-quality care with integrity and compassion
- Recognize and acknowledge personal emotional reactions and limitations in one's own knowledge, skills, and attitudes

Neonatal Intensive Care

Objective

To develop competencies in managing ventilated and critically ill premature infants and neonates with common congenital anomalies and postoperative pediatric patients

- Total duration: one (1) month
- Outline of training: one (1) critical care rotation (NICU or PICU) must be completed during the first year of fellowship

The fellow should understand the pathophysiology and management of common serious neonatal problems in the NICU.

Medical Expert

- Understand the physiological, anatomical, and pharmacological considerations for the premature and neonate
- Be able to identify neonatal patients requiring resuscitation
- Gain an appreciation of the presentation, diagnosis, and/or perioperative management of the following:
 - Intraventricular hemorrhage
 - Patent ductus arteriosus
 - Neonatal asphyxia
 - Transient tachypnea of the newborn
 - Respiratory distress syndrome
 - Bronchopulmonary dysplasia
 - Pulmonary interstitial emphysema
 - Diaphragmatic hernia
 - Tracheoesophageal fistula
 - Necrotizing enterocolitis
 - Hyperbilirubinemia
 - Omphalocele
 - Gastroschisis
- Interpretation of laboratory results and chest X-ray (CXR) in the newborn and premature infant
- Assess and initiate resuscitation of the asphyxiated newborn according to Neonatal Resuscitation Program (NRP) guidelines
- Gain proficiency in the following procedural skills:

- Intravenous access in the premature and newborn infant, including umbilical vein/artery catheterization
- Perform lumbar puncture in the septic newborn

Communicator

- Provide a clear, concise summary of the newborn infant’s problems, both verbally and in a written format
- Communicate clearly with other healthcare workers
- Explain procedures in a clear manner and obtain informed consent from the parents for invasive procedures
- Communicate bad news to parents in a compassionate, professional, and caring manner

Collaborator

- Understand the role of the neonatologist in the peripartum management of the neonate
- Work effectively as an integral member of the NICU team
- Demonstrate an increasing sense of responsibility and case ownership
- Understand the role and importance of each member in the care of the NICU patient
- Encourage input from the multidisciplinary team members

Manager

- Be able to utilize resources effectively
- Understand the difficulties of decision-making related to resource allocation
- Practice according to national standards and international guidelines for the management of neonatal intensive care patients

Health Advocate

- Demonstrate a commitment to patient care
- Provide expertise and leadership in maintaining and improving the standards of neonatal intensive care
- Be an advocate for the family and the patient in the critical care environment

Scholar

- Have the ability to critically review and appraise the literature
- Contribute to the learning of others; teach residents and medical students

Professional

- Answer questions and keep parents updated on a neonate’s progress in a caring, reassuring, and compassionate manner
- Honor patient confidentiality
- Deliver the highest quality care with integrity and honesty

Pediatric Cardiac Anesthesia

Objective

To develop competences in the management of patients with cardiac disease scheduled for noncardiac surgical interventions or other procedures.

- Duration: three (3) months
- Outline of training: subspecialty rotation in Year Two (2)

Fellows are expected to become competent in the perioperative management of patients with cardiovascular diseases during this rotation.

Medical Expert/Clinical Decision Maker

The fellow will demonstrate knowledge of the basic sciences as applied to the preoperative, intraoperative, and postoperative periods of cardiac surgery.

- Physiology and Anatomy. The fellow is expected to:
 - Describe fetal circulation, development of the heart, and fetal physiology
 - Describe the different congenital cardiac anomalies and their surgical management
 - Describe the single ventricle pathophysiology and specific management requirements
 - Describe the altered respiratory physiology of immediate postoperative cardiac cases
 - Describe common physiological changes occurring in the postoperative period and the impact they have on end-organ function (neurologic, renal, cardiac, hepatic, gastrointestinal)
- Pharmacology. The fellow is expected to:
 - Compare common medications for cardiac surgical patients including anesthetic agents, vasodilators, vasoconstrictors, and inotropic agents
 - Explain the use of antifibrinolytic agents
 - Justify use of blood products (packed red blood cells, fresh frozen plasma, platelets, cryoprecipitate), blood alternatives (e.g., albumin) and homeostasis-stabilizing agents (desmopressin, activated factor VIIa)
- Monitoring. The fellow will:
 - Be able to interpret the electrocardiogram (ECG) for ischemia, infarction, arrhythmias, and paced rhythms
 - Acquire skills of arterial and central venous cannulation (with ultrasound)
 - Interpret central venous pressure and know the indications, complications, and management
 - Know the basics of introductory transesophageal echocardiography (TEE), including techniques of probe insertion and several basic views, and implications and application in the critical care patient
 - Know the significance of temperature management in the intraoperative period, including hypothermic techniques
 - Understand the indicators of volume status, especially when weaning from bypass, including the findings from invasive monitors, TEE, and clinical indicators
- Clinical Assessment & Management. The fellow will:

- Know current indications and recommendations for subacute bacterial endocarditis prophylaxis
- Be able to correct common derangements in metabolic and electrolyte disturbances in the intraoperative period
- Know the basic principles of cardiac support devices including the intra-aortic balloon pump and extracorporeal membrane oxygenation (ECMO)
- Know the common pathophysiology and management of patients with:
 - Common congenital anomalies, e.g., atrial septal defect, ventricular septal defect, patent ductus arteriosus, tetralogy of Fallot
 - Complex congenital heart disease e.g., transposition of the great vessels, truncus arteriosus, single ventricle physiology, abnormal pulmonary venous return
 - Heart transplant recipients
 - Palliative procedures: e.g., Norwood, bicavopulmonary anastomosis, Fontan
 - Obstructive lesions and pulmonary hypertension
 - Valvular heart disease for valve replacement or repair
 - Shock and the use of volume resuscitation, venodilators/constrictors, inotropes, and myocardial relaxants
 - Cardiac tamponade
 - Dilated, restrictive, or obstructive cardiomyopathy, congestive heart failure (CHF), and diastolic dysfunction
 - Aberrant conduction, dysrhythmia, sudden acute and subacute ventricular and supraventricular arrhythmia
 - Pacemakers and the indications for and applications of the various modes of temporary pacing
 - Pulmonary edema and CHF
 - Heparin-induced thrombocytopenia and heparin resistance
 - Neurologic risk stratification during cardiopulmonary bypass procedures

Communicator

The fellow will be able to:

- Demonstrate effective communication with patients and families (description of procedures, informed consent, anesthetic options and risks)
- Demonstrate effective communication with the OR team (cardiac surgeons, nurses and perfusionists) and postoperative team, especially during the initiation and removal of cardiopulmonary bypass

Collaborator

The fellow will be able to:

- Recognize the need to consult other specialists for the care and management of the critical patient
- Foster healthy team relationships

Manager

The fellow will be able to:

- Demonstrate efficient use of time regarding patient assessment, OR set-up, anesthesia induction, transfer to PACU or ICU, and OR turnover
- Demonstrate the ability to make judgments regarding the cost-effective use of anesthesia resources with respect to drug choices, as well as monitoring and other equipment options

Health Advocate

The fellow will be able to:

- Demonstrate knowledge and recognition of broad health and societal issues that affect anesthetic care of the pediatric cardiac surgical patient
- Demonstrate the use of risk reduction strategies, including use of ultrasound and sterile technique for invasive lines

Scholar

The fellow will:

- Demonstrate commitment to continuing personal education including the use of information technology
- Demonstrate ability to critically appraise current anesthesia literature and apply new knowledge based on appropriate evidence
- Demonstrate effective teaching when assigned medical students or residents

Professional

The fellow will:

- Always demonstrate respectful and compassionate behavior toward patients, their families, and other health care providers
- Demonstrate the attitude, behavior, and ethical standards expected of a practitioner of anesthesia
- Be aware of the ethical and legal aspects of the care of the pediatric cardiac patient
- Recognize potential conflicts in patient care situations, professional relationships, and value systems, and demonstrate the ability to discuss and resolve differences of opinion

Preanesthesia Clinic

Objective

To develop competencies in the assessment of patients scheduled for day surgery or same day admission

- Duration: one (1) Month
- Outline of training: This should be done during Year One

During these rotations, fellows are expected to spend one (1) month in the preanesthesia clinic to acquire the following competencies:

Medical Expert/Clinical Decision Maker

The fellow will be able to:

- Demonstrate appropriate anesthesia-specific history and physical examination skills, including assessment of the airway
- Demonstrate a working knowledge of indications and recommendations for ordering invasive and noninvasive investigations preoperatively
- Demonstrate the ability to synthesize a reasonable investigative anesthetic management plan based on the nature and urgency of surgery

Communicator

The fellow will:

- Communicate appropriately with patients and families in the preanesthesia clinic, explaining findings of the history and physical examination and provide a reasonable management plan
- Provide a concise note regarding patient assessment and plan
- Establish an effective relationship with both patients and parents emphasizing understanding, trust, empathy, and confidentiality

Collaborator

The fellow will:

- Effectively consult with other healthcare professionals and demonstrate appropriate judgment regarding the assessment of pediatric anesthetic risk
- Coordinate the care of pediatric patients with other health professionals in various departments
- Interact well with the multidisciplinary team in the preadmission clinic.

Manager

The fellow will:

- Demonstrate efficient use of time regarding patient assessment, OR set-up, anesthesia induction, transfer to PACU or ICU, and OR turnover between cases
- Demonstrate the ability to make judgments regarding the cost-effective use of anesthesia resources in drug and equipment options and monitoring
- Demonstrate awareness of the principles and priorities for patient scheduling, OR lists (elective and emergent), and ICU, PACU, and ward care postoperatively
- Demonstrate the ability to manage after-hours scheduling of cases with regards to prioritization of cases and adapting to schedule changes

Scholar

The fellow will:

- Demonstrate development, implementation, and monitoring of a personal continuing education strategy

- Demonstrate the ability to critically appraise current anesthesia literature and apply new knowledge based on appropriate evidence
- Demonstrate effective oral presentation of case reports, journal club, or rounds, with synthesis of pertinent information
- Demonstrate effective teaching when assigned medical students or residents

Health Advocate

The fellow will:

- Understand the anesthesiologist's role in optimizing preoperative patient status
- Take steps to improve perioperative patient safety
- Provide risks and benefits of proposed anesthetic management plans and postoperative pain control options
- Understand the anesthesiologist's role in blood conservation and be able to describe the pros and cons of different blood conservation strategies

Professional

The fellow will:

- Demonstrate the attitude, behavior, and ethical standards expected of a practitioner of anesthesia
- Be aware of the ethical and legal aspects of the care of the pediatric patient
- Be able to recognize personal limits through appropriate consultation with other physicians and healthcare professionals, and to show appropriate respect for those consulted

Acute Pain Service

Objective

To develop competencies in the management of patients who need multimodal analgesia after surgical intervention or during medical illness

- Duration: one (1) month
- Outline of training: this should be done during Year Two (2)

During these rotations, fellows are expected to rotate with the acute pediatric pain management service.

Medical Expert/Clinical Decision Maker

The fellow will:

- Demonstrate the ability to assess patient- and surgery-specific needs and options for perioperative pain control
- Demonstrate the ability to assess patients with nonsurgical conditions requiring pain management
- Have working knowledge of indications, contraindications, and complications of drugs used in acute pain management
- Understand the rationale behind multimodal perioperative analgesia
- Demonstrate the ability to assess and modify acute analgesia management plans

Communicator

The provision of anesthesia in the pediatric setting is unique, as the healthcare provider must be able to communicate in an appropriate and age-specific manner with patients and their parents as well as other members of the healthcare team. The fellow will:

- Demonstrate application of knowledge of age-specific psychological concerns of pediatric patients and ability to respond to these concerns at an age-appropriate level
- Establish an effective relationship with both pediatric patients and parents emphasizing understanding, trust, empathy, and confidentiality
- Synthesize relevant information from the patient and family and be able to assess the impact of age, gender, background, and emotional influences on illness
- Discuss appropriate perioperative plans with the child and family to facilitate the optimal management plan
- Communicate a succinct assessment and perioperative anesthetic management plan to the attending staff
- Participate in pediatric anesthesia rounds to continue to develop formal presentation skills

Collaborator

The successful delivery of perioperative care requires the effective collaboration of the anesthesiologist, surgeon, nurse, and adjunct personnel. The fellow will:

- Effectively consult with other healthcare professionals and demonstrate appropriate judgment regarding the assessment of pediatric anesthetic risk
- Coordinate the care of pediatric patients with other health professionals in various departments

Manager

The fellow will be able to efficiently prioritize patients as they participate in the acute pain service rounds.

Scholar

The fellow will:

- Demonstrate development, implementation, and monitoring of a personal continuing education strategy
- Demonstrate ability to critically appraise current anesthesia literature and apply new knowledge based on appropriate evidence
- Demonstrate effective teaching when assigned medical students or residents

Health Advocate

The fellow will:

- Demonstrate an understanding of the unique patient safety issues and complications that can arise with perioperative pain control strategies
- Be able to counsel patients or parents on a variety of pain control options and describe the risks and benefits of each

Professional

The fellow will:

- Display professional behavior and attitude while dealing with patients, families, and staff
- Demonstrate respect for patients by including the patient and family in discussions of care management
- Recognize potential conflicts in patient care situations, professional relationships, and value systems, and demonstrate the ability to discuss and resolve differences of opinion
- Be able to accept constructive feedback and criticism and implement appropriate advice

Remote Area Anesthesia

Objective

To develop competences in the managements of patients who require diagnostic or interventional radiological procedures

- Duration: two (2) months
- Outline of training: This should be done during Year Two

This is a two-month rotation during which fellows will be exposed to anesthesia and sedation practice outside the environment of the operating room.

Medical Expert/Clinical Decision Maker

The fellow will be able to:

- Demonstrate location, patient, and procedure-specific knowledge of unique anesthesia considerations outside of the operating room
- Understand the pros and cons of sedation versus general anesthesia for outlying procedures
- Understand the principles of anesthesia practice in such procedures including but not limited to magnetic resonance imaging, computed tomography (CT), angiography, ultrasound-guided biopsy, radiation therapy, dental, dermatologic, and bone marrow biopsies, and burn dressing

Communicator

The fellow will:

- Communicate a succinct assessment and perioperative anesthetic management plan to attending staff
- Clearly communicate specific requests and concerns to staff that may be requested by the anesthesia team

Collaborator

The fellow will:

- Effectively consult with other health care professionals and demonstrate appropriate judgment regarding the assessment of pediatric anesthetic risk
- Coordinate the care of pediatric patients with other health professionals in various departments
- Demonstrate skill in managing crisis situations as a team member or team leader

Manager

The fellow will:

- Demonstrate efficient use of time regarding patient assessment, OR set-up, anesthesia induction, and transfer to PACU or ICU, and OR turnover
- Demonstrate awareness of the principles and priorities for patient scheduling

Scholar

The fellow will:

- Demonstrate development, implementation, and monitoring of a personal continuing education strategy
- Demonstrate effective teaching when assigned medical students or residents

Health Advocate

The fellow will:

- Ensure proper equipment and personnel are available prior to starting the provision of anesthesia services
- Understand the principles of and compliance with radiation safety for the patient and staff

Professional

The fellow will:

- Deliver anesthesia care with integrity, honesty, and compassion
- Demonstrate the attitude, behavior, and ethical standards expected of a practitioner of anesthesia
- Be aware of the ethical and legal aspects of the care of the pediatric patient
- Show recognition of personal limits through appropriate consultation with health professionals, and show appropriate respect for those consulted

Elective Rotation

Objective

To develop extra skills and knowledge in any area of special interest for each fellow

- Duration: one (1) month
- Outline of training: fellows can spend this period in any clinical rotation of interest or can devote more time to their graduation project

VI. CONTENTS OF THE PROGRAM

Educational Program

Fellows are expected to attend one (1) academic day per month reserved for fellow education, which includes:

- Lectures (Appendix I)
- Problem-based learning discussion (Appendix II)
- Care-based discussion
- Journal clubs
- Attendance of the academic day is mandatory; attendance of less than 75% will result in the following:
 - Written warning from the Program Director
 - Notification of the Scientific Committee of unsatisfactory attendance by the fellow to take appropriate action

SCFHS Universal Postgraduate Topics (E-learning modules)

These are high-value, interdisciplinary topics of utmost importance to the trainee. The reason for delivering the topics centrally is to ensure that every trainee receives high-quality teaching and develops essential core knowledge. Fellows are highly encouraged to go over the following modules:

Module 1

- Safe drug prescribing
- Hospital acquired infections
- Sepsis; Systemic Inflammatory Response Syndrome; Disseminated Intravascular Coagulation
- Antibiotic stewardship
- Blood transfusion

Module 2

- Side effects of Chemotherapy and Radiation Therapy

Module 3

- Abnormal ECG in diabetes and metabolic disorders

Module 4

- Preoperative assessment
- Postoperative care
- Acute pain management
- Chronic pain management
- Management of fluid in the hospitalized patient
- Management of electrolyte imbalances

Module 5

- Occupational hazards
- Evidence-based approach to smoking cessation
- Patient advocacy
- Ethical issues: transplantation/organ harvesting; withdrawal of care
- Ethical issues: treatment refusal; patient autonomy
- Role of doctors in death and dying

Workshops

Fellows are expected to attend the following mandatory workshops once during their training period.

Pediatric Crisis Management (Simulation-Based)

Objectives: By the end of this simulation-based workshop, fellows are expected to:

- Challenge their technical and theoretical knowledge during simulation, and demonstrate their ability to recognize and treat realistic and complex perioperative pediatric situations
- Demonstrate professional skills in dealing with OR conflicts with regards to pediatric patients or their parents
- Manage critical hemodynamic and respiratory events with up-to-date techniques in a safe learning environment
- Reflect on their role in approaching leadership and effective communication within highly interactive small group debriefing sessions, which are held in strict confidence

Neonatal Crisis Management (Simulation-Based)

Objectives: By the end of this simulation-based workshop, fellows are expected to:

- Challenge their technical and theoretical knowledge during simulation, and demonstrate their ability to recognize and treat complex perioperative neonatal emergencies
- Manage critical events (including hemodynamic compromise and respiratory failure) during or after anesthesia for preterm infants and neonates with up-to-date techniques in a safe learning environment
- Reflect on the fellow's role in approaching leadership, effective communication and collaboration within highly interactive small groups, and debriefing under strict confidentiality

CanMEDS competencies: This can be covered during the workshop: medical expert, communicator, collaborator, and professional.

Difficult Airway Workshop (Simulation-Based)

Objectives: By the end of this simulation-based workshop, fellows will be able to:

- Discuss the difficult airway algorithms available for the pediatric population
- Practice pediatric airway management with different commercially available pediatric difficult airway tools under the guidance of experts in the field

- Demonstrate the handling and care of flexible fiber optic laryngoscopes
- Demonstrate skills for emergent invasive airway access with available commercial tools
- Apply the algorithm to different clinical case scenarios using low to high fidelity simulators

CanMEDS competencies: This can be covered during the workshop: medical expert, communicator, collaborator, and professional.

Comprehensive Revision Course

Objectives: By the end of this simulation-based workshop, fellows will:

- Show familiarity with the standard of care in pediatric cases, with open discussion with an expert in the subspecialty
- Demonstrate critical thinking and depth of knowledge by participating in a group discussion format
- Respond to advanced challenging oral exam scenarios extracted from national and international references in an organized and efficient manner
- Be able to exchange experiences with peers to improve their approach to complex cases
- Give positive critique through reflection on their own performance and through observing other colleagues

CanMEDS competencies: This can be covered during the workshop: medical expert, communicator, collaborator, and professional.

Pediatric Advanced Life Support (PALS) Course

- A valid certificate will be accepted.

Fellows are highly encouraged to attend national/international conferences or courses in the field of Pediatric Anesthesia or any CanMEDS competency.

Learning Portfolio

Log Book

- Fellows are expected to document all cases and procedures completed in a log book to be presented at the end of each academic year.
- The recommended minimum number of procedures to achieve skills development is twenty-five (25) of each. Such procedural skills include invasive lines, neonatal intubations, and neuraxial blocks (caudal/epidural).
- A minimum of six-hundred (600) logged cases registered during the two-year training program is required.
- Feedback by the program director will be given to the fellows at the end of each academic year and instructions will be given to fulfill deficient procedures.

Research Project

Fellows must complete a project at the end of training, which can be any of the following:

- Pediatric Anesthesia-related evidence-based policy & procedure
- Pediatric Anesthesia local guidelines
- Case report
- Qualitative or quantitative research project

Scholar Activity

- Fellows are expected to present grand rounds once every academic year in their department.
- Fellows are expected to participate in theater teaching for residents and medical students.
- Fellows are highly encouraged to participate in national/international meetings to present research projects or other topics of their interest.

VII. ASSESSMENT

Description: Evaluation and assessment of fellows throughout the program are undertaken in accordance with the Commission's training and examination rules and regulations. This includes the following:

Annual Assessment

Continuous Appraisal

This assessment is conducted toward the end of each training rotation throughout the academic year and at the end of each academic year as a continuous means of both formative and summative evaluation.

Continuous formative evaluation

To fulfill the CanMEDS competencies based on the end-of-rotation evaluation, the fellow's performance will be evaluated jointly by relevant staff members who will assess the following competencies:

1. Performance of the trainee during daily work.
2. Performance and participation in academic activities (see the "Evaluation of the presenter by staff supervisor" form below).
3. Performance in 10 to 20 minutes of directly observed trainee–patient interaction. Trainers are encouraged to perform at least one assessment per clinical rotation, preferably near the end of the rotation. Trainers should provide timely and specific feedback to the trainee following each assessment of trainee–patient encounters (i.e., monthly evaluation, rotational Mini-CEX*, CBDs, ** DOPS, *** and MSF****) (Appendix).
4. Trainee's performance of diagnostic and therapeutic procedural skills. Timely and specific feedback from the trainer to the trainee is mandatory following each procedure (direct observation of procedural skills).
5. The CanMEDS-based competencies end-of-rotation evaluation form must be completed (preferably in electronic format), with the signatures by the attending consultants, within two weeks of the end of each rotation. The program director discusses evaluations with fellows as necessary. The evaluation form is submitted to the SCFHS Regional Training Supervisory Committee within four weeks of the end of the rotation.
6. Academic and clinical assignments should be documented on an electronic tracking system (e-Logbook, when applicable) on an annual basis. Evaluations are based on accomplishment of the minimum requirements for the procedures and clinical skills, as determined by the program.

*Clinical evaluation exercises

**Case-based discussions

***Direct observation of practical skills

****Multisource feedback

Summative continuous evaluation

A summative continuous evaluation report is prepared for each fellow at the end of each academic year and may also involve clinical or oral examinations, an objective structured practical examination, or an objective structured clinical examination.

End-of-first-year examination:

The end-of-year examination will be limited to F1 fellows. The number of examination items, eligibility, and passing score are established in accordance with the Commission's training and examination rules and regulations. Examination details and a blueprint are published on the Commission website, www.scfhs.org.sa

Final In-training Evaluation Report (FITER)/Comprehensive Competency Report (CCR)

In addition to the local supervising committee's approval of the completion of the clinical requirements (via the fellow's logbook), the program directors prepare a FITER for each fellow at the end of the final year of fellowship (F2). This could also involve clinical or oral examinations or completion of other academic assignments.

Final Pediatric Anesthesia Saudi Fellowship Examination

The final Saudi Fellowship examination consists of two parts:

1. Written Examination

This examination assesses the trainee's theoretical knowledge base (including recent advances) and problem-solving capabilities in Pediatric Anesthesia specialty; it is delivered in MCQ format and is held at least once per year. The number of examination items, eligibility, and passing score are established in accordance with the Commission's training, and examination rules and regulations. Examination details and a blueprint are published on the Commission's website, www.scfhs.org.sa

2. Oral Structure Clinical Examination (OSCE):

This examination assesses a broad range of high-level clinical skills, including data gathering, patient management, communication, and counseling. The examination is held at least once per year, as an objective structured clinical examination (OSCE) in the form of patient management problems (PMPs). Eligibility and the passing score are established in accordance with the Commission's training and examination rules and regulations. Examination details and a blueprint are published on the Commission website, www.scfhs.org.sa

Certification

A certificate acknowledging training completion will only be issued to the fellow upon successful fulfillment of all program requirements. Candidates passing all components of the final specialty examination are awarded the "Saudi Fellowship of Pediatric Anesthesia" certificate.

VIII. HOLIDAYS, VACATIONS, & INTERRUPTION OF TRAINING

Holidays, Vacations & Interruption of Training

As per SCFHS postgraduate rules and regulations www.scfhs.org.sa

IX. MENTORSHIP DURING FELLOWSHIP TRAINING

Guidelines for Mentors

Fellows will have access to mentors during their training via this link to the SCFHS mentors' manual: <http://www.scfhs.org.sa/Pages/default.aspx>

Goals

- Guide fellows towards personal and professional development through continuous monitoring of progress
- Early identification of struggling fellows as well as high achievers
- Early detection of fellows who are at risk of emotional and psychological disturbances
- Provide career guidance

X. STRESS DURING FELLOWSHIP TRAINING

Stress during Fellowship Training

Recognizing that fellowship training can be a period of physical, mental, and emotional stress, the Program Director provides continuous support for fellows in the program. In some instances a review of the fellow's personal concerns are discussed at the Scientific Committee Meeting.

Stress Counselling

Some fellows may experience stress during their training that is due to multiple factors

- Any fellow experiencing such issues can meet with the Program Director to seek advice
- The Scientific Committee will be asked to help with such issues if the Program Director is unable to
- The Scientific Committee will generate a report with recommendations
- The committee may request additional members to join the committee and help with resolution of the matter as needed.

XI. ACCREDITATION CRITERIA

Accrediting a Training Center

For a hospital to be accredited to participate in training of fellows, the following requirements must be fulfilled:

- Training hospital must meet the requirements for accreditation as detailed in the general accreditation by-laws.
- Training hospital must have a minimum of two (2) qualified subspecialty consultants registered in the SCFHS with satisfactory experience in teaching and commitment to carry out the training.
- Training hospital must have an approved division (section) of pediatric anesthesia
- Training hospital must have a separate pediatric anesthesia on-call schedule
- The hospital must be classified as a tertiary care hospital. Should the hospital not provide tertiary care, the fellow assigned to its program must complete a full year distributed among other approved tertiary care hospitals in the Kingdom
- Curriculum-based teaching activities as approved by the SCFHS should be designed so that each trainee may enjoy a high-quality learning experience.
- Research-oriented activities that allow the fellow sufficient exposure and participation are encouraged
- The hospital must allow the fellow to perform a certain number of procedures to be mastered during training
- The accredited hospital may periodically be reviewed by the Scientific Committee. Accreditation will be renewed periodically, according to SCFHS accreditation by-laws

Fellowship Program Director Criteria

The fellowship program director must:

- Be board-certified or an experienced pediatric anesthesiologist. He/she should be committed and actively involved in the clinical practice of pediatric anesthesia
- Have a strong background in teaching and research
- Have a minimum of six (6) years of general anesthesia experience and two (2) years of pediatric anesthesia experience
- Be experienced in postgraduate training, education, and research
- Be interested, authorized, and have the time required to fulfill teaching responsibilities in order to develop, implement, and achieve the educational goals of the fellowship
- Be given adequate time and resources to discharge his/her responsibilities

XII. REFERENCES

- 1) Manual of Pediatric Anesthesia: With an Index of Pediatric Syndromes By Jerrold Lerman MD (6th Edition)
- 2) A Practice of Anesthesia for Infants and children By Charles J. Cote MD (5th Edition)
- 3) Gregory's Pediatric Anesthesia By George A Gregory (5th Edition)
- 4) Smith's Anesthesia for infants and children By Peter Davies (8th Edition)
- 5) Pediatric Anesthesia By Bruno Bissonnette (1st Edition)
- 6) Anesthesia for Congenital Heart Disease By Dean B Andropoulos (2nd Edition)
- 7) Critical Heart Disease in Infants and Children By David Nichols (2nd Edition)

XIII. APPENDICES

Log Book: In-Training Monthly Evaluation Form

Ministry of National Guard - Health Affairs
King Abdulaziz Medical City
DEPARTMENT OF ANESTHESIA

LOGBOOK FOR PEDIATRIC ANESTHESIA FELLOWSHIP PROGRAM

No.	Date	MRN	Weight (in Kg.)	Age	Date of Birth			ASA	Surgery Procedures	Technical Procedure	Comments
					Day	Month	Year				
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

- Neonatal Surgery:**
1- Laparoscopy
2- LMA
3- DCP
4- PMSSE
5- Pyrene Stomach
6- Diaphragmatic Hernia
7- Diaphragmatic Hernia
8- Diaphragmatic Hernia
9- Malrotation

- A. AIRWAY:**
1- LMA
2- LMA
3- PMSSE
4- PMSSE
5- Bronchial Blocker
6- Awake
7- DCP
8- PDSI

- C. REGIONAL BLOCK**
1- Spinal
2- Epidural
3- Epidural Catheter
4- Spinal
5- TAP Block
6- TAP Block
7- Medius Sheath Block
8- Spinal Catheter
9- Spinal Catheter
10- Spinal Catheter
11- Spinal Catheter
12- Spinal Catheter
13- Spinal Catheter
14- Spinal Catheter
15- Spinal Catheter
16- Spinal Catheter
17- Spinal Catheter
18- Others

Pediatric Anesthesia Topics/Skills Checklist

Physiology and physical development

In children. By the end of the interactive lecture, the fellow will be able to:

- Describe the transition from fetal circulation after birth
- Differentiate between normal and abnormal growth and organ development of a child
- Comprehend the physiological properties of pediatric patients that differ from adults
- Discuss both anatomical and physiological anesthetic considerations for pediatric patients

Pediatric pharmacology

By the end of the interactive lecture, the fellow will be able to:

- Describe the principles of applied pharmacodynamics and pharmacokinetics in pediatrics in relationship to growth and development
- Describe the indications, appropriate doses, and monitoring techniques of common anesthetic and nonanesthetic medications used perioperatively for pediatric patients
- Evaluate the current evidence for concern about the effect of anesthetics on the growing brain

Psychological development & perioperative anxiety in children

By the end of the interactive lecture, the fellow will be able to:

- Describe the cognitive development of children at different stages of development
- List the risk factors for perioperative anxiety
- Discuss the procedural outcomes related to perioperative anxiety
- Describe the pharmacological and behavioral intervention for perioperative anxiety
- Compare the pharmacological and behavioral interventions based on current evidence
- Discuss the management of emergence-related behavioral changes (e.g., emergence delirium)

Perioperative fluid therapy

By the end of the interactive lecture, the fellow will be able to:

- Comprehend the principles of fluid management in neonatal and pediatric patients
- Compare the use of different types of fluids (e.g., crystalloids vs. colloids) in different anesthesia plans for different surgeries
- Describe intraoperative deficits and ongoing loss replacement
- Discuss common perioperative electrolyte disturbances and their management

Blood transfusion and blood conservation strategy

By the end of the interactive lecture, the fellow will be able to:

- Identify the indications for perioperative blood and blood product transfusion
- Describe current guidelines for blood transfusion and massive blood transfusion
- Manage blood transfusion reactions and side effects
- Apply appropriate conservative strategy for different age groups

Preoperative assessment & clinical principles for same day surgery for children

By the end of the interactive lecture, the fellow will be able to:

- Apply a systematic approach for preoperative assessment of neonates and pediatric patients
- Describe the principles of anesthesia for day surgery cases (e.g., criteria for admission and discharge)
- Evaluate pediatric patients for expected postoperative risks (e.g., obstructive sleep apnea, ex-prematurity, etc.)

Temperature regulation & hypothermia management

By the end of the interactive lecture, the fellow will be able to:

- Discuss the principles of thermal regulation in infancy and effects of anesthesia
- Compare thermal regulation under general vs. regional anesthesia
- List the current strategies to prevent and treat hypothermia in children
- Utilize hypothermic management after cardiac arrest when indicated

Neonatal & premature anesthesia

By the end of the interactive lecture, the fellow will be able to:

- Discuss different aspects of physiology of prematurity related to anesthesia (e.g., neurologic, liver, and renal prematurity, etc.)
- Apply principles of assessment and provision of anesthesia for neonatal emergencies (e.g., pyloric stenosis, necrotizing enterocolitis)
- Explore controversial areas in anesthesia for prematurity (e.g., day surgery and outpatient procedure, sedation, fast-track anesthesia, theories of anesthesia effect on growing brain)

Problem-Based Learning (PBL): Neonatal surgical emergencies

By the end of the interactive PBL session, the fellow will be able to:

- Construct a safe anesthetic plan and predict challenges for the following:
 - Gastrointestinal emergencies (necrotizing enterocolitis, omphalocele, gastroschisis, duodenal or biliary obstruction, etc.)
 - Eye surgery for retinopathy of prematurity
 - Congenital diaphragmatic hernia

Common Syndromes in the OR

By the end of the interactive lecture, the fellow will be able to:

- Formulate a safe anesthetic management plan based on specific considerations of the following syndromes:
 - Down Syndrome
 - Noonan Syndrome
 - VATER Syndrome
 - Goldenhar Syndrome
 - Marfan Syndrome
 - Pierre Robin Syndrome
 - Williams Syndrome
 - DiGeorge Syndrome
 - Epidermolysis bullosa
- Evaluate children with uncategorized dysmorphic appearances to construct a safe anesthetic plan in emergencies

Management of normal and abnormal airways

By the end of the interactive lecture, the fellow will be able to:

- Describe the developmental anatomy of neonatal and pediatric airways
- Describe different management strategies for normal pediatric airways
- Classify abnormal airways in pediatrics and associated ventilation challenges
- Identify different airway tools available in pediatric anesthesia
- Recognize and apply difficult airway algorithms in the pediatric population

PBL: Anesthesia for fetal/Ex Utero Intrapartum Treatment (EXIT) procedures

By the end of the interactive PBL session, the fellow will be able to:

- Discuss fetal development and fetal circulation features that affect anesthesia
- Perform preoperative fetal assessment for open, fetoscopic, or EXIT procedures
- Comprehend intraoperative considerations for EXIT procedures and utilization of ECMO
- Describe intraoperative fetal monitoring, resuscitation, and anesthetic management during these procedures

Pediatric anesthesia in remote locations & principles and interpretation of medical imaging

By the end of the interactive lecture, the fellow will be able to:

- Interpret normal variations and patterns of pulmonary imaging (CXR, CT, V/Q scan), cardiac imaging (CXR), abdominal imaging (AXR), neuroimaging (CT scan)
- Consider risks of anesthesia provision in remote areas (monitored anesthesia care, sedation, and general anesthesia)
 - Radiologic (diagnostic or therapeutic) suite
 - Emergency room
 - Oncology ward
 - Endoscopy

Acute pain management

By the end of the interactive lecture, the fellow will be able to:

- Describe the developmental neurobiology of pain
- Perform pain assessment in pediatric patients with the appropriate tools available
- Compare pharmacological and nonpharmacological management of different types of pain
- Evaluate specific pain assessment and management situations (e.g., prematurity, mentally-challenged children, surgical considerations)
- Compose a full multimodal perioperative pain management plan with appropriate utilization of regional analgesia
- Apply different narcotics for analgesia and pain control

Chronic pain management

By the end of the interactive lecture, the fellow will be able to:

- Identify the importance of a multidisciplinary approach to chronic pain in children
- Evaluate patients with chronic pain in different age groups
- Describe different pain syndromes and their management in children
- Discuss pharmacological and nonpharmacological treatments of chronic pain
- Adjust perioperative pain management plans for chronic pain patients scheduled for surgery

PBL: specific pediatric spine and orthopedic surgeries.

By the end of the interactive PBL session, the fellow will be able to:

- Discuss anesthetic plans for major scoliosis surgery in pediatric and adolescent patients
- Describe the effect of anesthesia and surgical techniques on intraoperative spinal cord monitoring (e.g., somatosensory evoked potentials, motor evoked potentials)

- Evaluate different anesthetic plans for common pediatric skeletal conditions, such as:
 - Congenital hip dislocation
 - Rib cage anomalies
 - Achondroplasia
 - Osteogenesis imperfecta

Regional anesthesia for both inpatients and outpatients

By the end of the interactive lecture, the fellow will be able to:

- Describe the anatomy, physiology, and general pharmacology of regional anesthesia in children
- Discuss clinical indications/contraindications of regional anesthesia in pediatric patients
- Describe the common side effects/complications of regional anesthesia
- Discuss the role of ultrasound in regional anesthesia
- Discuss the risks and benefits of regional anesthesia under general anesthesia in pediatric patients

Anesthesia for children with congenital heart disease I

By the end of the interactive lecture, the fellow will be able to:

- Identify specific perioperative challenges in pediatric cardiac patients
- Comprehend anesthetic management of cardiopulmonary bypass during pediatric cardiac surgery
- Plan anesthetic management for catheterization procedures (diagnostic, interventional, and electrophysiologic)
- Describe anatomical and physiological implications of the following common defects and their surgical corrections:
 - Atrial septal defect
 - Ventricular septal defect
 - Patent ductus arteriosus

Anesthesia for children with congenital heart disease II

By the end of the interactive lecture, the fellow will be able to describe anatomical and physiological implications of the following defects and their surgical corrections:

- Aortic Arch Abnormalities
- Tetralogy of Fallot
- Transposition of the great arteries
- Single ventricle (Norwood, Glenn, and Fontan) procedures)
- Right ventricular outflow tract obstruction
- Left ventricular outflow tract obstruction

PBL: Anesthesia for pediatric cardiac patients scheduled for noncardiac surgery

By the end of the interactive PBL session, the fellow will be able to:

- List the anesthetic considerations for pediatric cardiac patients scheduled for noncardiac surgery
- Interpret cardiac imaging studies, ECG, and diagnostic catheterization results
- Solve perioperative challenges in pediatric patients with corrected cardiac defects
- Solve perioperative challenges in pediatric patients with uncorrected cardiac defects
- Formulate a plan for postoperative transfer and disposition

Inborn metabolic and genetic disorders relevant to anesthesia

By the end of the interactive lecture, the fellow will be able to:

- Describe the pathophysiology of malignant hyperthermia
- Discuss the diagnosis and management of malignant hyperthermia
- Evaluate and construct an anesthetic plan for pediatric patients with the following conditions
 - Glycogen storage disorders
 - Porphyria
 - Pseudocholinesterase deficiency

Neurosurgery and craniofacial surgery

By the end of the interactive lecture, the fellow will be able to:

- Discuss the anesthetic considerations in pediatric neurosurgical patients
- Plan complete perioperative care for various neurosurgical conditions (e.g., tumors, hydrocephalus, meningocele, vascular anomalies, seizures, spinal defects)
- Categorize different craniofacial abnormalities with their different management considerations (e.g., craniosynostosis, midface defects)

PBL: thoracic surgery anesthesia for pediatric patients

By the end of the interactive PBL session, the fellow will be able to:

- Describe the changes in ventilation/perfusion during thoracic surgery
- Choose age-appropriate available methods for lung isolation
- Explore different anesthetic plans for intrathoracic lesions (e.g., tracheoesophageal fistula, congenital cystic adenomatoid malformation, lobar emphysema, etc.)
- Create an organized approach to intraoperative adverse events during common pediatric thoracic cases

Principles of critical appraisal & research in pediatric anesthesia

By the end of the interactive lecture, the fellow will be able to:

- Describe a systematic approach to critically appraise current literature
- Discuss controversial aspects of conducting research on pediatric patients

- Give examples of possible research questions and appropriate methods to answer them
- Recognize the importance of high-quality research and access available resources

PBL: Common pediatric otolaryngologic surgeries

By the end of the PBL session, the fellow will be able to:

- Formulate a perioperative care plan for the following procedures
 - Adenoidectomy/tonsillectomy
 - Cochlear implants
 - Bronchoscopy (diagnostic and interventional)
 - Tracheostomy
 - Laryngotracheal reconstruction
- Evaluate and manage the following conditions for otolaryngologic surgeries
 - Post-tonsillectomy bleeding
 - Foreign body aspiration
 - Acute epiglottitis
 - Airway fire injury

Hematological diseases

By the end of the interactive lecture, the fellow will be able to:

- Interpret laboratory values and diagnostic hematological tests
- Differentiate between common types of anemia
- Identify coagulation disorders and their considerations for surgical pediatric patients
- Design anesthetic plans for children with hematological disorders

Trauma, including burn management

By the end of the interactive lecture, the fellow will be able to:

- Describe the pathophysiology of burns with their multiorgan effects
- Describe the best practice anesthetic management of burn patients in early resuscitation and late corrective stages
- Evaluate pediatric trauma patients for management according to current resuscitation guidelines

Principles of care for critically ill infants and children

By the end of the interactive lecture, the fellow will be able to:

- Evaluate pediatric patients requiring critical care
- Discuss the prevention, diagnosis, and management of the following PICU conditions
 - Neurological emergencies/coma
 - Cardiopulmonary failure and ventilator support
 - Brain death and organ transplantation
 - Shock (septic, cardiac, etc.)

Nutrition and nutritional challenges

Apply a problem-solving strategy for decision-making in the following situations

- Aggressive care
- Palliative care
- Code/resuscitation status
- Family involvement and appropriate counseling for PICU patients

PBL: Obesity and pediatric patients in the OR

By the end of the interactive PBL session, the fellow will be able to:

- Estimate the unique challenges of obese pediatric patients scheduled for surgery (e.g., positioning, medication dosing, and fluid management)
- Evaluate the patients for best disposition and sleep apnea management plans
- Discuss the considerations of bariatric surgery in adolescent patients and best management of anesthesia

Risk management & ethical aspects in pediatric anesthesia

By the end of the interactive lecture, the fellow will be able to:

- Explore strategies to prevent infection transmission in the pediatric OR (prophylactic antibiotics, universal precautions, airborne or contact precautions)
- Discuss methods to anticipate events and reduce adverse outcomes
- Discuss specific pediatric areas of ethical interest (e.g., consent & assent, autonomy, end-of-life decisions, etc.)
- Formulate a medicolegally sound approach to malpractice claims

Anesthesia for transplant surgery (kidney-liver-lung-heart)

By the end of the interactive lecture, the fellow will be able to:


- Describe the common surgical techniques and their consideration in major organ transplant surgeries
- Assess transplant recipients with end-organ failure for possible optimization of their condition for surgery
- Create an anesthetic plan for transplant surgeries based on best practice evidence

PBL: Anesthesia for post-transplant patients.


By the end of the interactive PBL session, the fellow will be able to:

- Discuss immediate and long-term complications of transplant surgeries of major organs
- Identify organ transplant rejection if present, and minimize the risk factors perioperatively
- Provide appropriate anesthetic care for post-transplant patients scheduled for nontransplant surgeries


In-Training Daily Evaluation Form

Saudi Commission For Health Specialties				الهيئة السعودية للتخصصات الصحية			
Fellow's Daily Evaluation Form							
Name		_____		Level	<input type="checkbox"/> F1 <input type="checkbox"/> F2		
Day	<input type="checkbox"/> Sun <input type="checkbox"/> Mon <input type="checkbox"/> Tue <input type="checkbox"/> Wed <input type="checkbox"/> Thu	Date	_____	Room	_____		
General Eval	1 = <input type="checkbox"/> Unsatisfactory		2 = <input type="checkbox"/> Below Average		3 = <input type="checkbox"/> Average		
	4 = <input type="checkbox"/> Above Average		5 = <input type="checkbox"/> Outstanding		N/A = <input type="checkbox"/> Not Assessed		
MEDICAL EXPERT							
1. Preparative Assessment & Planning		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
2. Appropriate Conduct of Anesthetic Plan		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
COMMUNICATOR							
3. Appropriate Communication Skills		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
4. Adequate Completion of Anesthetic Record		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
COLLABORATOR							
5. Appropriate Consultation		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
6. Ability to Work in Team		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
MANAGER							
7. Effective Management of OR Day		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
8. Effective Function in Emergency Situation		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
SCHOLAR							
9. Appropriate Knowledge of the Level of Training		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
10. Adequate Practical Skills for the Level of Training		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
HEALTH ADVOCATE							
11. Address Patient & OR Personnel's Safety		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
PROFESSIONAL							
12. Function Ethically & Compassionately		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
13. Punctual & Reliable		<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> N/A
COMMENTS: _____ _____							
Evaluator	_____			Signature	_____		

Fellow's End Of Rotation Evaluation

Saudi Commission For Health Specialties				الهيئة السعودية للتنخيصات الصحية			
Fellow's End of Rotation Evaluation							
Name	:	_____	Hospital	:	_____		
Reg #	:	_____	Start	:	_____		
Rotation	:	_____	End	:	_____		
Level	:	<input type="checkbox"/> P1		<input type="checkbox"/> P2			
#	CRITERIA	(<5) Unsatisfactory	(5-6) Below Average	(6-7) Average	(>7-<9) Above Average	(9-10) Outstanding	N/A
A MEDICAL EXPERT							
1.	Demonstrate knowledge for patient care						
2.	Demonstrate technical competence in operative procedures						
B COMMUNICATOR							
3.	Establish an effective relationship with patients and families						
4.	Discuss appropriate information with patients and families and other members of the healthcare team						
5.	Age-appropriate involvement of children in anesthetic care						
C COLLABORATOR							
6.	Consult with other physicians and health care professionals as appropriate						
7.	Contribute effectively to multidisciplinary team discussion and plan of execution						
D MANAGER							
8.	Display managerial skills and guidance where appropriate						
9.	Allocate finite health care resources wisely						
10.	Utilize information technology to optimize patient care and lifelong learning						
E HEALTH ADVOCATE							
11.	Recognize and respond to issues where advocacy is appropriate						
12.	Contribute effectively to improved health of patients and communities						
F PROFESSIONAL							
13.	Critically appraise sources of medical information						
14.	Facilitate learning of patients, students, and other health professional						
15.	Contribute to the development of new knowledge						
F SCHOLAR							
16.	Deliver highest quality care with integrity, honesty, and compassion						
17.	Practice medicine ethically consistent with the obligations of a physician						
18.	Be oriented to by-laws and regulation of national medical practice						
Total Score		Total Score # Evaluated Items X 10 = 00.00%		:	_____ %		
Comments:							
Evaluator	:	_____	Signature	:	_____	Date	:
Director	:	_____	Signature	:	_____	Date	:
Fellow	:	_____	Signature	:	_____	Date	:

Faculty Assessment Form

Saudi Commission For Health Specialties		الهيئة السعودية للتنظيمات الصحية					
Faculty Assessment Form							
Faculty Member Name:		Academic Year:					
1/ Faculty member :							
		Never / Very Poor	Occasionally/ Needs improvement	Frequently/ Adequately	Usually/ Skilfully	Always/ Exemplary	N/A
1.	Provided Support whenever needed						
2.	Clarified clear expectations and explained methods to meet each						
3.	Encouraged me to explore my limits under his direct supervision						
4.	Gave a comprehensive feedback about my performance						
5.	Treated me in a professional manner						
2/ Select which one of the CanMed Roles you would like to adopt from this faculty member & items you feel this faculty needs to improve:							
	I will adopt	Can Improve	Can't determine				
Medical Expert							
Communicator							
Collaborator							
Health Advocate							
Manager							
Professional							
Scholar							
Evaluator:		Date:					



الهيئة السعودية للتخصصات الصحية
Saudi Commission For Health Specialties
الرقم الموحد 920019393
www.scfhs.org.sa