الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

PEDIATRIC SURGERY BOARD


بسم الله الرحمن الرحيم

PREFACE

i. The primary goal of this document is to enrich the training experience of postgraduate trainees by outlining their learning objectives to enable them to become independent and competent future practitioners.

ii. This curriculum may contain sections outlining some training regulations; however, such regulations need to be sought from the "General Bylaws of Training in Postgraduate Programs" and "Executive Policies" published by the Saudi Commission for Health Specialties (SCFHS), which can be accessed online through the official SCFHS website. In the case of a discrepancy in regulation statements, the one stated in the most updated bylaws and executive policies should be applied.

iii. As this curriculum is subject to periodic refinements, please refer to the electronic version posted online at www.scfhs.org.sa for the most updated edition.

I. CONTRIBUTORS

This curriculum was prepared by the Specialty's Curriculum Development Committee:
• Dr. Mohammad Al Onazi • Dr. Mohammed Al Rajhi • Dr. Abdullah Al Shehri • Dr. Norah Al Sabty
Reviewed and Approved by the Specialty's Scientific (Council/Committee) Members:
• Dr. Mohammed Al Rajhi (Chairman) • Dr. Mohammad Al Onazi • Dr. Abdullah Al Shehri
Curriculum Review Committee members:
• Dr. Sakra Balhareth, Pharm.D., BCPS, BCACP • Dr. Waleed Al Alkeridy, MBBS, MSc, FRCPC
Approved by the Head of Curricula Review Committee:
• Dr Ali Alyahya, MD, MME, FRCSC

II. COPYRIGHT STATEMENTS

Correspondence: Saudi Commission for Health Specialties, P.O. Box: 94656, Postal Code: 11614, Contact Center: 920019393

E-mail: Curricula@scfhs.org.sa

Website: www.scfhs.org.sa

IV. TABLE OF CONTENTS

IV. INTRODUCTION

1. Context of Practice

"The history of pediatric surgery in the Kingdom of Saudi Arabia (KSA) is interesting, as prior to 1980 no pediatric surgery units existed in the country. Between 1980 and 1990, few units were set up in the country; however, general surgeons have continued to perform pediatric surgeries. The number of pediatric surgeons has increased from none in 1980 to approximately 50 in 2003.[1]

To meet the high demand for pediatric surgeons and to establish standardized health care for sick children, the Saudi Commission for Health Specialties (SCFHS)–the organizing body for training and registration of health professionals in the KSA–started the Pediatric Surgery Fellowship Training Program in 2003. The program is a 3-year training program after completing a training in general surgery. It is based on rotations at different hospitals that are recognized for training on an annual basis. Unfortunately, since 2003, the program has been unable to fill the available training positions.[2] By 2014, 20 qualified pediatric surgeons had graduated from this program. The total number of qualified Saudi pediatric surgeons is 50, and approximately half of them are located in Riyadh. The workforce shortage in pediatric surgery in the KSA is not an exception in different parts of the world. Studies have shown a shortage in the number and distribution of pediatric surgeons in the United States of America (USA).[3,4]

There is little information about the education of pediatric surgical trainees and how to develop the best and brightest practitioners to pursue the pediatric surgery specialty[5]. Although the number of applicants for pediatric surgery training programs continues to exceed the number of available training positions,[6] the declining applicant pool for general surgery has a secondary impact on pediatric surgery, as there are only two applicants per position[5]. Pediatric surgery is not

among the top five fellowship programs of choice in general surgery residency for post-residency training in the USA.[7,8] Specific factors affecting the selection of pediatric surgery were explored among Saudi general surgery residents. Increasing exposure to pediatric surgery and developing a residency training program instead of a fellowship program were important factors in a survey examining the interest of general surgery residents in pediatric surgery.[9]

The KSA is a country with a young population, as approximately 22% of its 35 million population is below the age of 14 years according to the 2020 General Saudi Authority for Statistics Estimates.[10] Some congenital and hematological diseases and the high trauma rates, which require well-trained pediatric surgeons, are specific to Saudi Arabia. Moreover, the pediatric surgery specialty is considered a rare subspecialty that deals with a special patient population with peculiar diseases and anomalies such as congenital birth anomalies, complex multisystem anomalies (disease associations), syndromes with associated surgical diseases, and age-specific diseases that require special learning and training in advanced training centers. With the present and future developments in the healthcare system and the large number of existing medical cities and hospitals as well as those under construction, which are distributed across the KSA, we believe that the need for and the training of pediatric surgeons are important.

2. Goals and Responsibilities of Curriculum Implementation

Ultimately, this curriculum seeks to guide trainees to become *competent* in their respective specialties, and this goal requires a significant amount of effort and coordination from all stakeholders involved in postgraduate training. As *"adult-learners,"* trainees must be proactive, fully engaged, and exhibit the following: careful understanding of learning objectives, self-directed learning, problem solving, eagerness to apply acquired knowledge through reflective practice from feedback and formative assessments, and self-awareness and willingness to ask for support when needed. The program director plays a vital role in ensuring the

successful implementation of this curriculum. Moreover, training committee members, particularly the program administrator and chief resident, have a significant impact on program implementation. Trainees should share responsibilities with trainers in curriculum implementation.

The strategic direction of the SCFHS applies a recognized competency model of training governance to achieve the highest quality of training, and the curriculum for postgraduate programs must include research and evidence-based practice. Additionally, academic affairs in training centers and the regional supervisory training committee play major roles in training supervision and implementation. The Scientific Council constantly updates the content of this curriculum to match the highest standards in postgraduate education for each specialty.

3. What is new in this edition?

In 2016, a new pediatric surgery residency training program was started based on a new curriculum, adopting the CanMEDs framework, which is an innovative, competency-based framework that describes the core knowledge, skills, and attitudes of surgeons. In this revised curriculum, we continue to adopt the CanMEDs framework. This version is intended to provide a broad framework for residents and faculty to focus on the teaching and learning as well as clinical experience and professional development during the training program. The new curriculum provides a graded responsibility for the trainee, with clearer demarcation of what should be achieved at each stage of training. The mandatory rotations and their durations were adopted based on a validated survey questionnaire that was sent to trainees and trainers. Finally, new assessment methods, such as the Direct Observation of Procedural Skills (DOPS) and modified logbook, were included in the annual promotion criteria.

Residents are expected to acquire knowledge and skills, develop appropriate attitudes and behaviors throughout their training programs, and take personal responsibility in learning. The first batch graduated in 2021. The graduates are to

attain proficiency as medical experts with skills as communicators, collaborators, health advocates, and scholars.

Although the pediatric surgery residency program is relatively new, a survey showed that there is generally a high rate of satisfaction with the program. The program is considered highly competitive in the SCFHS matching system, and since it started, it has been rated as one of the top five programs.[11]

Contributors to the previous versions of the curriculum are:

- Dr. Mohammed Al Rajhi
- Dr. Mohammad Al Onazi
- Dr. Ali Alassiri
- Dr. Ahmad Abdulwahab
- Dr. Mohammed Al Mahmoud
- Previous curriculum supervisors:
- Dr. Zubair Amin
- Dr. Sami Al Shammari

V. ABBREVIATIONS IN THIS DOCUMENT

Abbreviation	Description
SCFHS	Saudi Commission for Health Specialties
R(1)	(First) year of residency
PT	Progress test
OSCE	Objective Structured Clinical Examination
OSPE	Objective Structured Practical Examination
Mini-CEX	Mini-Clinical Experience report
DOPS	Direct Observation of Procedural Skills report
CBD	Case-Based Discussion report
CBE	Competency-Based Education
ITER	In-Training Evaluation Report
COT	Consultation Observation Tool
RTC	Residency Training Committee
OSATS	Objective Structured Assessment of Technical Skills
GOALS	Global Operative Assessment of Laparoscopic Skills
KSA	Kingdom of Saudi Arabia

VI. PROGRAM ENTRY REQUIREMENTS

- The entry requirement for the pediatric surgery residency program is similar to that of all other training programs that are governed by the SCFHS rules and regulations through its executive policy on admission and registration. For further and updated details, refer to the SCFHS website at "https://www.scfhs.org.sa/en/MESPS/Pages/Regulations--.aspx"

Application requirements for postgraduate programs

- A bachelor's degree in a health specialization from a Saudi university or an equivalent from recognized universities.
- Certificate of completion of an internship year training.
- A copy of proof of identity (national identity/passport/residency).
- A recent photo.
- Academic records.
- Medically fit.
- Passing of the Saudi Professional License Exam, which is conducted by SCFHS.
- Attachment of the professional classification certificate
- A letter of initial approval to join the program from an accredited employer, and in the event of acceptance, a final sabbatical letter for the entire period of the program (for employees)
- Payment of fees (300) riyals in the event of requesting a curriculum vitae re-evaluation.

- In case of a Bachelor's degree without a GPA, a specialized SCFHS committee shall assess the average grade. Alternatively, the applicant must provide an official statement from the university or the Equivalency Committee in Higher Education before the end of the application period, bearing in mind that the mechanism for calculating the GPA may undergo changes on annual basis.

VII. LEARNING AND COMPETENCIES

1. Introduction to Learning Outcomes and Competency-Based Education

Training should be guided by well-defined "*learning objectives*" that are driven by targeted "*learning outcomes*" of a particular program to serve specific specialty needs. Learning outcomes are supposed to reflect professional "*competencies*" and tasks that are aimed to be "*entrusted*" to trainees upon graduation. This will ensure that graduates meet the expected demands of the healthcare system and patient care in relation to their specialty. *Competency-based education* (CBE) is an approach of "*adult-learning*" that is based on achieving *pre-defined*, *fine-grained, and well-paced* learning objectives that are driven from complex professional competencies.

Professional competencies related to health care are usually complex and contain a mixture of multiple learning domains (knowledge, skills, and attitudes). CBE is expected to change the traditional method of postgraduate education. For instance, the time of training, though significant, should not be considered as a proxy for *competence* (e.g., time of rotation in certain hospital areas is not the primary marker of competence achievement). Furthermore, CBE emphasizes the critical role of informed judgment in learners' competency progress, which is based on a staged and formative assessment that is driven by multiple workplace-based observations. Several CBE models have been developed for postgraduate healthcare education (e.g., CanMEDS by the Royal College of Physicians and Surgeons of Canada [RCPSC], the CBME-Competency model by the Accreditation

Council for Graduate Medical Education [ACGME], and tomorrow's doctor in the UK). The following concepts enhance the implementation of CBE in this curriculum:

Competency: Competency is a cognitive construct that assesses the potential to perform efficiently in each situation based on the standards of the profession. Professional roles (e.g., medical experts, health advocates, communicators, leaders, scholars, collaborators, and professionals) are used to define competency roles to achieve learning and assessment.

Milestones: Milestones are the stages of the developmental journey throughout the competency continuum. Trainees throughout their learning journey, from junior to senior levels, will be assisted in their transformation from being novices and supervised to being experienced and unsupervised practitioners. This should not undermine the role of supervisory/regulatory bodies toward the malpractice of independent practitioners. Milestones are expected to enhance the learning process by pacing trainings/assessments to match the developmental level of the trainees (junior vs. senior).

Learning-Domains: Whenever possible, efforts should be directed to annotating learning outcomes with a corresponding domain (K=Knowledge, S=Skills, and A=Attitudes). A learning outcome may be annotated with more than one domain.

Content-Area Categorization: It is advisable to categorize learning outcomes in broad content areas related to the practice of the profession. For example, diagnostic versus therapeutic, simple versus complex, and acute versus chronic.

Trainees are expected to progress from the novice to the experienced level in some professional competencies. The SCFHS endorsed CanMEDS to articulate professional competencies. This curriculum applies the principles of competency–based medical education. The CanMEDS, ACGME, and others are globally accepted frameworks that outline competency roles. The CanMEDS 2015/ACGME 2018 framework has been adopted in this section.

ACGME reference and link

https://www.acgme.org/Portals/0/MilestonesGuidebook.pdf

This reference provides an example of the general outline of CanMEDS competency framework (Frank JR, Snell L, Sherbino J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015)

2. Program Duration

The pediatric surgery residency program is a 6-year program

3. Program Rotation

Training Year	Mandatory core rotations*		Elective rotations**	
	Rotation name	Duration	Rotation name	Duration
R1	General Surgery Pediatric Surgery Emergency Rotation (ER) Annual leave	24 weeks 16 Weeks 8 Weeks 4 weeks	None	
R2	Pediatric Surgery Hepatobiliary. Cardiothoracic Vascular Surgery NICU PICU Research Annual leave	12 Weeks 8 Weeks 8 Weeks 4 Weeks 6 Weeks 6 Weeks 4 Weeks 4 weeks	None	

Training Year	Mandatory core rotations*		Elective rotations**	
	Rotation name	Duration	Rotation name	Duration
R3	Pediatric Urology Pediatric Surgery Annual leave	12 Weeks 36 Weeks 4 weeks	None	
R4	Pediatric Surgery Research Annual leave	36 Weeks 4 Weeks 4 weeks	Recommended Rotations*: Pulmonology ENT GI (Endoscopy) Radiology Surgical pathology Pediatric Oncology Cardiac Surgery	8 Weeks
R5	Pediatric Surgery Annual leave	48 Weeks 4 weeks		
R6	Pediatric Surgery Annual leave	48 Weeks 4 weeks		

Elective rotations are chosen by the trainee, but it must be approved by the trainee program director and local training committee.

The trainee will have 4 weeks leave annually

Master Rota for the Pediatric Surgery Residency Training Program

Week	16			24			8	4	52
R 1	Pediatric Surgery			GS			ER	Leave	
Week	12	8	8	4	6	6	4	4	52
R 2	Ped. Surg.	HB	CTS	VS	PICU	NICU	Research	Leave	
Week	12		36					4	52
R 3	Ped. Urology		Ped. Surgery					Leave	
Week	36		8			4		4	52
R 4	Ped. Surgery		Electives*			Research		Leave	
Week	24		24					4	52
R 5	Pediatric Surgery		Pediatric Surgery					Leave	
Week	24		24					4	52
R6	Pediatric Surgery		Pediatric Surgery					Leave	

GS: General Surgery; ER: Emergency Room; HB: Hepatobiliary; CTS: Cardiothoracic; VS: Vascular Surgery; PICU, pediatric intensive care unit; NICU: neonatal intensive care unit.

* Recommended elective rotations are Radiology, Pulmonology (bronchoscopy), Pediatric ENT, Gastroenterology (endoscopy), Plastic surgery, overseas rotations, Surgical pathology, Pediatric oncology, and Cardiac surgery.

4. Mapping of learning objectives and competency roles to program rotations

GOAL

Upon completion of the training period, residents are expected to demonstrate competence in the management of pediatric surgical patients, as outlined in this document.

Residents must demonstrate the required knowledge, skills, and attitudes for effective patient-centered care and services for a diverse population. In all aspects of specialist practice, residents must be able to address issues of gender/sex, sexual orientation, age, culture, religion, ethnicity, and ethics both professionally and compassionately.

Surgical training must provide opportunities for residents to achieve the competencies outlined in the objectives. The training must provide residents with a graduated responsibility for the management of pediatric surgical patients under appropriate supervision.

OBJECTIVES

General Objectives:

These goals and objectives of training in Pediatric Surgery operationalize the national objectives of training within the context of the SCFHS. They provide a framework that builds on the competencies of a fully trained pediatric general surgeon who can assume complete responsibility for the preoperative, operative, and postoperative management of pediatric surgical problems. It is important for trainees to develop skills and attitudes for interacting appropriately with patients, their families, and other colleagues involved in the care of pediatric patients. These skills will be built in a graduated manner so that at the end of the six training years, the pediatric surgery resident can assume the responsibility of a physician. Interwoven within these objectives are ethical and academic objectives that will reflect the conscience of modern pediatric surgery and help shape its future. The summary objectives are to ensure that pediatric surgeons maintain the leadership and direction of the pediatric surgery profession.

Different geographical locations place different demands on pediatric surgeons. However, some educational objectives are considered mandatory and basic to pediatric surgery practice and are referred to as primary objectives. Other objectives are considered desirable and appropriate to include under the umbrella of pediatric surgery but are dependent on the trainee's personal objectives or

those of the environment in which the resident intends to work. These objectives are referred to as secondary objectives.

For both sets of objectives, a comprehensive and thorough understanding of the subjects listed will be expected. Where appropriate, this will include embryology, anatomy, physiology, pathology, natural history (both pre- and postnatal), diagnosis, and management.

Residents must demonstrate knowledge, skills, and attitudes related to gender/sex, culture, and ethnicity pertinent to general pediatric surgery. In addition, all residents must demonstrate the ability to incorporate gender, cultural, and ethnic perspectives in research methodology, data presentation, and analysis.

Upon completion of the program, the graduate physician will be able to function as a consultant in pediatric surgery. Appropriate roles for pediatric general surgeons include medical experts and clinical decision makers, communicators, collaborators, managers, health advocates, scholars, and research scientists. As a dedicated professional, consistent with the obligations of a physician, the pediatric surgeon must endeavor to deliver the highest quality of care with integrity, honesty, and compassion, exhibit appropriate personal and interpersonal professional behavior, and practice medicine ethically, prioritizing the needs of individual patients. Continuing education and evaluation are expected throughout the pediatric surgeon's professional life, including an appreciation of the role of research and the need for critical analysis of current scientific and practical developments related to the specialty.

Objectives of specific rotation

Pediatric surgery residents are expected to apply the RCPSC CanMEDS competencies—medical experts, communicators, collaborators, leaders, health advocates, scholars, and professionals—for all rotations. All rotations share communicators, collaborators, leaders, health advocates, scholars, and professional competencies, with minor changes in medical experts according to the rotation need.

A. Medical Expert

1. Rotation Name: General and Pediatric Surgery

Training Level: Junior year 1-3

At the end of the training, resident will have acquired and should function effectively in the following competencies:

Knowledge of the principles of surgery

The Trainee should be able to:

- Obtain a concise history of the present illness and perform a physical exam.
- Interpret common laboratory and radiologic test results.
- Write clear and concise consultation reports, pre- and postoperative notes, progress notes, and discharge instruction plans.
- Comprehend the applied Anatomy of the abdomen (upper and lower gastrointestinal tract (GIT), gallbladder, liver, extra hepatic biliary tree, pancreas, and spleen), breast, neck, urinary system, circulatory system, and thorax.
- Discuss the physiology of the cardiac, respiratory, renal, gastrointestinal (GI), hepatobiliary, pancreatic, immune, and vascular systems and their clinical implications.
- Discuss the pathology of common inflammatory and malignant conditions and their clinical implications.
- Identify different types of shock and their physiological and pathological consequences and formulate a management plan.
- Apply the principles of Cardiopulmonary Resuscitation (CPR).
- Perform lifesaving procedures such as chest tube insertion for tension pneumothorax and pericardiocentesis for cardiac tamponade were performed according to the advanced trauma life support (ATLS) guidelines.

- Perform triage and stabilize a multi-trauma victim according to the ATLS guidelines.
- Provide the initial assessment and management of acute surgical emergencies.

Knowledge of Clinical Surgery:

The trainee should be able to:

- Take a comprehensive history and perform physical examination.
- List an appropriate differential diagnosis of the presenting symptoms.
- Explain the pathophysiology of diseases.
- Order the required investigations.
- Recognize and manage different diseases related to pediatric surgery in different body parts including the following:
- Head and neck (lymphadenopathy, neck swelling, neck trauma, salivary glands, and tumors)
- Breast and endocrine (breast lumps, breast cancer, nipple discharge, thyroid, parathyroid, and adrenal gland diseases)
- Chest wall, lungs, and pleura (acquired and congenital diseases)
- Hernias and abdominal wall defects
- Upper GIT Surgical diseases (esophagus, stomach, and small intestine)
- Lower GIT surgical diseases (appendix, colon, rectum, and anus)
- Upper and lower GI bleeding
- Hepatobiliary (liver, pancreas, and spleen)
- Acute abdomen
- Inguinoscrotal conditions
- Congenital diseases
- Soft tissue tumors

- Surgical diseases in special situations (surgical diseases in sickle cells disease and neutropenic patients)
- Surgical management of obesity

Technical Skills for the Junior Resident (R1–R3)

The junior resident should

- Demonstrate the aseptic technique in performing operative and bed-side procedures.
- Recognize the appearance of normal and abnormal tissues in the operating room.
- Gain proficiency in a variety of psychomotor skills, e.g., reduction of incarcerated inguinal hernia, wound closure, and knot-tying.
- Understand and identify the principles of laparoscopy.
- Complete examination of the anorectal region, including anoscopy and proctoscopy.
- Perform/demonstrate the surgical steps of the following procedures:
- Chest tube insertion
- Umbilical and inguinal hernia repair
- Central vascular access under supervision
- Circumcision
- Excision of skin lumps and lymph node biopsy
- Wound dressing (surgical and burn wounds)
- Incisional biopsy
- Cut wound suturing
- Incision and drainage of abscesses
- Thoracotomy incisions

- Laparotomy incisions
- Laparoscopic basic techniques
- Effective communication with medical team members and care givers
- Possession and demonstration of professionalism

2. Rotation name: Pediatric Surgery

1. Training level: 3–6 years

General Requirement

A pediatric surgery resident is expected to function as a medical expert by:

- Utilizing all the CanMEDS roles to provide patient- and family-centered care.
- Demonstrating high communication skill to obtain a comprehensive history from patients, parents, or other caregivers.
- Performing a thorough physical examination in children despite the possibility of poor compliance.
- Requesting a relevant investigation and formulate a clear and appropriate medical plan.
- Performing appropriately timed clinical assessments with recommendations that are presented in an organized manner.
- Describing the embryology, anatomy, pathology, and differential diagnosis of common pediatric and neonatal surgical diseases.
- Applying clinical and biomedical science knowledge that is relevant to pediatric surgery.
- Explaining the need to individualize the treatment for infants and children as drug dosage and fluid administration is based on weight, heat regulation problems, and high risk of nosocomial infections in newborns and obtaining the ability to manage the conditions accordingly.

- Identifying and managing physiological changes in preterm babies (such as immature hepatic and renal function) that affect medication doses and anesthetic administration.
- Predicting the apnea risk after the administration of anesthesia or sedation of newborn babies.
- Recognizing the indications for both operative and non-operative treatment.
- Performing the appropriate surgical procedures during the treatment of patients by recognizing the possible complications of each procedure.
- Distinguishing the different sutures and identifying their use.
- Recognizing the indications and limitations of procuring tissue biopsies and applying the proper technique for submitting tissues for the pathological examination of different specimens and for different diseases.
- Consulting effectively, including presentations, assessments, and recommendations, with other physicians in verbal and written forms.
- Applying the transfer principles when transferring a patient from one service to another.
- Formulating a clear management plan for patients admitted to receive pediatric surgery services or during consultation with other services.
- Demonstrating sterile precautions in performing bed-side procedures

Specific Requirements

As medical experts in core pediatric surgery, residents should recognize the pathophysiology of diseases and formulate a diagnostic workup and management plan for pediatric surgery conditions specified in the syllabus in Appendix-L.

Technical Skills Objectives

By the end of the training, the resident should have acquired and demonstrated the following skills as they apply to pediatric surgical practice.

General Surgical Skills Requirement

As medical experts, residents should be able to perform a list of mandatory procedures through the program, as specified in the resident logbook in Appendix B.

It is expected that over the six-year pediatric surgery residency period, the trainee will gain progressive experience from a technical, surgical, and soft skills point of view. During the junior years of the pediatric surgery residency training, residents must learn to perform common and routine surgical procedures (hernia repair and pyloromyotomy). However, in the senior years of training, the pediatric surgery resident should learn and be able to demonstrate proficiency in advanced pediatric surgery procedures (index cases), such as pediatric oncology surgery and neonatal surgery. In the final 12 months of the pediatric surgery training, the resident should be able to demonstrate progressive operative independence, teach junior residents, counsel the sick children's family (parents) in a timely and professional way, deliver the medical information that best describes the patient's illness, involve the parents in their child's management plan, gain the parents' trust by being honest, reliable, and professional, and maintain an ethical practice.

Specific requirement for Trauma

As medical experts, residents should be able to/demonstrate how to

- Function as a trauma team leader.
- Function as the operating surgeon for pediatric patients with trauma and as a supervising surgeon in an operating room in which several specialty groups may be working simultaneously.
- Provide operative and non-operative care for trauma patients including those who have sustained major burns.
- Obtain airway and vascular access in a trauma patient and perform appropriate diagnostic and therapeutic procedures.

Specific requirements for Endoscopy

As medical experts, residents should be able to/demonstrate how to perform

- Laryngoscopy and bronchoscopy
- Esophagoscopy, gastroscopy, and duodenoscopy
- Thoracoscopy
- Laparoscopy
- Proctosigmoidoscopy and colonoscopy
- Cystoscopy and vaginoscopy as applied to the treatment of ambiguous genitalia and imperforate anus

Other Procedures

As medical experts, residents should be able to/demonstrate how to perform the following:

- Central line insertion (temporary and long-term implantable ports)
- Tracheotomy and ostomy

3. Rotation Name: Vascular Surgery

Training level: 2nd year

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

Knowledge of the principles of surgery

- Obtain a concise history of present illness and perform a physical examination.
- Interpret common laboratory and radiologic tests.
- Write clear and concise consultation reports, pre- and postoperative notes, progress notes, and discharge instruction plans.
- Comprehend the applied anatomy of the cardiovascular system.

- Discuss the physiology of the cardiac, central, and peripheral vascular systems.
- Discuss the pathology of common conditions and their clinical implications.
- Recognize the utilization of vascular imaging techniques such as doppler ultrasound, CT-scan, MRI, and diagnostic and therapeutic angiography.
- Describe the indications, contraindications, and complications of vasoactive and thrombolytic medications.
- Describe the pathophysiology, diagnosis, and treatment of blunt and penetrating vascular injuries.
- Execute the clinical care of vascular patients, including the assessment of circulation and identification of acute and chronic ischemia.

Pre- and Operative Skills Objectives

The pediatric surgery resident should be able to

- Assess the need for short-term and long-term vascular access.
- Identify vascular catheter types, uses, contraindications, and complications.
- Perform simple percutaneous and open vascular access procedures under supervision.
- Assist in vascular reconstruction procedures.
- Assist in vascular graft placement procedures and in arterio-venous fistula creation surgery.

5. Rotation Name: Pediatric Urology

Training level: 3rd or 4th year

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

Knowledge of the principles of surgery

The resident should be able to

- Obtain a concise history of present illness and perform a physical exam.
- Interpret common laboratory and radiologic tests.
- Write clear and concise consultation reports, pre- and postoperative notes, progress notes, and discharge instruction plans.
- Identify the anatomy, physiology, and pathophysiology of common disorders involving the genitourinary system.
- Manage elective and emergency genitourinary problems in a variety of clinical settings.
- Discuss the pathology of common conditions and their clinical implications.

Pre- and Operative Skills Objectives

The pediatric surgery resident should be able to:

- Assess the need for short-term and long-term urological catheterization.
- Identify urological catheter types, indications, contraindications, and complications.
- Perform foley catheterization for different urological patients.
- Perform elective simple urological procedures.
- Assist in urological major reconstruction procedures.

Specific Requirements

As medical experts in the core pediatric urology department, residents should recognize the pathophysiology and formulate a diagnostic workup and management plan for pediatric surgery conditions specified in the syllabus in Appendix-L.

5. Rotation Name: Thoracic Surgery

Training level: 2nd year

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

Knowledge Objectives

The pediatric surgery resident should be able to:

- Obtain a concise history of present illness and perform a physical examination.
- Order and interpret common laboratory and radiologic diagnostic tests such as diagnostic imaging (plain chest radiography, ultrasonography, CT-scan, MRI, and nuclear medicine), endoscopy, pulmonary function tests, and esophageal manometry.
- Write clear and concise consultation reports, pre-and postoperative notes, progress notes, and discharge instruction plans.
- Recognize the development and anatomy of the chest wall, breathing muscles, respiratory system, and mediastinal structures, especially the esophagus.
- Outline the cardiopulmonary and esophageal physiology.
- Discuss the pathology of common conditions and their clinical implications by proposing a clear treatment plan.

Technical Skill Objectives

The pediatric surgery resident should be able to

- Perform chest tube insertions and know how to maintain it.
- Demonstrate and perform thoracotomy incisions and closures.
- Demonstrate and perform thoracoscopy.
- Perform lung biopsy.
- Outline the principles of conducting a safe bronchoscopy and esophagoscopy.

6. Rotation Name: Emergency Medicine

Training level: 1st year

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

Knowledge Objectives

- Obtain a concise history of present illness and perform a physical examination.
- Interpret the common laboratory and radiological tests.
- Develop diagnostic and therapeutic skills for ethical and effective patient care.
- Access and apply relevant information to clinical practice.
- Demonstrate effective consultation services regarding patient care, education, and legal opinions.
- Describe the anatomy and physiology of all body systems affected by trauma.
- Apply ATLS guidelines in trauma settings, perform clinical assessment of an ill or injured child, and collect all appropriate information.
- Review the anatomy, physiology, and pathology regarding the general management of patients with trauma.
- Specify the trauma services needed for initial evaluation and resuscitation.
- Choose the appropriate laboratory and radiological investigations to meet the immediate needs of critically ill or injured children.
- Function as a surgical consult by assessing and developing differential diagnoses and discussing recommendations with senior residents or attending instructors.
- Ascertain the severity of injuries and identify patients requiring operative interventions.
- Discuss wound care management in the emergency department and other settings.
- Explain the characteristics of basic surgical skills, including the following: sterile technique, handling of tissues, emergency surgical instruments, wound closures, knot tying, and universal precautions.
- Summarize basic critical care management principles.

- Analyze pharmacological support for trauma resuscitation patients.
- Discuss the primary causes and mechanisms of the following injuries: falls, burns, motor vehicle accidents, pedestrian injuries, and domestic abuse.
- Recognize shock, categorize it based on type, and explain the etiology and pathophysiology of each type of shock.
- Propose an algorithm for diagnosing and initiating treatment for each type of shock.
- Outline the signs and symptoms of acute airway obstruction and define appropriate interventions.
- Explain the physiological impact of mechanically assisted ventilation on the cardiovascular/respiratory system.
- Describe the indications for and potential complications from the following surgical interventions: a. bag mask ventilation, b. endotracheal intubation (oral and nasal), c. DPL, d. resuscitative thoracotomy, e. cricothyrotomy, f. pericardiocentesis, g. thoracostomy tube, h. thoracentesis, i. central venous catheter, j. ultrasound, k. peripheral vein cut down, l. wound exploration, and m. arterial line.
- Review the importance of serial physical examinations, hemodynamic monitoring, and serial laboratory evaluations.
- Outline the clinical use of the following drains and tubes: nasogastric tube (NGT), urinary bladder catheter, chest tube, central venous line, and arterial line.
- Initiate management of issues related to child abuse, deprivation, or family dysfunction.
- Screen patients for procedural sedation and help in the administration of procedural sedation in a safe and monitored environment for appropriate patients.

- Recognize common congenital and developmental syndromes.
- Recognize and measure normal and abnormal vital signs.
- Initiate resuscitation in a neonate, infant, or child.

Technical Skills Objectives

The resident should be able to:

- Perform emergency diagnostic and therapeutic procedures such as a. chest tube insertion, b. central line insertion, and c. pericardiocentesis and insertion of a variety of tubes (e.g., endotracheal, DPL, urinary catheter, and NGT).
- Initiate management of single or multisystem trauma:
- Manage the unconscious patient.
- Recognize and manage airway obstruction.
- Perform endotracheal and nasotracheal intubation.
- Apply closed-chest cardiac massage (CPR).
- Perform venous access procedures such as venipuncture and saphenous vein cut down.
- Determine the indication, dosage, contraindications, and method of administration of common cardiac medications used in resuscitation.
- Estimate volume requirements in acute trauma and burns and initiate replacement.
- Control external blood loss.
- Participate in trauma evaluation, resuscitation, operative management, and intensive care unit (ICU) supervision of patients with multiple injuries.
- Apply and remove all types of dressings and splints, including vacuum pack dressing.
- Suture a variety of incisions and tie knots using the sterile technique.

- Direct evaluation of an acutely injured patient to include resuscitation and decision regarding surgery.
- Explain the patient's condition, propose therapy to the family, and obtain appropriate informed consent.
- Discuss management options with the patient and family.
- Communicate the importance of injury prevention to patients, patients' families, and staff in the quest to control trauma in modern society.

7. Rotation Name: Hepatobiliary Surgery

Training level: 2nd year

Knowledge Objectives

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

- Perform a complete patient evaluation, record, report, and assess different abdominal pathologies.
- Evaluate and diagnose acute abdomen and abdominal emergencies.
- Evaluate and institute management of abdominal wound problems, including the following:
  - ✓ Infection
  - ✓ Fasciitis
  - ✓ Dehiscence
  - ✓ Evisceration
- Coordinate preoperative and postoperative care for a patient with acute abdomen.
- Assist in the management of a patient with acute abdomen and abdominal emergencies.

- Request and interpret appropriate laboratory and radiological examinations to evaluate patients with the following:
    - ✓ Acute abdomen
    - ✓ Jaundice
    - ✓ Peritonitis
- Interpret the following, in coordination with attending radiologists and staff:
    - ✓ Acute abdominal radiology results
    - ✓ Abdominal ultrasound results
    - ✓ Abdominal CT scans
    - ✓ MRCP
    - ✓ Post-endoscopic retrograde cholangiopancreatography (ERCP)
- Describe the anatomy of the liver and biliary system including commonly found variations.
- Describe the physiology and function of the liver and biliary system including the following:
    - ✓ Glucose metabolism
    - ✓ Coagulation
    - ✓ Protein synthesis
    - ✓ Drug metabolism
    - ✓ Function of the bile in fat metabolism
    - ✓ Reticuloendothelial system
- Correlate bile formation and composition with disease states affecting the biliary system, such as gallstone formation and biliary obstruction.
- Discuss the enterohepatic circulation of bile.
- Outline the workup and differential diagnosis of a patient with jaundice.

- Summarize the etiology and management of pyogenic and amebic hepatic abscesses.
- Outline the pathophysiology, evaluation, and management of the following:
  - ✓ Choledochal cysts
  - ✓ Sclerosing cholangitis
  - ✓ Primary biliary cirrhosis
  - ✓ Secondary biliary cirrhosis
  - ✓ Cholangitis
  - ✓ Gallstone pancreatitis
  - ✓ Benign biliary strictures
  - ✓ Acute cholecystitis
  - ✓ Acalculous cholecystitis
  - ✓ Congenital biliary atresia
- Describe the anatomy of the pancreas including regional vascular anatomy.
- Discuss the physiology of the pancreas including endocrine and exocrine functions and hormonal regulation.
- Explain the pathophysiology of pancreatitis, including the following: common etiologies such as gallstones, ERCP, trauma, idiopathic causes, and medications.
- Diagnose, evaluate, and manage the following in relation to pancreatitis: abscess, sterile pancreatic necrosis, and infected pancreatic necrosis.
- The complications of pancreatitis include ARDS, acute lung injury, hypovolemia, and pseudocysts.
- Provide indications for operative management of pancreatitis.
- Outline the pathophysiology, evaluation, and management of the following:
- Cystic fibrosis

- Pancreatic divisum
- Acute and chronic pancreatitis

✓ Congenital pancreatic cyst

✓ Pancreatic tumors

Technical Skills Objectives

The resident should be able to perform the following:

1. Assist with the perioperative management of patients undergoing hepatobiliary surgery.
2. Assist with the closure of abdominal incisions; exhibit competency in suture techniques.
3. Assist (preferably perform) with surgical laparoscopic cholecystectomy.
4. Assist with hepatic/pancreatic enteric anastomosis.
5. Assist with the Whipple procedure.
6. Assist with (preferably perform) uncomplicated hepatobiliary surgery under supervision, such as laparoscopic and open cholecystectomy, with operative cholangiography.
7. Assist with laparoscopic and open bile duct exploration.
8. Assist with splenectomy.
9. Assist with more complex hepatobiliary surgery including:
    - Biliary drainage procedures, such as Roux-en-Y and cholecystojejunostomy
    - Complicated cholecystectomy (acute and gangrenous)
    - Internal drainage of pseudocysts with Roux-en-Y cystojejunostomy
    - Longitudinal pancreaticojejunostomy (Puestow procedure)
    - Distal pancreatectomy
    - Biliary bypass for carcinoma

8. Recommended elective rotation

8.1 Endoscopy/GI rotation

Training level: 4th year

Knowledge Objectives

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

- Recognize the diagnostic and therapeutic principles of upper endoscopy indications, pre-endoscopy preparation, and complications.
- Recognize the diagnostic and therapeutic principles of lower endoscopy indications, pre-endoscopy preparation, and complications.
- Outline the principles of bowel preparation.
- Identify the types of sedation and medication used.
- Provide post-endoscopy patient care in the recovery room.
- Recognize the diagnostic and therapeutic principles of ERCP, indications, preparations, and complications.
- Interpret endoscopic findings and initiate possible differential diagnosis.
- Manage patients with upper and lower GI bleeding.
- Participate in the nonsurgical and surgical evaluation and management of common pediatric GI conditions including gastro-esophageal reflux disease (GERD), lactose intolerance, celiac disease, peptic ulcer, feeding disorders, nutritional problems, constipation, and chronic or severe diarrhea.
- Explain the pathophysiology, management, and endoscopic intervention for Inflammatory bowel disease (IBD).

Technical Skills Objectives

The resident should be able to perform the following:

- Obtain informed consent.

- Organize the room that is setup for endoscopy and know how to properly position the patient for the procedure.
- Perform flexible upper and lower endoscopy.
- Perform rigid esophagoscopy.
- Perform endoscopic esophageal dilation (balloon dilator and others).
- Identify the different tools used for endoscopic biopsy.
- Be exposed to foreign body removal techniques (esophagus and stomach).
- Perform endoscopic mass/polyp biopsy, polypectomy, and snaring.

8.2. Pulmonary/Otorhinolaryngology (ORL)/Bronchoscopy rotation

Training level: 4th year

Knowledge Objectives

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

- Recall the basic knowledge of normal airway anatomy.
- Illustrate congenital airway anomalies, including laryngeal cleft, laryngomalacia, tracheomalacia, types of esophageal atresia, and fistula.
- Recognize the diagnostic and therapeutic principles of bronchoscopy indications, pre-endoscopy preparation, and complications.
- Interpret endoscopic findings and initiate the possible differential diagnosis.
- Provide post-endoscopy patient care in the recovery room.
- Obtain informed consent and recognize the ethical principles of obtaining surgical consent.

Technical Skills Objectives

The resident should be able to do the following:

- Perform laryngoscopy.

- Demonstrate how to use rigid and flexible bronchoscopes of different sizes based on patient age and weight.
- Be exposed to airway foreign body removal techniques.
- Perform endoscopic mass biopsy, Bronchoalveolar lavage (BAL), and brush cytology.
- Positioning the patient for the procedure.

8.3. Pediatric Radiology/Interventional Radiology

Training level: 4th year

Knowledge Objectives

At the end of the training, residents will have acquired and should function effectively in the following competencies:

- Recognize pediatric radiographic diagnostic procedures
- Recall the anatomy, physiology, and pathology of different organ systems in pediatric age groups as they pertain to radiology.
- Outline the importance of immobilization, sedation, and radiation protection
- Identify radiological equipment and perform radiographic examinations for children and according to their special needs
- L
- Discuss management plans with the involved team based on imaging results.
- Identify when and which imaging studies are indicated for emergency, urgent, or routine patient care and the appropriate time interval between such imaging studies.
- Identify which imaging studies are contraindicated in a patient's condition.
- Attend special and interventional procedure meetings to discuss indications and complications.

Technical Skills Objectives

The resident should be able to do the following:

- Perform different radiological interventional procedures, such gastrostomy, gastrojejuneal and nasojejunal tube insertion, portacath and Peripheraly inserted central line (PICC) line insertion, tumor biopsy, tumor/bleeding embolization, and sclerotherapy injection.
- Interpret radiological examination findings of the skeletal, pulmonary and cardiovascular systems and the gastrointestinal and genitourinary tracts.

8.4. Pathology

Training level: 4th year

Knowledge Objectives

At the end of the training, residents will have acquired and should function effectively in the following competencies:

- Gain experience both anatomic pathology and clinical laboratory medicine with emphasis on fetal, neonatal, and pediatric disease processes.
- Gain experience with laboratory tests interpretation, quality control, and cost-effectiveness.
- Be involved in the daily activities of the pathology laboratory.

Technical Skills Objectives

The resident should be able to:

- Observe and participate in the gross examination of surgical specimens and review surgical microscopic sections with pathologists.
- Observe and participate in the examination process of frozen section specimens and interpret results for decision-making.
- Observe fetal evaluation and autopsy examinations (if applicable).

8.5. Pediatric Medical Oncology

Training level: 4th year

Knowledge Objectives

At the end of the training, residents will have acquired and should function effectively in the following competencies:

- Demonstrate the ability to obtain a comprehensive history and perform physical examinations of infants and children with various hematological and oncological disorders
- List appropriate differential diagnoses of presenting symptoms.
- Interpret routine and special laboratory test results
- Recognize the tumor biology
- Illustrate the pathophysiology of diseases
- Order the required investigations
- Recognize and manage different diseases in relation to oncology patients (blood/solid tumors)
- Recognize the basic principle of therapeutic options including chemotherapy, immunotherapy, radiation, and immunosuppression
- Identify current oncology treatment protocols available to each patient
- List the bone marrow transplant principles, indication, and complications
- Recall the palliative care for patients requiring pain control and other supportive measures
- Participate in the care of terminally ill patients
- Manage patients who report to Oncology emergency
- Apply surveillance and provide cancer prevention measures

- Attend clinical rounds and clinics, give IV infusions, and participate in patient care and management
- Be involved in tumor board case presentations and management discussions
- Illustrate BMT techniques, complications, and pitfalls

Technical Skill Objectives

The resident should be able to:

- Perform basic procedures needed for managing oncology patients

8.6. Plastic Surgery

Training level: 4th year

Knowledge Objectives:

At the end of the training, residents will have acquired and should function effectively in the following competencies:

- Identify the anatomy and physiology of the skin, muscles, tendons, ligaments, and nerves.
- Identify normal and abnormal wound healing and different types of dressing.
- Perform a focused history and physical examination related to the evaluation and correction of plastic surgery conditions.
- Outline the pathophysiology and management of thermal, chemical, and electrical burns, including psychological effects and recovery.
- Recall the pathology and treatment of neoplasia of the skin and soft tissues.
- Recognize the nature and principles of correction and reconstruction of congenital and acquired defects of the head, neck, trunk, and extremities such as various types of vascular malformations, malignancies, and contractures.
- Identify hand space infections as well as lacerations including recognition of tendons and nerve injuries and their management.

Technical Objectives

Upon completion of the pediatric surgery rotation, residents should be able to:

- Evaluate and demonstrate aseptic measures to deal with and manage wounds, including debridement, suturing, and dressing.
- Participate in acute resuscitation, evaluation, and management of patients with burns.
- Evaluate and manage hand infection.
- Identify flaps and grafts techniques and perform some techniques under supervision.
- Assist in the performance of incisional and excisional biopsies of the skin and soft tissues.
- Assist in the planning and performance of reconstructive surgeries, such as trauma, excision of neoplasm complex wounds, and breast reconstruction, under the supervision of a plastic surgeon.
- Recognize tendon and nerve injuries and assist with repairs.
- Describe Head and neck contractures, facial anomalies, and wounds.
- Describe Skin soft tissue injury, wound healing, and wound management.
- Understand and manage the Hand infection and lacerations (recognition of nerve and tendon injuries).
- Burns: Recognize and manage burn wound infections (including wound biopsy techniques) wound excisions, use skin substitutes, and burn patient rehabilitation (including psychological effects and recovery).
- Techniques: Skin grafting, microsurgery, use of flaps, and Z-Plasty.
- Perform a focused history and physical examination related to the evaluation and correction of plastic surgery conditions.

8.7. Cardiac Surgery

Training level: 4th year

Knowledge Objectives

At the end of the training, the resident will have acquired and should function effectively in the following competencies:

- Obtain a concise history of present illness and perform a physical examination.
- Interpret common laboratory and radiological test results.
- Write clear and concise consultation reports, pre- and postoperative notes, progress notes, and discharge instruction plans.
- Comprehend the applied anatomy of common cardiac conditions such as
  - ✓ Coarctation of the aorta, arch anomalies, and vascular ring/sling (specifically related to complications of general pediatric surgery)
  - ✓ Systemic/pulmonary shunts
  - ✓ Pericardiectomy
  - ✓ Pulmonary artery banding
  - ✓ Atrial septal defect
  - ✓ Ventricular septal defect
  - ✓ Septum primum
  - ✓ Tetralogy of Fallot
  - ✓ Transposition of great vessels
  - ✓ Arterio-venous canal
  - ✓ Hypoplastic left heart syndrome
  - ✓ Cardiac transplantation.
- Identify the fundamental principles of cardiopulmonary bypass, including indications, cannulation, weaning, and complications.
- Describe pharmacological manipulations in the postoperative period.

8.8. External rotation (overseas)

The Scientific Committee of the Pediatric Surgery Training Program welcomes elective rotations outside the KSA and encourages candidates to be exposed to different systems worldwide (North America, Europe, Australia, and Asia).

Hands-on training with constructed end-of-rotation evaluation is mandatory. However, upon request, observership rotation is subject to discussion. Consensus meetings will be held to approve or disapprove any proposed rotation.

Rotation can be either in general pediatric surgery or a subspecialty, such as colorectal, trauma, and fetal surgery or surgical oncology.

It is the candidate's full responsibility to communicate, organize, and approve the sponsoring hospital in conjunction with early notification and arrangement with the program director and Saudi council committee/Scientific Committee.

The External Rotation has to fulfil the following requirements in order to be approved by the Training/Scientific Committee:

- Hands-on training
- Full privileges when trainee covers n-call shifts
- Full privileges in the operating room
- Follow the Saudi council's in-training objectives The program directors of the accepting hospital should complete the Saudi Council end of rotation evaluation form.

9. Research Block

General guidelines

- Allocated period: 4 weeks/academic year in junior year
- Supervisor/organizer: Program director
- Mentor/ Principal Investigator (PI): Pediatric surgeon or any other physician (non-medical, e.g., an epidemiologist is acceptable)

- Approval: A project proposal (preliminary title with a brief description) must be approved by the research committee before submission to the Institutional Review Board (IRB) for approval. An email and a formal letter signed by the research and local committee which approves that their project can start will be sent to the trainee. This project must be related to pediatric surgery.

Rotation objectives

- Gain basic research knowledge through constructed courses over the first two years of training.
- Perform ONE project by the end of the training.
- Submit a final proposal before the end of R4.
- Submit the certificate of the completed project before the end of R6, which is published in a recognized journal or presented at a known local or international conference.

Note

- An R4 resident will not be promoted to R5 without an approved proposal.
- An R6 resident will not sit the final exam without a completed project.
- Type of project: The resident should be THE FIRST AUTHOR for any of the listed studies below. A case report is not acceptable.
- Retrospective study (Case series, Cohort, etc.)
- Meta-analysis or Systematic review
- Prospective study

**Clinical survey is discouraged unless it has a significant impact on the practice of pediatric surgery and should be discussed with the committee.

- Reporting process: The research committee expects residents to provide a report twice a year, indicating the status and progress of their project. "Research progress form" (attached) is to be filled and sent to research committee.

- Mid-year report: Trainee is to submit a status report form, signed by the program director, in February (email).
- End-of-year report: The program director is to submit an evaluation of the 4 weeks research block through the One45 system before the promotion exam.
- The pace of ending and publishing the project is determined by the program director who supervises the project progress.
- Required Courses:

The King Abdulaziz Medical City (KAMC) basic module or equivalent is mandatory for all trainees

Timing of courses: By October of each academic year, seats will be reserved for trainees (R1-R2) and arranged within their master Rota

Research Methods Blended Learning Course by the SCFHS (see Universal Topics)

Other equivalent courses should be approved by the program director and the research committee

A certificate of attendance and their status report should be submitted to the committee.

Research block: During the 4-week period, the resident should be rotating in the pediatric surgery department at the sponsoring hospital under the supervision of the hospital's program director. Delegation is dictated by the program director who is not on rounds, call, night duty or any obligation during this period. Minimal clinical attachment is required, freeing the trainee time for research. The trainee is expected to

- Attend clinics (max 2 sessions/week).

1. Join the department academic activity.
2. Join the resident teaching activity.
3. Have frequent meetings with the program director (min of once/week).

To ensure that the research project is completed early during the training, the research committee encourages the proper use of the time allocated for the research (4 weeks) in R2 and R4 training years. This can be decided between the resident and his program director if the research has been approved by the local committee. Other options are:

- Another research project.
- A research Rota in a research center abroad.
- An extra elective rotation. (gastro/endoscopy/anesthesia/ENT/airway/radiology/interventional radiology/pathology/general pediatric or cardiac surgery).
- An elective pediatric surgery rotation in a center abroad.
- Additional courses, which is provided by a recognized center.
- Colorectal workshop/observership in Colorado children hospital.
- St. Jude oncology course.
- Strasburg laparoscopic course.
- International Pediatric Endoscopy Group laparoscopic workshops.
- Others

Timeline for the trainee's research project

Level of training	Expected step	What to submit	Reporting to the research committee
R1–R2	- Attend the course - Choose a project topic	- Certificate of course attendance	Certificate
R3	- Choose a project topic - IRB approval - Proposal writing - Data collection - Data analysis	- A brief description of the project - Final project proposal	Committee approval letter
R4	- Data collection - Data analysis - Completed Manuscript	- Manuscript	Manuscript approval and promotion to R5
R5	- Approach journals - Abstract/poster submission to conferences	- Conference certificate as speaker or journal citation	
R6	Completed project either published or presented		A date for the final exam can be set

Table: Expected level of competency for master specialty level problems

Competency	Level RY 1–3	Level RY 4–6
Obtain a focused history		
Perform a comprehensive physical examination		
Triage and prioritize the patient		
Provide an immediate and emergency management		

Competency	Level RY 1–3	Level RY 4–6
Describe the pathophysiological basis of common and serious diseases		
Rationalize, order, and interpret appropriate investigations		
Formulate a list of differential diagnosis and an appropriate work plan		
Deliver timely management and make appropriate surgical decisions in emergency situations		
Recognize secondary complications/adverse events/severity		
Effectively deliver bad medical news to a patient's parents using an appropriate scientific method		
Poses sound knowledge of commonly used medications and their adverse effects		
Counsel patients/families/caregivers regarding the surgical plan/proposed future plan		
Perform all minor and intermediate surgical procedures effectively		
Participate in all required simulation courses		
Teach students, fellow colleagues, and other health care professionals about conditions		
Perform all major surgical procedures with assistance		
Independently perform all minor and intermediate laparoscopic procedures		
Perform all vascular access procedures		

Example of rotation specific objectives and topics that need to be covered:

Rotation	Knowledge Objective *(The trainee know how to)*	Skill Objective *(The trainee should show how to)*
Junior Years (R1–R3)		
Pediatric Surgery (Junior Years)	• Apply principles of Pediatric Surgery clinically • The child as a patient • Approach a sick child (history taking and physical examination)	• Interpret laboratory and radiological tests • Practice basic pediatric surgery techniques
General Surgery	• Apply Basic surgical principles clinically • Manage a trauma patient • Identify the different types of shock and their management • Antibiotics and other chemotherapy drugs that are commonly used	• Perform basic operative surgical skills • Perform basic laparoscopic techniques • Perform aseptic techniques • Perform minor/intermediate procedures
Emergency Medicine	• Manage common surgical emergencies in children • Apply the Pediatric Advance Life Support (PALS) guidelines appropriately • Order appropriate laboratory and radiological tests and interpret their results	• Perform ATLS • Suture cut wounds • Manage the airway and perform intubation • Perform vascular access procedure
Plastic Surgery	• Types of burns and their management • Differentiate between flaps and grafts • Manage the Vascular malformation	• Explain the steps of skin grafting • Comprehend the different types of tissue flaps • Understand and explain the different wound dressings

Rotation	Knowledge Objective *(The trainee know how to)*	Skill Objective *(The trainee should show how to)*
Vascular Surgery	• Explain the vascular system anatomy • Interpret vascular imaging • Diagnose vascular injuries	• Attend and explain vascular access surgery • Attend and explain vascular reconstruction • Attend and explain vascular grafts
Thoracic	• Know and apply lung physiology & anatomy clinically • Understand mediastinum pathology • Manage acquired & congenital lung diseases • Manage acquired and congenital rib cage anomalies • Manage pneumothorax • Manage empyema thoracis	• Understand the principles of thoracoscopy • Understand the principles of mediastinoscopy • Perform chest tube insertion
Senior Year (R3–R6)		
Urology	• Diagnose Urinary Tract Infections (UTIs) • Manage kidney stones • Approach urogenital tumors • Manage the congenital urinary tract anomalies (hypospadias, posterior urethral valve, pelviuteric junction (PUJ) obstruction, and congenital hydronephrosis • Manage acute urological emergencies	• Describe the steps of Cystoscopy • Understand the different types of ureteric stent and their indications • Describe hypospadias repair • Understand PUJ surgery • Perform circumcision • Perform release of Phimosis • Understand neurogenic bladder surgery • Describe drainage procedures

Rotation	Knowledge Objective *(The trainee know how to)*	Skill Objective *(The trainee should show how to)*
NICU	• Understand neonates normal physiology • Understand and clinical apply fluid management • Understand nutrition • Understand mechanical ventilation • Manage • Inguino-scrotal swellings • Congenital lung anomalies (respiratory distress) • Congenital diaphragmatic hernia • Intersex • Intestinal obstruction • Jaundiced neonate • Abdominal mass • Ovarian cyst • Abdominal wall defect • Neonatal sepsis	• Communication and counseling skills • Acquire Neonatal Resuscitation Program (NRP) competencies • Manage intubation and airway • Perform vascular access procedures • Perform abdominal drainage • Interpret neonatal radiological imaging findings • Understand the Extrapartum Intrauterine (EXIT) procedure • Describe the Extracorporeal Membrane Oxygenation (ECMO) procedure and its physiological effect
PGICU	• Understand child systemic physiology • Care for a critically sick child • Manage system failure • Comprehend fluid management • Indications of transfusion therapy • Manage pain • Manage acute abdominal and thoracic emergencies	• Acquire PALS competencies • Manage the critical airway • Perform vascular access procedures

Rotation	Knowledge Objective *(The trainee know how to)*	Skill Objective *(The trainee should show how to)*
	• Understand the commonly used drugs and chemotherapy • Understand the different modes and systems of mechanical ventilation	
Pediatric Surgery (Senior Years)	Manage acquired and congenital anomalies: • Head and neck (e.g., thyroglossal cyst, branchial cyst, and cystic hygroma) • Thoracic (e.g., cystic lung lesions, pectus deformity, lung and pleural infection, and mediastinal masses) • Abdomen (e.g., intestinal obstruction, malrotation, anorectal malformation, obstructive jaundice, and tumors) • Intersex anomalies	• Demonstrate how to perform advanced operative skills • Demonstrate how to perform advanced laparoscopy skills • Demonstrate how to perform advanced thoracoscopy skills • Perform common intermediate and major abdominal surgeries • Perform common intermediate and major thoracotomy procedures • Perform emergency life-saving procedures • Acquire and show competencies of ATLS • Perform diagnostic procedures such as bronchoscopy and endoscopy
Elective Rotation		
Endoscopy: Understand and explain the following	• Instrument types • Indications • Technique • Complications	• Esophagoscopy • Gastroscopy • Proctoscopy • Sigmoidoscopy • Colonoscopy

Rotation	Knowledge Objective *(The trainee know how to)*	Skill Objective *(The trainee should show how to)*
Oncology: Comprehend and explain the following	• Oncology principles • Diagnostic imaging • Principles of tumor therapy including immunotherapy, radiation biology, and immunosuppression • Cancer chemotherapy • Bone marrow transplantation	• Surgical management of chemotherapy complications
Radiology: Understand and professionally read the different pediatric radiological modalities	• Pediatric radiology • Body imaging • Interventional radiology	• Ultrasound (USS) (Pyloric stenosis, intussusception, acute appendicitis, and trauma) • Hydrostatic and/or pneumatic reduction of intussusception • Computerized Tomography (CAT) scan (trauma and tumors) • Magnetic Resonance Imaging (MRI) (Pelvic masses, vascular malformation, and pancreatico-biliary lesions)

B. Communicator

1- General Requirements

- Obtain and synthesize relevant history from patients and families and their communities.
- Convey pertinent information from the history and physical examination in different circumstances.
- Listen effectively.
- Communicate effectively with patients and their families regarding their medical conditions in the ER, clinics, and wards.
- Establish a therapeutic relationship with patients and their families, and discuss appropriate information with the healthcare team.
- Demonstrate an ability to be sympathetic and humane with the family and patient.
- Discuss the diagnosis and treatment plan in a manner that fosters patient satisfaction and compliance.
- Discuss individual patients daily with the appropriate attending
- Demonstrate the ability to cohesively and concisely present patients at weekly service rounds.
- Demonstrate the ability to present and discuss complications at weekly morbidity and mortality rounds.
- Accurately document the patient's admission and progress while in the hospital, with emphasis on the relevant issues.
- Interact effectively with other health care professionals.
- Participate in social service rounds and meetings with family members to discuss the smooth transition from the hospital to home.

- Demonstrate good communication skills with the supervising surgeon and other members of the healthcare team, including nurses, physiotherapists, and occupational therapists (as well as social workers for senior and chief residents in particular).
- Deliver information in a humane manner that is understandable and encourages discussion.
- Understand the importance of working in a healthcare team to understand the impact of the community on the patient.

Specific Requirements

1. Demonstrate appreciation of the unique psychological needs of pediatric patients.
2. Demonstrate appreciation of the unique relationship between pediatric patients. and their families and be able to deal effectively and compassionately with family members by establishing therapeutic relationships.

C. Collaborator

General Requirements

- Demonstrate the effective and well-thought-out use of consultants in the management of pediatric surgical patients.
- Identify the need to and benefit of consulting with other health care professionals and discuss patient management in a collegial way.
- Demonstrate willingness to be consulted by other health care professionals and discuss patient management in a collegial way.
- Participate in the Tumor Board conference and discuss newly diagnosed cancer cases with radiation, medical oncology, and other interdisciplinary team activities.

- Consult other health professionals, demonstrate respect for their opinions, and develop care plans in collaboration with these professionals.
- Demonstrate willingness to consult other physicians (such as hematologists and microbiologists) when managing their patients.
- Effectively present cancer cases to a Tumor Board and discuss the results with patients and their families.
- Understand that, in a community hospital, collaboration with family physicians both inside and outside the operating room is crucial.
- Understand the limitations in the potential to consult other services in a hospital.

Specific Requirements:

Effectively using the team approach in the management of critically and chronically ill patients, such as newborns with congenital anomalies and children with cancer, inflammatory bowel disease, short bowel syndrome, or transplantation.

D. Manager

- Utilize resources effectively to balance patient care, learning needs, and outside activities.
- Demonstrate the judicious use of expensive radiologic tests and interventions and as a senior or chief resident, demonstrate skills in running the team.
- Junior residents should demonstrate the ability to manage their time appropriately between the ward, emergency room, and operating room responsibilities.
- Allocate finite health care resources wisely.
- Demonstrate the ability to manage patients in the ward and emergency room with appropriate and efficient use of ancillary tests.

- Senior residents can build a cohesive team that is punctual and respects the personal lives of all its members.
- Demonstrate the ability to use information, whether it is in a hospital, computer information system (CIS), or web, to optimize patient management.
- Prioritize problems appropriately to work efficiently and effectively.
- Make clinical decisions in the emergency room based on the efficient and effective use of healthcare resources.
- Understand how to utilize information technology to optimize patient care and continued self-learning.
- Demonstrate an understanding of the importance of properly utilizing finite healthcare resources in the management of diseases and in information technology to optimize patient care, life-long learning, and other activities.
- Learn to manage patients within the limited resources of a community hospital. Learn when and how to transfer patients to tertiary faculties for care.
- Work effectively and efficiently in a healthcare organization.

Specific Requirements

1. Demonstrate an appreciation of the economic factors that influence decision-making and the impact of such factors on families.
2. Understand the principles and practice of quality assurance and improvement and actively participate in hospital-based quality assurance and improvement programs.
3. The chief pediatric surgery resident is in charge of managing the pediatric surgery team, including assigning duties to the residents and medical students during service and coordinating patient care rounds. In addition, the chief surgical resident design a call schedule to collaborative with the residents.
4. The chief pediatric surgery resident should demonstrate effective management in the operating room, clinic, emergency consulting rooms, and the ward.

E. Health Advocate

General Requirements

- Identify determinants of health that is unique to a hospital serving a multiethnic community (i.e., genetic diseases such as pediatric oncology, neonatal anomalies, and genetic factors leading to surgical problems).
- Identify the important risks to health that affects patients.
- Advise patients and their families regarding disease prevention, screening, and health maintenance.
- Demonstrate the ability to organize ancillary tests in a timely fashion.
- Disseminate population screening guidelines for common pediatric surgery with a genetic background.
- Disseminate the complications of excess body weight and identify complications that can be reversed by significant weight loss.
- Respond to the community's health needs.
- Contribute effectively to the improved health of patients and communities and injury prevention.
- Recognize and respond to issues where advocacy is appropriate.

Specific Requirements

1. Be knowledgeable about the appropriate use of car safety restraints according to the child's size (i.e., rear-facing infant seats, forward-facing car seats, booster seats, and lap-shoulder belts).
2. Contribute to health maintenance advocacy for children, including areas such as travel safety, helmet use, children operating machinery or motorized vehicles, and accessibility to firearms.
3. Understand injury prevention and control of pediatric surgeons in the advocacy of injury prevention policies for children and the youth.

4. Identify the need for and develop a plan for ongoing post-discharge care and support.

F. Scholar

General Requirements

- Develop, implement, and monitor a personal continuing education strategy using academic half-day activities including journal clubs, chapter rounds, and other presentations.
- Continuous development of new knowledge through daily education during morning rounds, in the operating room, or during clinic times.
- Critically appraise sources of medical information.
- Demonstrate the ability to use evidence-based medicine to address clinical dilemmas.
- Critical analyze current literature and perform discussions at Surgical Grand Rounds.
- Facilitate the learning of patients, hospital staff, students, and other health care professionals through formal and informal teaching opportunities.
- Assume the role of the pediatric surgical teacher for junior residents and medical students in the provision of pediatric surgery services.

1. Clinical

- Recognize areas of weakness in knowledge or skills.
- Formulate a plan to correct the weakness (e.g., spend more time in the laparoscopic skills laboratory and perform structured literature search about a specific clinical question encountered in the provision of service).
- Recognize and identify gaps in knowledge and expertise around the clinical question.

- Formulate a plan to fill the gap and present the newly acquired knowledge at General Surgery Rounds.
- Critically appraise sources of medical information.

2. Research

- Based on their clinical exposure, residents will have the opportunity to start the process of generating a research question (basic science, clinical, population health, or some combination).
- Develop a proposal to answer the research question.
- Conduct an appropriate literature search.
- Assimilate and critically evaluate the literature.
- Propose appropriate methods for conducting research.
- Perform and present the research results.

3. Education

- Demonstrate the desire and ability to teach others, including junior residents, non-general surgery residents, and medical students.
- Understand the principles of adult learning when teaching others.
- Demonstrate self-directed learning in the preparation of cases for rounds or the operating room.
- Help surgeons in the community hospital discuss latest papers in the literature in learning to implement evidence-based surgery in community hospital services.
- Encourage evidence-based review (Journal Club) presentation and appropriate use of information technologies.

Specific Requirements

1. Contribute to the development of new knowledge to foster the academic growth of the Pediatric Surgery specialty by participating in scholarly work, such as submitting original research for presentation and publication.

G. Professional

General Requirements

- Demonstrate professionalism (honesty, altruism, integrity, and compassion) in one's attitude toward patients and other healthcare professionals.
- Demonstrate a balance between personal professional roles and responsibilities and ways of attempting to resolve conflicts and role strain.
- Know and understand the professional, legal, and ethical codes to which physicians are bound.
- Demonstrate humility in one's approach to clinical practice.
- Demonstrate a level of professionalism consistent with the practice of surgery, particularly in areas of punctuality, politeness, availability, empathy, appropriate dressing, and respect for patients' privacy (attributes of professionalism).
- Demonstrate a sense of responsibility by ensuring continuity of care for patients.
- Demonstrate an understanding of their own limitations and know when to call for help in difficult situations.
- Recognize and resolve ethical issues as they arise in surgical care, including issues with informed consent, level of intervention discussions, and advanced directives.
- Demonstrate the ability to interact with patients, nurses, pharmacists, etc. with integrity, honesty, and compassion.

- Demonstrate self-evaluation and continued receptiveness to criticize.
- Learn to practice medicine with integrity and honesty.
- Learn to respect the needs of the community physicians and patients.
- Practice medicine that is ethically consistent with the obligations of a physician.
- Learn to continually assess one's medical practice for improvement.
- Commitment to lifelong learning by reading textbooks and journals, discussion of difficult/complex cases at rounds, and involvement in teaching and research.
- Emphasis on honesty, including full disclosure of iatrogenic complications, responsibilities, and collegial/collaborative relationships with all health care workers.
- Sensitivity to age, gender/sex, socioeconomic status, and cultural differences in the perception of illness, outcome, and treatment by the patient and their families.
- Appreciation of the medico-legal aspects of detailed legible documentation, informed consent, and complications occurring in the context of training.
- Understanding of the importance of cost-effective management of available resources in the current healthcare industry.

Specific Requirements

- Demonstrate sensitivity to age, gender/sex, culture, and ethnicity in dealing with patients and their families.
- Understand the ethical principles related to the complex issue of congenital abnormalities, and as applied to children scheduled for medical treatment, research, etc.
- Use ethics modules to develop suitable and ethically-based approaches to difficult clinical problems.

- Recognize the importance and maintenance of competence and the evaluation of outcomes.
- Understand the legal issues related to consent, confidentiality, and refusal of treatment.
- Maintain appropriate work-life balance.

VIII. CONTINUUM OF LEARNING

	R 1–2 (General surgery & Specialties)	R 3–6 (Pediatric Surgery)	
	Obtain fundamental knowledge related to core clinical problems of General Surgery and other specialties. Apply knowledge to provide appropriate clinical care related to core clinical problems of Pediatric General Surgery.	Acquire advanced and up-to-date knowledge related to core clinical problems of the specialty.	
	Develop clinical skills such as physical examination and practical procedures related to general surgery. Analyze and interpret the findings from clinical skills to develop appropriate differential diagnoses and management plan for the patient.	Compare and evaluate challenging contradictory findings and develop expanded differential diagnoses and management plans.	

During the program training years, pediatric surgery residents will acquire knowledge that reflects their exposure to certain disease conditions. As they successfully progress in the program from Junior years (1–3) to Senior years (4–6), they will reach the mastery level in knowledge acquisition. The following table provides an example of a chosen clinical problem and the expected knowledge from Junior and Senior Residents

Table: Expected Level of Knowledge Competency for Core Specialty Level Problems

Junior Resident Senior Resident

Core clinical problem	Core Specialty Level	Mastery Level
Approaching the child and care giver (history taking, physical examination, and parental counseling)	Personality, attitude, medical ethics, and communication Medical expert	Professionalism
Bilious vomiting in Neonates	Necrotizing Enterocolitis (NEC) Intestinal obstruction Sepsis Malrotation GERD	Intestinal Volvulus
Neonatal Intolerance to Feeding	GERD Upper GIT Obstruction Sepsis	NEC
Neonatal Constipation	Meconium plug Meconium ileus Hypothyroidism Anorectal Malformation Prematurity	Hirschsprung's Disease
Neonatal lower GIT bleeding	Anal Fissure Rectal Polyps	NEC
Neonatal Respiratory Distress and Excessive oral Secretions	Congenital Emphysema, Congenital Pulmonary Adenomatoid Malformation (CPAM) Pulmonary Sequestration Diaphragmatic Hernia.	Esophageal Atresia and Tracheo-Esophageal Fistula (EA-TEF)
Neonatal Jaundice	Biliary Atresia Primary Liver Disease	Choledocal Cyst
Neonatal Abdominal Wall Defect	Omphalocele Gastroschisis Umbilical Cord Hernia	Pentalogy of Cantrell Ectopic Vesicae Ectopia Cordis
Radiology in Neonate	Plain X-Rays USS CAT Scan MRI	Contrast Study Interpretation

Core clinical problem	Core Specialty Level	Mastery Level
Infant with Abdominal Pain	Intussusception	Malrotation
Infant with Bilious Vomiting	Intestinal Obstruction	Intestinal Volvulus
Infant with Repeated Vomiting	GERD	Hypertrophic Pyloric Stenosis
Toddler with abdominal pain	Acute Appendicitis UTI Lower Lobe Pneumonia	Ovarian Torsion Abdominal Tumors
Toddler Lower GIT Bleeding	Anal Fissure Rectal Polyp	Meckel's Diverticulum
Respiratory Distress	Congenital Causes Chest Infection Empyema Pleural Effusion	Foreign Body Inhalation
Abdominal masses in Toddlers	Wilm's Tumor Neuroblastoma	Teratoma Mesenteric Cysts Bowel Duplications Lymphangioma
Abdominal Pain in Neutropenic Patient	Medical Causes Acute Appendicitis	Enterocolitis Typhlitis
Upper GIT Bleeding	Severe Gastritis.	Esophageal Varices and Portal Hypertension

IX. TEACHING METHODS

The teaching process in postgraduate residency training programs is mainly based on the principles of adult learning theory. The trainees are expected to be aware of the importance of learning and play active roles in the content and process of their own learning. The training pogroms implement the adult learning concept in each feature of the activities where the residents are responsible for their own learning requirements. Below is an example of the common diseases that the pediatric surgery resident might encounter in several patient settings and common procedures that the resident needs to perform:

Top ten common pediatric surgical emergency problems in Saudi Arabia

Disease/Conditions
• Irreducible inguinal hernia
• Foreign bodies
• Bleeding circumcision
• Acute appendicitis
• Trauma
• Intestinal obstruction
• Hirschsprung's disease
• Lower GIT bleeding
• NEC
• Peri-anal conditions

Top ten procedures performed

Procedure/Operation
• Inguinal hernia repair
• Orchiopexy
• Central venous access
• Laparotomy/Laparoscopy for neonatal intestinal obstruction, intestinal anastomosis, and stoma formation
• Anorectoplasty (Open/Laparoscopy)
• Appendectomy
• Endorectal pull
• Oncology surgery
• GERD surgery
• Esophageal surgery

Top ten causes of out-patients consultation

Disease/Conditions
• Hernias
• Neck swelling
• Undescended testis
• Soft tissue and skin lumps
• Abdominal stomas
• Anorectal malformation
• Hirschsprung's disease

Disease/Conditions
• Gall stones/splenomegaly in hematological disease
• Chronic constipation
• GERD

Top ten causes of in-patient admission

Disease/Conditions
• Acute appendicitis
• Complicated inguinal hernias
• Acute scrotal swelling
• Trauma
• Intestinal obstruction/malrotation
• Hypertrophic pyloric stenosis
• Intussusception
• Bleeding circumcision
• Peri-anal conditions
• Lower GIT bleeding

Top tumors in children

Organ/systems
• Wilm's tumor
• Neuroblastoma
• Teratomas

Organ/systems
• Ovarian tumors
• Soft tissue tumors
• Liver tumors

Formal training time would include the following four teaching activities:

1. General principles
2. Program-specific learning activities (40–50%)
3. Universal topics (20–30%)
4. Simulation and workshop
5. Trainee directed topics (10–20%)
6. Other educational activities (less than 10%)

1. General Principles

1. Half-day protected time should be reserved weekly for residents as an academic day. They should be freed from all clinical duties to attend the activity. All activities should be planned with a presenter, time slots, and venue.
2. A monthly regional academic activity should also be planned for all residents in all hospitals.
3. Residents are mandated to publish a paper/poster or to have at least two presentations at recognized international pediatric surgery conferences.

2. Program-Specific Learning Activities (40–50%)

Program-specific activities are educational activities specifically designed and intended to teach trainees during their training time. Trainees are required to attend these activities, and non-compliance can subject trainees to disciplinary actions. It is advisable to link attendance and participation in these activities with formative assessment tools (see the formative assessment section below). The

program's administration should support these activities by providing protected time for trainees to attend and allowing them to participate in such activities.

- Program Academic Half-Day

At least 2–4 hours of formal training (commonly referred to as academic half-day) should be reserved every week. A formal teaching time is a planned activity an assigned tutor or tutors, time slots, and venue. Formal teaching time excludes teaching and clinic postings. The academic half-day covers the core specialty topics that are determined and approved by the specialty's scientific council aligned with specialty-defined competencies and teaching methods. The core specialty topics will ensure that important clinical problems of the specialty are well taught. It is recommended that lectures are conducted in an interactive case-based discussion (CBD) format. The learning objectives of each core topic must be clearly defined, and it is preferable to use pre-learning materials. Whenever applicable, core specialty topics should include workshops, team-based learning, and simulation to develop core procedure skills. Regional supervisory committees in collaboration with academic and training affairs, program directors, and chief residents should work together to ensure the planning and implementation of academic activities, as indicated in the curriculum. There should be active involvement of the trainee in the development and delivery of the topics under faculty supervision; involvement might be in the form of delivery, content development, research, etc. The trainee's supervisor should ensure that the discussion of each topic is stratified into the following three categories of learning domains: knowledge, skill, and attitude, whenever applicable.

- Periodical practice-based learning educational activities:

Daily	Morning Meeting Clinical Round Ambulatory and clinic teaching
Weekly	Grand Round Resident Program Academic Day Department specific academic activity Journal club Radiology Meeting
Monthly	Regional Pediatric Surgery Scientific Meeting Tumor Board Meeting Pathology Round Morbidity and Mortality Meetings

The important common pediatric surgery problems will be discussed in the academic half day or other practice-based learning educational activities in the form of interactive, preferably, CBDs supported with a recent update or review of relevant evidence-based approaches.

The following are examples of various topics and are not exhaustive

SECTION	TOPIC	OBJECTIVES
General surgical topics	Fluids and Electrolytes Wound Healing Nutritional Management	• Physiology of normal and abnormal fluids and electrolytes. • Diagnosis and management of electrolyte disturbances and acid-base imbalance. • Principles of wound healing. • Wound care strategies. • Principles of enteral and parenteral feeding. • Different types of formulas and their indications.
Head and Neck	Congenital Lesions	• Description of the embryology and anatomy of the neck and its structures. • Diagnosis and management of thyroglossal duct cysts. • Disease and management of branchial cleft cysts. • Aspects of tongue tie. • Management of Ranula. • Diagnosis and management of torticollis.
Breast and Endocrine	Breast	• Description the embryology and development of breast tissues. • Description of the normal and abnormal variations and approach to diagnosis and management.
	Adrenal	• Recognition of the pathophysiology of congenital and acquired adrenal insufficiency, cysts, and tumors.

SECTION	TOPIC	OBJECTIVES
	Thyroid and Parathyroid	• Description of causes, symptoms, diagnosis, and management of thyroiditis, MEN syndromes, and tumors.
Chest	Esophageal Atresia and Tracheo-esophageal Fistula	• Embryology and related anatomy. • Classification. • Diagnosis and management.
	Congenital Lung lesions	• Understanding of the embryology, diagnosis, and management of CPAM. • Description of the embryology, diagnosis, and management of congenital lobar emphysema. • Description of the basis of lung sequestrations and approaches to diagnosis and treatment.
	Congenital Diaphragmatic Hernias	• Outlining in detail of the embryology, antenatal and postnatal diagnoses, and management of Bochdalek and Morgagni hernias and eventration.
	Acquired Lung Lesions	• Covering of aspects of lung abscess and empyema. • Management of pneumatoceles, chylothorax, and infiltrates in immunosuppressed children.
	Vascular Rings	• Description of the embryology and anatomy of different types of vascular rings. • Diagnosis and symptoms. • Best approach management.
	Chest Wall Deformities	• Differentiation of the different types of deformities and presentation. • Exploration of the history of treatment and current approaches to management.

SECTION	TOPIC	OBJECTIVES
Hernias and Abdominal wall defects	Gastroschisis and Omphalocele	• Detailed description of both disorders with management and potential complications.
	Abdominal Hernias	• Description of their embryology, anatomy, and clinical findings. • Management with controversies and complications and their management.
Upper GI (Esophagus – Stomach – Small Bowel)	Gastroesophageal Reflux and Barret's disease	• Presentation and diagnosis. • Medical and surgical management.
	Pyloric Stenosis	• Presentation and diagnosis. • Medical management • Surgical treatment and complications.
	Duodenal and Small bowel atresia	• Description of their pathophysiology, presentation, classification, diagnosis, and management.
	Malrotation and Heterotaxia Syndromes	• Description of their embryology and the anatomy of bowel fixation. • Diagnosis and management approach.
	Neonatal Intestinal Obstruction	• Provision of the differential diagnosis and management of all possible causative factors.
	Short Bowel Syndrome	• Definition of related problems and description of nutritional support and possible surgical management.
Lower GI (Appendix – Colon – Rectum – Anus)	Appendicitis	• Description of symptoms, diagnosis, and management with potential complications.

SECTION	TOPIC	OBJECTIVES
	Hirschsprung's Disease	• Description of pathophysiology, symptoms, diagnosis, management, complications, and controversies.
	Imperforate Anus and cloaca	• Description of embryology, classification, diagnosis, and management.
	Inflammatory Bowel Disease	• Epidemiology and presentation. • Investigations and diagnosis. • Medical and surgical management. • Treatment of complications
	Constipation	• Definitions, history, workup, and differential diagnosis. • Knowledge of imaging and treatment plan formulation.
Gastrointestinal Bleeding	Upper and Lower GI Bleeding in Children	• Exploration of the different causes according to age group. Management of acute bleeding and differential diagnosis.
Hepatobiliary (Liver – Pancreas – Spleen)	Biliary Atresia	• Definition of the relevant embryology and classification. • Diagnostic approach and differential diagnosis. • Surgical treatment and early and post-operative care • Follow-up care and recognition and treatment of complications.
	Pancreatic Disorders	• Broad exploration of congenital structural abnormalities of the pancreas. • Approach to management of patient with pancreatic disorders.

SECTION	TOPIC	OBJECTIVES
	Indications for Splenectomy	• Description of indications and pathophysiology of various hematological and metabolic diseases. • Surgical approach, potential complications, and perioperative management
	Choledochal Cysts	• Description of their embryology. • Approach to management of patients with choledochal cysts.
Acute Abdomen	Acute Abdomen in Children	• History taking and presentation. • Diagnostic maneuvers. • Imaging. • Management of specific causative factors.
	NEC	• Pathophysiology and causative factors. • Diagnosis. • Medical Management. • Surgical management and controversies. • Complications, prognosis, and outcomes.
Cancer	Neuroblastoma	• Pathophysiology of neuroblastoma. • Clinical manifestations. • Diagnosis. • Staging system based on the latest INSS and Risk groups. • Prognosis and surgical approaches.
	Renal Tumors	• Description of the pathophysiology of various renal tumors. • Diagnosis and approach to management. • Description of different treatment protocols.

SECTION	TOPIC	OBJECTIVES
		• Detailed approaches to complex presentations and prognosis.
	Liver Tumors	• Development of detailed knowledge of management of liver masses in children, especially those with hepatoblastoma including treatment protocols.
	Lymphomas	• Exploration of the approach to lymph nodes in children, diagnostic approach, and management including treatment of post chemotherapy residual lymph node management.
	Germ Cell tumors	• Discussion of the embryology and classification of germ cell tumors. • Detailed knowledge of site-specific management approaches (Gonads, sacrococcygeal, and chest).
	Rhabdomyosarcoma	• Definition, epidemiology, and pathological classification. • Clinical presentation and diagnosis. • Clinical staging and grouping systems. • Management and risk groups. • Site-specific management and complications.
	Vascular Access	• Indications and approaches to temporary and permanent vascular access. • Management of the difficult IV access in emergencies. • Vascular access for hemodialysis. • Peritoneal dialysis in children.

SECTION	TOPIC	OBJECTIVES
	Vascular Anomalies	• Definitions and presentations. • Classification and diagnosis. • Management approaches.
Surgical Management of Obesity		• Definitions and prevention. • Presentations, workup, and complications. • Medical and surgical approaches.
Trauma	General Management and Prevention	• Epidemiology and resuscitation. • Prevention strategies and advocacy.
	Thoracic Injuries	• Presentation and resuscitation. • Organ-specific management approaches.
	Abdominal Trauma	• Diagnostic modalities. • Solid organ diagnosis and management. • Abdominal compartment syndrome. • Duodenal, pancreatic, and other organ injuries.
	Genitourinary Trauma	• Epidemiology and mechanisms of injury. • Clinical features and diagnostic evaluation. • Injury grading. • Management of specific injuries.
	Burns	• Definitions and diagnosis. • Approach to resuscitation. • Surgical management and complications.
	Child Abuse and Birth Injuries	• Epidemiology and presentation. • Specific management and multidisciplinary approach.

SECTION	TOPIC	OBJECTIVES
Urogenital Conditions	Congenital Conditions: • Vaginal Atresia • Hemato/Hydrometrocolpos • Bifid Vagina • Duplex Uterus • Urogenital Sinus	• Definitions and classification. • Pathophysiology. • Diagnosis and investigation. • Surgical management.
	Inflammatory Conditions: • Pelvic Inflammatory Disease • Vulvovaginitis • Vulvar Abscess • Fused labia Minora	• Pathophysiology. • Diagnosis and investigation. • Medical and surgical management.
Disorders of Sex Development (DSD)	46 XY DSD 46 XX DSD Ovo-testicular DSD 46 XX Testicular DSD 46 XY Complete Gonadal Dysgenesis	• Definitions and classification. • Pathophysiology • Diagnosis and investigation. • Medical and surgical management.
Urology	Cryptorchidism	• Definition and diagnosis. • Medical and surgical treatment.
	Acute Scrotum	• Presentation and diagnosis. • Management of specific diagnosis.
	Cloacal and Bladder Exstrophy	• Embryology and pathology. • Management.

SECTION	TOPIC	OBJECTIVES
	Urachal Abnormalities	• Definitions and embryology. • Diagnosis. • Surgical management.
Circumcision	Techniques and Complications	• Description of different techniques of circumcision. • Prevention and dealing with complications.

3. Universal Topics

Centrally delivered by the SCFHS to all trainees in all specialties. Modules that pertain mostly to pediatric surgery are recommended.

Intent

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. These topics are common to all specialties.

Topics included here meet one or more of the following criteria:

✓ Impactful: Topics that are common or life-threatening.

✓ Interdisciplinary: Topics that are difficult to teach through a single discipline.

✓ Orphan: Topics that are poorly represented in the undergraduate curriculum.

✓ Practical: Topics that trainees will encounter in hospital practice.

Development and Delivery

Core topics for the pediatric surgery curriculum will be centrally developed and delivered by the Commission through an e-learning platform. A set of preliminary learning outcomes will be developed for each topic. Content experts, in collaboration with the central team, may modify learning outcomes.

These topics will be didactic in nature, with a focus on the practical aspects of care. The content of these topics will be more in-depth compared with that of workshops and other planned face-to-face interactive sessions.

The suggested duration of each topic is 1.30 hours.

Assessment: At the end of each Learning Unit, an online formative assessment will be conducted. After the completion of all topics, a combined summative assessment in the form of a context-rich MCQ will be conducted. All trainees must attain minimum competency in the summative assessment. Alternatively, these topics can be assessed in a summative manner along with a specialty examination.

Training Year	*Modules*		Topic names	
	Number	Name	Number	Name
R1	Module 1	Introduction "Medical Fundamentals"	Topic-1	Blood Transfusion
			Topic-2	Hospital Acquired Infections
			Topic-3	Antibiotic Stewardship
			Topic-4	Sepsis, SIRS, and DIVC
			Topic-5	Safe Drug Prescribing
R2	Module 3	Diabetes and Metabolic Disorders	Topic-10	Diabetic Emergencies
			Topic-11	Management of Diabetic Complications
			Topic-12	Obesity
	Module 4		Topic-19	Upper GI Bleeding

Training Year	Modules		Topic names	
	Number	Name	Number	Name
		Medical and Surgical Emergencies	Topic-20	Lower GI Bleeding
R3	Module 5	Acute Care	Topic-22	Pre-Operative Assessment
			Topic-23	Post-Operative Care
			Topic-24	Acute and Chronic Pain Management
			Topic-25	Fluid Management in the Hospitalized Patient
			Topic-26	Management of Electrolyte Imbalances
R4	Module 7	Ethics and Healthcare	Topic-31	Occupational Hazards of Health care Workers
			Topic-33	Patient Advocacy
			Topic-34	Organ Transplantation
			Topic-35	Autonomy and Treatment Refusal
			Topic-36	Death and Dying

4. General Learning Opportunities

National and regional meetings	• Annual Pediatric Surgery meeting held by the Scientific Society of Pediatric Surgery • Updates in Pediatric Surgery meetings held by the Ministry of Health
International courses and meetings	• British Association of Pediatric Surgery • European Association of Pediatric Surgery meeting • Pacific Association of Pediatric Surgery • American Association of Pediatric Surgery • Canadian Association of Pediatric Surgery) • Section of Surgery of the American Academy of Pediatrics • International Pediatric Endoscopy Groups • IRCAD courses • Colorectal problems course Cincinnati Children's Hospital
Trainee	• Regular journal reading • Podcasts • WebSurg University and Videos • Simulation box training • Manuscript preparation

5. Simulation:

As the national supervising body, the SCFHS initiated a move toward integrating simulations into residency training programs.

Medical simulation involves creating an artificial clinical scenario from which trainees can learn. This process has educational advantages, such as learning and practicing how to deal with rare and/or high-risk clinical scenarios and rare procedures while practicing in a controlled standardized environment with immediate effective feedback that has a significant impact on knowledge, skills, and attitude. (1,2,3,4)

The scenarios for simulation need to be as close to real clinical situations as possible, including team members, equipment, and the environment, followed by timely and effective feedback. According to McGaghie *et al.,* effective feedback has three key components including planning, pre-briefing, and feedback provision. (5)

The use of simulation in postgraduate training programs is currently a necessity, especially in competency-based curricula. Current programs aim to graduate skilled, competent, and independent physicians while maintaining a focus on quality and patient safety. Practically speaking, there can be a high level of variability in using simulation to implement competency-based curricula, and the nature of the specialty is likely to play another role in increasing this variability. Establishing standardized needs assessment methods for simulation may pose a challenge to any national organizational body dealing with various ongoing postgraduate training programs.

For more details in choosing, writing, and applying simulation to this curriculum, please read (Standard Template for Simulation Curriculum Development of Postgraduate Training Programs, 2020)

List of needed simulation courses during the junior years of the residency training program (R1–R3)

Topics	Level	Description	Requirement
Basic life support	R1–2	One-day adult learning course in basic life support	Mandatory
Basic surgical skills workshop/Basic operative surgical skills course	R1 and 2	Three to five days hands-on workshop including operating room safety, instruments orientation and handling, knotting, suturing, sterility, and principles of wound care	Mandatory
Basic laparoscopic workshop/Fundamentals of laparoscopic surgery	R1–3	Three days hands-on workshop in principles of laparoscopic surgery	Mandatory
ATLS	R1–3	Three days interactive course addressing ATLS	Mandatory
Research methodology	R1–3	Workshop on research methodology	Mandatory
Focused Abdominal Sonography in Trauma (FAST) course	R1–3	One or two days hands-on course in FAST	Optional
Central line course/Vascular access under USS	R1–3	One day hands-on course in central lines placement techniques	Optional

List of needed simulation courses during the senior years of the residency training program (R3–R6)

Topics	Level	Description	Requirement
PALS	R3–6	Two days hands-on course in advance children life support	Mandatory
Advanced laparoscopic workshop	R4–5	Three days hands-on workshop in advance laparoscopic surgical techniques	Optional
Basic and advanced bronchoscopy course		One to two days hands-on course focused on bronchoscopy skills (special attention to rigid bronchoscopy and bronchoscopy procedures, i.e., foreign body retrieval, bronchial lavage, and bronchial biopsy)	Optional
NRP	R4–6	Two days hands-on course in neonatal resuscitation	Optional

3. Trainee directed topics (10–20%)

Updating the residency through top pediatric surgery journals such as *Journal of Pediatric Surgery, Pediatric Surgery International, and Seminars in Pediatric Surgery*.

Residents are also required to gain knowledge and skills in various fields that are generally important for trainees and are not specific to pediatric surgery residents.

Examples of skills and knowledge to be acquired

- How to read a research paper
- How to write a research paper
- Research and grant preparation
- Communication skills
- Presentation skills

- Leadership and management skills
- Decision-making skills
- Stress coping and management
- Time management
- Breaking bad news
- Child psychology
- Exam taking skills
- Surgical simulation

4. Other educational activities (less than 10%)

Laparoscopic Basic Courses	• Conducted in Riyadh and Jeddah periodically
Trainee	• Regular journal reading • Podcasts • WebSurg University and Videos • Simulation box training • Manuscript preparation
Recommended Textbooks	• Operative Pediatric Surgery, Seventh Edition by Lewis Spitz • Pediatric Surgery, 2-Volume Set: 7ed by Arnold G. Coran • Ashcraft's Pediatric Surgery 6ed by George W. Holcomb III MD • Operative Pediatric Surgery by Moritz Ziegler • Newborn Surgery 3ed by Prem Puri

X. ASSESSMENT AND EVALUATION

1. Purpose of Assessment

Assessment plays a vital role in the success of postgraduate training. Assessment guides trainees and trainers to achieve defined standards, learning outcomes, and competencies. However, assessments provide feedback to learners and faculty regarding curriculum development and implementation, teaching methods, and quality of the learning environment. Reliable and valid assessment is essential to assess curriculum alignment with objectives, learning methods, and assessment tools. Finally, assessments assure patients and the public that health professionals are equipped and competent to practice.

An assessment can serve the following purposes:

- ✓ **Assessment for learning:** Trainers will use information from trainees' performance to inform their learning for improvement. This enables educators to use information about trainees' knowledge, understanding, and skills to provide feedback to trainees about their learning progress and how to improve.
- ✓ **Assessment as learning** involves enabling trainees in the learning process to monitor their own progress. Trainees use self-assessment and educators' feedback to reflect on their progress. It develops and supports the trainees' metacognitive skills. Assessment of learning is crucial in helping residents/fellows become lifelong learners.
- ✓ **Assessment of learning** is used to demonstrate trainees' learning achievement. This is a graded assessment and usually counts toward the trainees' end-of-training degree.

✓ **Feedback and evaluation** as assessment outcomes represent quality metrics that can improve learning experience.

Miller's Pyramid of Assessment provides a framework for assessing the trainees' clinical competencies, which acts as a guide for the trainers to select the assessment methods to target different clinical competencies including "knows," "knows how," "shows how," and "does" (see Appendix A checklist).

For the sake of organization, assessment will be further classified into two main categories: *Formative* and *Summative*.

2. Formative Assessment

2.1 General Principles

Trainees, as adult learners, should strive to seek and develop their performance based on, feedback throughout their journey of competency from "novice" to "mastery" levels. Formative assessment (also referred to as formative assessment) is a component of assessment distributed throughout the academic year, aiming primarily to provide trainees with effective feedback.

Every two weeks, at least one hour should be assigned for trainees to meet with their mentors to review performance reports (e.g., In-Training Evaluation Report [ITER], e-portfolio, mini-CEX, etc.). Input from the overall formative assessment tools will be utilized at the end of the year to determine whether individual trainees will be promoted from the current to the subsequent training level. Formative assessment is defined based on scientific (council/committee) recommendations, usually updated and announced for each individual program at the start of the academic year.

According to the executive policy on formative assessment (available online: www.scfhs.org), formative assessment will have the following features and will be based on Miller's pyramid (see checklist *appendix A-)*:

- Multisource: minimum of four tools.
- Comprehensive: covering all learning domains (knowledge, skills, and attitude).
- Relevant: focusing on workplace-based observations.
- Competency milestone-oriented: reflects the trainee's expected competencies that match the trainee's developmental level.

Trainees should play an active role in seeking feedback during their training, and trainers should provide timely and formative assessments. The SCFHS provides an e-portfolio system to enhance the communication and analysis of data from formative assessments.

Trainers and trainees are expected to follow the recommendations of the Scientific Council regarding the updated forms, frequency, distribution, and deadlines related to the implementation of the evaluation forms.

2.2 Formative Assessment Tools

Residents' evaluations and assessments throughout the program is performed in accordance with SCFHS training and examination rules and regulations. This includes the following.

- Formative assessment: This assessment is conducted toward the end of each training rotation throughout the academic year and at the end of each academic year. To be promoted, trainees must
    1. Pass the end-of-year written examination: The end-of-year written examination is limited to R1, R2, R3, R4, and R5. The number of examination items, eligibility, and passing scores will be in accordance with the SCFHS training and examination rules and regulations. The examination consisted of MCQs. (see the blue print).
    2. Pass the end-of-year clinical examinations: All residents will undergo end-of-year clinical examinations. The number of exam items, eligibility, and passing scores will be in accordance with the SCFHS training and

examination rules and regulations. It consists of a structured oral examination (SOE) and an objective structured practical exam (OSPE).

3. Submit their annual procedures logbook with DOPS forms (2 forms per month spent in each surgical rotation): The assessment of acquiring the required surgical skills in several pediatric surgical procedures will be performed through quantitative and qualitative methods:
    1. Quantitative assessment: The log book will be used to record the trainee's exposure to various pediatric surgical procedures every year. A certain number of cases in each procedure is specified as the minimum number of cases a trainee should be exposed to annually, either as the primary surgeon, assistant, or supervising junior trainees. The logbook should be reviewed and signed by the program director at the end of each rotation, in addition to the annual review of the logbook at the end of each academic year.
    2. Qualitative assessment: To ensure that standardized feedback is provided to the trainee after the surgical procedure, the DOPS evaluation forms were approved for use in open surgeries (Objective Structured Assessment of Technical Skills [OSAT]) and laparoscopic surgeries (Global Operative Assessment of Laparoscopic Skills [GOALS]). Each trainee is required to submit two2 forms per month for different surgical procedures, which has been filled and signs by a senior pediatric surgeon.
4. Submit their research progress according to the guidelines for each level of training.
5. Obtain an ITER: This is completed by the program director at the end of each academic year after the trainee has successfully passed all clinical rotations according to the CanMED competencies. Evaluations should be performed using the One45 platform.

Learning Domain	Formative Assessment Tools	Important details (e.g., frequency, specifications related to the tool)
Knowledge	• Annual Written Progress Test (Promotion exam) • Structured Oral Exam (SOE)	At the end of each training year
Skills	Objective Structured Practical Exam (OSPE) Logbook DOPS: Direct Observation for Procedural Skills Research Activities	At the end of each training year To achieve the required skills as approved by the scientific committee. (For further details please refer to Appendix B Logbook) Two forms per month OSAT and GOALS Submit their research progress according to the guidelines for each level of training
Attitude	ITER: In-Training Evaluation Report	At the end of each rotation

The evaluation of each component will be based on the following criteria:

Percentage	< 50%	50–59.4%	60–69.4%	>70%
Description	Clear fail	Borderline fail	Borderline pass	Clear pass

To achieve unconditioned promotion, the candidate must score a minimum of "borderline pass" for all the formative assessment tools used.

- The program director can still recommend the promotion of candidates if the above is not met in some situations as outlined below.
- If the candidate scored "borderline failure" in one or two components at maximum. These scores should not belong to the same area of assessment (for example, both borderline failures should not belong to the skills category).

- The candidate must have passed all other components and scored a minimum of clear pass in at least two components.

3. Summative Assessment

3.1. General Principles

Summative assessment is a component of assessment that aims primarily to make informed decisions about trainees' competency. Compared to formative assessment, *summative assessment* does not aim to provide constructive feedback. For further details on this section, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org). To be eligible to sit for the final exams, trainees will be granted "Certification of Training Completion" upon successful completion of all training rotations.

3.2. First Part Examination (If Applicable)

This is only applicable to residency programs. Residents should sit for this exam during the first four years of training. This exam is essential to promote a trainee from the junior to senior level. The exam is a written examination in an MCQ format, and it is held at least once a year. The number of examination items, eligibility, and passing scores will be in accordance with the SCFHS training and examination rules and regulations of the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org).

(see blue prints).

Blueprint for Principles of Surgery Part - I Examination

Principles of surgery	75 %
Neonatal physiology, fluids, and electrolytes	12
Shock, Hemostasis, and transfusion	12
Sepsis and related considerations	12
Trauma and critical care	12
Surgical complications	8
Nutritional support	4
Pre-operative assessment, anesthesia, and pain management	10
Wound healing and burns	5
Clinical Surgery	**25 %**
Head and neck	5
Hernias, abdominal wall, and soft tissue tumors	4
Upper GIT (esophagus, stomach, and small intestine)	4
Lower GIT (appendix, colon, rectum, and anus)	4
GI bleeding	2
Hepatobiliary (liver, pancreas, and spleen)	4
Acute abdomen	2

3.3. Final In-training Evaluation Report

The final in-training evaluation report (FITER) is prepared by the program's directors for each resident at the end of his/her final year in residency (R6) after the trainee has successfully passed all clinical rotations according to the CanMED competencies. Evaluations should be performed using the One45 platform.

This report will be the basis for obtaining the Certificate of Training Completion as well as the qualification to sit for the final specialty examinations.

3.4 Certification of Training Completion

To be eligible to sit for the final specialty examinations, each trainee is required to obtain "Certification of Training Completion." Based on the General Bylaws of Training in Postgraduate Programs and executive policy (please refer to www.scfhs.org), trainees will be granted "Certification of Training Completion" once the following criteria is fulfilled.

1. Successful completion of all training rotations.
2. Completion of training requirements (e.g., logbook, research, and DOPS) as outlined in FITER, which is approved by the scientific committee of the pediatric surgery residency program.
3. Clearance from the SCFHS training affairs that ensures compliance with tuition payments and completion of universal topics.
4. Passing the first part of the examination (whenever is applicable).
5. "Certification of Training Completion" will be issued and approved by the supervisory committee or its equivalent, according to the SCFHS policies.

Learning Domain	Summative Assessment Tools	Passing Score
Knowledge	• Final written examination • Final clinical examination: SOE	At least borderline pass in each tool of assessment in accordance with the standard setting method used by the executive administration
Skills	• Logbook • DOPS • Research Activities	At least borderline pass in each tool of assessment in accordance with the standard setting method used by the executive administration
Attitude	• FITER	Successfully passing the FITER

3.5 Final Specialty Examinations

The final specialty examination is the summative assessment component that grants trainees the specialty's certification. It has two elements:

✓ Final written exam: To be eligible for this examination, trainees are required to have obtained "Certificate of Training Completion."

The final written exam assesses the theoretical knowledge base in the specialty of pediatric surgery specialty. It is delivered in an MCQ format and is held at least once a year. The number of exam items, eligibility, and passing scores will be in accordance with the Commission's training and examination rules and regulations.

Blueprint for Final Written Pediatric Surgery Exam

Domain	Pathology	Diagnosis	Management	Follow-up/ complications
Abdomen	7	9	9	8
Chest	4	4	5	4
Oncology	4	4	4	3
Trauma	1	3	4	2
Head and Neck	2	2	2	1
Neonatology	1	1	1	1
Miscellaneous	4	4	4	2

Final clinical/practical exam: Trainees will be required to pass the final written exam to be eligible to sit for the final clinical/practical exam. The final clinical/practical exam assesses a broad range of clinical skills, including data-gathering, patient management, communication, and counseling skills. The examination is held at least once a year in an SOE format. For further details on exam eligibility and the passing score, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org).

Blueprint for the Final Clinical Pediatric Surgery Exam

Example of the Final Clinical Exam Blueprint

		DIMENSIONS OF CARE				
		Health Promotion & Illness Prevention 1±1 Station(s)	Acute 5±1 Station(s)	Chronic 3±1 Station(s)	Psychological Aspects 1±1 Station(s)	# Station(s)
DOMAINS FOR INTEGRATED CLINICAL ENCOUNTER	Patient Care 7±1 Station(s)	1	4	2		7
	Patient Safety & Procedural Skills 1±1 Station(s)		1			1
	Communication & Interpersonal Skills 2±1 Station(s)			1	1	2
	Professional Behaviors 0±1 Station(s)					0
	Total Stations	1	5	3	1	10

*Main blueprint framework adapted from the Medical Council of Canada Blueprint Project.

Certification: Candidates who pass all components of the final specialty examination are awarded the "Saudi Specialty Certificate in Pediatric Surgery."

XI. PROGRAM AND COURSE EVALUATION

The SCFHS applies various measures to evaluate the implementation of this curriculum. The training outcomes of this program will follow the quality assurance framework endorsed by the Central Training Committee of the SCFHS. Trainee assessment (both formative and summative) results will be analyzed and mapped to the curriculum content. Other indicators that will be incorporated are as follows:

- Report of the annual trainees' satisfaction survey.
- Reports from trainees' evaluation of faculty members.
- Reports from trainees' evaluation of rotations.
- Reports from the annual survey of program directors.
- Data available from program accreditations.
- Reports from direct field communications with trainees and trainers.

Goal-based Evaluation: The achievement of intended milestones will be evaluated at the end of each stage to assess the progress of curriculum delivery, and any deficiencies will be addressed in the following stage utilizing the time devoted to trainee-selected topics and professional sessions.

In addition to subject-matter opinions and best practices from benchmarked international programs, the SCFHS will apply a robust method to ensure that this curriculum will utilize all the data available during the revision of this curriculum in the future.

XII. POLICIES AND PROCEDURES

This curriculum represents the means and materials and outlines the learning objectives with which trainees and trainers will interact to achieve the identified educational outcomes. The SCFHS has a full set of "General Bylaws of Training in Postgraduate Programs" and "Executive Policies" (published on the official SCFHS website) that regulates all training-related processes. The general bylaws of training, assessment, and accreditation as well as executive policies on admission, registration, formative assessment and promotion, examination, trainees' representation and support, duty hours, and leaves are examples of regulations that need to be implemented. Regarding this curriculum, trainees, trainers, and supervisors must comply with the most updated bylaws and policies that can be accessed online (via the official SCFHS website).

XIII. APPENDICES

The following are examples of the evaluation forms used to assess various aspects of resident performance in residency programs.

Appendix A

EDUCATIONAL PORTFOLIO

RESIDENT ASSESSMENT

Pediatric Surgery In-Training Evaluation Report

Domain		Item	N/A	Clear Fail (1)	Borderline (2)	Clear Pass (3)	Exceeds Expectation (4)
• Medical Expert							
• History & Physical Examination	1	Comprehensive, accurate, and concise with all relevant details					
• Diagnostic Tests	2	Used in a cost-effective manner and understands limitation and predictive value					
• Clinical Decision	3	Able to formulate appropriate differential diagnosis.					

Domain		Item	N/A	Clear Fail (1)	Borderline (2)	Clear Pass (3)	Exceeds Expectation (4)
	4	Able to analyze, integrate, and formulate effective management strategies					
• Medical Knowledge	5	Broad clinical and basic knowledge of a wide variety of medical problems					
• Emergency Management	6	Able to identify and respond appropriately to urgent cases					
• Evidence-based Practice/Critical Appraisal Skills	7	Able to search and analyze the literature, discuss the level of evidence, and apply findings					
• Surgical Skills	8	Able to discuss surgical indications and make complex surgical decisions					
	9	Perform appropriate peri-operative assessment and management					

Domain		Item	N/A	Clear Fail (1)	Borderline (2)	Clear Pass (3)	Exceeds Expectation (4)
	10	Demonstrate knowledge of the anatomy and the steps for each operation					
	11	Demonstrate level-appropriate surgical techniques with good handling of tissues and instruments					
	12	Able to handle intra-operative events and complications with calm temperament and thoughtful steps					
• COMMUNICATOR							
	13	Communicates effectively with patients, their families, and health care professionals					
	14	Able to maintain clear, accurate, and appropriate documentations					
• COLLABORATOR							
	15	Works effectively in a team environment with attending, junior, and nursing staff					

Domain		Item	N/A	Clear Fail (1)	Borderline (2)	Clear Pass (3)	Exceeds Expectation (4)
• MANAGER							
	16	Demonstrate good leadership skills					
• SCHOLAR							
	17	Attends and contributes to rounds, seminars, and other learning events					
	18	Accepts and acts on constructive feedback					
	19	Contributes to the education of patients, junior residents, house staff, and students					
• HEALTH ADVOCATE							
	20	Offers advocacy on behalf of patients at practice and general population levels					
• PROFESSIONAL							
	21	Delivers the highest standards of excellence in clinical care and ethical conduct in dealing with patients and health care providers					

Domain		Item	N/A	Clear Fail (1)	Borderline (2)	Clear Pass (3)	Exceeds Expectation (4)
	22	Punctuality					
	23	Reliability					
Total Score = Total marks/No. of evaluated items (≥ 3: Clear pass) (2–3: Border line) (< 2: Clear fail)							
Overall evaluation of trainee:							

Comments (areas of strength/areas for improvement):

(for the evaluator to answer…)

Did you have an opportunity to meet with this trainee to discuss their performance?

- Yes
- No

(for the evalutee to answer…)

Did you have an opportunity to discuss your performance with your preceptor/supervisor?

- Yes
- No

Appendix B

Logbook

Procedure	R1	R2	R3	R4	R5	R6	Total
General							
CVL insertion/portacath	2		5	5	10	10	32
Abscess I & D	5		5	5	5		20
Lymph node biopsy			2	2	2	2	8
Circumcision	10		10	10	5	5	40
Chest tube insertion	2	2	2	2	2		10
Total	19	2	24	24	24	17	110
Head & Neck							
Thyroglossal duct cyst excision			2	2	3	3	10
Branchial cyst excision			2	2	3	3	10
Dermoid excision (scalp and external angular)			1	2	2		5
Total			5	6	8	6	25
Thoracic							
EA/TEF repair			2	2	3	3	10
Mediastinal mass excision			1	1	1	2	5

Procedure	R1	R2	R3	R4	R5	R6	Total
Lung lobectomy				1	2	2	5
Lung wedge resection/ lung biopsy						2	2
VATS decortication					1	1	2
Esophageal dilatation			1	1	2	2	6
Bronchoscopy			1	1	1	2	5
Total			5	6	10	14	35
Inguinoscrotal							
Inguinal hernia repair	10		10	10	10	10	50
Inguinal hernia repair ≤ 6 months			5	5	10	10	30
Hydrocelectomy	5		5	5	5	2	22
Orchidopexy (inguinal)	5		10	10	10	5	40
Total	20	0	30	30	35	27	142
Abdominal							
Appendectomy	5	5	10	10	10	10	50
Laparotomy for intestinal atresia repair			5	5	5	5	20
Laparotomy for NEC			2	2	3	3	10
Ladd's procedure			1	1	1	2	5

Procedure	R1	R2	R3	R4	R5	R6	Total
Laparoscopic cholecystectomy	10	5	2	2	2	2	23
Congenital diaphragmatic hernia repair		0	2	2	3	3	10
Fundoplication – laparoscopic/open			2	3	5	5	15
Duodenal atresia repair			1	1	1	1	4
Gastrostomy tube insertion, Laparoscopic/ Open			2	3	5	5	15
Pull through for Hirschsprung			2	2	3	3	10
PSARP/ASARP			2	2	3	3	10
LAARP			1	1	1	2	5
Intraoperative cholangiogram			1	1	2	1	5
Intussusception – laparoscopic/open reduction			1	1	1	2	5
Intussusception – pneumatic/hydrostatic reduction			2	2	2	2	8
Liver biopsy		2	1	1	1	1	6
Morgagni's hernia repair – laparoscopic/open			1	1	2	2	6
Neuroblastoma resection				1	2	3	6
Omphalocele/Gastroschisis repair			1	1	2	2	6
Laparoscopic orchiopexy			1	2	2	2	7

Procedure	R1	R2	R3	R4	R5	R6	Total
Ovarian cystectomy, laparoscopic/open				1	2	2	5
Portoenterostomy (Kasai Procedure)			1	1	1	1	4
Pyloromyotomy, laparoscopic/open			2	2	3	3	10
Radical nephrectomy (Wilm's tumor)				1	2	3	6
Rectal biopsy – full thickness				1	2	2	5
Rectal biopsy – suction	1		2	2	3	2	10
Splenectomy, laparoscopic/open			1	1	2	2	6
Stoma creation			5	5	5	5	20
Stoma closure			5	5	5	5	20
Abdominal mass excision				1	1	1	3
Liver resection		2			1	1	4
Total	16	14	56	64	83	86	319
Grand Total							
	R1	R2	R3	R4	R5	R6	Total
General	19	2	24	24	24	17	110
Head & Neck			5	6	8	6	25

Procedure	R1	R2	R3	R4	R5	R6	Total
Thoracic			5	6	10	14	35
Inguinoscrotal	20	0	30	30	35	27	142
Abdominal	16	14	56	64	83	86	319
	55	16	120	130	160	150	631
Others	25	64					
Total	80	80	120	130	160	150	720

Mini-Clinical Evaluation Exercise

Pediatric surgery residents will be responsible for conducting at least one mini-Clinical Evaluation Exercise (mini-CEX) session per rotation. The process will end with a structured discussion with a supervisor or assessor.

- A case selected from an inpatient or outpatient setting is interviewed under direct supervision.
- This case should be presented along with a conclusion, which should not be longer than 15 min.
- This should be followed immediately by a 15-min feedback, which includes things action performed correctly and those that need improvement.
- A mini-CEX form should be completed in the presence of residents.
- The assessment form should be part of the educational portfolio.

Case-based Discussions

Competence in patient investigation, patient management, health promotion, and disease prevention and some aspects of both attitudes/ethics and continuing professional development is assessed using a CBD form. These forms can be completed by trainers under the following circumstances:

- During an outpatient clinic visit. Trainers and trainees may wish to allocate 5–10 minutes to discuss the management of patients seen in an outpatient clinic.
- Case selection would be determined by either the trainee or trainer. The trainee should have had some direct clinical role with the patient (e.g., history taking, clinical examination, investigations ordered or interpreted, management decisions, management of complications, and critical incidents).
- At the end of the outpatient clinic visit. Trainers and trainees may wish to allocate time at the end of the clinic visit to review a small number of case notes of patients for which the trainee played a significant role in their management.
- Case presentations during postgraduate teaching. Trainees are often asked to present cases in local or regional postgraduate teaching sessions. A nominated trainer completes the CBD form after the presentation.
- During a designated teaching session. Trainers and trainees may wish to allocate a period of one-to-one teaching or small-group teaching where cases are discussed and a CBD form is completed.

A list of clinical scenarios that cover most of the pediatric surgery curriculum will be developed. Trainees should aim to cover all these scenarios in their CBDs, if possible, so that their portfolio reflects a wide range of clinical management situations.

It is recommended that approximately half of the cases for CBDs are chosen by the trainee and the other half by the trainer.

As a guide, trainees should ensure that a minimum of one case per annual quarter is discussed and a CBD form is completed. By the end of the training, a trainee's portfolio should contain at least 20 CBD forms.

CBD Scenarios

- Pediatric surgery residents are expected to manage a range of clinical scenarios. This may involve referrals from other healthcare professionals, patient self-referrals, or screening for conditions requiring pediatric surgery.

Competencies Assessed in Mini-CEX

- Professional approach to interacting with the patient
- History-taking skills
- Physical examination skills
- Clinical diagnostic skills
- Clinical judgment and synthesis
- Patient management skills
- Communication skills
- Overall clinical competences

** See Appendix B*

Appendix C

Educational Portfolio Mini-CEX Form

Resident's Name	
Clinical Setting	
Title of Procedure	

Clinical Problem Category						
Thoracic	Abdomen	Oncology	Neck	Limb		Neonatology
○	○	○	○	○		○
If other, please specify						
New or FU?						

Thoracic	Abdomen	Oncology	Neck	Limb		Neonatology
Focus of clinical encounter						
History	Diagnosis	Management	Explanation			
○	○	○	○			
Number of times patient was seen by the trainee:						
Complexity of the case:						
Assessor's position:						
Number of previous mini-CEXs observed by the assessor with any trainee:						
Please grade the following areas using the scale below:						
Please mark as "Insufficient Evidence" if you have not observed the behavior and feel unable to comment						

History Taking				
Insufficient evidence	Below expectations	Borderline for completion	Meets expectations for completion	Above expectation
○	○	○	○	

Physical Examination Skills				
Insufficient evidence	Below expectations	Borderline for completion	Meets expectations for completion	Above expectation
○	○	○	○	○

Communication Skills				
Insufficient evidence	Below expectations	Borderline for completion	Meets expectations for completion	Above expectation
○	○	○	○	○
Clinical Judgment				
Insufficient evidence	Below expectations	Borderline for completion	Meets expectations for completion	Above expectation
○	○	○	○	○
Professionalism				
Insufficient evidence	Below expectations	Borderline for completion	Meets expectations for completion	Above expectation
○	○	○	○	○
Organization/Efficiency				
Insufficient evidence	Below expectations	Borderline for completion	Meets expectations for completion	Above expectation
○	○	○	○	○
Overall Clinical Care				
Insufficient evidence	Below expectations	Borderline for completion	Meets expectations for completion	Above expectation
○	○	○	○	○
Anything especially good?				

Suggestions for development
Agreed action
Time taken for observation: (in minutes)
Assessor's Name:

Competencies assessed in CBDs

- Professional approach to interacting with the patient
- Data gathering and interpretation
- Making diagnosis and decisions
- Clinical management
- Managing medical complexity
- Working with colleagues and in teams
- Maintaining an ethical approach
- Fitness to practice

* See Appendix D

Appendix D Form

Educational Portfolio: CBD Form

Trainee's Name:		Date (dd/mm/year)	

R1 ○	R2 ○	R3 ○	R4 ○	R5 ○

Assessor's Name:			
Assessor's Status:	Consultant	Residents (R1, R2, R3, R4, R5, R6)	Other (specify)
Clinical scenario (see study guide)			
Brief description of the case:			
Overall difficulty of the case:	Simple	Intermediate	Difficult

Topic	Poor	Fair	Good	V. Good	N/A
Medical Record Documentation					
Clinical Assessment					
Investigation and Referrals					
Treatment					
Follow-up and Future Planning					
Professionalism					
Clinical Judgment					

Topic	Poor	Fair	Good	V. Good	N/A
Leadership/Management Issues					
Overall performance in this assessment	Poor	Fair	Good	V. Good	

Meets expectations/Does not meet expectations (for stage of training)

Anything especially good?	Suggestions for development:
Agreed action:	

Signature of Assessor:	_____	Signature of Trainee:	_____

Appendix E

Educational Portfolio

Reflection Form

Rotation (____): General Pediatric Surgery

- Clinical Management:
    - Strength:
    - Areas of Improvement:
    - New Skills:
- Medical Practice:
    - Strength:
    - Areas of Improvement:

        - New Skills:
- Professionalism:
        - Strength:
        - Areas of Improvement:
        - New Skills:
- Communication Skills:
        - Strength:
        - Areas of Improvement:
        - New Skills:
- Leadership and Teamwork:
        - Strength:
        - Areas of Improvement:
        - New Skills:

Appendix F: OSATS

Pediatric Surgery Training Program Objective Structured Assessment of Technical Skills (OSATS)			
Name:		Level of Training:	R 1 – 2 – 3 – 4 – 5 – 6
Assessor:			F 1 – 2 – 3
Operation:		Date:	
Guidelines:	Trainee should have 2 different DOPS for 2 different procedures in a month		

Global Rating Scale

Domain1: Indication for Surgery						
4	5	6	7	8	9	10
No understanding of pathology		Basic understanding of pathology			Excellent understanding of pathology	
Domain 2: Respect for Tissue						
4	5	6	7	8	9	10
Frequently used unnecessary force on tissue or caused damage by inappropriate use of instrument		Careful handling of tissue but occasionally caused inadvertent damage			Consistently handled tissues appropriately with minimal damage	
Domain 3: Time and Motion						
4	5	6	7	8	9	10
Many unnecessary moves		Efficient time/motion but some unnecessary moves			Clear economy of movement and maximum efficiency	
Domain 4: Knowledge & Handling of Instruments						
4	5	6	7	8	9	10
Repeatedly awkward and unsure, inappropriate use of instruments		Occasionally stiff and awkward, mostly appropriate choice and use of instruments			Fluid moves and obviously familiar with the instruments	

Domain 5: Use of Assistants						
4	5	6	7	8	9	10
Consistently placed assistants poorly or failed to use assistants		Appropriate use of assistants most of the time			Strategically used assistants to the best advantage at all times	
Domain 6: Flow of Operation						
4	5	6	7	8	9	10
Frequently stopped operating and seemed unsure of the next move		Demonstrated forward planning with reasonable progression of the operation			Obviously planned course of the operation with effortless flow from one move to the next	
Domain 7: Knowledge of Specific Procedure						
4	5	6	7	8	9	10
Deficient knowledge and needed specific instructions in most steps		Knew all important steps of the operation			Demonstrated familiarity with all aspects of the operation	
Domain 8: Perioperative Management						
4	5	6	7	8	9	10
Chaotic and incomplete		Performed well but needs instructions			Independently, carefully, and complete	

Overall Performance Scale

	Below Expectation		Meets Expectation			Above Expectation	
Overall judgment Assessor	4	5	6	7	8	9	10
	Dissatisfied		Neutral			Satisfied	
Overall judgment Resident	4	5	6	7	8	9	10
	Dissatisfied		Neutral			Satisfied	

Alphabetic Summary Scale

A	Competent to assist adequately
B	Competent to perform the operation under strict supervision
C	Competent to perform the operation under limited supervision
D	Competent to perform the operation unsupervised
E	Competent to supervise and educate the operation

Feedback

The OSATS instrument used by the Association of Surgeons of the Netherlands (Hopmans JH, den Hoed PT, van der Laan L, et al. Assessment of surgery residents' operative skills in the operating theater using a modified Objective Structured Assessment of Technical Skills (OSATS): A prospective multicenter study. Surgery 2014;156:1078-88

Appendix G: GOALS

Pediatric Surgery Training Program

Global Operative Assessment of Laparoscopic Skills (GOALS)

Name:		Level of Training:	R 1 – 2 – 3 – 4 – 5 – 6
Assessor:			F 1 – 2 – 3
Operation:		Date:	
Guidelines:	Trainee should have 2 different DOPS for 2 different procedures in a month		

Global Rating Scale

Domain 1: Indication for surgery						
4	5	6	7	8	9	10
No understanding of pathology		Basic understanding of pathology			Excellent understanding of pathology	
Domain 2: Depth perception						
4	5	6	7	8	9	10
Constantly overshooting target, hits backstop, wide swings, or slow to correct		Some overshooting or missing plane but corrects quickly			Accurately directs instruments in correct plane to the target	

Domain 3: Bimanual dexterity						
4	5	6	7	8	9	10
Use of one hand, ignoring the non-dominant hand, or poor coordination between the hands		Use of both hands but does not optimize interactions between hands to facilitate conduct of operation			Expertly uses both hands in a complementary manner to provide optimal working exposure	
Domain 4: Efficiency						
4	5	6	7	8	9	10
Uncertain, much wasted effort, many tentative motions, constantly changing focus of operation, or persisting at a task without progress		Slow, but planned and reasonably organized			Confident, efficient, and safe conduct of operation, maintaining focus on the components of procedure until it is adequately completed by another approach	
Domain 5: Use of assistants						
4	5	6	7	8	9	10
Consistently placed assistants poorly or failed to use assistants		Appropriate use of assistants most of the time			Strategically used assistants to the best advantage at all times	

Domain 6: Tissue handling						
4	5	6	7	8	9	10
Rough, tears tissue by excessive traction, injures adjacent structures, poor control of coagulation device (recoil), or grasper frequently slip off		Handles tissues reasonably well, with some minor trauma to adjacent tissues, e.g., coagulation of the liver, causes unnecessary liver bleeding, or occasional slipping of grasper			Handles tissues very well with appropriate traction on tissues and negligible injury of adjacent structures. Uses energy sources appropriately but not excessively	
Domain 7: Autonomy						
4	5	6	7	8	9	10
Unable to complete an entire procedure, even in a straightforward manner and with extensive verbal guidance		Able to complete operation safely with moderate prompting			Able to complete operation independently without prompting	
Domain 8: Perioperative management						
4	5	6	7	8	9	10
Chaotic and incomplete		Performed well but needs instructions			Independently, carefully, and complete	

Overall Performance Scale

Overall judgment Assessor	Below Expectation		Meets Expectation			Above Expectation	
	4	5	6	7	8	9	10
	Dissatisfied		Neutral			Satisfied	
Overall judgment Resident	4	5	6	7	8	9	10
	Dissatisfied		Neutral			Satisfied	

Alphabetic Summary Scale

A	Competent to assist adequately
B	Competent to perform the operation under strict supervision
C	Competent to perform the operation under limited supervision
D	Competent to perform the operation unsupervised
E	Competent to supervise and educate the operation

Feedback

Modified from Hogle NJ, Liu Y, Ogden T, Fowler DL. Evaluation of surgical fellows' laparoscopic performance using Global Operative Assessment of Laparoscopic Skills (GOALS). Surg Endosc 2014;28:1284-90

Appendix H: Examiner Evaluation Sheet for each candidate

(Final Board Examination)

SAUDI COMMISSION FOR HEALTH SPECIALTIES PEDIATRIC SURGERY ORAL EXAMINATION

Name of Candidate: _____

Number:_____

Case No.	Grade	Comments
1	R F Bp P V O	
2	R F Bp P V O	
3	R F Bp P V O	
4	R F Bp P V O	
5	R F Bp P V O	
6	R F Bp P V O	
7	R F Bp P V O	
8	R F Bp P V O	

R: 40% (missing essential action); F: 60% (fail); Bp: 70% (barely passed); P: 71%–80% (pass); V: 80%–90% (very good); O: 90% (outstanding)

Name of the Committee:

Name of Examiner: Signature:

Appendix I: Committee Evaluation Sheet for each candidate

SAUDI COMMISSION FOR HEALTH SPECIALTIES

Saudi Board of Pediatric Surgery

Final Board Exam Month DD, YYYY

Name of Candidate: _____

Exam Subject:

Comment on weaknesses and defense of red flag or high score:

SCORE GUIDE	
Above Average	71–100
Pass	70
Fail	<70
Red Flag	<40

Mark%

Examiner's Name: _____

Signature: _____

Appendix-J

Universal Topics

Intent:

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. These topics are common to all specialties.

Topics included here meet one or more of the following criteria:

- ✓ Impactful: Topics that are common or life-threatening.
- ✓ Interdisciplinary: Topics that are difficult to teach through a single discipline.
- ✓ Orphan: Topics that are poorly represented in the undergraduate curriculum.
- ✓ Practical: Topics that trainees will encounter during clinical practice.

Development and Delivery:

Core topics for the PG curriculum will be centrally developed and delivered by the Commission through an e-learning platform. A set of preliminary learning outcomes was developed for each topic. Content experts, in collaboration with the central team, may modify learning outcomes.

These topics will be didactic in nature, with a focus on the practical aspects of care. The content of these topics will be more in-depth compared with that of workshops and other planned face-to-face interactive sessions.

The suggested duration of each topic is 1.30 hours.

Assessment:

The topics will be delivered in a modular fashion. At the end of each Learning Unit, there will be a formative online assessment. After completion of all topics, there will be a combined summative assessment in the form of a context-rich MCQ. All trainees must attain minimum competency in the summative assessment. Alternatively, these topics can be assessed in a summative manner along with a specialty examination.

Some ideas may include case studies, high-quality images, worked examples of prescribing drugs in disease states, and Internet resources.

Module 1: Introduction

- ✓ Safe drug prescription
- ✓ Hospital acquired infections
- ✓ Sepsis, SIRS, and DIVC
- ✓ Antibiotic stewardship
- ✓ Blood transfusion

Safe drug prescription

At the end of the Learning Unit, you should be able to:

- Recognize the importance of safe drug prescription in healthcare.
- Describe various adverse drug reactions with examples of commonly prescribed drugs that can cause such reactions.
- Apply principles of drug-drug, drug-disease, and drug-food interactions in common situations.
- Apply principles of prescribing drugs in special situations such as renal and liver failure.
- Apply principles of prescribing drugs for the elderly, pediatric age group patents, and pregnant and lactating mothers.

- Promote evidence-based cost-effective prescription.
- Discuss ethical and legal framework governing safe-drug prescription in Saudi Arabia.

Hospital Acquired Infections (HAI)

At the end of the Learning Unit, you should be able to

- Discuss the epidemiology of hospital acquired infections (HAI) with special reference to HAI in Saudi Arabia.
- Recognize HAI as one of the major emerging threats in healthcare.
- Identify the common sources and set-ups of HAI.
- Describe the risk factors of common HAIs, such as ventilator-associated pneumonia, MRSA, CLABSI, and vancomycin-resistant Enterococcus (VRE).
- Identify the role of healthcare workers in the prevention of HAI.
- Determine appropriate pharmacological (e.g., selected antibiotics) and non-pharmacological (e.g., removal of an indwelling catheter) measures in the treatment of HAI.
- Propose a plan to prevent HAI in the workplace.

Sepsis, SIRS, and DIVC: At the end of the Learning Unit, you should be able to:

- Explain the pathogenesis of sepsis, SIRS, and DIVC.
- Identify patient-related and non-patient-related predisposing factors for sepsis, SIRS, and DIVC.
- Recognize a patient at risk of developing sepsis, SIRS, and DIVC.
- Describe the complications of sepsis, SIRS, and DIVC.
- Apply the principles of management of patients with sepsis, SIRS, and DIVC.
- Describe the prognosis of sepsis, SIRS, and DIVC.

Antibiotic Stewardship

At the end of the Learning Unit, you should be able to:

- Recognize antibiotic resistance as one of the most pressing global public health threats.
- Describe the mechanism of antibiotic resistance.
- Determine the appropriate and inappropriate use of antibiotics.
- Develop a plan for safe and proper antibiotic usage, including the appropriate indications, duration, types of antibiotics, and discontinuation.
- Appraise local guidelines in the prevention of antibiotic resistance.

Blood Transfusion

At the end of the Learning Unit, you should be able to:

- Review the different components of blood products available for transfusion.
- Recognize the indications and contraindications of blood product transfusion.
- Discuss the benefits, risks, and alternative to transfusion.
- Obtain consent for specific blood product transfusion.
- Perform the necessary procedures for safe transfusion.
- Gain understanding of special precautions and procedures necessary for massive transfusions.
- Recognize transfusion associated reactions and provide immediate management.

Module 2: Cancer

- ✓ Principles of management of cancer
- ✓ Side effects of chemotherapy and radiation therapy
- ✓ Oncologic emergencies

- ✓ Cancer prevention
- ✓ Surveillance follow-up of patients with cancer

Principles of Management of Cancer

At the end of the Learning Unit, you should be able to:

- Discuss the basic principles of staging and grading of cancers
- Enumerate the basic principles (e.g., indications, mechanism, and types) of

1. Cancer surgery
2. Chemotherapy
3. Radiotherapy
4. Immunotherapy
5. Hormone therapy

Side Effects of Chemotherapy and Radiation

Therapy: At the end of the Learning Unit, you should be able to:

- Describe important side effects (e.g., common or life-/organ-threatening) of common chemotherapy drugs.
- Explain the principles of monitoring of side effects in a patient undergoing chemotherapy.
- Describe measures (pharmacological and non-pharmacological) available to ameliorate the side effects of commonly prescribed chemotherapy drugs.
- Describe important (e.g., common and life-threatening) side effects of radiation therapy.
- Describe measures (pharmacological and non-pharmacological) available to ameliorate the side effects of radiotherapy.

Oncologic Emergencies

At the end of the Learning Unit, you should be able to:

- Enumerate important oncologic emergencies encountered both in hospital and ambulatory settings.
- Discuss the pathogenesis of important oncologic emergencies
- Recognize oncologic emergencies.
- Institute immediate measures when treating a patient with oncologic emergencies.
- Counsel patients in an anticipatory manner to recognize and prevent oncologic emergencies.

Cancer Prevention

At the end of the Learning Unit, you should be able to:

- Conclude that many major cancers are preventable.
- Identify smoking prevention and lifestyle modifications that are major preventable measures.
- Recognize cancers that are preventable.
- Discuss the major cancer prevention strategies at the individual and national levels.
- Counsel patients and families regarding cancer prevention including screening in proactive manner.

Surveillance and Follow-Up of Patients with Cancer

At the end of the Learning Unit, you should be able to:

- Describe the principles of surveillance and follow-up of patients with cancer.
- Enumerate the surveillance and follow-up plan for common forms of cancer.
- Describe the role of primary care physicians, family physicians, and others physicians in the surveillance and follow-up of patients with cancer.

- Liaise with oncologists to provide surveillance and follow-up for patients with cancer.

Module 3: Diabetes and Metabolic Disorders

- ✓ Recognition and management of diabetic emergencies
- ✓ Management of diabetic complications
- ✓ Comorbidities of obesity
- ✓ Abnormal electrocardiography (ECG) findings

Recognition and Management of Diabetic Emergencies

At the end of the Learning Unit, a resident should be able to:

- Describe the pathogenesis of common diabetic emergencies including their complications.
- Identify risk factors and groups of patients vulnerable to such emergencies.
- Recognize a patient presenting with a diabetic emergency.
- Institute immediate management.
- Refer the patient to an appropriate next level care.
- Counsel patient and families to prevent such emergencies.

Management of Diabetic Complications

At the end of the Learning Unit, a resident should be able to:

- Describe the pathogenesis of important complications of type 2 diabetes mellitus.
- Screen patients for such complications.
- Provide preventive measures for such complications.
- Treat such complications.
- Counsel patients and families with special emphasis on prevention.

Comorbidities of Obesity

At the end of the Learning Unit, a resident should be able to:

- Screen patients for the presence of common and important comorbidities of obesity.
- Manage obesity-related comorbidities.
- Provide dietary and lifestyle advice for the prevention and management of obesity.

Abnormal ECG

At the end of the Learning Unit, a resident should be able to:

- Recognize common and important ECG abnormalities.
- Institute immediate management, if necessary.

Module 4: Medical and Surgical Emergencies

- ✓ Management of acute chest pain
- ✓ Management of acute breathlessness
- ✓ Management of altered sensorium
- ✓ Management of hypotension and hypertension
- ✓ Management of upper GI bleeding
- ✓ Management of lower GI bleeding

The following learning outcomes apply to all the above.

At the end of the Learning Unit, a resident should be able to:

- Triage and categorize patients.
- Identify patients who need prompt medical and surgical attention.
- Provide preliminary diagnoses based on history and physical examination.
- Order and interpret urgent investigations.

- Provide appropriate immediate management to patients.
- Refer the patients to the next level of care, if needed.

Module 5: Acute Care

- ✓ Pre-operative assessment
- ✓ Post-operative care
- ✓ Acute pain management
- ✓ Chronic pain management
- ✓ Management of fluid in the hospitalized patient
- ✓ Management of electrolyte imbalances

Pre-Operative Assessment

At the end of the Learning Unit, a resident should be able to:

- Describe the basic principles of pre-operative assessment.
- Preform pre-operative assessment of an uncomplicated patient with special emphasis on

1. General health assessment
2. Cardiorespiratory assessment
3. Medications and medical device assessment
4. Drug allergy
5. Pain relief needs

- Categorize patients according to risks.

Post-Operative Care

At the end of the Learning Unit, a resident should be able to:

- Devise a post-operative care plan including monitoring of vitals, pain management, fluid management, medication provision, and laboratory investigations.

- Properly hand-over patients to appropriate facilities.
- Describe the process of post-operative recovery.
- Identify common post-operative complications.
- Monitor patients for possible post-operative complications.
- Institute immediate management for post-operative complications.

Acute Pain Management

At the end of the Learning Unit, a resident should be able to:

- Review the physiological basis of pain perception.
- Proactively identify patients who might be in acute pain.
- Assess a patient with acute pain.
- Apply various pharmacological and non-pharmacological modalities available for acute pain management.
- Provide adequate pain relief for uncomplicated patients with acute pain.
- Identify and refer patients with acute pain who can be benefitted from specialized pain services.

Chronic Pain Management

At the end of the Learning Unit, a resident should be able to:

- Review the biopsychosocial and physiological basis of chronic pain perception.
- Discuss various pharmacological and non-pharmacological options available for chronic pain management.
- Provide adequate pain relief for uncomplicated patients with chronic pain.
- Identify and refer patients with chronic pain who can benefit from specialized pain services.

Fluid Management in Hospitalized Patients

At the end of the Learning Unit, a resident should be able to:

- Review the physiological basis of water balance in the body.
- Assess a patient for his/her hydration status.
- Recognize a patient with over and under hydration.
- Order fluid therapy (oral as well as intravenous) for a hospitalized patient.
- Monitor fluid status and response to therapy through patient history, physical examination, and selected laboratory investigations.

Management of Acid-Base Electrolyte Imbalances

At the end of the Learning Unit, a resident should be able to

- Review the physiological basis of electrolyte and acid-base balance in the body.
- Identify diseases and conditions that are likely to cause or are associated with acid/base and electrolyte imbalances.
- Correct electrolyte and acid-base imbalances.
- Perform careful calculations, checks, and other safety measures while correcting acid-base and electrolyte imbalances.
- Monitor response to therapy through patient history, physical examination, and selected laboratory investigations.

Module 6: Frail Elderly

- ✓ Assessment of frail elderly
- ✓ Mini-mental state examination
- ✓ Prescribing drugs in the elderly
- ✓ Care of the elderly

Assessment of Frail Elderly

At the end of the Learning Unit, a resident should be able to:

- Enumerate the differences and similarities between comprehensive assessment of the elderly and of other patients.
- Perform comprehensive assessment, in conjunction with other members of the health care team, of the frail elderly with special emphasis on social factors, functional status, quality of life, diet and nutrition, and medication history.
- Develop a problem list based on the assessment of the elderly.

Mini-Mental State Examination

At the end of the Learning Unit, a resident should be able to:

- Review the appropriate usages, advantages, and potential pitfalls of Mini-Mental State Examination (MMSE).
- Identify patients suitable for MMSE.
- Screen patients for cognitive impairment through MMSE.

Prescribing Drugs in the Elderly

At the end of the Learning Unit, a resident should be able to:

- Discuss the principles of prescribing in the elderly.
- Recognize polypharmacy, prescribing cascades, inappropriate dosages, inappropriate drugs, and deliberate drug exclusions as major causes of morbidity in the elderly.
- Describe physiological and functional declines in the elderly that contribute to increased drug-related adverse events.
- Discuss drug-drug and drug-disease interactions among the elderly.
- Familiarize with the Beers Criteria.
- Develop rational prescribing habits for the elderly.

- Counsel elderly patients and families on the safe medication usage.

Care of the Elderly

At the end of the Learning Unit, a resident should be able to:

- Describe the factors that need to be considered while planning care for the elderly.
- Recognize the needs and wellbeing of caregivers.
- Identify the local and community resources available for the care of the elderly.
- Develop, with inputs from other healthcare professionals, an individualized care plan for elderly patients.

Module 7: Ethics and Healthcare

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

Occupation Hazards of HCW

At the end of the Learning Unit, a resident should be able to:

a. Recognize common sources and risk factors for occupational hazards among HCW.
b. Describe common occupational hazards in the workplace.
c. Develop familiarity with legal and regulatory frameworks governing occupational hazards among HCW.
d. Develop a proactive attitude to promote workplace safety.
e. Protect yourself and colleagues against potential occupational hazards in the workplace.

Evidence-Based Approach to Smoking Cessation

At the end of the Learning Unit, a resident should be able to:

- Describe the epidemiology of smoking and tobacco usages in Saudi Arabia.
- Review the effects of smoking on the smoker and family members.
- Effectively use pharmacologic and non-pharmacologic measures to treat tobacco usage and dependence.
- Effectively use pharmacologic and non-pharmacologic measures to treat tobacco use and dependence among special population groups such as pregnant women, adolescents, and patients with psychiatric disorders.

Patient Advocacy

At the end of the Learning Unit, a resident should be able to:

- Define patient advocacy.
- Recognize patient advocacy as a core value governing medical practice.
- Describe the role of patient advocates in patient care.
- Develop a positive attitude toward patient advocacy.
- Be a patient advocate in conflicting situations.
- Be familiar with local and national patient advocacy groups.

Ethical Issues: Transplantation/Organ Harvesting and Withdrawal of Care

At the end of the Learning Unit, a resident should be able to:

- ✓ Apply key ethical and religious principles governing organ transplantation and withdrawal of care.
- ✓ Be familiar with the legal and regulatory guidelines regarding organ transplantation and withdrawal of care.
- ✓ Counsel patients and families in the light of applicable ethical and religious principles.

- ✓ Guide patients and families to make informed decisions.

Ethical Issues: Treatment Refusal and Patient Autonomy

At the end of the Learning Unit, a resident should be able to:

- ✓ Predict situations where a patient or family is likely to decline prescribed treatment.
- ✓ Describe the concept of "rational adults" in the context of patient autonomy and treatment refusal.
- ✓ Analyze key ethical, moral, and regulatory dilemmas in treatment refusal.
- ✓ Recognize the importance of patient autonomy in the decision-making process.
- ✓ Counsel patients and families declining medical treatment considering the best interest of patients.

Role of Doctors in Death and Dying

At the end of the Learning Unit, a resident should be able to:

- ✓ Recognize the important role of a doctor during the dying process.
- ✓ Provide emotional as well as physical care to a dying patient and their family.
- ✓ Provide appropriate pain management for dying patients.
- ✓ Identify suitable patients and refer patients for palliative care services.

Appendix-K

Top Conditions and Procedures in the Specialty

Top Conditions and Procedures in the Specialty
Top Ten Causes of Mortality in Saudi Arabia*

Disease/Conditions		Relative	Cumulative
		Frequency	Frequency
1.	Condition A	18%	18%
2.	Condition B	13%	31%
3.	Condition C	10%	41%
*In some specialties it is the overall mortality pattern that is important. However, for others, it might be the diseases that are important. The number shown here are fictional.			
Top Ten Cancers			
Disease/Conditions		**Relative**	**Cumulative**
		Frequency	Frequency
1.	Lung	18%	18%
2.	Colorectal	13%	31%
3.	Prostrate	10%	41%
Top Ten Causes of Out-Patient Consultations Related to the Specialties in Saudi Arabia			
Disease/Conditions		**Relative**	**Cumulative**
		Frequency	Frequency
1.	Condition A	22%	22%
2.	Condition B	12%	34%
3.	Condition C	10%	44%

Top Ten Causes of In-patient Admissions Related to the Specialties in Saudi Arabia			
Disease; Conditions		Relative	Cumulative
		Frequency	Frequency
1.	Condition A	18%	18%
2.	Condition B	13%	31%
3.	Condition C	10%	41%

Top Ten Procedures/Surgeries Performed by the Specialty	
Name of Procedures/ Surgeries	Approximate Frequency
Procedure A	
Procedure B	
Procedure C	

Examples of Core Specialty Topics: Case Discussions and Interactive Lectures	
Topics	Comments
Approach to patients with urinary retention	
Approach to patients with hematuria	

Examples of Core Specialty Topics: Workshops/Simulation	
Topics	Comments
ECG interpretation and response	
Chest tube insertion and removal	
Wound care	
Surgical drains	

Appendix-L

Pediatric Surgery Curriculum Syllabus

	Skin and Soft Tissue- Musculoskeletal	Benign lesions (Lipoma, dermoid and epidermoid cysts, and subcutaneous nodules) Necrotizing soft tissue infections Cutaneous manifestations of systemic diseases (i.e., inflammatory bowel disease syndrome) Lymphatic and vascular malformations
	Head and neck	Congenital lesions: especially thyroglossal duct cyst, branchial cleft cysts, sinuses and other remnants, cystic hygromas/lymphangiomas, and hemangioma. Salivary glands diseases especially tumors, Hemangiomas, and inflammation/calculi Ranula Acquired neck masses Tumors (Teratoma, Sarcoma, Lymphoma, Pleomorphic adenoma, and Sternomastoid tumor) Congenital torticollis Trauma specific to the head and neck Thyroid and parathyroid lesions Cervical lymphadenopathy
	Chest	EA-TEF Esophageal achalasia, webs, stenosis, and duplications Acquired esophageal conditions: • Gastroesophageal reflux • Barrett's esophagus

		• Hiatal hernia • Strictures • Perforations (cervical and distal) • Foreign bodies Congenital lung lesions • CPAM • Lobar emphysema • Congenital diaphragmatic hernia • Pulmonary sequestration Acquired lung lesions • Abscess and empyema • Pneumatocele • Chylothorax • Infiltrates in immunosuppressed patients • Lung bullae and spontaneous pneumothorax • Lung complications in cystic fibrosis • Pleural effusions • Foreign body aspiration • Mediastinal lesions: cysts, thymic disorders, and tumors according to location (anterior, middle, and posterior) Chest wall deformities • Pectus excavatum and carinatum • Chest wall reconstruction Diaphragmatic eventration and phrenic nerve palsy Cardiovascular conditions such as patent ductus arteriosus, pericardial effusions, and/or tamponade

		Vascular rings Thoracic trauma
	Abdomen	Abnormalities in gastrointestinal physiology • Short bowel syndrome • Intestinal adaptation • Physiologic testing (manometry and pH study) Gastric conditions • Pyloric stenosis (including physiologic disturbances) • Antral web • Spontaneous perforation • GERD • Gastric delayed emptying • Bezoars • Peptic ulcer disease Duodenal conditions • Atresia • Stenosis • Webs • Diverticula • Duplications • Other causes of duodenal obstruction Small intestinal conditions • Malrotation • Jejunoileal atresia/stenosis • Meconium ileus and equivalent

		• Meckel's diverticulum and related vitello-intestinal duct anomalies • NEC • Intussusception • Duplications • Mesenteric cysts • Neoplasms • IBD/ Crohn's disease • Bowel obstruction (acquired and/or congenital) Colonic conditions • Appendicitis • IBD and ulcerative colitis • Typhlitis • Meconium plug syndrome • Hirschsprung's disease and neuronal intestinal dysplasia • Colonic atresia • Polyps • Anorectal malformation: imperforate anus (and variants) • Perianal conditions: fissures, abscesses, fistulae, and rectal prolapse • Constipation • Fecal incontinence • Intestinal pseudo-obstruction • Chronic constipation Hepatic and biliary conditions

		• Various types of congenital and acquired liver cysts (parasitic and nonparasitic) and the management approach of each. • Trauma • Tumors • Portal hypertension • Liver abscess • Biliary atresia, biliary hypoplasia, and bile duct perforation • Choledochal cyst • Gallstones/cholecystitis: causes, type of stones, and pathophysiology of gallstones formation • Physiologic and pathological jaundice • Cholestatic syndromes • Liver transplantation (indications, complications, and results) • Splenic conditions including hemolytic conditions, red blood count enzyme deficiencies (pyruvate-kinase and hexose-kinase), idiopathic thrombocytopenic purpura, Gaucher's disease, splenic cyst/torsion, and wandering spleen • Lymphangioma • Abscess Pancreatic conditions • Cystic fibrosis • Pancreatic divisum • Annular pancreas • Acute and chronic pancreatitis

		• Congenital cysts • Tumors • Persistent hyperinsulinemic hypoglycemia of infancy (PHHI) Abdominal wall conditions • Gastroschisis • Omphalocele • Hernias • Umbilical granuloma • Umbilical discharge
	Genitourinary Tract	Penis • Phimosis • Paraphimosis • Balanitis • Circumcision (indications, contraindications, techniques, and complications) Inguinoscrotal area • Cryptorchidism • Varicocele • Hydrocele • Acute scrotum Urinary Bladder • Exstrophy (bladder and cloacal) • Urachal anomalies • Urogenital trauma • Neurogenic bladder • Diverticulum

		• Bladder neck obstruction • Bladder augmentation • Tumors Kidney • Congenital abnormalities • Non-functioning kidney • Tumors • Hydronephrosis • Pyelonephritis • Duplex systems • Renal transplantation Ureter • PUJ • Vesicoureteral reflex • Hydroureter and megaureter • Ectopic ureter • Ureteral duplication and associated problems • Ureterostomy types • Ureterocele • Congenital anomalies Urethra • Posterior Urethral Valve (PUV) • Hypospadias • Epispadias • Other penile congenital anomalies • Urinary diversions indications and techniques Trauma

		• Kidney, ureter, and bladder • Adequate knowledge of pelvic fractures and urethral injuries • Stones • Urological stone types and locations • Diagnosis and management options
	Gynecologic Conditions	Congenital conditions • Vaginal atresia • Hemato/hydrometrocolpos • Bifid vagina • Duplex uterus • Urogenital sinus Inflammatory conditions • Pelvic inflammatory disease • Vulvovaginitis • Vulvar abscess • Fused labia minora • Bartholin gland infection Traumatic/mechanical conditions • Vaginal laceration • Child abuse • Torsion (normal ovary, cyst, and tumor) Neoplastic conditions • Ovarian cysts • Ovarian solid tumors • Vaginal and uterine tumors • Vulvar lesions (cysts, nevi, and hemangioma)

	DSD	Pediatric surgeons will manage children with DSD anomalies in collaboration with other health care professionals such as pediatric urologists, endocrinologists, psychologists, and genetic specialists (multidisciplinary approach). They must, therefore, demonstrate knowledge of and the capacity to manage patients with these conditions based on knowledge of the different patterns of disease, natural history, responses to treatment, and ethical implications of gender assignment. This will include patients with • 46 XY DSD • 46 XX DSD • Ovo-testicular DSD • 46 XX testicular DSD • 46 XY complete gonadal dysgenesis
	Endocrine Anomalies	Pediatric surgeons will, in collaboration with other health care professionals, provide care for children with endocrine anomalies. The trainee should be able to formulate the management plan of and surgical approaches to the following diseases: • Thyroid problems • Thyroid nodule • Inflammation and abscesses • Tumors • Multiple endocrine neoplasia syndromes • Parathyroid conditions • Hypoparathyroidism

		• Hyperparathyroidism (primary, secondary, and tertiary) • Tumors • Breast conditions • Neonatal hypertrophy • Mastitis/abscesses • Gynecomastia • Nipple discharge • Fibroadenoma • Fibrocystic disease • Premature thelarche • Tumors • Pancreatic conditions • Hyperinsulinism (age dependent) • Functioning endocrine lesions • Adrenal conditions • Adrenal hemorrhage • Adrenal insufficiency (congenital or acquired) • Adrenocortical tumors (virilizing tumors, pheochromocytoma, and neuroblastoma) • Cysts • Incidentaloma
	Oncology	Pediatric surgery residents will contribute to caring for children with oncologic problems in collaboration with other healthcare professionals. They should be able to describe the general principles of: • The pathophysiology of tumor including molecular biology, tumor markers and cytogenetics, tumor

		specific risk stratification, genetic predisposition, and other risk factors. • Paraneoplastic and tumor associated syndromes (e.g., Opso-myoclonus ataxia syndrome). Tumors associated with syndromes such as Beckwith-Wiedemann and hemihyperplasia • Diagnostic imaging for tumor evaluation • Principles of tumor therapy including immunotherapy, radiation biology, and immunosuppression • Opportunistic infections • Cancer chemotherapy and drug action • Surgical complications of chemotherapy • Bone marrow transplantation • Secondary neoplasia Specific tumors • Renal tumors: Wilms' tumor, mesoblastic nephroma, nephroblastomatosis, adenocarcinoma, clear cell sarcoma, renal cell carcinoma, lymphoma, and rhabdoid tumor. • Adrenal tumors: Neuroblastoma, ganglioneuroblastoma, carcinoma, and pheochromocytoma. • Liver tumors: • Benign: Hemangioma, hemangiomatosis, hemangioendothelioma, hamartoma, adenoma, and focal nodular hyperplasia. • Malignant: Hepatoblastoma, hepatocellular carcinoma, and liver metastasis.

		• Abdominal and pelvic tumors: • Carcinoid, lymphoma (GALT/MALT), and adenocarcinoma. • Sarcomas/peripheral neuroectodermal tumors (PNET): Rhabdomyosarcoma, fibrosarcoma, leiomyosarcoma, liposarcoma, neurofibromas, and desmoplastic small round cell tumor. • Teratomas: Sacrococcygeal and gonadal tumors and familial teratomas. • Germ cell and non-germ cell tumors, para testicular rhabdomyosarcoma, and metastatic tumors, i.e., leukemia. • Ovarian benign and malignant tumors including teratoma, carcinoma, serous, mucinous, yolk sac, teratoma, carcinoma, Sertoli/lutein, Sertoli-Leydig, and dysgerminoma. • Vaginal and uterine tumors (yolk sac and rhabdomyosarcoma). • Lymphoma: Hodgkin's disease, non-Hodgkin's disease, post-transplantation, lymphoproliferative disease, and acquired immunodeficiency syndrome. • Bone tumors: Osteogenic sarcoma and Ewing's sarcoma (including PNET) as they relate to pediatric surgical intervention (rib resection, lung metastases, etc.). • Head and neck: salivary gland tumors, lymphoma, rhabdomyosarcoma, neuroblastoma, teratoma, and nasopharyngeal carcinoma.

		• Thoracopulmonary: pleuropulmonary blastoma, bronchoalveolar carcinoma, and carcinoid. *Role of pediatric surgeon in palliative care* Understand and outline the approach to palliative care management in pediatric surgery in situations such as trauma, oncology, neonatology, and complex medical disease.
	Critical Care	Critical care goals and objectives will be highlighted separately for rotations in the NICU and PICU. The resident is required to comprehend and demonstrate mastery in various situations that are needed for the care of critically ill and injured children including: • Fluids and electrolytes management. • Thermoregulation: physiologic effects and management of hypothermia and hyperthermia. • Diagnosis and treatment of shock. • Normal and abnormal pulmonary physiology in various age groups. • Cardiac physiology: knowledge of cyanotic and non-cyanotic congenital anomalies, intra-cardiac shunts, transitional circulation, and inotropic support. • Transfusion therapy and coagulation. • Anesthesiology: principles of airway management (including tracheostomy), inhalation agents, muscle relaxants, recognition, and management of malignant hyperthermia. • Differential diagnosis and treatment of cardiorespiratory arrest.

		• Management of post-operative pain in infants and children. • Principles of hemodynamic and respiratory monitoring. • Principles of local anesthetic use • Extra-corporeal life support (ECLS): indications in neonates and older children. Techniques of cannulation, monitoring, and complications. • Indications, techniques, and possible complications of the various types of central line insertion including intra-osseous, temporary, and long-term, and implantable ports.
	Trauma and Burns	The resident should be able to: • Recognize the impact of trauma on children and the community: demographics, epidemiology; patterns of injury (i.e., seat belt syndrome and patterns of child abuse). • Operate the primary assessment (ATLS guidelines) protocol. • Implement the principles of operative and non-operative management of head, neck, chest, abdomen, pelvis, genitourinary, and extremity trauma. • Describe the pathophysiology of burn injury, fluid resuscitation (initial and maintenance), nutritional management, and sepsis. • Describe the signs of increased intracranial pressure, how to monitor intracranial pressure, and use of the Glasgow Coma Scale.

		• Identify signs of cervical and thoracic and their management. • Identify signs of abdominal and genitourinary trauma and their management.
	Nutrition	The resident should be able to • Classify the normal caloric requirements by age groups and by carbohydrate, fat and protein contributions, concentrations, vitamins, trace elements, and minerals. • Explain nutritional assessment techniques and the effect of acute and chronic conditions on patients. • Identify the indications, contraindications, and complications of enteral and parenteral nutrition. • Identify different types of enteral formulas and defined diets. • Recognize the different methods of parenteral nutrition (peripheral vs. central solutions). The resident should know the indications, techniques, and complications of feeding tube and parenteral line insertion as well as nutrition disorders including obesity and metabolic syndromes, malnutrition states, short bowel syndrome, and re-feeding syndrome.
	Neonatology	Residents, in collaboration with other health care professionals, will care for premature and ill newborns. They should demonstrate knowledge of: • Physiology of the newborns and premature infants—comparison with small/large for gestational age infants, Intrauterine Growth

		Retardation (IUGR), and very low birth weight newborns—; related complications, fluid and electrolyte requirements, thermoregulation, and metabolic rate; and cerebral, renal hepatic, and cardiopulmonary function, formulas, and caloric requirements. • Hyperbilirubinemia: physiology, phototherapy, exchange transfusion, cholestasis. • Intracranial bleeding: staging, techniques of diagnosis, site of blood, management, and outcome. • Cardiopulmonary support of the newborn: principles on noninvasive and invasive. • Ventilatory support; congenital diaphragmatic hernia pulmonary hypertension of the newborn, meconium aspiration; inotropic support; principles of ECLS; surfactant use. • Neonatal sepsis: etiology and risk factors, immune status, diagnostic workup, bacteriology, and treatment pharmacokinetics.
	Emergency Pediatric Medicine	The resident should know and comprehend the following: • Growth and development milestones of children. • Clinical measurements of dehydration and volume depletion. • Causes, forms, and pathophysiology of fluid and electrolyte disorders. • Calculations for the correction of fluid and electrolyte disorders.

		• Calculation for the correction of acid/base abnormalities. • Pharmacology and dosage calculation for resuscitation drugs. • Pathophysiology of acute pediatric disorders. • Etiology and complications of common congenital and developmental syndromes. • Pathophysiology of infectious disorders. • Pharmacology and dosage for common antibiotics. • Immunization: timing, efficacy, and side effects. • Causes of immune deficiency and compromise in children. • Presentation of anemia and purpura. • Presentation of common malignancies. • Access to social agencies for psychosocial disorders. • Assessment of cardiopulmonary emergencies in children. • Risk factors for child abuse, deprivation, and family dysfunction. • Reporting responsibilities and SCAN team activation in suspected child abuse or neglect. • Define shock, categorize shock based on type, and explain the etiology and pathophysiology of each type of shock: a. cardiogenic, b. hypovolemic, c. distributive (septic, anaphylactic, neurogenic, and adrenal insufficiency mediated), and d. obstructive (cardiac tamponade, tension pneumothorax, and pulmonary embolus).

		• Summarize the clinical presentation and hemodynamic parameters associated with each type of shock using clinical terms (e.g., heart rate, respiratory rate, and blood pressure). Discuss the pathophysiology, including the mechanism of arrest, of the following situations: septic shock, anaphylactic shock (envenomation, drug-related), acute adrenal insufficiency, hypothermia, penetrating or blunt trauma, tension pneumothorax, pericardial tamponade, and hemorrhagic shock.
	Transplantation	Surgeons, in collaboration with other health care professionals, will care for children with organ transplants or awaiting transplantation. They should demonstrate knowledge of the indications for liver, kidney, and small bowel transplants and of immunosuppressive agents (effects and complications).

References:

1. Al-Rabeeah A. The history of health care in the Kingdom of Saudi Arabia with emphasis on pediatric surgery. *Saudi Med J* 2003;5:S9–S10
2. Pediatric surgery training committee-SCHS. Personal communication, 6th February 2012.
3. Nakayama DK, Newman KT. Pediatric surgery workforce: Population and economic issues. *J Pediatr Surg* 2008;43:1426–31
4. Nakayama DK, Burd RS, Newman KT. Pediatric surgery workforce: supply and demand. *J Pediatr Surg* 2009;44:1677–82
5. Ziegler MM: Pediatric surgical training: An historic perspective, a formula for change. *J Pediatr Surg* 2004;39:1159-72

6. Walsh D. Pediatric surgery: a career resource. *Am J Surg* 2010; 199, 275–77

7. Reed CE, Vaporciyan AA, Erikson C, et al. Factors dominating choice of surgical specialty. *J Am Coll Surg* 2010;210:319–24

8. Borman, KR, Vick LR, Biester TW, et al. Changing demographics of residents choosing fellowships: Longterm data from the American Board of Surgery. *J Am Coll Surg* 2008;206:782–89.

9. Al Rajhi M, Magzoub M, Zamakhshary M. Factors affecting interest in pediatric surgery: Survey of Saudi general surgery residents (non-published study, 2013)

10. https://www.stats.gov.sa/sites/default/files/Population%20by%20Age%20Groups%20%2Cand%20Gender_0.pdf (Accessed on 20/12/2021)

11. Altokhais T, Al Rajhi M, Bawazir, O, et al. Resident satisfaction with the pediatric surgery training program. *BMC Medical Education* (2020;20:375