



الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Pediatric Hematology and Oncology







الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

SAUDI BOARD

PEDIATRIC HEMATOLOGY & ONCOLOGY CURRICULUM

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INTRODUCTION

Pediatric Hematology/Oncology is that branch of medicine concerned with the diagnosis and treatment of infants, children and adolescents with cancer and non-malignant disorders of the blood and blood-forming tissues. A specialist in Pediatric Hematology/Oncology has the necessary medical knowledge and skills to deal with the prevention, diagnosis and management of a broad range of conditions affecting infants, children and adolescents with cancer and non-malignant disorders of the blood, including the necessary medical knowledge and skills to perform hematopoietic stem cell transplantation.⁽¹⁾

Cancers estimates amongst the leading causes of morbidity and mortality worldwide. Although childhood cancer is a rare disease, 100,000 children younger than 15 years of age die from cancer each year, the majority of them in developing countries.⁽²⁾

Childhood cancers in Saudi Arabia affected around 5932 children in the period extending between 1999 and 2008; which accounted for 8% of total cancer cases during the same period. This finding shows similarities with the results reported from the Gulf Cooperation Council (GCC) States on cancer incidence for the period 1998-2007. However, the trend of cancer incidence cases among children under 15 years of age in Saudi Arabia in the period from 1999 up to 2008 has increased from 88 per 1,000,000 to 98 per 1,000,000, respectively.⁽²⁾

The occurrence of cancers in Saudi children is low in comparison to other developed countries, but it's an important public health problem as its cause loss of young lives. Saudi Arabia is a young nation with 41.7% of the population under the age of 15 years, which put a large number of the population at risk of childhood cancer. Some of these children, constituting almost half of the population, will develop cancer at some point in their lifetime before they reach 15 years of age. Leukemia is the top childhood cancer in Saudi Arabia followed by lymphomas and brain and nervous system malignancies. Many cancers have a high chance of cure if detected early and treated adequately.⁽²⁾

Saudi Arabia is well-known for its high prevalence of hereditary blood disorders (sickle-cell disease and β - thalassemia). In Saudi Arabia, 4.20% had sickle cell trait, 0.26% had sickle cell disease, and 3.22% had β - thalassemia trait, while 0.07% had had β -thalassemia disease. Certain cultural factors in Saudi Arabia, including the high frequency of consanguineous marriages (exceeding 55%) and the large family size may contribute to the high prevalence of sickle-cell disease and β - thalassemia in Saudi Arabia. Because of the burden on the healthcare system and effect on the quality of life in patients with sickle-cell disease or β - thalassemia, it need proper preventive actions and early intervention, many of these disorders and their complications could, to a large extent, be eliminated.⁽³⁾

The Pediatric Hematology-Oncology program provides the fellows with instruction and experience in the pathophysiology of pediatric hematologic and oncologic disorders, as well as in the clinical diagnosis and management of these disorders. Upon completion of the training program, fellows will be competent in the clinical practice of pediatric hematology-oncology and will be prepared to conduct clinical and/or laboratory-based research. The fellows will also have the knowledge to teach at both the undergraduate and postgraduate levels.

The purpose of this curriculum is to define the process of training and the competencies required for the award of the Saudi Board Certification in Pediatric Hematology-Oncology.

INTRODUCTION

Post training, the Pediatric Hematology-Oncology specialist will have the competencies required to be able to work as a consultant within the National Health Service and will be in a position to develop further a sub- specialist interest within Pediatric Hematology-Oncology.

This curriculum will be reviewed every three years or at any time as necessary.

All trainees satisfactorily completing the program are eligible candidates for the Saudi Board Pediatric Hematology/Oncology examination.

SPECIFIC LEARNING OBJECTIVES CANMEDS PHYSICIAN COMPETENCY FRAMEWORK

The Canadian Medical Education Directives for Specialists (CanMEDS) framework, which is applied in postgraduate training programs in many countries, offers a model of physician competencies that emphasizes not only medical expertise but also multiple additional nonmedical expert roles that aim to serve society's needs competently. Therefore, the Saudi Commission for Health Specialties (SCFHS) is adopting the CanMEDS framework to establish a core curriculum for all training programs including that of the Saudi Board Certification in Pediatric Hematology & Oncology. Therefore, at the completion of training, the fellow will have acquired the following competencies and will function effectively as a:

Medical Expert

Definition

As Medical Experts, Pediatric Hematology/Oncology physicians integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional values in their provision of high-quality and safe patient-centred care. Medical Expert is the central physician Role in the CanMEDS Framework and defines the physician's clinical scope of practice.

Description

As Medical Experts who provide high-quality, safe, patient-centred care, physicians draw upon an evolving body of knowledge, their clinical skills, and their professional values. They collect and interpret information, make clinical decisions, and carry out diagnostic and therapeutic interventions. They do so within their scope of practice and with an understanding of the limits of their expertise. Their decision-making is informed by best practices and research evidence, and takes into account the patient's circumstances and preferences as well as the availability of resources. Their clinical practice is up-to-date, ethical, and resource efficient, and is conducted in collaboration with patients and their families, other health care professionals, and the community. The Medical Expert Role is central to the function of physicians and draws on the competencies included in the Intrinsic Roles (Communicator, Collaborator, Leader, Health Advocate, Scholar, and Professional).

Key Competencies

Pediatric hematology/oncology physicians are able to:

- 1) Function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical and patient-centered medical care.
- 2) Establish and maintain clinical knowledge, skills and attitudes appropriate to Pediatric Hematology/Oncology.
- 3) Perform a complete and appropriate assessment of a patient.
- 4) Use preventive and therapeutic interventions effectively.
- 5) Demonstrate proficient and appropriate use of procedural skills, both diagnostic and therapeutic.
- 6) Seek appropriate consultation from other health professionals, recognizing the limits of their expertise.

Enabling Competencies

Pediatric hematology/oncology physician are able to:

- 1) Function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical and patient-centred medical care

SPECIFIC LEARNING OBJECTIVES

- Perform a consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal form in response to a request from another health care professional.
- Demonstrate use of all CanMEDS competencies relevant to Pediatric Hematology/Oncology.
- Identify and appropriately respond to relevant ethical issues arising in patient care and medical decision-making.
- Demonstrate the ability to prioritize professional duties when faced with multiple patients and problems.
- Demonstrate compassionate and patient-centred care.
- Recognize and respond to the ethical dimensions in medical decision-making .
- Demonstrate medical expertise in situations other than patient care, such as providing expert legal testimony or advising governments, as needed.

2) Establish and maintain clinical knowledge, skills and attitudes appropriate to Pediatric Hematology/Oncology

- Apply knowledge of the clinical, socio-behavioural, and fundamental biomedical sciences relevant to Pediatric Hematology/Oncology. This includes the knowledge needed to effectively and ethically provide medical care for infants, children and adolescents with cancer and non-malignant hematologic disorders.
 - Foundational knowledge of the following:
 - Physiological changes in growth and development as they relate to cancer and non-malignant hematological disorders in pediatric patients, including but not limited to normal values and the maturation of hematopoietic organs and tissues.
 - Pathophysiological processes as they relate to cancer and nonmalignant hematological disorders.
 - Psychological processes in pediatric patients with cancer and nonmalignant hematological disorders.
 - Cellular and molecular biology, biochemistry, pharmacology and immunology as they relate to the understanding of cancer and non-malignant hematologic disorders.
 - General principles of anatomical pathology as they relate to Pediatric Hematology/Oncology.
 - Disorders of immune function as related to Pediatric Hematology/Oncology.
 - Expert knowledge in hematopathology and laboratory medicine as it relates to Pediatric Hematology/Oncology. This includes but is not limited to knowledge of the appropriate indications for, methods of, and limitations of the following:
 - Peripheral blood morphology
 - Bone marrow aspirations and biopsies
 - Cerebral spinal fluid (CSF) assessment
 - Hemostasis and thrombosis evaluation
 - Transfusion medicine
 - Flow cytometry, including but not limited to immunophenotyping
 - Hemoglobinopathy investigations
 - Cytogenetics and molecular diagnostics
 - Foundational knowledge of general principles of diagnostic imaging as they apply to Pediatric Hematology/Oncology.
 - Expert knowledge of pediatric cancer, including but not limited to the following:
 - Diagnostic work-up for patient with a potential underlying malignancy
 - Diagnosis and management of pediatric malignancies, including but not limited to:
 - Leukemias and preleukemic disorders
 - Lymphomas

SPECIFIC LEARNING OBJECTIVES

- Central nervous system (CNS) tumors
- Retinoblastoma
- Wilms tumor
- Neuroblastoma
- Hepatoblastoma
- Ewing sarcoma
- Osteogenic sarcoma
- Rhabdomyosarcoma
- Common pediatric oncologic emergencies, including but not limited to:
 - Fever and neutropenia
 - Tumor lysis syndrome
 - Superior mediastinal syndrome
 - Hyperleukocytosis
 - Spinal cord compression
- Cancer chemotherapy as it applies to pediatric oncology patients, including but not limited to mechanisms of action and toxicities related to specific chemotherapy agents
- The role, indications, and complications of surgery as applied to the management of infants, children and adolescents with cancer
- The role, indications, and complications of radiation therapy as applied to the management of infants, children and adolescents with cancer
- The potential genetic implications for patients and families with inherited cancer predispositions, and the importance of genetic counseling
- Expert knowledge of non-malignant hematologic diseases, including but not limited to:
 - Diagnosis and management of pediatric hematological diseases, including but not limited to:
 - Disorders of hematopoiesis
 - Aplastic anemia
 - Red cell aplasia and polycythemia
 - Leukopenia and leukocytosis
 - Amegakaryocytic thrombocytopenia and thrombocytosis
 - Red cell disorders
 - Hemoglobinopathies
 - Red cell membrane defects
 - Red cell enzyme deficiencies
 - Nutritional anemias
 - Iron deficiency
 - Megaloblastic anemia
 - Dyserythropoiesis
 - Immune hemolytic anemia
 - White cell disorders
 - Lymphopenia and lymphocytosis
 - Neutropenia and neutrophilia
 - Eosinophilia
 - Neutrophil function defects
 - Storage diseases
 - Disorders of hemostasis and thrombosis
 - Thrombocytopenia and thrombocytosis
 - Platelet dysfunction
 - Congenital coagulation disorders

SPECIFIC LEARNING OBJECTIVES

- Acquired coagulation disorders
 - Hypercoagulable states
 - Disorders of fibrinolysis
 - Perinatal and developmental hematology
 - Anemia
 - Neutropenia
 - Thrombocytopenia
 - Bleeding diatheses
 - Leukocytosis
 - Splenomegaly and disorders of splenic function
 - Lymphadenopathy
 - Histiocytic disorders
 - Langerhans cell histiocytosis
 - Hemophagocytic lymphohistiocytosis
 - Potential genetic implications for patients and families with inherited hematological conditions, and the importance of genetic counseling
- Expert knowledge of stem cell transplantation as it applies to Pediatric Hematology/Oncology, including but not limited to:
 - Basic biology of hematopoiesis and hematopoietic stem cell transplant (HSCT), and the immunologic relationships between donor hematopoietic cells and the host.
 - Indications for autologous and allogeneic stem cell transplantation.
 - Basics of the human leukocyte antigen (HLA) system and the principles involved in choosing matched and unmatched stem cell donors.
 - Different sources of available stem cells, specifically bone marrow, peripheral blood and cord blood, including methods of cryopreservation.
 - Choice and implementation of preparative regimens used in HSCT, including but not limited to the use of radiation therapy.
 - Pathogenesis of graft versus host disease (GVHD)
 - Strategies to prevent, diagnose and manage potential complications of HSCT, including but not limited to sinusoidal obstructive syndrome (SOS), engraftment syndrome, graft rejection and GVHD
- Expert knowledge of supportive care related to the management of Pediatric Hematology/ Oncology patients.
 - Prevention and treatment of infectious complications
 - Prevention and treatment of chemotherapy-related organ dysfunction
 - Management of pain
 - Management of mucositis
 - Nutritional support
 - Management of constipation
 - Anti-emetic therapy
 - Blood product support
 - Care and use of central venous access devices
 - Psychosocial support
- Expert knowledge of long-term follow-up of patients with Pediatric Hematology/Oncology problems for the purposes of:
 - Disease monitoring
 - Detecting late effects of therapy, recognizing the particular risks and needs of infants, children and adolescents
 - Promotion and maintenance of a healthy lifestyle

SPECIFIC LEARNING OBJECTIVES

- Palliative care and pain/symptom management as applied to Pediatric Hematology/Oncology.
 - Recognition and assessment of patients in need of pain and symptom management, including use of appropriate pain scales.
 - Appropriate use of medications and other therapies to provide complex symptom relief for infants, children and adolescents.
 - Recognition and assessment of chronic pain as relevant to Pediatric Hematology/Oncology, including but not limited to sickle cell pain, hemarthroses and cancer related pain.
 - Community and hospital resources necessary to provide appropriate palliative care services.
 - Recognition of the psychosocial needs of the patient and family in the context of palliative care and complex pain management.
 - Describe the CanMEDS framework of competencies relevant to Pediatric Hematology/Oncology.
 - Apply lifelong learning skills of the Scholar Role to implement a personal program to keep up-to-date, and enhance areas of professional competence.
 - Contribute to the enhancement of quality care and patient safety in Pediatric Hematology/Oncology, integrating the available best evidence and best practices.
- 3) Perform a complete and appropriate assessment of a patient
- Identify and explore issues to be addressed in a patient encounter effectively, including the patient's context and preferences.
 - Elicit a history that is relevant, concise, and accurate to context and preferences, for the purposes of prevention and health promotion, diagnosis and/or management.
 - Perform an efficient physical examination, demonstrating sensitivity to the patient's needs and modifications necessary based on the patient's age, gender, sexual orientation, and ethnicity.
 - Select medically appropriate investigative methods in a resource-effective and ethical manner.
 - Demonstrate effective clinical problem solving and judgment to address patient problems, including interpreting available data and integrating information to generate differential diagnoses and management plans.
 - Pediatric cancer.
 - Plan and coordinate an appropriate diagnostic work-up for any new patient with a potential underlying malignancy.
 - Diagnose and manage pediatric malignancies, including but not limited to:
 - Leukemias and preleukemic disorders
 - Lymphomas
 - CNS tumors
 - Retinoblastoma
 - Wilms tumor
 - Neuroblastoma
 - Hepatoblastoma
 - Ewing sarcoma
 - Osteogenic sarcoma
 - Rhabdomyosarcoma
 - Manage a wide variety of pediatric cancer patients receiving medical care, including but not limited to those who are receiving chemotherapy, those who are experiencing toxicities related to treatment, and those who are acutely ill.
 - Manage pediatric oncologic emergencies, including but not limited to:

SPECIFIC LEARNING OBJECTIVES

- Fever and neutropenia
- Tumor lysis syndrome
- Superior mediastinal syndrome
- Hyperleukocytosis
- Spinal cord compression
- Consult with non-oncologic services as is appropriate for optimal patient care
- Non-malignant hematologic diseases:
 - Evaluate a new patient referred for a possible underlying hematologic disorder
 - Plan and coordinate the necessary confirmatory laboratory investigations
 - Manage effectively children with acute hematologic disorders, including but not limited to the following emergency conditions:
 - Splenic sequestration crisis
 - Stroke
 - Life threatening hemorrhage
 - Hemolytic crisis
 - Pulmonary embolism
 - Provide comprehensive, multi-disciplinary care, including prevention and monitoring of complications, for patients with chronic hematologic conditions, including but not limited to sickle cell disease, thalassemia, and bleeding and thrombotic disorders.

4) Use preventive and therapeutic interventions effectively

- Implement a management plan in collaboration with a patient and the patient's family.
- Demonstrate appropriate and timely application of preventive and therapeutic interventions relevant to Pediatric Hematology/Oncology, collaborating with other specialty services as is appropriate.
 - Select chemotherapy and other forms of systemic therapies, and describe the acute and chronic side effects related to the therapies.
 - Integrate multimodal therapies, including surgery and radiation therapy, for individualized patient care plans.
 - Describe indications for therapy with both curative and palliative intent.
 - Manage medical emergencies and complications which may arise as a result of cancer or non-malignant hematological disorders and their treatment.
 - Provide supportive care, including but not limited to the prevention and management of pain, nausea and vomiting, the applicability/usefulness of blood components and growth factors, and the use and complications of central venous access devices.
- Ensure appropriate informed consent is obtained for therapies.
- Ensure patients receive appropriate end-of-life care.

5) Demonstrate proficient and appropriate use of procedural skills, both diagnostic and therapeutic

- Demonstrate effective, appropriate, and timely performance of diagnostic and therapeutic procedures relevant to Pediatric Hematology/Oncology, including but not limited to:
 - Bone marrow aspiration and biopsy from sites appropriate to the size and clinical status of the child.
 - Lumbar puncture for diagnostic investigation and/or the administration of intrathecal medication.
- Ensure appropriate informed consent is obtained for procedures.
- Document and disseminate information related to procedures performed and their outcomes.
- Ensure adequate follow-up is arranged for procedures performed.

SPECIFIC LEARNING OBJECTIVES

- 6) Seek appropriate consultation from other health professionals, recognizing limits of their own expertise
- Demonstrate insight into their own limits of expertise.
 - Demonstrate effective, appropriate, and timely consultation of another health professional as needed for optimal patient care.
 - Arrange appropriate follow-up care services for a patient and the patient's family.

Communicator

Definition

As Communicators, physicians form relationships with patients and their families that facilitate the gathering and sharing of essential information for effective healthcare.

Description

Physicians enable patient-centred therapeutic communication by exploring the patient's symptoms, which may be suggestive of disease, and by actively listening to the patient's experience of his or her illness. Physicians explore the patient's perspective, including his or her fears, ideas about the illness, feelings about the impact of the illness, and expectations of health care and health care professionals. The physician integrates this knowledge with an understanding of the patient's context, including socio-economic status, medical history, family history, stage of life, living situation, work or school setting, and other relevant psychological and social issues. Central to a patient-centred approach is shared decision-making: finding common ground with the patient in developing a plan to address his or her medical problems and health goals in a manner that reflects the patient's needs, values, and preferences. This plan should be informed by evidence and guidelines.

Because illness affects not only patients but also their families, physicians must be able to communicate effectively with everyone involved in the patient's care.

Key Competencies

- 1) Pediatric hematology/oncology physician are able to:
- 2) Develop rapport, trust, and ethical therapeutic relationships with patients and families.
- 3) Accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues, and other professionals.
- 4) Convey relevant information and explanations accurately to patients and families, colleagues and other professionals.
- 5) Develop a common understanding on issues, problems, and plans with patients, families, and other professionals to develop a shared plan of care.
- 6) Convey effective oral and written information about a medical encounter.

Enabling Competencies

Pediatric hematology/oncology physician are able to:

- 1) Develop rapport, trust, and ethical therapeutic relationships with patients and families
 - Recognize that being a good communicator is a core clinical skill for Pediatric Hematologists/Oncologists, and that effective physician-patient communication can foster patient satisfaction, physician satisfaction, adherence and improved clinical outcomes.
 - Establish positive therapeutic relationships with patients and their families that are characterized by understanding, trust, respect, honesty and empathy.

SPECIFIC LEARNING OBJECTIVES

- Establish a professional relationship with infants, children and adolescents of all ages, as well as with their parents, legal guardians or other caregivers, in order to obtain a meaningful history, conduct a relevant physical examination and provide the best care available for the disorder for which the consultation was requested.
 - Respect patient confidentiality, privacy and autonomy.
 - Listen effectively.
 - Be aware of and responsive to nonverbal cues.
 - Facilitate a structured clinical encounter effectively.
- 2) Accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues, and other professionals:
- Gather information about a disease and about a patient's beliefs, concerns, expectations and illness experience.
 - Seek out and synthesize relevant information from other such as a patient's family, caregivers and other professionals.
- 3) Convey relevant information and explanations accurately to patients and families, colleagues and other professionals:
- Deliver information to a patient and family, colleagues, and other professionals in a humane manner and in such a way that it is understandable and encourages discussion and participation in decision-making.
 - Discuss complementary health care practices, their importance to families, and their potential benefits, risks and limitations.
 - Establish an atmosphere of open communication appropriate to the consultation, and convey interest, sensitivity, empathy and support, including but not limited to the discussion of poor prognosis and end-of-life issues.
 - Identify and present well-documented assessments and recommendations in written and/or verbal form, with respect to patient care, education and expert opinion.
 - Discuss with patients and their families, appropriate current information, including benefits and risks, related to choices faced in Pediatric Hematology/Oncology, including but not limited to:
 - Participation in clinical trials.
 - Genetic testing and genetic counseling.
- 4) Develop a common understanding on issues, problems, and plans with patients, families, and other professionals to develop a shared plan of care:
- Identify and explore problems to be addressed from a patient encounter effectively, including the patient's context, responses, concerns, and preferences.
 - Respect diversity and difference, including but not limited to the impact of gender, religion and cultural beliefs on decision-making.
 - Encourage discussion, questions, and interaction in the encounter.
 - Engage patients, families, and relevant health professionals in shared decision-making to develop a plan of care.
 - Address challenging communication issues effectively, such as obtaining informed consent and breaking bad news to families, and demonstrate an understanding of coping mechanisms and supports available to ameliorate distress.
- 5) Convey effective oral and written information about a medical encounter:
- Maintain clear, accurate, and appropriate records of clinical encounters and plans.

- Present verbal reports of clinical encounters and plans.
- Acquire communication skills required for interaction with the media and other community groups on topics relevant to Pediatric Hematology/Oncology.

Collaborator

Definition

As Collaborators, physicians work effectively with other health care professionals to provide safe, high-quality, patient-centred care.

Description

Collaboration is essential for safe, high-quality, patient-centred care, and involves patients and their families, physicians and other colleagues in the health care professions, community partners, and health system stakeholders.

Collaboration requires relationships based in trust, respect, and shared decision-making among a variety of individuals with complementary skills in multiple settings across the continuum of care. It involves sharing knowledge, perspectives, and responsibilities, and a willingness to learn together. This requires understanding the roles of others, pursuing common goals and outcomes, and managing differences.

Collaboration skills are broadly applicable to activities beyond clinical care, such as administration, education, advocacy, and scholarship.

Key Competencies

Physicians are able to:

- 1) Participate effectively and appropriately in an interprofessional health care team.
- 2) Work with other health professionals effectively to prevent, negotiate, and resolve interprofessional conflict.

Enabling Competencies

Physician are able to:

- 1) Participate effectively and appropriately in an interprofessional health care team:
 - Describe the specialist's roles and responsibilities to other professionals.
 - Describe the roles and responsibilities of other professionals within the health care team.
 - Recognize and respect the diversity of roles, responsibilities and competences of other professionals in relation to their own.
 - Understand and respect the role and expertise of all members of an interdisciplinary team, and the value of such expertise in the care of ill infants, children and adolescents.
 - Work with others to assess, plan, provide and integrate care for individual patients (or groups of patients).
 - Provide consultation with respect to diagnosis and delivery of optimal patient care, education and medico-legal issues relevant to the care of infants, children and adolescents with cancer and non-malignant hematologic disorders.
 - Work with others to assess, plan, provide and review other tasks, such as research problems, educational work, program review or administrative responsibilities.
 - Consult and collaborate with physicians and other health care professionals, including pediatricians and family physicians, and participate in interdisciplinary team activities within and between hospitals, other health care facilities, and collaborative groups.

SPECIFIC LEARNING OBJECTIVES

- Develop, or contribute to the development of, a care plan in collaboration with the members of the interdisciplinary team.
- Describe the principles of team dynamics.
- Respect team ethics, including confidentiality, resource allocation and professionalism.
- Demonstrate leadership in a health care team, as appropriate.

2) Work with other health professionals effectively to prevent, negotiate, and resolve interprofessional conflict:

- Demonstrate a respectful attitude towards other colleagues and members of an interprofessional team.
- Work with other professionals to prevent conflicts.
- Employ collaborative negotiation to resolve conflicts.
- Respect differences and address misunderstandings and limitations in other professionals.
- Recognize one's own differences, misunderstanding and limitations that may contribute to interprofessional tension.
- Reflect on interprofessional team function.

Leader

Definition

As Leaders, physicians engage with others to contribute to a vision of a high-quality health care system and take responsibility for the delivery of excellent patient care through their activities as clinicians, administrators, scholars, or teachers.

Description

The CanMEDS Leader Role describes the engagement of all physicians in shared decision making for the operation and ongoing evolution of the health care system. As a societal expectation, physicians demonstrate collaborative leadership and management within the health care system. At a system level, physicians contribute to the development and delivery of continuously improving health care and engage with others in working toward this goal. Physicians integrate their personal lives with their clinical, administrative, scholarly, and teaching responsibilities. They function as individual care providers, as members of teams, and as participants and leaders in the health care system locally, regionally, nationally, and globally.

Key Competencies

Physicians are able to:

- 1) Participate in activities that contribute to the effectiveness of their health care organizations and systems.
- 2) Manage their practice and career effectively.
- 3) Allocate finite health care resources appropriately.
- 4) Serve in administration and leadership roles, as appropriate.

Enabling competencies:

Physicians are able to:

- 1) Participate in activities that contribute to the effectiveness of their health care organizations and systems:
 - Work collaboratively with others in their organizations and share responsibility for health care delivery in interdisciplinary and interprofessional settings.
 - Participate in systemic quality process evaluation and improvement, including but not limited to patient safety initiatives.

SPECIFIC LEARNING OBJECTIVES

- Demonstrate an understanding of standardization, quality control, quality assurance, and safety as each relates to hematopathology laboratory practices.
 - Demonstrate knowledge of the definition and role of audits, quality improvement, risk management and knowledge of adverse effects/incident reporting, and complaint management in a hospital and ambulatory setting.
 - Demonstrate an understanding of cost/benefit ratios of diagnostic and therapeutic interventions, cost containment and efficacy, effectiveness and efficiency as they relate to quality assurance.
 - Describe the structure and function of the health care system as it relates to Pediatric Hematology/Oncology, including the roles of physicians.
 - Demonstrate knowledge of various forms of health care provision applicable to Pediatric Hematology/Oncology, in particular the relative advantages, disadvantages and impacts on the child and family. This will include in-hospital care, ambulatory care, outreach/community care, home care, chronic care, rehabilitation care, and palliative and hospice care.
 - Demonstrate understanding of population-based approaches to health care services and their implication for the Pediatric Hematology/Oncology patient population and for the pediatric population at large.
 - Demonstrate an understanding of the social, societal and governmental aspects of health care provision as applied to the Pediatric Hematology/Oncology patient population
 - Demonstrate an understanding of human resource planning as it applies to Pediatric Hematology/Oncology.
 - Describe principles of health care financing, including physician remuneration, budgeting and organizational funding.
- 2) Manage their practice and career effectively:
- Set priorities and manage time to balance patient care, practice requirements, outside activities and personal life.
 - Implement processes to ensure personal practice improvement.
 - Employ information technology appropriately for patient care.
- 3) Allocate finite health care resources appropriately:
- Recognize the importance of just allocation of health care resources, balancing effectiveness, efficiency and access with optimal patient care.
 - Demonstrate an understanding of cost and cost-effectiveness of various forms of pediatric care as they apply to Pediatric Hematology/Oncology.
 - Demonstrate an understanding the use of finite resources, including but not limited to blood products and bone marrow donor sources.
 - Apply evidence and management processes for cost-appropriate care.
- 4) Serve in administration and leadership roles, as appropriate:
- Chair or participate effectively in committees and meetings.
 - Lead or implement change in health care.
 - Plan relevant elements of health care delivery (e.g., work schedules).

Health Advocate

Definition

As Health Advocates, physicians contribute their expertise and influence as they work with communities or patient populations to improve health. They work with those they serve to determine and understand needs, speak on behalf of others when required, and support the mobilization of resources to effect change.

Description

Physicians are accountable to society and recognize their duty to contribute to efforts to improve the health and well-being of their patients, their communities, and the broader populations they serve. Physicians possess medical knowledge and abilities that provide unique perspectives on health. Physicians also have privileged access to patients' accounts of their experience with illness and the health care system.

Improving health is not limited to mitigating illness or trauma, but also involves disease prevention, health promotion, and health protection. Improving health also includes promoting health equity, whereby individuals and populations reach their full health potential without being disadvantaged by, for example, race, ethnicity, religion, gender, sexual orientation, age, social class, economic status, or level of education. Physicians leverage their position to support patients in navigating the health care system and to advocate with them to access appropriate resources in a timely manner. Physicians seek to improve the quality of both their clinical practice and associated organizations by addressing the health needs of the patients, communities, or populations they serve. Physicians promote healthy communities and populations by influencing the system (or by supporting others who influence the system), both within and outside of their work environments. Advocacy requires action. Physicians contribute their knowledge of the determinants of health to positively influence the health of the patients, communities, or populations they serve. Physicians gather information and perceptions about issues, working with patients and their families to develop an understanding of needs and potential mechanisms to address these needs. Physicians support patients, communities, or populations to call for change, and they speak on behalf of others when needed. Physicians increase awareness about important health issues at the patient, community, or population level. They support or lead the mobilization of resources (e.g. financial, material, or human resources) on small or large scales.

Physician advocacy occurs within complex systems and thus requires the development of partnerships with patients, their families and support networks, or community agencies and organizations to influence health determinants. Advocacy often requires engaging other health care professionals, community agencies, administrators, and policy-makers.

Key competencies

Physicians are able to:

- 1) Respond to individual patient health needs and issues as part of patient care.
- 2) Respond to the health needs of the communities that they serve.
- 3) Identify the determinants of health for the populations that they serve.
- 4) Promote the health of individual patients, communities, and populations.

Enabling Competencies

Physicians are able to:

- 1) Respond to individual patient health needs and issues as part of patient care:
 - Identify the health needs of an individual patient.

SPECIFIC LEARNING OBJECTIVES

- Demonstrate in-depth knowledge of the health care needs and quality of life issues of infants, children and adolescents with hematologic/oncologic diseases and/or those having undergone hematopoietic stem cell transplantation.
 - Identify important determinants of health and health outcomes for infants, children and adolescents with hematologic/oncologic disease and/or those having undergone a hematopoietic stem cell transplantation.
 - Recognize that the health care needs of infants, children and adolescents are different from adults and change throughout the developmental continuum.
 - Recognize the importance of community services, including but not limited to school, recreation, and appropriate transportation, in the health of a child with a hematologic/oncologic disorder.
 - Ensure timely and appropriate care for adolescents and young adults with hematologic/oncologic disease as they transition from pediatric to adult health care services.
 - Identify opportunities for advocacy, health promotion and disease prevention with individuals to whom they provide care.
 - Appreciate the possibility of competing interests between individual advocacy issues and the community at large.
- 2) Respond to the health needs of the communities that they serve:
- Describe the practice communities that they serve.
 - Identify opportunities for advocacy, health promotion and disease prevention in the communities that they serve, and respond appropriately.
 - Demonstrate knowledge of the principles of clinical epidemiology that will permit the analysis of data for advocacy purposes, including competence to recognize, assess, and respond to the psychosocial, economic, societal and biologic factors influencing the health of the pediatric hematology/ oncology population.
 - Assess the ability of the pediatric hematology/oncology population to access needed services in the health and social support systems.
 - Appreciate the possibility of competing interests between the communities served and other populations.
- 3) Identify the determinants of health for the populations that they serve:
- Identify the determinants of health of the populations, including barriers to access to care and resources
 - Identify vulnerable or marginalized populations within those served and respond appropriately.
- 4) Promote the health of individual patients, communities, and populations:
- Describe an approach to implementing a change in a determinant of health of the populations they serve.
 - Describe how public policy impacts on the health of the populations served.
 - Identify the determinants of burden of morbidity and the importance of advocacy for the development of policies that might mitigate that burden .
 - Identify points of influence in the health care system and its structure.
 - Describe how health care governance influences patient care, research and educational activities at a local, regional, provincial, and national level.
 - Describe the ethical and professional issues inherent in health advocacy, including altruism, social justice, autonomy, integrity and idealism.

SPECIFIC LEARNING OBJECTIVES

- Recognize and respond to those issues, settings, circumstances, or situations in which advocacy on behalf of patients, professions, or society is appropriate.
- Appreciate the possibility of conflict inherent in their role as a health advocate for a patient or community with that of manager or gatekeeper.
- Describe the role of the medical profession in advocating collectively for health and patient safety.

Scholar

Definition

As Scholars, physicians demonstrate a lifelong commitment to excellence in practice through continuous learning and by teaching others, evaluating evidence, and contributing to scholarship.

Description

Physicians acquire scholarly abilities to enhance practice and advance health care. Physicians pursue excellence by continually evaluating the processes and outcomes of their daily work, sharing and comparing their work with that of others, and actively seeking feedback in the interest of quality and patient safety. Using multiple ways of learning, they strive to meet the needs of individual patients and their families and of the health care system.

Physicians strive to master their domains of expertise and to share their knowledge. As lifelong learners, they implement a planned approach to learning in order to improve in each CanMEDS Role. They recognize the need to continually learn and to model the practice of lifelong learning for others. As teachers they facilitate, individually and through teams, the education of students and physicians in training, colleagues, co-workers, the public, and others.

Physicians are able to identify pertinent evidence, evaluate it using specific criteria, and apply it in their practice and scholarly activities. Through their engagement in evidence-informed and shared decision-making, they recognize uncertainty in practice and formulate questions to address knowledge gaps. Using skills in navigating information resources, they identify evidence syntheses that are relevant to these questions and arrive at clinical decisions that are informed by evidence while taking patient values and preferences into account.

Finally, physicians' scholarly abilities allow them to contribute to the application, dissemination, translation, and creation of knowledge and practices applicable to health and health care.

Key Competencies

Physicians are able to:

- 1) Maintain and enhance professional activities through ongoing learning.
- 2) Critically evaluate medical information and its sources, and apply this appropriately to practice decisions.
- 3) Facilitate the learning of patients, families, students, residents, other health professionals, the public and others, as appropriate.
- 4) Contribute to the development, dissemination, and translation of new knowledge and practices.

Enabling Competencies

Physicians are able to:

- 1) Maintain and enhance professional activities through ongoing learning:
 - Describe the principles of maintenance of competence.

SPECIFIC LEARNING OBJECTIVES

- Describe the principles and strategies for implementing a personal knowledge management system.
 - Recognize and reflect on learning issues in practice.
 - Conduct a personal practice audit.
 - Pose an appropriate learning question, recognize and identify gaps in knowledge and expertise around the question, and formulate a plan to address the gap(s).
 - Access and apply information relevant to the clinical practice of pediatric hematology/oncology using the principles of evidence-based medicine.
 - Integrate new learning into practice.
 - Evaluate the impact of any change in practice.
 - Document the learning process.
 - Attend and document participation in relevant meetings and educational activities.
- 2) Critically evaluate medical information and its sources, and apply this appropriately to practice decisions:
- Describe the principles of critical appraisal.
 - Critically appraise retrieved evidence in order to address a clinical question.
 - Develop and implement a system to identify and critically review key current literature related to Pediatric Hematology/Oncology.
 - Demonstrate foundational knowledge of epidemiology and biostatistics, including the design, conduct and evaluation of clinical trials.
 - Execute a systematic search for evidence and critically evaluate medical literature to optimize problem solving and decision making in Pediatric Hematology/Oncology.
 - Apply principles of evidence-based medicine to evaluate quality of research publications
 - Integrate critical appraisal conclusions into clinical care.
- 3) Facilitate the learning of patients, families, students, residents, other health professionals, the public and others, as appropriate:
- Describe principles of learning relevant to medical education.
 - Identify collaboratively the learning needs and desired learning outcomes of others.
 - Develop effective educational strategies for trainees, including medical students, health care professionals, patients and family members, and the general public.
 - Assess accurately the needs of target groups with regard to information on Pediatric Hematology/Oncology.
 - Provide education for health care professionals and guidance to patients, using current and evolving scientific and technological approaches, on issues related to Pediatric Hematology/Oncology.
 - Evaluate the effectiveness of educational strategies employed to achieve learning objectives.
 - Select effective teaching strategies and content to facilitate others' learning.
 - Demonstrate an effective lecture or presentation.
 - Assess and reflect on a teaching encounter.
 - Provide constructive feedback to both teacher and students.
 - Describe the principles of ethics with respect to teaching.
- 4) Contribute to the development, dissemination, and translation of new knowledge and practices:
- Describe the principles of research and scholarly inquiry.
 - Describe the principles of research ethics.
 - Pose a scholarly question.

- Conduct a systematic search for evidence.
- Select and apply appropriate methods to address the question.
- Demonstrate understanding of the concepts of clinical research design.
- Provide explanations to patients and families regarding clinical research trials.
- Demonstrate critical appraisal skills.
- Undertake and demonstrate progress of a scholarly project.

Professional

Definition

As Professionals, physicians are committed to the health and well-being of individual patients and society through ethical practice, high personal standards of behavior, accountability to the profession and society, physician-led regulation, and maintenance of personal health.

Description

Physicians serve an essential societal role as professionals dedicated to the health and care of others. Their work requires mastery of the art, science, and practice of medicine. A physician's professional identity is central to this Role. The Professional Role reflects contemporary society's expectations of physicians, which include clinical competence, a commitment to ongoing professional development, promotion of the public good, adherence to ethical standards, and values such as integrity, honesty, altruism, humility, respect for diversity, and transparency with respect to potential conflicts of interest. It is also recognized that, to provide optimal patient care, physicians must take responsibility for their own health and well-being and that of their colleagues. Professionalism is the basis of the implicit contract between society and the medical profession, granting the privilege of physician-led regulation with the understanding that physicians are accountable to those served, to society, to their profession, and to themselves.

Key Competencies

Physicians are able to:

- 1) Demonstrate a commitment to their patients, profession, and society through ethical practice.
- 2) Demonstrate a commitment to their patients, profession and society through participation in profession-led regulation.
- 3) Demonstrate a commitment to physician health and sustainable practice.

Enabling competencies

Physicians are able to:

- 1) Demonstrate a commitment to their patients, profession, and society through ethical practice:
 - Exhibit appropriate professional behaviors in practice, including honesty, integrity, commitment, compassion, respect and altruism.
 - Demonstrate specific strategies to enhance professional and personal awareness and interrelationships.
 - Demonstrate adherence to accepted practices of the profession and the local institution.
 - Demonstrate a commitment to delivering the highest quality care and maintenance of competence with integrity, honesty and compassion.
 - Display attitudes commonly accepted as essential to professionalism and consistent with a consulting Pediatric Hematology/Oncology role.
 - Recognize personal strengths and weaknesses including those related to professional competence.
 - Recognize and appropriately respond to ethical issues encountered in practice.

SPECIFIC LEARNING OBJECTIVES

- Practice medicine in an ethically responsible manner that respects the medical, legal and professional obligations of belonging to a self-regulating body.
 - Recognize, analyze and develop approaches to resolving ethical issues related to Pediatric Hematology/Oncology.
 - Demonstrate knowledge of the legal and ethical issues related to Pediatric Hematology/Oncology.
 - Recognize, analyze and attempt to resolve ethical issues in clinical practice, including but not limited to truth-telling, advanced directives, confidentiality, conflict of interest, resource allocation, and research ethics.
 - Demonstrate an appreciation of ethical dilemmas, including but not limited to withdrawal of curative treatment, end of life therapy, and innovative therapies.
 - Demonstrate an understanding of relevant legislation that relates to the health care system in order to guide one's clinical practice.
 - Manage conflicts of interest.
 - Recognize the principles and limits of patient confidentiality as defined by professional practice standards and the law.
 - Maintain appropriate boundaries with patients.
- 2) Demonstrate a commitment to their patients, profession and society through participation in profession-led regulation:
- Demonstrate knowledge and understanding of the professional, legal and ethical codes of practice.
 - Fulfill the regulatory and legal obligations required of current practice.
 - Demonstrate knowledge of liability issues related to Pediatric Hematology/Oncology for infants, children and adolescents:
 - Recognize principles of liability.
 - Demonstrate adherence to practice guidelines.
 - Demonstrate accountability to professional regulatory bodies.
 - Recognize, analyze and address unprofessional behaviors in clinical practice, taking into account local and provincial regulations.
 - Participate in peer review.
- 3) Demonstrate a commitment to physician health and sustainable practice:
- Balance personal and professional priorities to ensure personal health and a sustainable practice.
 - Strive to heighten personal and professional awareness and insight.
 - Recognize other professionals in need and respond appropriately.

References:

- 1) C. Hastings, D.S. Wechsler, K. C. Stine. et al. Consensus on a Core Curriculum in American Training Programs in Pediatric Hematology-Oncology: A Report from the ASPHO Training Committee. *Pediatric Hematology and Oncology J*, 24:503–512, 2007
- 2) Hind M Al-Mutlaq, Amen Ahmed Bawazir, Hoda Jradi, et al. Patterns of Childhood Cancer Incidence in Saudi Arabia (1999-2008). *Asian Pacific Journal of Cancer Prevention*. 2015;16(2):431-435.
- 3) Shehab Ahmed Alenazi, Hafeezullah Wazir Ali, Mohammed Ghannam Alharbi, et al. Prevalence of Thalassemia and Sickle Cell Disease in Northern Board Region of Saudi Arabia. *Kashmir J Med Sci*. 2015;1(1).
- 4) Jason R. Frank, The CanMEDS 2015 Physician Competency Framework.
- 5) Royal College of Physicians and Surgeons of Canada. Objectives of Training in the Subspecialty of Pediatric Hematology/Oncology, 2013 (editorial revision 2015).

REQUIREMENTS OF THE TRAINING PROGRAM

Admission Requirements

To be accepted into the training program, the candidate must fulfill the requirements from SCFHS Admission Requirements for Postgraduate Training Programs (scfhs.org.sa):
Please refer to the updated executive policy of SCFHS on admission and registration.
Website: www.scfhs.org.sa

General Training Requirements

- 1) The trainee shall abide by the training regulations and obligations as set by the Saudi Commission for Health Specialties.
- 2) Training is a full-time commitment. The trainee shall be enrolled in full-time, continuous training for the entire duration of program.
- 3) The training is to be conducted in institutions accredited for training by the Saudi Board of Pediatric Hematology-Oncology.
- 4) The training will be comprehensive in the specialties of Pediatric Hematology-Oncology.

OVERVIEW OF THE TRAINING PROGRAM

Structure of the Training Program

- 1) It is a three-year postgraduate structured training program in Pediatric Hematology-Oncology that consists of two parts: the clinical training and the research training.
- 2) In order to successfully complete the training, a Fellow must be active for a minimum of 33 months in the fellowship, which start in March of each year. This period must include:
 - Six (6) months of inpatient care
 - Two (2) months of training in pediatric hematopoietic stem cell transplantation
 - Five (5) months of hematology.
 - Three (3) months of training in relevant laboratory diagnostic skills
 - One (1) month of Radiation Oncology
 - One (1) month of elective
 - One (1) month selective of one of the following: pain management & palliative care, adult hematology, pathology, immunocompromised infectious disease or radiology.
 - One (1) months of outpatient care clinics.
 - Two (2) months of junior attending during the third year
 - Eight (8) months of research: during the second and third year, the fellow is responsible to attend outpatients care clinics.
 - Three (3) months rotation of subspecialty of interest or outpatient care clinics during third year.
- 3) The fellow is required to do a minimum of four months outside rotation in a well-recognized training center during the first two years of fellowship.
- 4) The sequence of the clinical rotations will be determined by the local supervisory training committee.
- 5) After the successful completion of the three-year training program and after obtaining the Final In-Training Evaluation Report (FITER) (appendix 1), candidates will then be eligible for the Final Certification Examination of the Saudi Commission of Pediatric Hematology-Oncology.
- 6) Candidates who successfully pass the Final Certification Examination will receive the Saudi Commission Specialty Certification in Pediatric Hematology-Oncology.

Rotations Roadmap

Year	01Mar 31Mar	01Apr 30Apr	01May 31May	01Jun 30Jun	01Jul 31Jul	01Aug 31Aug	01Sep 30Sep	01Oct 31Oct	01Nov 30Nov	01Dec 31Dec	01Jan 31Jan	01Feb 28Feb
F1	Inpt	Inpt	Inpt	BMT	leave	Res	Hema	Hema	Lab	Lab	OPD	Elect
F2	Inpt	Inpt	Inpt	BMT	leave	Res/OPD	Hema	Rad	Hema	Hema	Lab	Select
F3	Junior attending	Junior attending	Res/OPD	Res/OPD	leave	Res/OPD	Res/OPD	Res/OPD	Res/OPD	Subs/OPD	Subs/OPD	Subs/OPD

Inpt: inpatient, BMT: bone marrow transplantation, Res: research, Hema: hematology, Lab: laboratory, OPD: outpatient care clinics, Elect: elective, Rad: radiation oncology, Select: selective, Subs: subspecialty of interest.

Clinical Rotations

Inpatient Service

The Fellow is responsible for evaluating newly diagnosed and relapsed patients with cancer, making specific diagnostic, treatment plans and supervising the medical and oncologic care. The Fellow is actively involved in maintaining appropriate communication between the family, the patient, and the medical team, and participates in diagnostic and treatment conference.

The Fellow supervises, together with attending, patients admitted for routine chemotherapy and performs all inpatient consultations. Fellows also participate in the weekly team meeting. During this rotation the Fellow assumes responsibility as primary physician for the care of a certain number of patients. He/she also is actively involved in teaching the pediatric residents. A faculty member serves as attending and supervises the fellow during this rotation.

Hematology-Hemostasis Service

The Fellow supervises the care of routine hematology admissions for PRBC transfusion and/or Desferal infusion, etc. and performs all in-house hematology-hemostasis consultations under the supervision of the attending.

Hematopoietic Stem Cell Transplantation

Fellows will be responsible for management of patients who are undergoing transplantation and the complications of transplant under supervision of the transplant attending physician. They will participate in family conferences, consent conferences and update rounds with the attending physician. After the first month rotation, fellows is encouraged to attend the outpatient hematopoietic stem cell transplantation clinic.

Ambulatory Care

Fellows participate in diagnosis and treatment of patients referred for diagnostic evaluation of malignant and hematological diseases or providing follow-up care of patients initially diagnosed during rotation on the inpatient service under the supervision of a faculty attending.

Radiation Oncology

Fellows spend a one-month rotation in Radiation Oncology, becoming familiar with the basic principles of radiation therapy and the late effects of radiation.

Elective rotation

The fellow can arrange their own elective rotation in any area of interest. The elective rotation will provide the fellow with the opportunity to gain additional training in a specialized area of interest.

Selective rotation

The fellow can choose between a variety of pre-arranged electives which include radiology, immunocompromised infectious disease, pathology, adult hematology, palliative care, and the pain management service.

Junior Attending Rotation

Fellows will have a minimum of two months as a junior attending during the third year. It is designed to provide an experience that will facilitate the fellow's education in becoming a competent consultant in Pediatric Hematology-oncology. This two months rotation will include inpatient hematology-oncology exposure. The goals of this experience are to develop consultancy and time management skills required to practice Pediatric Hematology-oncology, as well as to allow the experience in supervision and education the junior fellows, residents and medical students. Fellows will be responsible for reviewing the hematology-oncology inpatients and formulate an appropriate investigational and/or management plan. The fellow will be expected to review literatures as needed and to discuss the appropriate diagnostic and treatment approaches with the attending consultant. The fellows will be supervised by the attending consultant but will be encouraged to function as independently as possible.

Subspecialty of interest or Ambulatory Care

The fellow can choose to rotate in any subspecialty of pediatric hematology-oncology after approval by the Program Director. The fellow will have opportunity to extend his/her knowledge in any subspecialty of pediatric hematology-oncology or can do ambulatory care.

Research Rotations

Fellows will be trained as a clinical researcher with in-depth knowledge of statistical and analytical skills in population based, clinical studies or outcomes research. The guiding principle of the clinical research education is to have fellows of the Hematology/Oncology Fellowship Program to perform a clinical research project under the mentorship.

The fellow needs to have a research mentor. The selection of the research mentor will be done by the fellow, but must be approved by director of the Hematology/Oncology Fellowship. Fellows will have to submit a written research proposal according, which will be reviewed by the Committee of the Hematology/Oncology Fellowship.

The fellow will have covered most of the knowledge-based objectives by the end of the third year.

MENTORSHIP

Each new Fellow entering the Program will be asked to select a faculty mentor who will be available to them while they are in the Fellowship Program. Fellows without mentor past 6 months of starting the program will be assigned a mentor by a program director.

The following is a summary of the mentor role, as well as principles outlining the way the mentorship system should operate.

Role of the Mentor

- 1) The mentor's main responsibility will be to assist the fellow in making decisions regarding training issues as well as career choices. The mentor should be supportive to the fellow and take on a role as the fellow's advocate.
- 2) While frequency of meetings between fellow and mentor may vary, the mentor should meet with each mentee a minimum of four times per academic year(30-60minutes).
- 3) The mentor should review rotation evaluations on a regular basis and discuss pertinent weaknesses/strengths with the mentee to improve academic standing. The same applies to performance on in-training exams.
- 4) The mentor is encouraged to review each mentee's rotations/electives annually such that they meet educational/research objectives and ensure that exposure to abroad range of pediatric hematology-oncology is achieved at the completion of the program.

Selection Process

Fellows have the opportunity to choose their own mentor. It is recognized that many fellows entering the fellowship training program will have little knowledge of faculty members initially. However, after a period of six months, fellows should be in a position to choose a mentor and it is expected that by half way through the first academic year that each new fellow will approach a mentor. Fellows will be reminded after 6 months in the program. If they have not selected a mentor by this time, a mentor will be selected for them by program director. If fellows require help approaching a mentor or feel like they need to change mentors, they need to contact the Director of the Training Program.

TEACHING AND LEARNING ACTIVITIES

Trainees will achieve the competencies described in the curriculum through a variety of learning methods. There will be a balance of different modes of learning from formal teaching programs to experiential learning.

- 1) Formal Teaching and Learning Activities:
 - Core specialty topics (70%)
 - Universal topics (10%)
 - Fellow's selected topics (20%)
- 2) Practice-Based Learning (PBL), such as:
 - Morning report case presentations (optional)
 - Morbidity and mortality review
 - Journal club
 - Case presentation
 - Grand round/guest speakers on core specialty topics
 - Joint specialty meeting
- 3) Work-Based Learning (WBL), such as:
 - Daily-round-based learning
 - On-call-based learning
 - Clinic-based learning
 - Workshops and courses
- 4) Self-directed Learning

Formal Learning And Teaching Activities

Core Specialty Topics (70%)

Formal teaching would be utilized during the fellowship program for 1–2 hours per week. Topics might be included interactive lectures, case discussion, quizzes or videos. This ensures that Fellows become well versed in the important pediatric hematology-oncology topics/clinical problems.

Leukemia
Objectives
Discuss the epidemiology of childhood leukemia and myelodysplastic syndrome (MDS), the peak age at which they occur, etiology and genetic associations.
Explain constitutional and genetic conditions that predispose to the development of leukemia.
Recognize the various clinical presentations of children with leukemia and myelodysplastic syndrome (MDS).
Discuss the appropriate diagnostic investigations in children with leukemia and myelodysplastic syndrome (MDS).
Recognize the prognostic factors in childhood and infant leukemia and their implications on risk stratification.
Discuss the current treatment trial protocols for childhood and infant leukemia as well as for refractory and relapsed leukemia.
Plan the monitoring of the response to treatment including minimal residual disease (MRD) with a recognition of its limitations.
Discuss the role and indications for bone marrow transplant in infant and childhood leukemia.
Explain the current role of radiotherapy in leukemia treatment and the complications associated with it.
Recognize the role of immunotherapy for leukemia.

TEACHING AND LEARNING ACTIVITIES

Discuss the prognostic factors associated with relapsed leukemia.
Recognize the clinical, laboratory and prognostic features of chronic myeloid leukemia, juvenile myelomonocytic leukemia and other rarer forms of childhood leukemia.
Discuss the clinical presentation, laboratory features and prognosis of myelodysplasias.
Discuss the role of bone marrow transplant in the treatment of myelodysplasia and chronic myeloid leukemia in childhood.
Discuss the management of complications related to leukemia treatment including tumor lysis syndrome, coagulopathy, thrombosis and infections.
Plan the follow-up strategies for leukemia survivors, identify late effects of therapy and counsel accordingly

Hodgkin's Lymphoma
Objectives
Discuss the epidemiologic, clinical, and laboratory features of Hodgkin's lymphoma in children
Discuss the histological subtypes of Hodgkin's lymphoma, their incidence in children and the effect of this on their prognosis
Recognize staging system for Hodgkin's lymphoma
Discuss the current treatment strategies for Hodgkin's lymphoma including the role of radiotherapy
Recognize how fluorodeoxyglucose positron emission tomography (FDG-PET) may be important in the assessment of response.
Recognize the complications and late effects of chemotherapy and radiotherapy in the treatment of Hodgkin's lymphoma including those pertaining to cardiac and lung function, increased risk of breast cancer in those receiving mediastinal radiation at a young age and risks of subfertility

Non-Hodgkin's Lymphoma (NHL)
Objectives
Discuss the epidemiologic, clinical, and laboratory features of NHL in children.
Recognize the cytogenetic and molecular genetic abnormalities associated with NHL.
Recognize the histological subtypes of NHL in children and adolescents.
Recognize that diagnosis of nonHodgkin's lymphoma can be made based on pleural effusion or ascitic fluid alone.
Explain how to use the degree of bone marrow involvement to distinguish between stage IV nonHodgkin's lymphoma and acute leukemia.
Discuss the prognostic features and prognosis of nonHodgkin's lymphoma according to stage and histology and immunophenotype.
Recognize the current treatment strategies according to immunophenotype and pathological subtype.
Discuss the management of acute presentations of NHL including SVC obstruction, airway compression, spinal cord compression, and tumour lysis syndrome.

Hematopoietic Stem Cell Transplantation (HSCT)
Objectives
Recognize the role of high-dose chemotherapy with autologous stem cell rescue in the management of malignant disorders in children.
Discuss the indications for allogeneic hematopoietic stem cell transplantation (HCST) in children.
Discuss the principles of HLA (human leucocyte antigen) typing and donor selection, including the different potential sources of HCST, and HCST collection and cryopreservation.
Discuss the complications of HCST and their management, including graft-versus-host disease, veno-occlusive disease and graft failure
Recognize the commonly used chemotherapy conditioning regimens used in HCST in malignant and non-malignant disorders in children and their short and long term side effects
Discuss the role of total body irradiation (TBI) in HCST, including its administration and short and long term side effects
Discuss the principles of immunosuppression, and the types of immunosuppressive agents used in HSCT

TEACHING AND LEARNING ACTIVITIES

Recognize the consequences of myelosuppression and immunosuppression post-HCST, including the need for infection prophylaxis.
Recognize the late effects of HCST in children, including those related to growth, fertility and second malignancy.

Nonmalignant Hematology
Objectives
Discuss the causes of anemia in children and the appropriate laboratory work-up.
Plan the investigation of thrombosis and bleeding disorders in children and infants.
Discuss the management principles for a child with hemophilia or other bleeding disorders such as Von Willbrands disease.
Recognize the importance of prompt treatment of bleeding in a hemophiliac patient and the need for close monitoring of head injuries.
Discuss the main risk factors for thrombosis in a child.
Recognize therapeutic options for management of thrombosis and risks associated with anticoagulants
Discuss the clinical indications for blood product support including the choice of appropriate blood products.
Recognize the hazards of blood transfusion including transfusion-transmitted infection and transfusion reactions
Recognize the clinical presentation of hemolysis and initiate the laboratory evaluation.
Discuss the differential diagnosis and the initial management of cytopenia including idiopathic thrombocytopenic purpura (ITP).
Recognize the clinical presentation of sickle cell disease, and the necessity of prompt intervention with sickle bone crisis, splenic sequestration and sickle chest syndrome.
Recognize the CNS complications of sickle cell disease.
Recognize the clinical presentation and laboratory features of thalassemia.
Discuss the use of transfusion programs and the principles of iron chelation therapy in hemoglobinopathies.

Renal Tumors
Objectives
Recognize the clinical presentation of a renal tumor and the differential diagnosis of renal mass.
Recognize the pathological subtypes of renal tumors including Wilm's tumor
Recognize the incidence of Wilm's tumor
Recognize the congenital anomalies associated with Wilm's tumor and the current strategies for screening
Discuss the prognosis of Wilm's tumor and its relationship with the histology, cytogenetic and molecular and recognize the prognostic significance of histology after chemotherapy.
Discuss how to stage Wilm's tumor pre- and post-surgery
Discuss the principles of treatment for all stages of Wilm's tumor according to the current clinical trial and the management of a patient with recurrent tumor.
Recognize the complications of Wilm's tumor and its treatment and late effects of treatment
Discuss the stages and treatment of other renal tumors include rhabdoid tumor, clear cell sarcoma and renal cell carcinoma.

Neuroblastoma (NBL)
Objectives
Recognize clinical presentation and laboratory findings of neuroblastoma.
Plan the management of clinical problems associated with neuroblastoma, including hypertension, spinal cord compression, Horner's Syndrome and abdominal mass.
Recognize the association of opsoclonus myoclonus with neuroblastoma (NBL).
Plan the use of appropriate radiological investigations to diagnosis and stage neuroblastoma .
Discuss the International Staging System (INSS).
Discuss the prognostic factors and prognosis according to age and stage.
Recognize the genetic variables which have a significance for the prognosis, such as MYCN amplification
Discuss the current treatment strategies.

TEACHING AND LEARNING ACTIVITIES

Recognize the principles of managing relapsed neuroblastoma NBL.

Hepatic Tumors

Objectives

Discuss the congenital conditions which associated with an increased risk of hepatoblastoma and the association of hepatocellular carcinoma with inborn errors of metabolism that cause cirrhosis.

Discuss tumor markers in primary liver tumors

Recognize the pre-treatment staging system

Discuss the current treatment strategies

Discuss the role of liver transplantation in the management of hepatic tumors

Recognize the prognosis of hepatoblastoma and hepatocellular carcinoma and the factors that determine it

Retinoblastoma

Objectives

Recognize the inheritance pattern of bilateral retinoblastoma

Discuss the incidence, genetic, and clinical features of unilateral and bilateral retinoblastoma

Plan imaging modalities appropriately to determine the extent and metastatic spread of retinoblastoma and Discuss the staging of retinoblastoma.

Recognize that the central nervous system and bone marrow are the most common metastatic sites of retinoblastoma

Discuss the role of surgery, irradiation, chemotherapy and photocoagulation in the treatment of retinoblastoma

Plan screening and follow-up for children who are siblings of a patient with retinoblastoma

Recognize the prognostic features and prognosis of retinoblastoma according to stage and histology

Discuss the complications and late effects of retinoblastoma including the risk of the development of secondary malignancy in unilateral or bilateral retinoblastoma

Bone tumors

Objectives

Discuss the incidence, predisposing factors and genetic predispositions associated with osteosarcoma and Ewing sarcoma

Discuss the different pathologic subtypes of osteosarcoma and their effect on prognosis

Recognize the different molecular subtypes of the Ewings family of tumors and their effect on prognosis

Recognize the clinical presentations of osteosarcoma and Ewings tumors and potential metastatic sites

Recognize the stages system

Discuss the relevant prognostic indicators in different bone tumors, such as site, tumor volume and histopathological response to treatment

Recognize the current treatment strategies

Recognize the rehabilitation requirements for limb sparing, joint sparing surgery and massive resections including amputation

Recognize the late effects of bone tumor multi-modality management, including second malignancy predisposition

Soft Tissue Sarcoma

Objectives

Recognize the cytogenetic and molecular genetic abnormalities associated with soft tissue sarcomas

Discuss the histological subtypes of soft tissue sarcomas relative to prognosis and patterns of presentation and spread

Recognize the clinical presentation of rhabdomyosarcoma affecting the head and neck (parameningeal versus non-parameningeal), nasopharyngeal, orbital, pelvic areas and extremities

Discuss the stages of soft tissue sarcomas appropriately

Recognize the role of surgery, chemotherapy and radiotherapy in the treatment of soft tissue sarcomas and current treatment strategies

TEACHING AND LEARNING ACTIVITIES

Recognize the prognosis of rhabdomyosarcoma according to a stage and histology and anatomic site of the primary tumour and the prognostic features of soft tissue sarcomas other than rhabdomyosarcomas

Central Nervous System Tumors

Objectives

- Discuss the incidence of central nervous system (CNS) tumors
- Recognize the cytogenetic and molecular genetic abnormalities associated with CNS tumors and recognize the association between brain tumors and inherited syndromes
- Recognize the neuropathological subtypes and grading of brain tumors and their relation to tumor site, pattern of spread and prognosis
- Discuss the different clinical presentations of CNS tumors according to the age, anatomical positional and presence of raised intracranial pressure
- Discuss and interpret neuroimages
- Recognize the importance of staging in treatment and prognosis of CNS tumors (including the use of CSF cytology and serum and CSF tumor markers)
- Discuss the role of surgery, irradiation and chemotherapy in the treatment of CNS tumors
- Discuss the chemotherapy agents and delivery techniques in relation to the blood brain barrier
- Discuss the radiotherapy planning techniques including, planning volumes & delivery techniques
- Recognize the complications and late effects of brain tumors arising from tumor, surgery, radiotherapy and chemotherapy.
- Discuss the potential neurological, endocrinological, cognitive, behavioral and social sequelae of CNS tumors and their treatment
- Recognize the secondary malignancies associated with treatment of CNS tumors.
- Plan an multi-disciplinary team approach to rehabilitation that includes; physical therapy, speech and language, special senses (vision and hearing impairment), education (knowledge of special educational need provision), dietetics (management of obesity and failure to thrive), endocrinology (assessment and replacement) and psychosocial care

Infections in Immunocompromised Patients

Objectives

- Discuss bacterial prophylaxis
- Discuss fungal prophylaxis
- Discuss viral prophylaxis
- Recognize treatment of infection in immunocompromised patients

Supportive care

Objectives

- Discuss the issues related to:
 - Nutrition
 - Dental care and oral hygiene
 - Central venous access
 - Pain control
 - Terminal care
 - Anti-emetics

Chemotherapy

Objectives

- Discuss the mechanism of action and indications
- Recognize common toxicities and their management

Universal Topics (10%)

Universal e-learning topics: The Saudi Commission for Health Specialties intends to develop an e-learning platform to deliver high value, interdisciplinary topics of the utmost importance to the trainee to ensure that they all receive high quality teaching and develop essential core knowledge. These topics are common to all specialties and are delivered in a modular fashion. At the end of each learning unit, there is an on-line formative assessment. Upon completion of all topics, trainees undertake a combined summative assessment in the form of context-rich multiple-choice questions (MCQ) in which they must attain minimum competency.

The following are mandatory modules to be completed.

Module 1: Introduction

- 1) Safe drug prescription
- 2) Hospital-acquired infections
- 3) Sepsis, systemic inflammatory response syndrome (SIRS), and disseminated intravascular coagulation (DIC)
- 4) Antibiotic stewardship
- 5) Blood transfusion

Safe drug prescription: Upon completion of the learning unit, you should be able to perform the following:

- 1) Recognize the importance of safe drug prescription in healthcare
- 2) Describe various adverse drug reactions with examples of the commonly prescribed drugs that can cause them
- 3) Apply the principles of drug–drug interactions, drug–disease interactions, and drug–food interactions in common situations
- 4) Apply the principles of prescribing drugs in special situations such as in the case of renal failure or liver failure
- 5) Apply the principles of prescribing drugs for elderly, pediatric, pregnant, and lactating patient groups
- 6) Promote evidence-based, cost-effective prescription
- 7) Discuss the ethical and legal frameworks governing safe-drug prescription in Saudi Arabia

Hospital-acquired infections (HAI): Upon completion of the learning unit, you should be able to perform the following:

- Discuss the epidemiology of HAI with special reference to Saudi Arabia
- Recognize HAI as one of the major emerging threats in healthcare
- Identify the common sources of and circumstances surrounding HAI
- Describe the risk factors for common HAIs such as ventilator-associated pneumonia, methicillin-resistant staphylococcus aureus, central line-associated bloodstream infections, and vancomycin-resistant enterococcus
- Identify the role of healthcare workers in the prevention of HAI
- Determine appropriate pharmacological (e.g., selected antibiotics) and nonpharmacological (e.g., removal of indwelling catheters) measures in the treatment of HAI
- Propose a plan to prevent HAI in the workplace

Sepsis, SIRS, DIC: Upon completion of the learning unit, you should be able to perform the following:

- Explain the pathogenesis of sepsis, SIRS, and DIC
- Identify patient-related and nonpatient-related predisposing factors of sepsis, SIRS, and DIC

- Recognize patients at risk of developing sepsis, SIRS, and DIC
- Describe the complications of sepsis, SIRS, and DIC
- Apply the principles of management of patients with sepsis, SIRS, and DIC
- Describe the prognosis of sepsis, SIRS, and DIC

Antibiotic stewardship: Upon completion of the learning unit, you should be able to perform the following:

- Recognize antibiotic resistance as one of the most pressing global public health threats
- Describe the mechanism of antibiotic resistance
- Determine appropriate and inappropriate use of antibiotics
- Develop a plan for safe and proper antibiotic use that includes the correct indications, duration, types, and discontinuation
- Be aware of local guidelines for the prevention of antibiotic resistance

Blood transfusion: Upon completion of the learning unit, you should be able to perform the following:

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

Module 2: Cancer

- 1) Principles of cancer management
- 2) Side effects of chemotherapy and radiation therapy
- 3) Oncological emergencies
- 4) Cancer prevention
- 5) Surveillance and follow-up of cancer patients

Principles of cancer management: Upon completion of the learning unit, you should be able to perform the following:

- Discuss the basic principles of cancer staging and grading
- Enumerate the basic principles (e.g., indications, mechanisms, and types) of
 - Cancer surgery
 - Chemotherapy
 - Radiotherapy
 - Immunotherapy
 - Hormone therapy

Side effects of chemotherapy and radiation therapy: Upon completion of the learning unit, you should be able to perform the following:

- Describe the important (e.g., frequent and life- and organ-threatening) side effects of common chemotherapy drugs
- Explain the principles of monitoring side effects in patients undergoing chemotherapy
- Describe the measures (pharmacological and nonpharmacological) available to ameliorate the side effects of commonly prescribed chemotherapy drugs

- Describe the important (e.g., common and life-threatening) side effects of radiation therapy
- Describe the measures (pharmacological and nonpharmacological) available to ameliorate the side effects of radiotherapy

Oncological emergencies: Upon completion of the learning unit, you should be able to perform the following:

- Enumerate the important oncological emergencies encountered in both hospital and ambulatory settings
- Discuss the pathogeneses of important oncological emergencies
- Recognize oncological emergencies
- Institute immediate measures when treating patients with oncological emergencies
- Use an anticipatory manner to counsel patients in the recognition and prevention of oncological emergencies

Cancer prevention: Upon completion of the learning unit, you should be able to perform the following:

- Conclude that many major cancers are preventable
- Identify smoking prevention and lifestyle modifications as major preventable measures
- Recognize preventable cancers
- Discuss the major cancer prevention strategies at both individual and national levels
- Use a proactive manner to counsel patients and families regarding cancer prevention measures including screening

Surveillance and follow-up of cancer patients: Upon completion of the learning unit, you should be able to perform the following:

- Describe the principles of surveillance and follow-up for patients with cancer
- Enumerate the surveillance and follow-up plans for common forms of cancer
- Describe the role of primary care physicians, family physicians, and others in the surveillance and follow-up of cancer patients
- Liaise with oncologists to provide surveillance and follow-up for patients with cancer

Module 3: Acute care

- 1) Preoperative assessment
- 2) Postoperative care
- 3) Acute pain management
- 4) Chronic pain management
- 5) Management of fluid in hospitalized patients
- 6) Management of acid-base and electrolyte imbalances

Preoperative assessment: Upon completion of the learning unit, you should be able to perform the following:

- Describe the basic principles of preoperative assessment
- Perform preoperative assessment for uncomplicated patients, with a special emphasis on
 - General health assessment
 - Cardiorespiratory assessment
 - Medications and medical device assessment
 - Drug allergies
 - Pain relief requirements
- Categorize patients according to risk

Postoperative care: Upon completion of the learning unit, you should be able to perform the following:

- Devise a postoperative care plan that includes monitoring vital signs, pain management, fluid management, medication, and laboratory investigations
- Handover patients properly to appropriate facilities
- Describe the process of postoperative recovery
- Identify common postoperative complications
- Monitor patients for possible postoperative complications
- Institute immediate management of postoperative complications

Acute pain management: Upon completion of the learning unit, you should be able to perform the following:

- Review the physiological basis of pain perception
- Proactively identify patients who might be in acute pain proactively
- Assess patients experiencing acute pain
- Apply the various pharmacological and nonpharmacological modalities available for acute pain management
- Provide adequate pain relief for uncomplicated patients with acute pain
- Identify and refer patients experiencing acute pain who may benefit from specialized pain services

Chronic pain management: Upon completion of the learning unit, you should be able to perform the following:

- Review the biopsychosocial and physiological bases of chronic pain perception
- Discuss the various pharmacological and nonpharmacological options available for chronic pain management
- Provide adequate pain relief for uncomplicated patients with chronic pain
- Identify and refer patients experiencing chronic pain who may benefit from specialized pain services

Management of fluid in hospitalized patients: Upon completion of the learning unit, you should be able to perform the following:

- Review the physiological basis of water balance in the body
- Assess patients' hydration status
- Recognize patients who are dehydrated or overhydrated
- Order fluid therapy (oral and intravenous) for hospitalized patients
- Monitor fluid status and response to therapy via history, physical examination, and selected laboratory investigations.

Management of acid-base and electrolyte imbalances: Upon completion of the learning unit, you should be able to perform the following:

- Review the physiological basis of electrolyte and acid-base balance in the body
- Identify diseases and conditions that are associated with or likely to cause 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 patient response to therapy via history, physical examination, and selected laboratory investigations

Module 4: Ethics and healthcare

- 1) Occupational hazards for healthcare workers (HCWs)
- 2) Evidence-based approach to smoking cessation
- 3) Patient advocacy
- 4) Ethical issues: transplantation, organ harvesting, and withdrawal of care
- 5) Ethical issues: treatment refusal and patient autonomy
- 6) The role of doctors in death and dying

Occupational hazards for healthcare workers (HCWs): Upon completion of the learning unit, you should be able to perform the following:

- Recognize common sources of and risk factors for occupational hazards in HCWs
- Describe common occupational hazards in the workplace
- Develop familiarity with the legal and regulatory frameworks governing occupational hazards in HCWs
- Develop a proactive attitude to promoting workplace safety
- Protect yourself and colleagues against potential occupational hazards in the workplace

Evidence-based approach to smoking cessation: Upon completion of the learning unit, you should be able to perform the following:

- Describe the epidemiology of smoking and tobacco use in Saudi Arabia
- Review the effects of smoking on smokers and their family members
- Use pharmacological and nonpharmacological measures to treat tobacco use and dependence effectively
- Effectively use pharmacological and nonpharmacological measures to treat tobacco use and dependence in special population groups, such as pregnant women, patients with psychiatric disorders, and adolescents

Patient advocacy: Upon completion of the learning unit, you should be able to perform the following:

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

Ethical issues: transplantation, organ harvesting, and withdrawal of care: Upon completion of the learning unit, you should be able to perform the following:

- Apply the 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 their families in the light of applicable ethical and religious principles
- Guide patients and their families in making informed decisions

Ethical issues: treatment refusal and patient autonomy: Upon completion of the learning unit, you should be able to perform the following:

- Predict situations in which patients or their family members are likely to refuse prescribed treatment

TEACHING AND LEARNING ACTIVITIES

- Describe the concept of the “rational adult” 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 or family members who refuse medical treatment in the best interest of patients

Role of doctors in death and dying: Upon completion of the learning unit, you should be able to perform the following:

- Recognize the important role a doctor can play during the dying process
- Provide emotional and physical care to dying patients and their families
- Provide appropriate pain management in dying patients
- Identify suitable patients and refer them to palliative care service

Fellow Selected Topics (20%)

- 1) Trainees will be given choice to develop a list of topics on their own.
- 2) They can choose any topics relevant to their needs.
- 3) All these topics must be planned and cannot be random.
- 4) All the topics need to be approved by the local education committee.
- 5) Institution might work with trainees to determine the topics as well.

Practice-Based Learning

Practice-Based Learning	Objective	CanMEDS Competencies
Morning Report (optional)	<ul style="list-style-type: none"> ▪ Educate all attending staff, monitoring pediatric hematology-oncology patient care, and review management decisions and their outcomes. ▪ Develop competence in a short presentation of all admitted pediatric hematology-oncology patients in a scientific and informative fashion. ▪ Generate an appropriate differential diagnosis and proper management plan. 	Leader Medical Expert Professional Scholar
Morbidity and Mortality Report	<ul style="list-style-type: none"> ▪ Identify areas of improvement for clinicians involved in case management. ▪ Prevent errors that lead to complications. ▪ Modify behavior and judgment based on previous experiences. ▪ Identify system issues that may affect the pediatric hematology-oncology patient care such as outdated policies and changes in patient identification procedures, that may affect patient care 	Professional Leader Medical Experts
Grand Rounds/ Guest Speaker Lectures.	<ul style="list-style-type: none"> ▪ Increase physician’s medical knowledge and skills, and ultimately, improve patient care. ▪ Understand and apply current practice guidelines in the field of pediatric hematology-oncology. ▪ Describe the latest advances in the field of pediatric hematology-oncology and research. ▪ Identify and explain areas of controversy in the field of pediatric hematology-oncology. 	Medical Expert Professional
Case Presentation	<ul style="list-style-type: none"> ▪ Formulate a list of all problems identified in the history and 	Medical Expert

TEACHING AND LEARNING ACTIVITIES

	<p>physical examination.</p> <ul style="list-style-type: none"> ▪ Develop a proper differential diagnosis for each problem. ▪ Formulate a diagnosis/treatment plan for each problem. ▪ Present a follow-up of the patient's case, in a focused, problem-based manner that includes pertinent new findings and diagnosis and treatment plans. ▪ Demonstrate a commitment to improving case presentation skills by regularly seeking feedback on presentations. ▪ Accurately and objectively record and present data. 	Scholar
Journal Clubs, Critical Appraisal and Evidence Based Medicine	<ul style="list-style-type: none"> ▪ Promote continuing professional development. ▪ Stay up -to-date with the literature. ▪ Disseminate information on and develop arguments concerning . ▪ Ensure that professional practice is evidence based. ▪ Learn and practice critical appraisal skills. ▪ Provide an enjoyable educational and social occasion. 	Medical Expert Scholar Health Advocate
Joint Specialty Meetings.	<ul style="list-style-type: none"> ▪ Provide the knowledge, technical skills and experience necessary for Paediatric Hematology-Oncology Fellows to interpret and correlate clinical finding and laboratory data such as radiological imaging with pathological changes. ▪ Promote effective communication and sharing of expertise with peers and colleagues. ▪ Promote the development of investigative skills to better understand pathologic processes as they apply to both individual patients and the general patient population. ▪ Promote the acquisition of knowledge, provide experience in laboratory direction and management, and encourage Fellows to assume a leadership role in the education of other physicians and allied health professionals. 	Medical Expert Communicator Collaborator Leader

Work-Based Learning

Work Based Learning	Objectives	CanMEDs
Daily Round Based Learning	<ul style="list-style-type: none"> ▪ Present a focused history and physical examination finding to the rounding team. ▪ Document historical and physical examination findings according to accepted formats including a complete written database and problem list. ▪ Develop a patient management plan in consultation with others 	Medical Expert Communicator Health Advocate Professional
On-Call Duty Based Learning	<ul style="list-style-type: none"> ▪ Elicit a comprehensive history and perform a complete physical examination on admission, clearly write the pediatric hematology-oncology patient's assessment and differential diagnosis of medical problems, and initiate the plan of management. ▪ Discuss the plan of management, including investigations and the treatment plan with the seniors. ▪ Communicate the plan to the nurse charged with patient's care. ▪ Perform the basic procedures necessary for diagnosis and management. ▪ Attend to consultations within and outside the department, including emergency consultations and other specialties. 	Medical Expert Scholar Health Advocate Professional
Clinic Based Learning	<ul style="list-style-type: none"> ▪ Elicit a focused history and physical examination under the supervision of the consultant 	Medical Expert Communicator

TEACHING AND LEARNING ACTIVITIES

	<ul style="list-style-type: none"> ▪ Present briefly the clinical finding to the attending consultant ▪ Discuss the differential diagnosis and the management plan with the attending consultant ▪ Discuss with the consultant the need for specialized procedures. ▪ Write the patient's assessment and differential diagnosis and the plan of management. ▪ Supervise the resident's notes, orders, and management, interpret and discuss the laboratory results with residents. 	Health Advocate
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Simulation and Workshops

(The implementation of such projects will be based on logistic feasibility and equal opportunity for all Fellows and training centers across the Kingdom)

Simulation Projects:

- Bone Marrow Aspiration/Biopsy
- Lumbar Puncture/Intrathecal Chemotherapy

Self-Directed Learning

Item	Objectives	CanMEDs
Self-Directed Learning	<ul style="list-style-type: none"> ▪ Maintenance of a personal portfolio (self-assessment, reflective learning, personal development plan). ▪ Achieving personal learning goals beyond the essential, core curriculum. ▪ Reading, including web-based material. ▪ Reading journals. ▪ Auditing and conducting research projects. ▪ Attending national and international conferences. 	Professional Medical Expert Scholar

CLINICAL AND RESEARCH TRAINING ROTATIONS/COMPETENCIES

Throughout training the trainee is expected to assume responsibility for self- assessment and reflection, continuing self-directed learning and maintenance of competence and to utilize all reasonable opportunities for gaining competencies. This section identifies the types of situations in which a trainee will learn.

Inpatient Rotation

Goal

To develop the skills necessary to effectively manage pediatric hematology/oncology patients who are admitted to hospital.

Objectives

The Pediatric Hematology-Oncology trainee will rotate through oncology inpatient wards on at least six occasions during fellowship. Upon completion of the rotations, the fellow is expected to be a competent in the following areas.

MEDICAL EXPERT

- Demonstrate appropriate competency in managing a spectrum of patients under Pediatric Hematology-Oncology care including patients with newly diagnosed malignancies, those receiving planned chemotherapy, those who are acutely ill and those receiving palliative care.
- Apply an effective diagnostic process in a new patient admitted for signs and symptoms of a possible malignant condition.
- Demonstrate the necessary skills required to conduct informative and sensitive disclosure of a newly diagnosed patient and family with particular reference to a diagnosis of malignancies.
- Demonstrate medical expertise in the prevention, identification and management of Pediatric Hematology-Oncology emergencies such as hyperleukocytosis, mediastinal masses, spinal cord compression, tumor lysis syndrome, and septic shock.
- Demonstrate an appropriate threshold for requesting the services of non-Hematology-Oncology consultation teams.
- Discuss the complications of chemotherapy treatment.
- Demonstrate an understanding of the issues children and families face in coming to terms with a diagnosis of a malignant disease and the coping mechanisms and supports available.
- Demonstrate medical expertise in supportive care of patient under care of Pediatric Hematology-Oncology, with specific reference to antiemetic therapy, mucositis, nutrition, constipation, pain management and end-of-life care.

COMMUNICATOR

- Develop relationships with patients and family that are characterized by trust, respect and confidentiality.
- Demonstrate the ability to gather information about a disease and also about the patient and families concerns and expectations about the disease.
- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision- making.

COLLABORATOR

- Describe the roles and responsibilities of the individual members of the multidisciplinary inpatient team that when collectively coordinated, facilitates optimum patient management.
- Consult and collaborate with primary care physicians and other health care professionals.
- Coordinate diagnostic and treatment-related procedures with relevant personnel.

LEADER

Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.

- Demonstrate an understanding of the cost-effective use of Pediatric Hematology-Oncology resources, including use of laboratory and diagnostic imaging services.
- Utilize information technology to optimize patient care.

HEALTH CARE ADVOCATE

- Demonstrate in-depth knowledge of the health care needs and the quality of life issues of individuals with hematologic/oncologic diseases.
- Demonstrate and promote active involvement of the patient and family in decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psycho-social support for the patient and family.

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of Pediatric Hematology-Oncology using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of pediatric residents and elective students.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.
- Recognize, analyze and attempt to resolve ethical issues in clinical practice, including but not limited to end of life care, consent, truth-telling, confidentiality, conflict of interest and research ethics.

Hematology Consults Rotation

Goal

To develop the skills necessary to assess, investigate, diagnose and manage patient with hematological disorders.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrate the ability to formulate a differential diagnosis in a suspected patient with hematological disorder based on the symptoms, signs and available investigation results and thereby plan and coordinate the necessary confirmatory investigations.
- Demonstrate ability to utilize the current treatment approaches to patients with a hematological disorder.
- Demonstrate the ability to list the indications of blood and blood product transfusion, request and administer the appropriate transfusion, anticipate the potential complications and management accordingly.
- Demonstrate the skills required to manage acutely and/or seriously ill pediatric hematology patients in conjunction with other multidisciplinary teams for example, PICU and surgery.

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.
- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision- making
- Promote effective communication, within the multidisciplinary team, that is respectful of each other's roles while ensuring optimum management for the patient.
- Provide effective communication to the referring physician.

COLLABORATOR

- Describe the roles and responsibilities of other professionals within the health care team.
- Effectively coordinate diagnostic and treatment related procedures with relevant personnel.

LEADER

- Utilize information technology to optimize patient care.
- Demonstrate an ability to effectively triage new consultations and/or referrals.
- Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of Pediatric Hematology-Oncology resources, including use of laboratory.

HEALTHCARE ADVOCATE

- Demonstrate an appreciation of the health care needs of patients with hematological disorders.
- Encourage the promotion of active involvement of the patient and family in medical management decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psychosocial support exists for the patient and family.

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of pediatric hematology using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of pediatric residents and elective students.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.

Bone Marrow Transplant Rotation

Goal

To develop the skills necessary to provide a comprehensive hematopoietic stem cell transplantation service for children.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrate a basic knowledge of the cellular and molecular biology of hematopoiesis and hematopoietic stem cell transplantation.
- Discuss the indications for autologous, allogeneic (full and low intensity), matched unrelated, mismatched related, and tandem transplantation.
- Describe the purpose of the conditioning regimens used in hematopoietic stem cell transplantation.
- Demonstrate a basic understanding of bone marrow and peripheral blood precursor cell procurement methods as well as cryopreservation.
- Demonstrate an understanding of the principles and pathogenesis of graft versus host disease (GVHD), and the treatment thereof.
- Demonstrate an understanding of the different approaches of ‘pre-treating’ stem cells, for example t-cell depletion prior to transplantation.
- Demonstrate the ability to recognize, confirm and manage the potential complications of HSCT including the following: marrow engraftment failure, graft-versus-host disease, veno-occlusive disease.
- Demonstrate an understanding of the preventative and supportive care measures required in patients receiving HSCT including Infections and neutropenia, mucositis, pain and nutritional support.

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.
- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision-making.
- Promote effective communication, within the multidisciplinary team, that is respectful of each other’s roles while ensuring optimum management for the patient.
- Provide effective communication to the referring physician.

COLLABORATOR

- Describe the roles and responsibilities of other professionals within the health care team.
- Effectively collaborate with relevant subspecialty teams in the management of the transplant patient – for example, PICU, infectious diseases, nephrology.

LEADER

- Utilize information technology to optimize patient care.
- Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of health care resources, specifically relating to hematopoietic stem cell transplantation.

HEALTHCARE ADVOCATE

- Demonstrate an appreciation of the health care needs of patients with haematopoietic stem cell transplantation.
- Encourage the promotion of active involvement of the patient and family in medical management decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psychosocial support exists for the patient and family

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of pediatric hematopoietic stem cell transplantation using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of pediatric residents and elective students.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.

PROCEDURES

- To perform a bone marrow harvest.

Leukemia/Lymphoma Clinic Rotation

Goal

To develop the out-patient skills necessary to assess, investigate, diagnose, manage and follow children with solid tumors with leukemia, lymphoma, histiocytosis and hemophagocytic lymphohistiocytosis.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrate the necessary skills to effectively manage children with leukemia/lymphoma/histiocytic related disorders in an outpatient setting.
- Demonstrate the necessary skills required to conduct a factual, informative and sensitive disclosure of a recently diagnosed patient with leukemia/lymphoma/histiocytic related disorder.
- Demonstrate an awareness of the mechanism of action of the common chemotherapy agents utilized in the treatment of pediatric leukemia/lymphoma/histiocytic related disorders and the potential acute and long-term complications of treatment.
- Demonstrate the ability to appropriately request investigations and following-up the results, discuss the management with the primary team, and communicate this to the patient and their family.
- Demonstrate the ability to ensure a patient follows the treatment protocol appropriately and in case of protocol deviation, discuss with the primary physician.
- Demonstrate the ability to monitor and manage patients who have completed their active treatment.
- Demonstrate the skill required to effectively triage new referrals/consultations where applicable

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.
- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision- making
- Develop the ability to document the details of the outpatient visit accurately.

COLLABORATOR

- Identify the role, expertise and limitations of the individual members of the outpatient team that when collectively coordinated, facilitates optimum patient management.
- Effectively collaborate with the patient's primary/referral physician and other relevant health-care professionals.

LEADER

- Utilize information technology to optimize patient care.
- Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of health care resources.
- Develop the skill to work in a time-efficient, and safe, manner in an outpatient setting.
- Demonstrate punctuality by commencing the clinic in a timely fashion.

HEALTH CARE ADVOCATE

- Demonstrate an appreciation of the health care needs of patients with malignant hematological disorder.
- Encourage the promotion of active involvement of the patient and family in medical management decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psychosocial support exists for the patient and family

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of pediatric leukemia/lymphoma/histiocytic related disorder using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of pediatric residents and elective students.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.

Solid Tumor Clinic Rotation

Goal

To develop the out-patient skills necessary to assess, investigate, diagnose, manage and follow children with solid tumors.

Objective

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrate the necessary skills to effectively manage children with solid tumor malignancies in an outpatient setting.
- Demonstrate the necessary skills required to conduct a factual, informative and sensitive disclosure of a recently diagnosed patient with solid tumor malignancies.
- Demonstrate an awareness of the mechanism of action of the common chemotherapy agents utilized in the treatment of pediatric solid tumor malignancies and the potential acute and long-term complications of treatment.
- Demonstrate the ability to appropriately request investigations, gather results in a timely fashion, discuss the management with the primary team, and communicate this to the patient and their family.
- Demonstrate the skill-set required to anticipate potential future tumor or treatment related events, inform the patient and family to the appropriate extent, plan/schedule the necessary monitoring and investigations.
- Demonstrate the ability to ensure a patient follows the treatment protocol appropriately and in case of protocol deviation, discuss with the primary physician.
- Demonstrate the ability to monitor and manage patients who have completed their active treatment.
- Demonstrate the skill required to effectively triage new referrals/consultations where applicable

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.
- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision-making
- Develop the ability to document the details of the outpatient visit accurately.
- Effectively promote communication between the patient and families and the patient's primary team as well as the relevant health-care professionals both within and outside the hospital.

COLLABORATOR

- Identify the role, expertise and limitations of the individual members of the outpatient team that when collectively coordinated, facilitates optimum patient management.
- Effectively collaborate with the patient's primary/referral physician and other relevant health-care professionals.

LEADER

- Utilize information technology to optimize patient care.
- Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of health care resources.
- Develop the skill to work in a time-efficient, and safe, manner in an outpatient setting.
- Demonstrate punctuality by commencing the clinic in a timely fashion.

HEALTHCARE ADVOCATE

- Demonstrate an appreciation of the health care needs of patients with solid tumor.
- Encourage the promotion of active involvement of the patient and family in medical management decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psychosocial support exists for the patient and family.

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of pediatric solid tumor using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of pediatric residents and elective students.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.

Neuro-Oncology and Late-Effects Rotation

Goal

To develop the necessary skills to manage neurooncology out-patients and the long-term follow up of patients who received anti-cancer treatment during childhood or adolescence.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

Neuro-Oncology

- Demonstrate the ability to manage a pediatric neurooncology patient in an out-patient setting.
- Demonstrate an awareness of acute and long-term side effects of chemotherapy, radiotherapy and neurosurgery used in treating pediatric neurooncology patients.
- Demonstrate an awareness of the role of diagnostic imaging in managing pediatric neurooncology patients while receiving active treatment and following completion of treatment.

Late Effects

- Demonstrate the necessary skills required to anticipate, monitor and manage, within a multidisciplinary framework, the acquired long-term complications of anti-cancer treatment in pediatric oncology patients who received such treatment during childhood or adolescence.
- Demonstrate the ability to promote patient education and patient self-responsibility with respect to health related lifestyle and behavior.

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.
- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision-making.
- Develop the ability to document the details of the outpatient visit accurately.
- Effectively promote communication between the patient and families and the patient's primary team as well as the relevant health-care professionals both within and outside the hospital.

COLLABORATOR

- Identify the role, expertise and limitations of the individual members of the outpatient team that when collectively coordinated, facilitates optimum patient management.
- Effectively collaborate with the patient's primary/referral physician and other relevant health-care professionals.

Leader

- Utilize information technology to optimize patient care.
- Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of health care resources.
- Develop the skill to work in a time-efficient, and safe, manner in an outpatient setting.
- Demonstrate punctuality by commencing the clinic in a timely fashion

HEALTHCARE ADVOCATE

- Demonstrate an appreciation of the health care needs of patients with brain and spine tumors.
- Encourage the promotion of active involvement of the patient and family in medical management decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psychosocial support exists for the patient and family

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of pediatric neurooncology and long-term follow up using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of pediatric residents and elective students.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.

Hematology Clinic Rotation

Goal

To develop the out-patient skills necessary to assess, investigate, diagnose and manage patients with hematological disorders.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrates proficiency in formulation of differential diagnoses in patients presenting with hematological disorders.
- Demonstrate a rational approach to the diagnosis and management of hematological referrals (anemia, bleeding disorders, thrombosis, leukopenia, platelet disorders and bone marrow failure)
- Demonstrate the ability to request and interpret the necessary laboratory investigations required in the hematology service.
- Demonstrate the ability to comprehensively manage a patient with hemoglobinopathy diseases including the prevention, anticipation and monitoring of complications within a multidisciplinary team.

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.

- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision-making.
- Develop the ability to document the details of the outpatient visit accurately.
- Effectively promote communication between the patient and families and the patient's primary team as well as the relevant health-care professionals both within and outside the hospital.

COLLABORATOR

- Identify the role, expertise and limitations of the individual members of the outpatient team that when collectively coordinated, facilitates optimum patient management.
- Effectively collaborate with the patient's primary/referral physician and other relevant health-care professionals.

LEADER

- Utilize information technology to optimize patient care.
- Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of health care resources.
- Develop the skill to work in a time-efficient, and safe, manner in an outpatient setting.
- Demonstrate punctuality by commencing the clinic in a timely fashion.

HEALTHCARE ADVOCATE

- Encourage the promotion of active involvement of the patient and family in medical management decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psychosocial support exists for the patient and family
- Ensures medical interventions are scheduled and completed in a timely fashion.

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of pediatric hematology using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of pediatric residents and elective students.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.

Radiation Oncology Rotation

Goal

To develop a knowledge of the principles and role of radiation therapy, including the complications in the management of childhood malignancy.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Discuss the characteristics of tumor radiobiology.
- Understand the units of radiotherapy measurement.
- Demonstrate an awareness of the logistics involved in the radiation planning process.
- Demonstrate an understanding of the complications of radiotherapy on the normal tissue, with specific attention to the following: hematological, organ specific, endocrine/fertility and second malignancies.
- Demonstrate an awareness of the possible interaction between radiotherapy and concurrent chemotherapy.
- Demonstrate an awareness of the challenges involved in the practicalities of administering radiotherapy to the young patient.
- Demonstrate the ability to monitor, and manage, the long-term care of patients who have undergone radiotherapy.

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.
- Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision-making.
- Effectively promote communication between the patient and families and the patient's primary team as well as the relevant health-care professionals both within and outside the hospital.

COLLABORATOR

- Effectively collaborate with the patient's primary oncology team and other relevant health care professionals.

LEADER

- Utilize information technology to optimize patient care.
- Demonstrate the ability to set realistic priorities and to use time effectively in order to optimize professional performance.

HEALTHCARE ADVOCATE

- Encourage the promotion of active involvement of the patient and family in medical management decision-making.
- Work with other health care team members to ensure appropriate medical, financial and psychosocial support exists for the patient and family.

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of pediatric radiation oncology using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.

Laboratory Rotation

Goals

To enhance the diagnostic laboratory skill set of the Hematology-Oncology subspecialty trainee.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrate the ability to examine peripheral blood smears/bone marrow examinations and to differentiate normal morphology from abnormal.
- Demonstrate familiarity with the principles of operation of automated hematology analyzers, and interpretation of results.
- Discuss the principles, interpretation, limitations and utilization of specialized hematology tests, included hemoglobin electrophoresis, osmotic fragility testing, coagulation essays.
- Discuss the principles of a flow cytometry and the clinical applications specifically involving lymphocyte immunophenotyping and leukemia classification.
- Discuss the role of basic molecular biology, and cytogenetic, techniques, such as PCR, RT-PCR and the application of these techniques in the diagnosis of hematological disorders.
- Demonstrate specific Knowledge about blood and blood components including donor selection, method of preparation, testing performed, indications for use, risks associated with product transfusion and blood transfusion equipment.

COMMUNICATOR

- Demonstrate an awareness of the important role of communication between the hematopathologist and the hematologist/oncologist.
- Promote communication between laboratory personnel and clinicians.

COLLABORATOR

- Identify the role, expertise and limitations of the hematopathologist, laboratory personnel and clinical hematologist/oncologist that when collectively coordinated, facilitates optimum patient management.

LEADER

- Effectively manage time in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of laboratory services.
- Demonstrate an understanding of quality assurance/quality control issues pertaining to laboratory services.

HEALTHCARE ADVOCATE

- Advocate for individual patients in ensuring the diagnostic laboratory process is completed in a timely, comprehensive and efficient manner.
- Demonstrate an understanding of the role of the hematopathologist, specifically in budget and hospital planning, in ensuring that the diagnostic hematopathology laboratory needs of children are best served.

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the diagnostic haematopathology laboratory process using the principles of evidence-based medicine.
- Demonstrate the ability to present the challenges, and findings, of a hematopathology laboratory test in informal, or formal, settings.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution.

Junior Attending Rotation

Goal

To develop consultancy and time management skills required to practice Pediatric Hematology-oncology, as well as to allow the supervision and education of junior fellows, residents and medical students.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrate the ability to function effectively as consultants.
- Demonstrate effective clinical problem solving and judgment to address patient problems, including interpretation available data and integrating information to generate differential diagnoses and management plans.
- Demonstrate ability to use preventive and therapeutic intervention effectively.
- Demonstrate ability to seek appropriate consultation from other health professionals, recognizing the limits of their expertise.
- Demonstrate the necessary skills required to conduct a factual, informative and sensitive disclosure of a recently diagnosed patient with malignancy.
- Implement an effective management plan in collaboration with a patient and their family.

COMMUNICATOR

- Develop relationships with patients and their families that are characterized by trust, respect and confidentiality.
- Deliver information to the patient and families in a humane manner in such a way that it is understandable, encourages discussion and participation in decision-making.

- Promote effective communication within the multidisciplinary team that is respectful of each other's roles while ensuring optimum management for the patient.
- Demonstrate an understanding of the issues children and families face in coming to terms with a diagnosis of a malignant disease and the coping mechanisms and supports available.
- Provide effective communication to the referring physician.

COLLABORATOR

- Identify the role, expertise and limitations of the individual members of the involved multidisciplinary team that when collectively coordinated, facilitates optimum patient management.
- Effectively coordinate diagnostic and treatment-related procedures with relevant personnel.

LEADER

- Utilize information technology to optimize patient care and life-long learning.
- Demonstrate ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of health care resources, including use of diagnostic investigations.

HEALTHCARE ADVOCATE

- Advocate for individual patients in ensuring they receive the most appropriate and effective medical management available.
- Promote active involvement of the family in decision-making and care of the child.
- Work with other health care team members to ensure appropriate medical, financial and psycho-social support for the patient and family

SCHOLAR

- Demonstrate the ability to access and apply information relevant to the clinical practice of Pediatric Hematology-Oncology using the principles of evidence-based medicine.
- Demonstrate an understanding the ability to integrate new learning into practice.
- Demonstrate the ability to pose an appropriate clinical question, recognize and identify gaps in knowledge and expertise around this question, formulate a plan to address the gap(s).
- Stimulate and supervise the learning of junior fellows/residents/medical students involved with the oncology consult team.

PROFESSIONAL

- Exhibit appropriate professional behaviors in practice, including honesty, integrity, empathy, commitment, compassion and respect for others.
- Recognize personal strengths and weakness including those related to professional competence.
- Demonstrate an ability to function within an interprofessional team and participate in conflict resolution

Research Rotations

Goal

To carry out study design, implementation, analysis, and publication with increasing independence over time as well as develop a solid background in the methodological and biostatistical aspects of research.

Objectives

The Pediatric Hematology-Oncology trainee upon completion of the rotation should be able to:

MEDICAL EXPERT

- Demonstrate an understanding of the basic principles of research design, methodology, data analysis (biostatistics), and clinical epidemiology.
- Demonstrate an understanding of responsible use of informed consent and standards of ethical conduct of research.
- Demonstrate ability to conduct a clinical research project including research design, subject recruitment, data collection, data analysis and writing manuscript.
- Understand the principles of paper writing and grant.
- Demonstrate the necessary skills to critically assess basic and clinical research literature and using available medical informatics systems.

COMMUNICATOR

- Demonstrate skills in conveying and discussing scientific research to scientific communities through posters, abstracts, teaching slides, manuscripts, grant applications, or other scientific communications.
- Communicate and collaborate effectively with research team members to conduct the research.

COLLABORATOR

- Identify, consult and collaborate with appropriate experts to conduct the research.

LEADER

- Demonstrate ability to identify an area of research interest and a research mentor in order to engage in the scholarship of scientific inquiry and dissemination.
- Demonstrate ability to utilize available resources and regularly meet with an identified research mentor.
- Demonstrate ability to set realistic priorities and to use time effectively in order to optimize professional performance.
- Demonstrate an understanding of the cost-effective use of health care resources.

HEALTH ADVOCATE

- Recognize the contributions of scientific research in improving the health of patients and communities.

SCHOLAR

- Demonstrate the ability to pose an appropriate research question, recognize and identify gaps in knowledge and expertise around this question, formulate appropriate study design to answer it.
- Discuss and critically appraise the medical literatures as it pertains to the research project.
- Demonstrate ability to carry out the research outlined in the proposal.
- Demonstrate ability for data collection, data analysis and preparation of an abstract and manuscript.
- Demonstrate ability to identify areas for further research.

PROFESSIONAL

- Uphold ethical and professional expectations of research consistent with institutional review board guidelines, including maintenance of meticulous data and conduct of ethically research.

- Demonstrate personal responsibility for setting research goals and working with mentors to set and achieve research timeline objectives.
- Publish accurate and reliable research results, with attention to appropriate authorship attribution criteria.
- Disclose potential financial conflicts of interest (including speaker fees, consultative relationships, etc.) as appropriate when engaging in and disseminating research results.

ASSESSMENT

The Assessment System

The purpose of the assessment system is to:

- Enhance learning by providing formative assessment, enabling trainees to receive immediate feedback, measure their own performance and identify areas for development.
- Drive learning and enhance the training process by clarifying what is required of trainees and motivating them to ensure they receive suitable training and experience.
- Provide robust, summative evidence that trainees are meeting the curriculum standards during the training program.
- Ensure trainees are acquiring competencies within the domains of good medical practice.
- Assess trainees' actual performance in the workplace.
- Ensure that trainees possess the essential underlying knowledge, skills, and attitude required for their specialty.
- Identify trainees who should be advised to consider a career change.

Assessment Methods

The following assessment methods are used in the integrated assessment system:

Procedures Assessment

Direct Observation of Procedural Skills (DOPS)

- This assessment is conducted at the beginning of fellowship training.
- The procedures form should be filled out at the beginning of the two months of training (appendix2)
- The trainee will perform procedures under the supervision of the attending consultant and receive immediate feedback.
- Each trainee shall do three procedures of each of the following:
 - Bone marrow aspiration
 - Bone marrow biopsy
 - Lumbar puncture with intrathecal chemotherapy
- A successful completion of DOPS form is a must for the fellows before starting the logbook.
- The failure to submit this form to the local training committee within two months of training shall be discussed with the local training program director.

Logbook

- All the trainees are required to keep a logbook (appendix 3) during training (electronic records are highly recommended)
- A successful completion of DOPS form is a must for fellows before starting the logbook.
- The purposes of the logbook are to:
 - Monitor trainees' performance on a continual basis
 - Maintain a record of procedures and technical intervention performed
 - Enable the trainee and supervisor to determine the learning gaps
 - Provide a basis of feedback to the trainee.

- For the first-year fellowship, fellow is required to do a minimum of 30 lumbar punctures with intrathecal chemotherapy and minimum of 20 bone marrow aspirate and biopsy then increment by 1% for each successful lumbar puncture with intrathecal chemotherapy and 1% for each successful bone marrow aspirate and biopsy to a maximum of total of 60 lumbar punctures with intrathecal chemotherapy and a maximum of total of 40 of bone marrow aspirate and biopsies.
- For the second-year fellowship, fellow is required to do a minimum of 30 lumbar punctures with intrathecal chemotherapy, minimum of 20 bone marrow aspirate and biopsy and a minimum of one bone marrow harvest then increment by 1% for each successful lumbar puncture with intrathecal chemotherapy, 1% for each successful bone marrow aspirate and biopsy and 2% for successful bone marrow harvest to maximum of total of 60 lumbar punctures with intrathecal chemotherapy, maximum of total of 38 of bone marrow aspirate and biopsies and a maximum of one bone marrow harvest.
- The completed logbook will be countersigned by the program director.
- The logbook should be submitted maximum 4 weeks before the final written exam
- Failure of submission shall be discussed with program director and scientific committee.
- The completion of logbook is included on the end-of-year total score for first and second year trainees.

Annual Assessment

Continuous Evaluation

- This assessment is conducted toward the end of each training rotation throughout the academic year.
- To fulfill the CanMEDS competencies based on the end of rotation evaluation, the Fellow's performance will be evaluated jointly by relevant staff for the following competencies (appendix 4):
 - Performance of the trainee during daily work.
 - Performance and participation in academic activities.
 - Performance in a 10 to 20-minute direct observation assessment of trainee-patient interactions. Trainers are encouraged to perform at least one assessment per clinical rotation, preferably near the end of the rotation. Trainers should provide timely and specific feedback to the trainee after each assessment of a trainee-patient encounter (Mini Clinical Evaluation Exercise (Mini-CEX) and case-based discussion (appendix 5 and 6)).
 - Performance of diagnostic and therapeutic procedural skills by the trainee.
- The CanMEDS-based competencies end-of-rotation evaluation form must be completed within two weeks following the end of each rotation (preferably in an electronic format) and signed by at least two consultants. The program director will discuss the evaluation with the Fellow, as necessary. The evaluation form will be submitted to the Local Training Supervisory Committee of the SCFHS within four weeks following the end of the rotation.
- Annual promotion depends on satisfactory annual overall evaluation and passing and the average score for all rotations will not be less than 60%.

Research

- All the fellows are required to conduct a research project during training.
- In each academic year, two research days is held, mid-year research day and end-year research day where the research project for each fellow is evaluated.
- The components and scores as per SCFHS Pediatric Hematology-Oncology Fellowship Research Manual (appendix 7).

End-of-year Written Examination

- The end-of-year written exam will be held at the end of the academic year.
- The exam is held a once a year.
- The same exam is used for all training levels with difference in passing score.

Objectives

- An assessment of specialty knowledge.
- Using theoretical data to determine the candidate's ability to think logically, to solve problems, to apply basic medical science to clinical problems, and to make judgments with valid comparisons.

Exam eligibility

As per SCFHS General Exam rules and Regulations (scfhs.org.sa)

Exam eligibility for third-year trainees only

As per SCFHS General Exam rules and Regulations (scfhs.org.sa)

- Successful completion of the required period of fellowship training.
- Agreement issued by the local supervisory committee based on a satisfactory FITER report.
- Research publication or at least an evidence of accepting the research manuscript for publication.
- Certificate of completion of universal topics.

Exam rules

As per SCFHS General Exam rules and Regulations (scfhs.org.sa).

Exam format

As per SCFHS General Exam rules and Regulations (scfhs.org.sa).

The questions will cover all aspects of pediatric hematology-oncology as shown in the blueprint (appendix 8).

Passing score

The passing score will be in accordance with the commission's training and examination rules and regulations. There will be no negative marking as per the rules of SCFHS.

Final Saudi Board Clinical Examination

- The clinical exam will be held at the end of the third academic year. The exam is held a once a year.
- The final clinical exam is restricted for third-year fellows after passing the final written exam.
- Successful candidates will be awarded "Saudi Board of Pediatric Hematology-Oncology"

Objectives

- Determine that the ability of the candidate to practice as a specialist and provide consultation in the general domain of his/her specialty for other healthcare professionals or other bodies that may seek assistance and advice.
- Ensure that the candidate has the necessary clinical competencies relevant to his/her specialty including but not limited to history taking, physical examination, documentation, procedural skills, communication skills, bioethics, diagnosis, management, investigation and data interpretation.
- All competencies contained within the specialty core curriculum are subject to inclusion in the examination.

Exam Eligibility

As per SCFHS General Exam rules and Regulations (scfhs.org.sa)

General rules

As per SCFHS General Exam rules and Regulations (scfhs.org.sa)

Exam format

- As per SCFHS General Exam rules and Regulations (scfhs.org.sa)
- The stations as shown in the Final Clinical Exam Blueprint (appendix 9)

Passing score

As per SCFHS General Exam rules and Regulations (scfhs.org.sa)

The Components of Promotion Requirement

- The total score of promotion for first-year and second-year fellowship will be distributed as follows:
 - Written exam 50%
 - Research 20%
 - Rotation Evaluations 20%
 - Logbook 10%
- The total score of third-year fellowship is depend only on the Final Written Exam and the Final Clinical Exam (OSCE).

CERTIFICATION

A certificate of training completion will only be issued upon the Fellow’s successful completion of all program requirements. Candidates passing final written and clinical examinations are awarded the “Saudi Board of Pediatric Hematology-Oncology” certificate.

SUGGESTED LEARNING RESOURCES

Textbooks

- Principles and Practice of Pediatric Oncology by PA Pizzo
- Lanzkowsky's Manual of Pediatric Hematology and Oncology
- Nathan and Oski's Hematology and Oncology of Infancy and Childhood.

Journals

- Blood
- Blood Review
- British Journal of Hematology
- Hemophilia
- Journal of Thrombosis and Hemostasis
- Hematology: ASH Education Program Book
- Pediatric Blood Cancer
- Pediatric Hematology and Oncology
- New England Journal of Medicine
- Bone Marrow Transplantation
- Biology of Blood and Marrow Transplantation
- Journal of Clinical Oncology
- Leukemia & Lymphoma
- Leukemia
- The Lancet
- Lancet Oncology

Clinical Trials

- National Cancer Institute (NCI)
- Children Oncology Group (COG)
- The European Society for Pediatric Oncology (SIOP)

Note: This list is intended for use as a study aid only. SCFHS does not intend the list to imply endorsement of these specific references, nor are the exam questions necessarily taken solely from these sources.

ON-CALL DUTIES

Pediatric hematology-oncology Fellows are expected to attain proficiency in the recognition and management of emergent, urgent and elective problems in pediatric hematology and oncology. As part of this training, the Fellows participate in pediatric hematology-oncology on-call duties. Fellows are on-call with a faculty member, who provides support, advice and education. The Fellow provides complete coverage for all the inpatient care, walk-ins, consultations and emergency admissions. Fellows at all levels of training take on-call duties. The frequency of calls will be determined as per SCFHS rules.

VACATION AND CONFERENCE LEAVE

Fellows are granted 30 vacation days per year, as per SCFHS rules and regulations. Requests for vacation time must be approved by the Program Director. Requests for vacation time must be given at least four weeks in advance. In addition, Fellows are granted conference leave as per SCFHS rules and regulations. The conference must be approved by the Program Director.

APPENDICES

Appendix 1: Final In-Training Evaluation Report (FITER)

- 1) This is a summative evaluation prepared at the end of the fellowship program, which grants the Fellow with the full range of competencies (knowledge, skills and attitudes) required for the Pediatric Hematology-Oncology specialist, and a readiness to sit the Saudi certification examinations.
- 2) It provides information that will be considered by the Saudi Examination Board during the deliberation of a candidate whose performance at the Saudi certification examination falls into the borderline category.
- 3) The FITER is requested by the Saudi Board at the end of fellowship training.
- 4) The FITER is completed by the fellowship training Program Director.
- 5) The FITER is not a composite of the regular in-training evaluations; rather it is a testimony of the evaluation of competencies at the end of a fellowship education program.
- 6) It will be completed as late as possible in the Fellow's training but no later than two months before the OSCE Exam.
- 7) The FITER of individual candidates is available only to the Chair of the Examination Committee, who must maintain confidentiality regarding the name of the candidate, the training center and the program director at all times.

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Final In-Training Evaluation Report (FITER)/Comprehensive Competency Report (CCR)		
Trainee Name:		
Trainee SCFHS number:		
Evaluation covering the last year as a Fellow: In the Fellowship Program Committee's view, the trainee mentioned above has acquired the competencies of the Pediatric Hematology-Oncology as prescribed in the Objectives of Training and is competent to practice as a specialist. (Please tick ✓ in the appropriate box)		
	Yes	No
The following sources of information were used for this evaluation:		
Items	Yes	No
Written exams		
Oral exams		
Clinical observations (e.g., CERS) by Faculty		
OSCEs		
Feedback from healthcare professionals		
Completion of a scholarly project		
Other evaluations		
Note: If, during the period from the date of signature of this document to the completion of training, the Residency Program Committee judges that the candidate's demonstration of competence is inconsistent with the present evaluation, it may declare the document null and void and replace it with an updated FITER. Eligibility for the examination would be dependent on the updated FITER		
Comments:		
Name of Program Director:		
Date:	Signature:	
This is to attest that I have read this document.		
Name of Trainee: _____		
SCFHS number: _____		
Date: _____	Signature: _____	
Trainee's Comments:		

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FITER: (Medical Expert Competency)						
Trainee Name:						
Trainee SCFHS Number:						
	EXPECTATIONS					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not Applicable
Medical Expert						
a. Possesses basic scientific and clinical knowledge relevant to specialty						
b. Performs histories and physical examinations that are complete, accurate, and well-organized						
c. Uses all pertinent information to arrive at complete and accurate clinical decisions						
d. Recognizes and manages emergency conditions resulting in prompt and appropriate treatment. Remains calm, acts in a timely manner, and prioritizes correctly						
e. Recognizes and appropriately manages patients with complex problems and multi-system diseases						
f. Demonstrates proficiency in pre-operative and post-operative patient management, including indications for surgical intervention						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

- *Rarely meets ≤30%
- *Inconsistently meets >30-60%
- *Generally meets >60-80%
- *Sometimes exceeds >80-90%
- *Consistently exceeds >90%

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PROCEDURES AND CLINICAL SKILLS						
Trainee Name:						
Trainee SCFHS number:						
	EXPECTATIONS					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not Applicable
PROCEDURES AND CLINICAL SKILLS						
Demonstrates the ability to perform diagnostic and therapeutic procedures/skills described in the Pediatric Hematology-Oncology Fellowship Training Curriculum						
a. Diagnostic lumbar puncture						
b. Lumbar puncture with instillation of intrathecal chemotherapy						
c. Bone marrow aspiration and biopsy						
Minimizes risks and discomforts to the patient						
Overall is proficient in clinical and procedural skills relevant to Pediatric Hematology-Oncology						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the specific objectives and give specific examples wherever possible.						

- *Rarely meets
- *Inconsistently meets >30-60%
- *Generally meets >60-80%
- *Sometimes exceeds >80-90%
- *Consistently exceeds >90%

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FITER: (Communicator Competency)						
Trainee Name:						
Trainee SCFHS number:						
	EXPECTATIONS					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not Applicable
COMMUNICATOR						
a. Establishes a therapeutic relationship with patients and communicates well with the family. Provides clear and thorough explanations of diagnosis, investigation, and management in a professional manner. Demonstrates empathy and sensitivity to racial, gender, and cultural issues						
b. Prepares documentation that is accurate and timely						
c. Develops diagnostic and therapeutic plans that are understandable to patients and clear and concise for other healthcare personnel, including other consultants						
d. Presents clinical summaries and scientific information in a clear and concise manner to a healthcare audience						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

- *Rarely meets ≤30%
- *Inconsistently meets >30-60%
- *Generally meets >60-80%
- *Sometimes exceeds >80-90%
- *Consistently exceeds >90%

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FITER: (Collaborator Competency)						
Trainee Name:						
Trainee SCFHS Number:						
	EXPECTATIONS					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not Applicable
COLLABORATOR						
a. Interacts effectively with health professionals by recognizing and acknowledging their roles and expertise						
b. Consults and delegates effectively						
c. Establishes good relationships with peers and other health professionals						
d. Effectively provides and receives information from other health professionals						
e. Manages conflict situations well						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

- *Rarely meets ≤30%
- *Inconsistently meets >30-60%
- *Generally meets >60-80%
- *Sometimes exceeds >80-90%
- *Consistently exceeds >90%

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FITER: (Manager Competency)						
Trainee Name:						
Trainee SCFHS number:						
	EXPECTATIONS					
	* Rarely meets	* Inconsistently meets	* Generally meets	* Sometimes exceeds	* Consistently exceeds	Not Applicable
MANAGER						
a. Understands and makes effective use of information technology, such as methods for searching medical databases						
b. Makes cost-effective use of healthcare resources based on sound judgment						
c. Prioritizes and uses personal and professional time effectively in order to achieve a balanced personal and professional life						
d. Demonstrates an understanding of the principles of practice management						
e. Demonstrates the ability to effectively utilize healthcare resources to maximize benefits to all patients, including managing waiting lists						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible						

- *Rarely meets ≤30%
- *Inconsistently meets >30-60%
- *Generally meets >60-80%
- *Sometimes exceeds >80-90%
- *Consistently exceeds >90%

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FITER: (Health Advocate Competency)						
Trainee Name:						
Trainee SCFHS Number:						
	EXPECTATIONS					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not Applicable
HEALTH ADVOCATE						
a. Understands the specialist's role to intervene on behalf of patients with respect to the social, economic, and biological factors that may impact their health						
b. Understands the specialist's role to intervene on behalf of the community with respect to the social, economic, and biological factors that may impact community health						
c. Recognizes and responds appropriately in advocacy situations						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

- *Rarely meets ≤30%
- *Inconsistently meets >30-60%
- *Generally meets >60-80%
- *Sometimes exceeds >80-90%
- *Consistently exceeds >90%

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FITER: (Scholar Competency)						
Trainee Name:						
Trainee SCFHS Number:						
	EXPECTATIONS					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not Applicable
SCHOLAR						
a. Demonstrates an understanding of, and a commitment to, the need for continuous learning. Develops and implements an ongoing and effective personal learning strategy						
b. Critically appraises medical information by asking relevant questions and determining which information is reliable. Successfully integrates information from a variety of sources.						
c. Understands the principles of adult learning and helps others learn by providing guidance, teaching, and giving constructive feedback						
d. Facilitates the learning of patients, other house staff/students, and other health professionals						
e. Completes the electronic logbook in a timely fashion						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the specific objectives and give specific examples wherever possible.						

- *Rarely meets ≤30%
- *Inconsistently meets >30-60%
- *Generally meets >60-80%
- *Sometimes exceeds >80-90%
- *Consistently exceeds >90%

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FITER: (Professional Competency)						
Trainee Name:						
Trainee SCFHS Number:						
	EXPECTATIONS					
	*Rarely meets	*Inconsistently meets	*Generally meets	*Sometimes exceeds	*Consistently exceeds	Not Applicable
PROFESSIONAL						
a. Demonstrates integrity, honesty, compassion, and respect for diversity						
b. Fulfills medical, legal, and professional obligations of the specialist						
c. Meets deadlines and demonstrates punctuality						
d. Monitors patients and provides follow-up						
e. Understands the principles of ethics and applies these in clinical situations						
f. Demonstrates an awareness of limitations, and seeks advice when necessary. Accepts advice graciously						
g. Demonstrates respect towards other physicians and healthcare workers						
h. Participates in professional organizations—local, provincial, and national						
Please comment on the strengths and weaknesses of the candidate and provide a rationale for your ratings. Make direct reference to the objectives and give specific examples wherever possible.						

*Rarely meets ≤30%
 *Inconsistently meets >30-60%
 *Generally meets >60-80%
 *Sometimes exceeds >80-90%
 *Consistently exceeds >90%

Appendix 2: Direct Observation of Procedural Skills (DOPS)

Name of Fellow:		
Date of Procedure:		
Criteria	Below Expectation	Displays Competency
Ability to Perform Bone Marrow Aspiration		
Ability to Perform Bone Marrow Biopsy		
Ability to Perform Lumbar Punctures with Intrathecal Chemotherapy		
Comments:		
Supervising Staff:		
Signature:		Date:
Date of Procedure:		
Criteria	Below Expectation	Displays Competency
Ability to Perform Bone Marrow Aspiration		
Ability to Perform Bone Marrow Biopsy		
Ability to Perform Lumbar Punctures with Intrathecal Chemotherapy		
Comments:		
Supervising Staff:		
Signature:		Date:
Date of Procedure:		
Criteria	Below Expectation	Displays Competency
Ability to Perform Bone Marrow Aspiration		
Ability to Perform Bone Marrow Biopsy		
Ability to Perform Lumbar Punctures with Intrathecal Chemotherapy		
Comments:		
Supervising Staff:		
Signature:		Date:
*Fellows should complete this form within two months of joining the fellowship program. *Fellows should bring this form to the program director whenever it is signed off on.		

Appendix 3: Procedures Logbook

Procedures Logbook					
Date	MRN	Age/Gender	Procedure Name	Supervising Consultant	Comments

Appendix 4: Pediatric Hematology-Oncology Comprehensive In-Training Evaluation report (CER)

Pediatric Hematology-Oncology Comprehensive In-Training Evaluation report (CER)					
Trainee name:					
SCFHS Registration No:		Level of training (F1/F2/F3):			
Rotation:		Rotation dates: From		to	
Competencies	Meets Expectations				
	Rarely ≤30%	Inconsistently >30–60%	Generally >60–90%	Exceed >90%	NA
Medical expert					
Appropriate basic knowledge					
Accurate history and physical exam					
Appropriate clinical decisions					
Appropriate emergency management					
Appropriate indication for procedures					
Performance before, during, and /after procedures					
Clinical Skills Proficiency					
Communicator					
Appropriate interaction with patient/family/other healthcare professionals					
Accurate documentation					
Appropriate planning					
Clear presentation					
Collaborator					
Proper Interaction with health professionals					
Proper consultations					
Proper management of conflicts					
Manager					
Proper use of information technology					
Proper understanding of resources					
Appropriate time management					
Follows policies and procedures					
Maximizes benefits to patients					
Health advocate					
Appropriate response to patient health needs					
Appropriate promotion and participation in patient safety					
Scholar					
Participates in appropriate medical education activities					
Implements an ongoing plan for self-education					
Analyzes and integrate medical information					
Teaches others					
Completion of the log-book					
Professional					
Proper professional attitude					
Understands medical and legal obligations					
Punctual					
Maintains ethics and morals					
Accepts advices					
Participates in professional organizations					
Total Score					
Comment on strengths and weaknesses of the candidate. Make direct reference to objectives and give specific examples if possible.					
Evaluation methods	Mini-CEX	DOPS	CBD	MSF	Others(specify):
Fellowship training committee approval					
Program Director Name:		Date:		Signature:	
Fellow name:					
Date		Signature			

Appendix 5: Mini-Clinical Evaluation Exercise (Mini-CEX)

Definition

The mini-CEX is a 10-20 minutes direct observation assessment or “snapshot” of a trainee-patient interaction. To be most useful, the evaluator should provide timely and specific feedback to the trainee after each assessment of a trainee-patient encounter.

Purpose

A mini-CEX is designed to:

- Guide the trainee’s learning through structured feedback
- Help improve communication, history taking, physical examination and professional practice
- Provide the trainee with an opportunity to be observed during interactions with patients and identify strategies to improve their practice
- Be a teaching opportunity enabling the evaluator to share their professional knowledge and experience

Trainee responsibilities

- Arrange a mini-CEX encounter with an evaluator
- Provide the evaluator with a copy of the mini-CEX rating form

Evaluator responsibilities

- Choose an appropriate consultation for the encounter
- Use the mini-CEX rating form to rate the trainee
- Provide constructive feedback and discuss improvement strategies. If a trainee received a rating which is unsatisfactory, the assessor must complete the “suggestion for Development” section.

Mini-Clinical Evaluation Exercise (Mini-CEX) Rating Form									
Trainee name: _____ SCFHS Registration no: _____ Fellowship level: _____ Date: _____ Mini-CEX time: _____ min Observing : _____ min Providing feedback: _____ min									
Brief summary of case:									
<input type="checkbox"/> New example <input type="checkbox"/> Follow-up case <input type="checkbox"/> Inpatient <input type="checkbox"/> Ambulatory <input type="checkbox"/> Emergency <input type="checkbox"/> Department <input type="checkbox"/> Other Complexity: <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Focus: <input type="checkbox"/> Data <input type="checkbox"/> Gathering <input type="checkbox"/> Diagnosis <input type="checkbox"/> Therapy <input type="checkbox"/> Counseling <input type="checkbox"/> Other									
Assessment									
SCORE FOR STAGE OF TRAINING									
Questions	Unsatisfactory			Satisfactory			Superior		
	1	2	3	4	5	6	7	8	9
History taking									
Physical examination Skills									
Communications skills									
Critical judgment									
Humanistic quality/professionalism									
Organization and efficiency									
Overall clinical care									
Suggestion of development: 1- 2- 3- Evaluator name: _____ Evaluator signature: _____									

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Question	Description
History taking	Facilitates patient's narrative; uses appropriate questions to obtain accurate, adequate information effectively; responds to verbal and nonverbal cues appropriately.
Physical examination skills	Follows an efficient, logical sequence; examinations are appropriate for clinical problems; provides patients with explanations; is sensitive to patients' comfort and modesty
Communication skills	Explores patients' perspectives; jargon free speech; open and honest; empathetic; agrees management plans and therapies with patients
Critical judgment	Forms appropriate diagnoses and suitable management plans; orders selectively and performs appropriate diagnostic studies; considers risks and benefits
Humanistic quality/professionalism	Shows respect, compassion, and empathy; establishes trust; attends to patient's comfort needs; respects confidentiality; behaves in an ethical manner; is aware of legal frameworks and his or her own limitations
Organization and efficiency	Prioritizes; is timely and succinct; summarizes
Overall clinical care	Demonstrates global judgment based on the above topics

Appendix 6: Case-Based Discussion (CBD)

Purpose:

To evaluate the level of professional judgment exercised in clinical cases by the trainee.

CBD is designed to:

- Guide the trainee's learning through structured feedback
- Help improve clinical decision making, clinical knowledge and patient management
- Provide the trainee with an opportunity to discuss their approach to the case and identify strategies to improve their practice
- Be a teaching opportunity enabling the evaluator to share their professional knowledge and experience.

Overview

CBD encounter involves a comprehensive review of clinical cases between a trainee and an evaluator. The trainee is given feedback from an evaluator across a range of areas relating to clinical knowledge, clinical decision making and patient management. CBD encounter takes approximately 20-30 minutes.

Trainee responsibilities

- Arrange a CBD encounter with an evaluator.
- Provide the evaluator with a copy of the CBD rating form.

Evaluator responsibilities

- Choose the case(s) for discussion.
- Use the CBD form to rate the trainee.
- Provide constructive feedback and discuss improvement strategies.
- Provide an overall judgment on the trainee's clinical decision making skills.

Case-Based Discussion (CBD) Rating Form

Case-Based Discussion (CBD) Rating Form									
Trainee name: _____									
Registration no: _____									
Fellowship level: _____ Date: _____									
Brief summary of case:									
<input type="checkbox"/> New example <input type="checkbox"/> Follow-up case <input type="checkbox"/> Inpatient <input type="checkbox"/> Ambulatory <input type="checkbox"/> Emergency <input type="checkbox"/> Department <input type="checkbox"/> Other Complexity <input type="checkbox"/> Low <input type="checkbox"/> Moderate <input type="checkbox"/> High Focus <input type="checkbox"/> Data <input type="checkbox"/> Gathering <input type="checkbox"/> Diagnosis <input type="checkbox"/> Therapy <input type="checkbox"/> Counseling <input type="checkbox"/> Other									
Assessment									
SCORE FOR STAGE OF TRAINING									
Questions	Unsatisfactory			Satisfactory			Superior		
	1	2	3	4	5	6	7	8	9
Clinical Assessment									
Investigation and Referrals									
Treatment									
Follow-up and Future Planning									
Professionalism									
Clinical Judgment									
Leadership/Managerial skills									
Overall Performance									
Suggestions of development: 1- 2- 3- Evaluator name: _____ Evaluator signature: _____									

Appendix 7: Saudi Commission for Health Specialties - Pediatric Hematology-Oncology Fellowship Research Manual

Definition of research

Research is the systematic, rigorous investigation of a situation or problem in order to generate new knowledge or validate existing knowledge. Research in health care takes place in a variety of areas and has many potential benefits; the areas include professional practice, environmental issues affecting health, vitality, treatments, theory development, health care economics, and many others. Most of researches which are conducted in health field are called clinical researches.

Clinical research is a branch of healthcare science that determines the safety and effectiveness (efficacy) of medications, devices, diagnostic products and treatment regimens intended for human use. These may be used for prevention, treatment, diagnosis or for relieving symptoms of a disease.

Type of researches

- Basic medical research: Areas tackled in the most fundamental parts of medical research include cellular and molecular biology, medical genetics, immunology, neuroscience, and psychology.
- Preclinical research: Pre-clinical research covers research that prepares the ground for clinical research with patients. Typically the work requires no ethical approval (though some work with animals does), is supervised by people with PhDs rather than medical doctors, and is carried out in a university or company rather than a hospital or surgery.
- Clinical research: Clinical research is carried out with patients. It is generally supervised by doctors in a medical setting such as a hospital and requires ethical approval.
- The clinical phase of drug testing is called Clinical trial.

Types of clinical study Designs

- Meta-Analysis. A way of combining data from many different research studies: A way of combining data from many different research studies. A meta-analysis is a statistical process that combines the findings from individual studies
- Systematic Review: A summary of the clinical literature. A systematic review is a critical assessment and evaluation of all research studies that address a particular clinical issue. The researchers use an organized method of locating, assembling, and evaluating a body of literature on a particular topic using a set of specific criteria. A systematic review typically includes a description of the findings of the collection of research studies.
- Randomized Controlled Trial: A controlled clinical trial that randomly (by chance) assigns participants to two or more groups. There are various methods to randomize study participants to their groups.
- Cohort Study (Prospective Observational Study): A clinical research study in which people who presently have a certain condition or receive a particular treatment are followed over time and compared with another group of people who are not affected by the condition.
- Case-control Study: Case-control studies begin with the outcomes and do not follow people over time. Researchers choose people with a particular result (the cases) and interview the groups or check their records to ascertain what different experiences they had. They compare the odds of having an experience with the outcome to the odds of having an experience without the outcome
- Cross-sectional study: The observation of a defined population at a single point in time or time interval. Exposure and outcome are determined simultaneously

- Case Reports and Series: A report on a series of patients with an outcome of interest. No control group is involved.
- N.B. For PHO fellowship program, this study design is not accepted as the main graduation research project.
- Ideas, Editorials, Opinions: Put forth by experts in the field

Bioethical training and certification

Each fellow should take online ethical course which usually requires testing of acquired knowledge and certification. Most of universities are providing these courses either for free or with subscription. The most popular course and certification is NIH or CITI.

Research Funding

Research funding in many countries is provided by research bodies or private organizations which distribute money for equipment and salaries. In the KSA, the funding bodies include the research center within individual institute, King Abdul-Aziz city for science and technology, charity societies such as SANAD or pharmaceutical companies.

Research Requirements

- 1) Selection of research
- 2) Research team
- 3) Approval of project by local training committee
- 4) Preparation of proposal with references
- 5) Fulfilling the IRB requirements
- 6) IRB approval
- 7) Data collection
- 8) Data Analysis
- 9) Writing the paper
- 10) Publication

Research duration, Components and Presentation

During the 3 years of PHO training fellowship program, a total of 8 months is assigned for the completion of the individual fellow research project.

The 8 months are distributed to be:

- 1 month in the first year
- 2 months in the second year
- 5 months in the third year

During the first year, the candidate should select the research project, write the proposal and apply for IRB. Fellow should be able to present his/her work at the end of first year research day. The 100 total score is distributed as per the above processes: 25% for the selection of research project, 50% for completion of proposal and 25% for the issuing of letter by IRP which indicates that the proposal is accepted for evaluation.

During the second year, the candidate should obtain the IRB approval (25%), complete data collection (50%) and start analysis of data (25%). He/she should be able to present his/her data at the end of second year research day. Fellow should submit/present a progression report of his/her research project at the mid of second year research day.

During the third year, the candidate should complete the analysis and the writing of the final research manuscript. Fellow is encouraged to write the research manuscript and to publish it or at least to have an evidence of accepting the research manuscript for publication. He/she should present the detailed data with the abstract, method of study, results, discussion and references in the mid of 3rd year research day. The candidate will not be able to set for final written and clinical exam unless he/she has certificate of completion of training with evidence of at least submission of the final manuscript to well-known journal for review and publication. This certificate of completion of training program is issued and signed by the local program director.

Evaluation of research and scoring

The final research should be assessed and scored by the PHO Fellowship Scientific Council members. The whole research work for 1st and 2nd years should be scored from 0% to 100% as per mark distribution in section # 7. The final score for the first and second years will be calculated as 20% of total promotion mark for each year. The completion of the end of training research is evaluated with the following score distribution: 15% for proposal, 15% for IRB approval, 20% for data collection and analysis and 50% for publication or at least acceptance in well-known journal. Passing mark for research is 75%. If a fellow achieves 75% or more, he/she will be eligible to set for final exit written exam. Certificate of completion of training will be issued and signed by the local program director and should be submitted to SCHS before the exit written exam.

Research Days

During every training year, there are 2 research days.

- The med year research day that is going to be held on the last week of September
- The end of year research day that is going to be held on first week of January. Each fellow should be ready to present the required component of his/her research work in these research days, see section 7 and 8.

Journal Selection

Either a local or international indexed journal is accepted. Fellowes should be encouraged to publish in international journals.

Publication

Each research project should be either published or at least accepted in well-known journal. During the final presentation of research, fellow should provide an evidence of publication or at least acceptance of his/her manuscript for evaluation by the journal.

Written by Research Committee: Dr. Hassan Trabolsi & Dr. Saad Al Daama

Appendix 8: Written Exam Blueprint

Contents						
Categories	Sections	Proportions	Medical science	Diagnosis	Management	Investigations
Hematology 45%	Anemias	15%	4	4	3	4
	Hemostasis & Platelets	18%	5	4	5	4
	Bone Marrow Failure Disorders	5%	2	1	1	1
	Immunologic abnormalities & Leukocytes disorders	3%	0	1	1	1
	Pediatric Transfusion Medicine	4%	1	1	1	1
Oncology 40%	Leukemias & Lymphomas	15%	3	3	5	4
	Solid Tumors & Histiocytic Disorders	18%	4	4	6	4
	Supportive Care	7%	3	1	2	1
SCT 5%	Stem Cell Transplantation	5%	1	1	2	1
Scholarly Activities and others 10%	Research, ethics, professionalism and patient safety	10%	5	0	5	0
	Total	100%				

*Main blueprint framework adapted from the American Board of Pediatrics.

Appendix 9: Final Clinical Exam Blueprint

DOMAINS FOR INTEGRATED CLINICAL ENCOUNTER	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)	
	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 Medical Council of Canada Blueprint Project

Definitions

Dimensions of Care	Focus of care for the patient, family, community, and/or population
Health Promotion & Illness Prevention	The process of enabling people to increase control over their health and its determinants, and thereby improve their health. Illness prevention covers measures not only to prevent the occurrence of illness such as risk factor reduction but also arrest its progress and reduce its consequences once established. This includes but is not limited to screening, periodic health exam, health maintenance, patient education and advocacy, and community and population health.
Acute	Brief episode of illness, within the time span defined by initial presentation through to transition of care. This dimension includes but is not limited to urgent, emergent, and life-threatening conditions, new conditions, exacerbation of underlying conditions
Chronic	Illness of long duration that includes but is not limited to illnesses with slow progression.
Psychosocial Aspects	Presentations rooted in the social and psychosocial determinants of health that include but are not limited to life challenges, income, culture and the impact of the patient's social and physical environment.

Domains	Reflects the scope of practice & behaviors of a practicing clinician
Patient Care	Exploration of illness and disease through gathering, interpreting and synthesizing relevant information that includes but is not limited to history taking, physical examination and investigation. Management is a process that includes but is not limited to generating, planning, organizing care in collaboration with patients, families, communities, populations, and healthcare professionals (e.g. finding common ground, agreeing on problems & goals of care, time and resource management, roles to arrive at mutual decisions for treatment)
Patient Safety & Procedural Skills	Patient safety emphasizes the reporting, analysis, and prevention of medical error that often leads to adverse healthcare events. Procedural skills encompass the areas of clinical care that require physical and practical skills of the clinician integrated with other clinical competencies in order to accomplish a specific and well characterized technical task or procedure.

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Communication & Interpersonal Skills	Interaction with patients, families, caregivers, other professionals, communities & populations. Elements include but are not limited to active listening, relationship development, education, verbal, non-verbal and written communication (e.g. patient-centered interview, disclosure of error, informed consent)
Professional Behaviors	Attitudes, knowledge, and skills based on clinical and/or medical administrative competence, ethics, societal, and legal duties resulting in the wise application of behaviors that demonstrate a commitment to excellence, respect, integrity, accountability and altruism (e.g. self-awareness, reflection, lifelong learning, scholarly habits, and physician health for sustainable practice).

Appendix 10: Laboratory Training Rotation Form

Year 1= 2 months

Area	No. of Weeks
Morphology	3
Flow cytometry	1
Cytogenetic/Molecular	1
Coagulation/Electrophoresis	1
Transfusion Medicine	2

Year 2= 1 month

Area	No. of Weeks
Morphology/Flow cytometry	3
Transfusion Medicine	1

Morphology

SN	Skills	Meets
1	Familiar with the routine hematology lab work flow	
2	Basic competence with light microscopy	
3	Familiar with different staining methods(Wright Geimsa/supravital stains/iron stain)	
4	Perform anemia workup and recommend use of appropriate test: CBC, smear, reticulocyte count, haptoglobin, OFT, EMA flow, G6PD, electrophoresis, DAT, enzyme assay, BMA, genetic	
5	Acquire ability to independently assess peripheral blood smear	
6	Define the microscopic findings of peripheral blood smears in common hematologic conditions including: microcytic, macrocytic, and hemolytic anemias; as well as thrombocytopenia, leukopenia and leukocytosis	
7	Define the microscopic findings of peripheral blood smears in common oncologic conditions, such as ALL, AML, APL, CML and JMML besides lymphomas and MPD/MDS	
8	Ability to recognize normal findings on bone marrow aspiration and trephine biopsy	
9	Familiar with common cytochemical stains (MPO/NSE/SBB/PAS/...)	
10	Familiar with cellularity assessment and Fibrosis evaluation (reticulin Stain)	
11	Recognize the microscopic findings of bone marrow aspirations and biopsies of ALL, AML, APL, CML, JMML, Hodgkin's lymphoma, Burkitt's lymphoblastic lymphoma, DLBCL, ALCL, aplastic anemia, red cell aplasia, neutropenia, immune thrombocytopenia, common storage diseases; histiocytic disorders and solid tumors	
12	Familiar with FAB and WHO classifications of myeloid neoplasm and acute leukemia	
13	Able to diagnose acute leukemia using smear and cytochemical stains	
14	Familiar with microscopic findings of body fluids (CSF cytosin/pleural and ascitic fluids)	

APPENDICES

Flow cytometry

SN	Skills	Meets
1	Describe the basic techniques of flow cytometry: from sample acquisition to computer display; as well as gating, data analysis and interpretation	
2	Describe current applications of flow cytometry	
3	Recognize the normal pattern appearance of different hematopoietic cells	
4	Provide an overview of lineage-associated markers and commonly used markers	
5	Understand and interpret different leukemia panels. B-lineage (pro, common, pre, late and mature) and T-lineage ALL (and recognize ETP), myeloid leukemia subclasses (WHO and FAB) and APL	
6	Familiar with diagnostic findings and classification of acute leukemia of ambiguous lineage (ALAL)	
7	Familiar with Down syndrome TAM diagnosis	
8	Understand and interpret occurrence of aberrant markers in different leukemia	
9	Familiar with hematogones patterns in immunophenotyping	
10	Describe and interpret the use of flow for minimal residual disease (MRD) in ALL and AML	
11	Describe clinical application of flow in PNH, Platelet membrane disorders, CD34+ cell count, DNT in ALPS, lymphocyte subsets and immunodeficiency, as well as EMA in spherocytosis	

Cytogenetic

SN	Skills	Meets
1	Participation in cytogenetic specimen quality checks	
2	Observing specimen processing in the lab (culture, pellet, metaphases, slide preparation, microscopy, banding, capturing interpretation, ..etc)	
3	Become familiar with the Cytogenetic ISCN nomenclature	
4	Know major cytogenetic subgroups of ALL, AML, MDS, NHL and their prognostic significance	
5	Know available and commonly used FISH probes in ALL, AML	

Molecular Diagnosis

SN	Skills	Meets
1	Review the molecular panels done for AML, MDS, ALL, and inherited bone marrow syndrome	
2	Understand assays done for: TCR and IgH gene rearrangements; chromosomal translocations including BCR/ABL; JAK2 V617F; tumor burden quantitation in CML and Ph+ ALL; infectious diseases: CMV, EBV, HCV, etc	
3	Understand role of STR analyses	
4	Able to obtain clinical and laboratory data and review Hematopathology specimen related to Molecular/cytogenetic requests to clarify what is the appropriate cytogenetic/molecular test to perform to assist with accurate interpretation of data	

APPENDICES

Coagulation

To familiarize Fellows with procedures for the laboratory evaluation and management of patients with hemorrhagic and thrombotic disorders.

SN	Skills	Meets
1	Describe the basic clinical methods used for the coagulation tests: (PT, INR, PTT and TT)	
2	Observe the techniques used to complete such laboratory tests such as PT, PTT, TT, fibrinogen and DD	
3	Define possible sources of error in the completion and analysis of a basic coagulation test	
4	Observe the techniques used to complete mixing studies, factors and inhibitor analysis (specific factor, naturally occurring or lupus anticoagulant)	
5	Familiarize Fellows with the historic use of bleeding time	
6	Familiar with the use of PFA, interpretation of its data and limitations	
7	Describe and observe tests used for Von Willibrand Disease workup	
8	Describe the clinical application and interpretation of Urea lysis test and FXIII assay	
9	Be able to describe the application of special tests: reptilase time, ACT, ECT, dRRVT and lupus anticoagulant group	
10	Describe the Laboratory evaluation for the fibrinolytic system (plasmin, tPA) and the fibrinolytic inhibitors (PAI1,2, TAFI, α -2 antiplasmin)	
11	Able to describe and interpret aggregation studies in different platelets disorders	
12	Able to order and interpret different thrombophilia screen tests	
13	Familiar with different tests used in monitoring patients on different anticoagulation agents	
14	Able to work up patients suspected to have HIT (observe the screening test)	
15	Able to discuss evaluation of possible heparin resistance	

Hemoglobin Electrophoresis

SN	Skills	Meets
1	Familiar with the basic principles of electrophoresis	
2	Familiar with different types of electrophoresis: alkaline, acidic, HPLC, and IEF	
3	Able to interpret different newborn screening patterns	
4	Able to interpret HE data for common hemoglobinopathies	

Transfusion Medicine

Manufacturing

SN	Skills	Meets
1	Donor evaluation	
2	Blood components preparation: methods	
3	Testing: bacterial cultures and EBDS; viral donor screen, NAT, GAT, etc.	
4	Blood products preservation	
5	Storage of different components, shelf life and storage lesion	
6	Blood derivatives characteristics (whole blood, PRBC, FFP, cryoprecipitate, platelets, granulocytes, plasma-derived factors, IVIG, albumin)	
7	Blood components computation, indications and clinical usage	
8	Blood products manipulation: leukoreduction, volume depletion, irradiation, washing, etc; techniques, limitation and clinical application	
9	CMV risk reduction	
10	Quality assurance	

APPENDICES

Immunohematology

SN	Skills	Meets
1	Red cell antigens and human blood grouping	
2	Antibody screening and identification: IAT/alloimmunization	
3	Crossmatching for different components	
4	Auto Antibodies: DAT, AIHA (warm, cold, Donath-landsteiner) evaluation test, autoabsorption	
5	RBCs anitogenicity and hemolytic disease of the newborn	
6	Platelets Refractoriness workup and management	
7	Transfusion in special groups: hemoglobinopathies, AIHA, neonates, massive transfusion and exchange transfusion	
8	Transfusion in BMT patients: graft manipulation (RBC depletion, plasma depletion. group switch, cross matching)	
9	Complication of transfusion and reaction workup	
10	Therapeutic apheresis:leucapheresis, plasma apheresis, Blood exchange	
11	Donors apheresis for peripheral blood stem cells; (auto/allo)	

REFERENCES

- Frank JR, Snell L, Sherbino J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.).

NOTES
