Oman Medical Specialty Board

PEDIATRIC INTENSIVE CARE FELLOWSHIP TRAINING PROGRAM

2022 Edition / Version 1

TABLE OF CONTENTS

1. INTRODUCTION

The need for a pediatric intensive care service is rapidly expanding due to a rapidly growing population and an increase in birth rate. Furthermore, due to population distribution in a widespread geographical area, there is a need to establish multiple pediatric critical care centers to provide the service.

The primary objective and goal of the Pediatric Intensive Care (PICU) fellowship training program is to train physicians who will pursue an academic career in pediatric intensive care. During the program, fellows are expected to acquire knowledge and skills needed to graduate as pediatric critical care consultants by the end of their training. The trainees are expected to gain basic knowledge including anatomy, physiology, pharmacology and evidence-based knowledge required as pediatric intensive care physicians.

The fellows will be exposed to various clinical conditions related to the pediatric intensive care specialty and will be supervised to perform different PICU procedural skills.

In this three-year fellowship program, trainees will have the opportunity to learn the following:

- Approach to a critically ill neonate or child.
- Approach to recognize, diagnose and treat different system failures included within the range of pediatric intensive care.
- Attain knowledge of various supportive methods for the critically ill.
- Attain knowledge of various monitoring, investigations and data interpretation.
- Cardiopulmonary resuscitation
- Recognize when operative intervention is needed and possible common surgical complications.
- Practice transportation of the critically ill neonate or child
- Gain PICU technical skills
- Know the principles of ethics including patient autonomy, beneficence, non-malfeasance and justice.
- Learn administration and quality management
- Learn how to do research and practice evidence-base medicine

The fellow's competency will be evaluated using various evaluation methods, these include:

- Periodic assessment of their performance.
- Assessment during participation in oral presentations and examination questions sessions.
- Performance in written examinations
- Direct observation of procedural skills
- Participation in the unit clinical audits
- Participation in various educational courses

2. OMSB VISION AND MISSION

Vision:

Leading the advancement of medical professions to ensure excellence in healthcare.

Mission:

We are an autonomous body furthering the growth of human resources for health, through developing specialized physicians and assuring the competencies of health care professionals for a healthier and a happier community.

3. PEDIATRIC INTENSIVE CARE VISION AND MISSION

Vision:

We visualize that our graduates will deliver state-of-the-art, comprehensive medical care to critically ill children through their excellence, scholarship, innovation and leadership in patient care.

Missions

1. **Patient Care:** improve the standard of care provided to critically ill children and to ensure the highest quality of care to children around all hospitals in Oman by applying evidence-based approaches in management.
2. **Research:** pursue new knowledge through high-quality research that explores unanswered questions and challenges.
3. **Education:** provide focused educational opportunities and access to incomparable clinical diversity provided with the knowledge and procedural skills required for clinical excellence.

4. GENERAL OBJECTIVES

Medical Knowledge

- Demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.
- Demonstrate knowledge of:
    1. Biostatistics, bioethics, clinical and laboratory research methodology, study design, preparation of applications for funding and/or approval of clinical research protocols, critical literature review, principles of evidence-based medicine, ethical principles involving clinical research, and teaching methods
    2. Pharmacologic principles and the application of these principles to the critically-ill patient
    3. Life-sustaining therapies.

Patient Care

- Provide patient care that is compassionate, appropriate and effective for the treatment of health problems and the promotion of health.
- Demonstrate proficiency in the clinical skills necessary in pediatric critical care medicine, including:
    1. Providing consultation, performing a history and physical examination, making informed diagnostic and therapeutic decisions that result in optimal clinical judgement, and developing and carrying out management plans
    2. Providing transfer of care that ensures seamless transitions, counseling patients and families, using information technology to optimize patient care, and providing appropriate role modeling and supervision
    3. Diagnosing and managing patients with acute life-threatening problems
    4. Providing compassionate end-of-life care and performing an accurate brain death examination
    5. Providing safe transport for critically-ill patients
    6. Participating in team-based care of critically-ill patients whose primary problem is surgical.

- Competently perform all medical, diagnostic, and surgical procedures considered essential for the practice of pediatric critical care medicine.
- Competently use and interpret the results of laboratory tests and imaging
- Acquire the necessary procedural skills for effective patient's care.
- Develop an understanding of the indications, contraindications, risks, and limitations of the PICU procedural skills.
- Demonstrate competence in the performance and interpretation of:
    1. Central arterial and venous catheterization
    2. Endotracheal intubation
    3. Peripheral arterial and venous catheterization
    4. Procedural sedation
    5. Resuscitation
    6. Thoracostomy tube placement

Professionalism

- Demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles, including:
    1. Trustworthiness that makes colleagues feel secure when the fellow is responsible for the care of patients
    2. Leadership skills that enhance team function, the learning environment, and/or the health care delivery system/environment to improve patient care
    3. The capacity to recognize that ambiguity is part of clinical medicine and to respond by utilizing appropriate resources in dealing with uncertainty.

Interpersonal and Communication Skills

- Demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.
- Demonstrate skill in teaching both individuals and groups of learners in clinical settings, classrooms, lectures, and seminars, as well as by electronic and print modalities.

- Demonstrate skill in providing feedback to learners and assessing educational outcomes.

Systems-based Practice

- Demonstrate an awareness of and responsiveness to the larger context and system of health care in the country or region in which they practice
- Call effectively on other resources in the system to provide optimal health care.
- Understand how to analyze and use information/recommendation from incident reports, audits, mortality and morbidity meetings and quality projects in improving quality of patient's care in the hospital and community.
- Recognize the importance of having national programs to improve patient's care like transport of critically ill patients, home ventilation, and home care of chronic patients.

Practice-based Learning and Improvement

- Investigate and evaluate their care of patients, to appraise and assimilate scientific evidence
- Continuously improve patient care based on constant self-evaluation and lifelong learning.
- Be actively engaged in national and international activities like conferences and workshop as faculties and organizers.
- Master their ability to use updated evidence to participate in implementing new national guidelines to improve quality care in PICU.

5. ADMISSION CRITERIA

5.1 OMSB Fellowship Admission criteria:

To be admitted to a Fellowship Program, the applicant must:

a. Complete the requirements of residency training and obtain a specialty certificate or equivalent recognized by OMSB in the core specialty.
b. Pass the examinations and the interviews for the particular sub-specialty as well as complete the registration requirements.
c. Provide a written permission from the sponsoring employer of the applicant allowing him / her to join the full duration of the fellowship program.

5.2 Pediatric Intensive Care Specific Admission criteria:

The following are prerequisites for enrolment in the program:

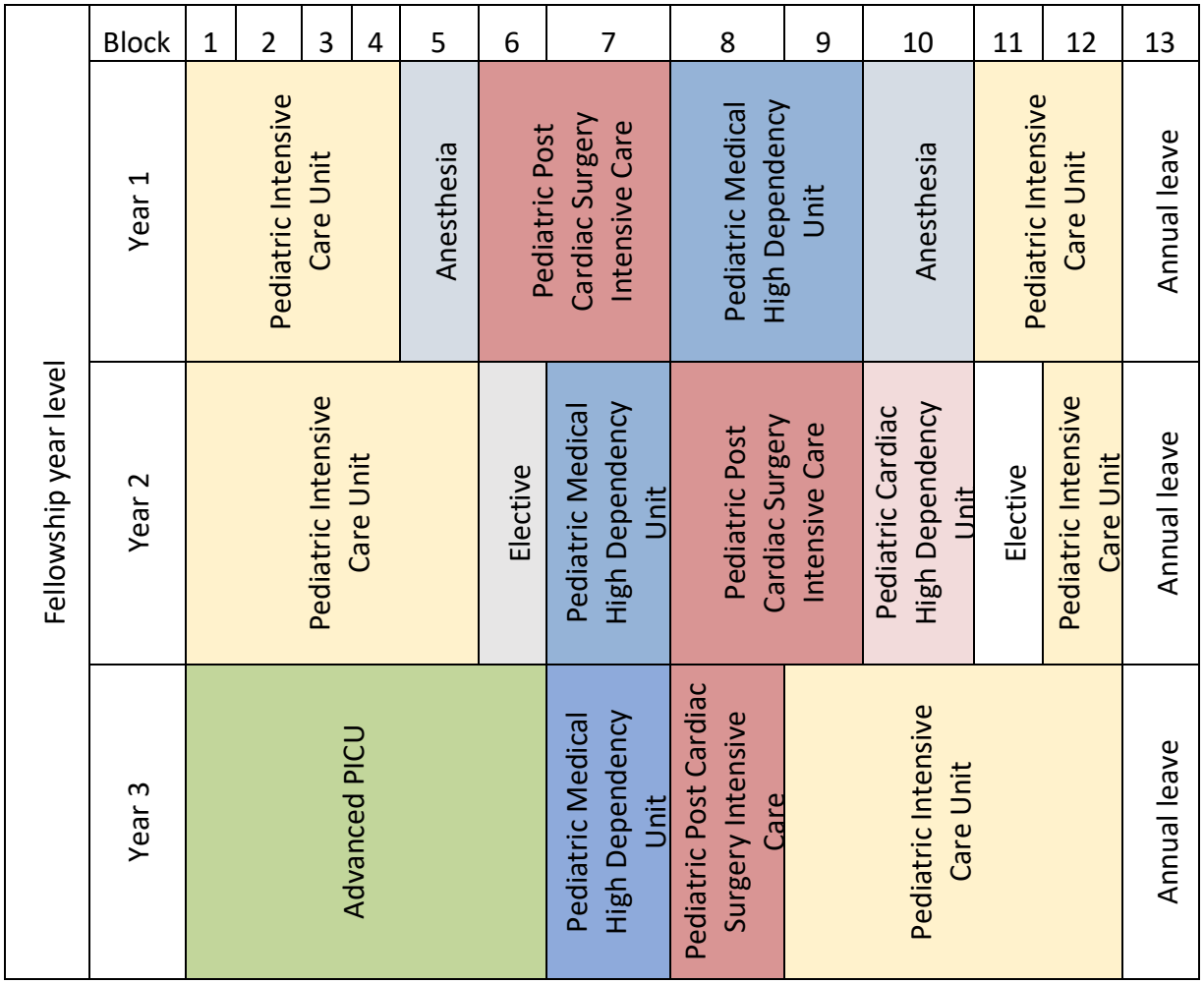
a. Completion of Pediatric OMSB Residency Program with specialty certificate or its equivalent with an assessment score of "satisfactory completion of pediatric residency program".
b. 3-6 months experience in Pediatric Intensive care preferable in a tertiary center.
c. Provide three letters of recommendation from consultants in the same specialty with whom the applicant has worked within the last1-2 years.
d. Hold an active certificate in American Heart Association (AHA) Pediatric Advance Life Support (PALS) Provider course.

6. ROTATIONS OUTLINE

The program structural components:

The program extends over a period of three years. During this period, the fellows will become experienced in various areas of critical care medicine. The program will cover structured and bedside teaching skills to enrich the fellows' knowledge as indicated in the diagram below:

Figure 1: Block Diagram of Pediatric ICU fellowship programs



BLOCK DIAGRAM

The purpose of a block diagram is to give the Accreditation Committee an overview of what takes place during each year of training.

Experiences of Rotations:

- In each one month block indicate the following:
  (1) the type of activity: educational rotation (e.g. ED, Elec), vacation, or attending duties (ATT)
  (2) the percentage of clinical (C) and research (R) time (e.g.___% C, ____ % R)
  (3) the training site in which the activity occurs
- Provide a legend for the abbreviations used (e.g. EM = Emergency Medicine, Elec = Elective, RES = Research, AL = Annual Leave)
- Add additional years if more than one year of training

Year 1

Block	1	2	3	4	5	6	7	8	9	10	11	12	13
Institution	RH	RH	RH	RH	SQUH	RH	RH	RH	RH	RH	SQUH	SQUH	Leave
Rotation	PICU	PICU	PICU	PICU	Anesthesia	PPCSU	PPCSU	MHD	MHD	Anesthesia	PICU	PICU	Leave
%Clinical	90	90	90	90	90	90	90	90	90	90	90	10	0
%Research	10	10	10	10	10	10	10	10	10	10	10	90	0

Total Number of Clinical Blocks: 12
Total number of blocks for leave: 1

Year 2

Block	1	2	3	4	5	6	7	8	9	10	11	12	13
Institution	RH	RH	RH	RH	SQUH	RH	RH	RH	RH	RH	RH	SQUH	Leave
Rotation	PICU	PICU	PICU	PICU	PICU	Elective	MHD	PPCSU	PPCSU	CHD	Elective	PICU	Leave
%Clinical	90	90	90	90	90	90	90	90	90	90	90	10	0
%Research	10	10	10	10	10	10	10	10	10	10	10	90	0

Total Number of Clinical Blocks: 11
Total number of blocks for leave: 1

Year 3

Block	1	2	3	4	5	6	7	8	9	10	11	12	13
Institution	KFH	KFH	KFH	KFH	KFH	KFH	RH	RH	RH	RH	RH	RH	Leave
Rotation	APICU	APICU	APICU	APICU	APICU	APICU	MHD	PPCSU	PICU	PICU	PICU	PICU	Leave
%Clinical	90	90	90	90	90	90	90	90	90	90	90	10	0
%Research	10	10	10	10	10	10	10	10	10	10	10	90	0

Total Number of Clinical Blocks: 11
Total number of blocks for leave: 1

Abbreviations:

RH: Royal Hospital
SQUH: Sultan Qaboos University Hospital
KFH: King Faisal Hospital
PICU: Pediatric Intensive Care Unit
PPCSU: Pediatric Post Cardiac Surgical Unit
APICU: Advanced Pediatric Intensive Care Unit
MHD: Medical High Dependency
CHD: Cardiac High Dependency

7. ROTATION OBJECTIVES

PEDIATRIC INTENSIVE CARE ROTATION

SPECIFIC OBJECTIVES FOR FY 1:

- **Duration:** FY 1: 6 blocks
  FY 2: 6 blocks
  FY 3: 4 blocks
- **Training Center:** Royal Hospital and Sultan Qaboos University Hospital
- **Methods of Assessment:** In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Describe anatomy, physiology of the major organ systems
2. Understand principles of Oxygen delivery and Oxygen consumption in a critically sick pediatric patient
3. Know fundamentals of gas exchange and assessment of oxygenation and ventilation
4. Understand definition, types, pathophysiology, clinical presentation and management of acute respiratory failure
5. Describe principles of mechanical ventilation in patients needing respiratory support.
6. Know how to differentiate upper airway from lower airway obstruction and principles of their management
7. Know definitions, pathobiology, pathogenesis and management of Pediatric Acute respiratory distress syndrome
8. Understand different types of acute pulmonary infections and their management
9. Know definition, epidemiology, clinical features, diagnosis and management of Pediatric Sepsis and Septic shock
10. Know different types of health care associated infections, preventions, diagnosis, and their management
11. Know management principles of a pediatric patient with polytrauma
12. Describe pathophysiology of traumatic and non-traumatic raised intracranial pressure and principles of management

13. Understand different types of intracranial infections and principles of their management
14. Know the definitions and management of status epilepticus
15. Diagnose acute kidney injury, prevention and management in Pediatric patient
16. Understand principles of fluid therapy in critically ill pediatric patient
17. Discuss regulation of acid-base balance in the body, the principles of blood gas analysis and their clinical application
18. Know different types of electrolyte disorders and their management
19. Understand definitions, pathophysiology and management of Pediatric acute liver failure, indications for liver transplant
20. Discuss common complications seen in children with underlying malignancies including severe sepsis and septic shock
21. Discuss management of common hematological abnormalities seen in intensive care patients including causes of anemia and Disseminated Intravascular Coagulation (DIC)
22. Discuss indications of use of blood products in intensive care unit and related complications
23. Identify common critical Hemato-oncology emergencies and know principles of their management
24. Know common sedatives, analgesics and muscle relaxants used in PICU, different pain and sedation scores, sedation protocols and management of sedation with-drawl and delirium
25. Understand principles of nutrition delivery in a critically sick pediatric patient
26. Identify and manage common endocrine disturbances in an intensive care unit including diabetic ketoacidosis, diabetes insipidus, syndrome of inappropriate antidiuretic hormone secretion and thyroid function abnormalities
27. Acquire skill in safe transport of a critically sick pediatric patient in and outside the hospital
28. Acquire the skills for oral and nasal intubations and use of other airway adjuncts and equipment such as laryngeal mask airway (LMA) and video-assisted laryngoscopy
29. Gain the required competency in insertion of peripheral lines, intra-osseous needles, central lines including femoral, internal jugular subclavian lines and hemodialysis lines.

30. Demonstrate the ability to use anatomical landmarks and use of ultrasound for central line insertion
31. List indications for insertion of chest drains and thoracentesis and attain skills to perform the procedure
32. Gain competence in use of bedside ultrasound for vascular access, diagnosis of pleural and pericardial effusions

PATIENT CARE

1. Be advocate for the child's best interest in clinical decision making
2. Anticipate, recognize and manage complications in timely manner
3. Recognize sick and deteriorating patients and provide care in emergent manner in order to stabilize them
4. Perform cardiopulmonary resuscitation as a team leader
5. Perform rapid sequence intubation in indicated cases
6. Coordinate needful consults from other subspecialty teams to provide the best treatment
7. Coordinate and supervise transfer of sick patients to Pediatric intensive Care
8. Organize, participate and supervise MOCK cardio pulmonary resuscitation (CPR) sessions in the unit, the department of child health and OMSB simulation center

INTERPERSONAL AND COMMUNICATION SKILLS

1. Demonstrate competence in history taking from the patients and families
2. Apply communication techniques in breaking bad news.
3. Communicate medical information in a simple way to families and care givers
4. Discuss consultations with other teams and communicate care plans effectively and clearly
5. Demonstrate use of clear communication and hand over of patients transferred out of the PICU
6. Clearly document notes on patients with complex diseases and chronic PICU stays
7. Provide feedback to referring physicians about patients who are transferred back to the community

8. Effectively provide communication to colleagues, clinic staff and referring medical personnel to minimize duplication.
9. Provide efficient care implementation and prevent miscommunications and errors.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Apply evidence-based practices to patient care
2. Use updated evidence to implement new guidelines or review existing ones
3. Address difficult clinical questions through literature review and use of expert opinions
4. Use evidence-based medicine review of new articles
5. Be involved in clinical presentations and clinical audits
6. Be involved in teaching residents and write their evaluation

PROFESSIONALISM

1. Demonstrate respect, compassion and integrity to patients and family members.
2. Deliver high-quality care while maintaining sensitivity to cultural diversity, age, gender and disabilities.
3. Practice prevention in his/her personal lifestyle and promote a culture of healthy lifestyle choices and physical activity in the work environment and community.

SYSTEMS-BASED PRACTICE

1. Participate in hospital quality and safety initiatives in the critical care units.
2. Deliver cost-effective, efficient and high-quality evidence-based clinical care within limitations of local resources.
3. Use the departmental handoff to document encounters and patient data.
4. Collaborate with other health care providers and allied health care professional and advocate for optimum patient care.
5. Recognize health system forces that increase the risk for error including barriers to optimal patient care .
6. Reflect awareness of common socio-economic barriers that impact patient care.
7. Demonstrate the incorporation of cost-awareness principles into complex clinical scenarios .

8. Demonstrate sufficient knowledge of socio-behavioral sciences including but not limited to health care economics, medical ethics, and medical education.

SPECIFIC OBJECTIVES FOR FY 2:

- **Duration:** FY 2: 6 blocks
- **Training Center:** Royal Hospital and Sultan Qaboos University Hospital
- **Methods of Assessment:** In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Know definitions, pathophysiology, management and outcome of multiple organ dysfunction syndrome
2. Demonstrate knowledge of different modes of mechanical ventilation including High Frequency Oscillatory Ventilation (HFOV) and Airway Pressure Release Ventilation (APRV)
3. Know clinical applications of the different modalities of renal replacement treatment including use of Peritoneal Dialysis (PD), hemodialysis and continuous renal replacement therapy (CRRT) and limitations of their use
4. Discuss indications of inhaled nitric oxide, possible complications and monitoring of treatment
5. Discuss principles of pharmacotherapy, pharmacokinetics and drug interactions in Pediatric intensive care
6. Know principles of neuro-monitoring in PICU
7. List criteria for clinical diagnosis of brain death
8. Know principles of management of acute on chronic respiratory failure in PICU
9. Understand different types of acute neuromuscular weakness and their management
10. Know principles of management of a critically sick immune-compromised patient
11. Know different types of metabolic crisis and their management
12. Know management of common poisoning requiring intensive care

PATIENT CARE

1. Evaluate progress on patients admitted to PICU on a daily basis

2. Participate and provide assistance when indicating different organ support such as non-conventional ventilation (APRV, HFOV etc.), inhaled nitric oxide, renal replacement therapies, plasmapharsis etc.
3. Participate in formulating evidence-based guidelines on use of different organ support

INTERPERSONAL AND COMMUNICATION SKILLS

1. Give constructive feedback to residents of different levels
2. Manage and resolve conflicts between medical team and parents/families
3. Be responsible for the daily PICU procedures, distribute them among juniors and supervise junior's performance.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Learn about the different types of study designs and biostatistics
2. Participate in unit and department academic activities e.g. Mortality and morbidity meeting
3. Educate junior fellows on PICU online sites and journals and supervise them in their preparation of journal club presentations
4. Lead at least one PICU/ department/ hospital quality improvement project
5. Conduct morning rounds under senior supervision

PROFESSIONALISM

1. Maintain appropriate boundaries in work and learning situations while respecting diversity of race, age, gender, disability, educational and socio-economic status.
2. Document and report clinical information truthfully
3. Follow formal policies
4. Honestly acknowledge personal errors
5. Demonstrate empathy and compassion to all patients

SYSTEMS-BASED PRACTICE

1. Understand how cost-benefit analysis is applied to patient care (i.e. via principles of screening tests and the development of clinical guidelines)
2. Identify costs for common diagnostic or therapeutic tests
3. Minimize unnecessary care including tests, procedures, therapies and ambulatory or hospital encounters

SPECIFIC OBJECTIVES FOR FY 3:

- **Duration:** FY 3: 4 blocks
- **Training Center:** Royal Hospital and Sultan Qaboos University Hospital
- **Methods of Assessment:** In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Understand genomics and genetic predisposition to critical illness and its outcome
2. Understand different inflammatory syndromes and role of immune system, intracellular signaling, immunomodulation and immune paralysis
3. Understand principles of palliative care in Pediatric critical care including end of life care
4. Know different quality metrics, outcome indices in pediatric critical illness
5. Understand principles of risk assessment and measures for risk reduction in PICU
6. Review literature to formulate management plans for patients with challenging diseases.

PATIENT CARE

1. Participate in end of life decision making e.g. Not escalation of organ support, DNAR, brain death assessment and withdrawal of care
2. Demonstrate ability to work as an acting consultant
3. Perform on-call duties as a third on-call as an acting consultant.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Counsel families about patient's condition and progress in presence of consultant
2. Act in a consultative role to other physicians and health professions, and health related agencies.
3. Take the lead in counseling parents on their child progress and in breaking bad news.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Keep abreast of new developments in the pediatric critical care field
2. Supervise first and second-year fellows in reviewing literature to address diagnostic and treatment options in children with complicated clinical backgrounds.
3. Conduct and lead quality improvement projects in the unit
4. Supervise residents and evaluate patients on a daily basis
5. Be involved in teaching of junior fellows and residents
6. Observe junior fellows and residents during procedures and provide feedback
7. Lead daily morning rounds and discuss with the plan with consultants
8. Present journal club articles and new updates in PICU.

PROFESSIONALISM

1. Develop the appropriate conflict resolution skills necessary in a high stress environment
2. Know of the hospital ethics guidelines and policy
3. Participate in discussions of cases with ethical issues

SYSTEMS-BASED PRACTICE

1. Understand mechanisms for analysis and correction of systems errors
2. Negotiate patient-centered care among multiple care providers.
3. Demonstrate how to manage the team by utilizing the skills and coordinating the activities of inter-professional team members
4. Demonstrate ability to understand and engage in a system level quality improvement intervention.
5. Partner with other healthcare professionals to identify, propose improvement plans within the system.

6. Formulate new policies and guidelines for the unit and update at least one of existing policies and guidelines

METHODS TO ACHIEVE OBJECTIVES:

- Attend scheduled unit teaching sessions and Journal club presentations, literature review and discussions on the latest evidence in the field of pediatric intensive care
- Participate bedside teaching during consultant led rounds
- Attend the protected fellow's teaching activities including lectures and simulation sessions conducted in the PICU unit and simulation center
- Participate in writing of PICU guidelines on common management issues
- Participate in quality improvement projects of unit
- Participate in national and international conferences, workshops in pediatric intensive care
- Periodic evaluation and feedback from supervising consultants

PEDIATRIC MEDICAL HIGH DEPENDENCY (MHD) ROTATION

Duration: FY 1: 2 Blocks
FY 2: 1 Block
FY 3: 1 Block

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

SPECIFIC OBJECTIVES FOR FY 1:

Duration: FY 1: 2 Blocks

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Apply primary assessment in management of a sick child
2. Identify and manage neonatal and pediatric emergencies
3. Identify and manage a child with sepsis and severe sepsis
4. Know the steps of management of various types of shock
5. Describe the management of a child with respiratory distress and respiratory emergencies including severe bronchiolitis, pneumonia and asthma
6. Learn the management of a patient on non-invasive ventilation
7. Discuss indications for invasive mechanical ventilation and indications for admission to PICU
8. Discuss management of a child with dehydration and electrolyte imbalances
9. Understand the management of patients with hematology oncology emergencies including acute chest syndrome and sepsis
10. Learn the indications for tracheostomy and common complications in patients with tracheostomies.

PATIENT CARE

1. Assess patients transferred from PICU and formulate an appropriate plan of management.
2. Recognize clinical deterioration in patient's condition and act appropriately.
3. Anticipate patients who might require higher level of care and PICU admission and monitor them closely.
4. Perform intubations, central venous catheters, lumbar puncture and chest drain insertions.
5. Attend morning safety boards with clinical team and decide on the plan of the day.
6. Review the clinical acuity of admitted cases and have daily follow up plans.
7. Show competence in history taking and writing of patient's problem list.
8. Perform basic and advanced pediatric life support.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Show competence in Family counseling under consultant's supervision.
2. Communicate medical information in a simple way to families and care takers.
3. Communicate effectively with other medical and paramedical treating teams about clinical plans.
4. Interact in a collaborative manner with residents at different levels and provide them feedback.
5. Communicate effectively with referring team and follow up management plans.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Obtain consents for the different procedures and research purposes.
2. Advise on best clinical practice based on latest evidence.

PROFESSIONALISM

1. Maintain appropriate boundaries in work and learning situations while respecting diversity of race, age, gender, disability, educational and socio-economic status.
2. Demonstrate respect, compassion and integrity to patients and family members.
3. Document and report clinical information clearly.

SYSTEMS-BASED PRACTICE

1. Perform regular auditing related to patient's care and unit management.
2. Make recommendations in relation to clinical audits.
3. Gain competence in patient flow management and ability to use high dependency beds in the most effective way.
4. Ensure clear and proper handover for patients transferred to and from the unit.
5. Participate in unit morbidity and mortality discussions.
6. Use time and available resources effectively.
7. Assign primary responsibility of overall care for chronic patients.

SPECIFIC OBJECTIVES FOR FY 2:

Duration: FY 2: 1 Block

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Show competence in preparing patients and families planned for discharge on home ventilation program.
2. Identify the differences between patients requiring high dependency versus PICU care.
3. Demonstrate knowledge of patient's clinical details.

PATIENT CARE

1. Show competence in caring for patients with complex medical backgrounds and formulate plans of management in liaison with other treating medical and paramedical teams.
2. Formulate thorough plans for patients planned for discharge on home ventilation.
3. Lead the rounds under consultant's direct supervision.
4. Care for patients on home ventilation program including arrangement of the needed multi teams' consults. This should include training parents on basic life support, nursing care, performance of tracheostomy change, recognition of complications.

5. Attend multi-team meetings and coordinate needed follow up of patients with medical complexity.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Arrange for case conferences with other subspecialties to formulate management plans for patients with complex conditions
2. Disseminate newly made guidelines and policies to nursing staff and physicians who are expected to deal with patients in medical HD.
3. Review and discuss new treatment or equipment prior to their clinical implementation in medical High Dependency Unit.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Use the research skills needed to search clinical evidence for the various medical practices and treatment
2. Integrate latest literature review in unit policies and guidelines

PROFESSIONALISM

1. Develop the skills for conflict resolution
2. Show awareness of medical ethical standards

SYSTEMS-BASED PRACTICE

1. Participate in unit's resource management including management of beds, staff and equipment.
2. Know the equipment and guidelines for home ventilation and assist caregivers to receive them in liaison with home ventilation team.

SPECIFIC OBJECTIVES FOR FY 3:

Duration: FY 3: 1 Block

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Use newly published medical articles and review new evidence in advancement of their medical knowledge
2. Read about new modalities of ventilatory supports can be provided in medical high dependency unit
3. Learn about new technologies to assist in diagnosis of patients and their treatment

PATIENT CARE

1. Provide direct supervision to juniors and evaluate their ability to provide care for patients in medical high dependency
2. Provide advice for outside calls on appropriate clinical management
3. Implement evidence-based management approach in clinical management

INTERPERSONAL AND COMMUNICATION SKILLS

1. Lead discussion on end of life management and “do not resuscitate” order
2. Lead counseling sessions for difficult families i.e. (those who are not satisfied with the provided medical services or those who prefer to be treated in another center).
3. Participate in counseling sessions when medical errors need to be conveyed to the family.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Demonstrate knowledge of the different types of study designs and biostatistics
2. Conduct teaching sessions for the junior staff
3. Review literature to address diagnostic and treatment options in children with complicated clinical backgrounds

4. Supervise first- and second-year fellows in decision-making
5. Participate in clinical reviews
6. Participate in the department teaching activities and in teaching of junior staff
7. Lead daily rounds as acting consultant

PROFESSIONALISM

1. Determine a framework for recognizing and dealing with ethical issues arising in the MHD
2. Demonstrate respect, compassion and integrity to patients and family members
3. Deliver high-quality care while maintaining sensitivity to cultural diversity, age, gender and disabilities.

SYSTEMS-BASED PRACTICE

1. Adopt skills needed to know how to lead the unit especially during crisis and when resources are limited
2. Participate in projects that improve utilization of the unit's equipment and consumables, like LEAN projects
3. Recognize shortage in equipment and monitoring devices that may affect patient care

METHODS TO ACHIEVE OBJECTIVES:

- Attend MOCK CPR sessions in the unit and in the OMSB simulation center
- Work with the nursing staff providing rapid response
- Attend multidisciplinary team counseling for patients requiring home ventilation.
- Perform regular follow up of home ventilation patients in the day care
- Participate in the unit and consultants' meetings
- Attend case discussions and debriefing sessions
- Coordinate transfer from referring hospitals to the unit
- Organize patients transfer from the unit to other hospitals
- Attend sessions on bioethics organized by the hospital ethics committee

- Review hospital ethics committee guidelines
- Participate in conflict resolution for clinical cases
- Lead discussions for cases needing conflict resolution in liaison with consultants and Ethical Committee, e.g. in situation s of discharge against medical advice
- Teach residents during rounds and participating in the resident's regular teaching sessions.
- Be involved in the monthly resident's evaluation
- Attend regular Sunday's grand round, identify patients for multidisciplinary meetings and arrange for them
- Attend family counseling sessions with consultants
- participate in ethics and communication seminars
- Access PICU medical journals and up-to-date sites from MOH and OMSB online libraries in research of best evidence for practice

PEDIATRIC POST CARDIAC SURGERY INTENSIVE CARE ROTATION

Duration: FY 1: 2 Blocks
FY 2: 2 Blocks
FY 3: 1 Block

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

SPECIFIC OBJECTIVES FOR FY 1:

Duration: FY 1: 2 Blocks

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Describe the anatomy, physiology of cardiovascular system and major cardiac lesions.
2. Describe the fetal circulation and changes that occur postpartum.
3. Demonstrate knowledge of causes and management of heart failure.
4. Demonstrate clinical knowledge and application of use of invasive and noninvasive hemodynamic monitoring.
5. Demonstrate basic knowledge of cardiorespiratory interactions and ventilation strategies in heart failure.
6. Apply knowledge about the effects of sedative and analgesics on cardiovascular system and associated side effects.
7. Discuss pathophysiology of pediatric cardiogenic shock and its management.
8. Describe the pharmacology of the common medications used in cardiac ICU including diuretics, inotropes and anti-arrhythmia medications.
9. Discuss the principles of surgical procedures of complex cardiac lesions, the expected complications and the post-operative management.
10. Demonstrate knowledge of cardiac emergencies including neonatal emergencies with duct dependent lesions, arrhythmias, child presenting with heart failure.

11. Discuss the indications of use of temporary pacemakers, how to operate pacemakers and when permanent pacemakers are needed.
12. Know the steps of the different PALS algorithms related to and arrhythmia management.
13. Demonstrate knowledge and skills in inserting Central Venous Line (CVL) insertion and intubation.

PATIENT CARE

1. Write comprehensive clinical notes, which include intraoperative events and transfer summaries.
2. Demonstrate effective management of cardiac emergencies.
3. Plan the management of patients post cardiac surgery and anticipate possible post-operative complications.
4. Effectively manage children post single ventricle surgery.
5. Ensure the detailed and complete follow-up and handover of all patients who are under the residents' care.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Demonstrate proficiency in obtaining informed consent.
2. Communicate effectively with families and explain procedures and common complications.
3. Communicate effectively with physicians and other health professionals.
4. Articulate relevant medical notes and transmit patient information clearly, efficiently and accurately.
5. Write notes for complex patients including admissions, transfers within the hospital or to another institution, discharge and death summaries.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Investigate and evaluate patient using evidence-based medicine
2. Use research tools for implementing better quality care
3. Identify learning needs (clinical questions) as they emerge in patient care activities.

4. Access medical information resources to answer clinical questions and library resources to support decision making.
5. Determine if clinical evidence can be generalized to an individual patient.
6. Identify, reflect upon, and learn from critical incidents such as near misses and preventable medical errors.

PROFESSIONALISM

1. Demonstrate sensitivity toward patients and their families.
2. Maintain professional communication with other team members.
3. Demonstrate respect, compassion, and accountability to patients and their families.
4. Accept feedback from all members of the health care team including faculty, peer residents, students, nurses, allied health workers, patients and their advocates.

SYSTEMS-BASED PRACTICE

1. Find a balance between patient care, learning and stress management.
2. Coordinate patient care within the health care system.
3. Identify relative costs of different diagnostic and treatment modalities.
4. Participate in bed management decisions.
5. Participate regularly in discussions with other clinical teams including respiratory therapy service, pharmacy on availability of medications and equipment and limitations encountered.

SPECIFIC OBJECTIVES FOR FY 2:

Duration: FY 2: 2 Blocks

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Apply knowledge of hemodynamic monitoring to detect changes in patient's condition and act accordingly.

2. Know the principles of ECMO support, indications, contra-indications and complications.
3. Analyze common pressure waveforms including central venous pressures, left atrial pressure.

PATIENT CARE

1. Coordinate multidisciplinary care for chronic cardiac ICU patients with multiple co-morbidities.
2. Demonstrate competence in managing patients after complex heart surgeries such as Norwood procedure and truncus arteriosus repair.
3. Demonstrate leadership in resuscitation of a sick child with congenital heart disease.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Show competence in leading case conferences between different health teams to discuss complex patients in a multidisciplinary manner.
2. Participate in online discussions with international teams around new services as applicable.
3. View the experience from families' perspective and learn to identify their expectations.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Teach residents the basic perioperative management of patients after heart surgeries.
2. Participate in the education activities of other health professionals such as journal clubs and regular CMEs in the NHC.
3. Appropriately integrate new or emerging medical evidence.

PROFESSIONALISM

1. Develop the appropriate conflict resolution skills necessary in a high stress environment.
2. Be aware of the hospital ethics guidelines and policy.
3. Participate in discussions of cases with ethical issues.

SYSTEMS-BASED PRACTICE

1. Coordinate patient care within the health care system.
2. Review existing unit policies and guidelines.
3. Participate in hospital quality and safety initiatives in the critical care units.
4. Deliver cost-effective, efficient and high-quality evidence-based clinical care within limitations of local resources.
5. Reflect awareness of common socio-economic barriers that impact patient care.
6. Identify costs for common diagnostic or therapeutic tests.
7. Dialogue with care team members to identify risk for and prevention of medical error.

SPECIFIC OBJECTIVES FOR FY 3:

Duration: FY 3: 1 Block

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Troubleshoot equipment failure of common equipment such as ECMO, pacemakers, etc.
2. Keep updated in the latest management strategies of patients with congenital heart diseases.

PATIENT CARE

1. Function as an acting consultant under supervision.
2. Supervise junior fellows and nurses in setting the daily patient management plan and evaluate patients on a daily basis.
3. Manage the unit as a leader in stressful conditions.
4. Lead daily unit and handover round and safety huddles.
5. Identify complex patients and discuss relevant clinical management and limitations of care if applicable including those indicated for “DNR” orders.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Counsel families about patient's condition and progress in presence of consultant.
2. Act in a consultative role to other physicians and health professions, and health related agencies.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Lead the daily round under-supervision of consultant
2. Conduct and lead quality improvement projects in the unit such as LEAN projects which are a set of management practices to improve efficiency and effectiveness by eliminating waste.
3. Formulate new policies and guidelines for the unit and update the present policies and guidelines.
4. Show competence in teaching junior fellows, residents and nurses.
5. Participate in training nurses of cardiac ICU.
6. Work effectively as a member or leader of a health care team or other professional group.

PROFESSIONALISM

1. Develop skills to resolve ethical issues for managing patients with complex clinical situations and know how to utilize multi -specialty meetings and ethical committee to treat these situations.
2. Demonstrate a commitment to ethical principles towards withholding of clinical care.
3. Maintain confidentiality of patient information.
4. Demonstrate sensitivity and responsiveness to patients' culture, age and disabilities.

SYSTEMS-BASED PRACTICE

1. Recognize the importance of regular unit and consultants' meetings in discussing various aspects of the unit's needs.
2. Recognize the importance of renewing and upgrading unit's services for a better patient care.

3. Collaborate with other health care providers and allied health care professional and advocate for optimum patient care.

METHODS TO ACHIEVE OBJECTIVES:

- Attend regular teaching sessions and fellows teaching.
- Use Self-directed learning.
- Attend Simulations activities.
- Regular discussions about ECMO patients care in the unit.
- Attend post-operative hand over and discussions with anesthetist.
- Attend Case discussions and debriefing sessions.
- Attend meetings with families supervised by attending consultants.
- Attend hand over discussions and multi-specialty meetings.
- Attend online clinical discussions.
- Lead daily morning rounds and discuss the plan with attending consultant.
- Attend morning safety huddles, handover meetings and plan the work of the day.
- Perform regular scheduled updates for existing policies and guidelines
- Participate regularly in journal clubs.
- Share recent articles to discuss during patient management.
- Regularly supervise teaching activities for residents.
- Rotate with other fellows and consultants in national presentations.

PEDIATRIC CARDIAC HIGH DEPENDENCY ROTATION

Duration: FY 2: 1 Block

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Recognize the deterioration of cardiac patient
2. Demonstrate knowledge of post-operative follow up of patient post cardiac surgery
3. Recognize arrhythmias and discuss initial management
4. Identify late complications in post cardiac surgical patients
5. Acquire the skills of intubation, insertion of Intercostal Drain (ICD) and insertion of Central Venous Line (CVL) with conscious sedation
6. Demonstrate knowledge of how to use the defibrillator
7. Demonstrate knowledge of the surgical procedures of complex cardiac lesions and post-operative management

PATIENT CARE

1. Apply the skills needed for stabilization of neonates with duct dependent circulations
2. Resuscitate a child according to PALS guidelines
3. Assess patients received from Pediatric Post Cardiac Surgery Unit and formulate an appropriate management plan
4. Prepare and plan appropriate pre-operative assessment of patients before cardiac surgery

INTERPERSONAL AND COMMUNICATION SKILLS

1. Write comprehensive transfer summaries of patients from cardiac ICU.
2. Deliver clear and detailed handovers when transferring patients to cardiac ICU.
3. Communicate effectively with other medical and paramedical teams to provide comprehensive patient care.

4. Provide regular and informative updates to patient's caregivers/family on the progress of the patient's clinical status.
5. Communicate effectively with subspecialty services.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Participate in the unit education activities.
2. Use information technology to optimize learning
3. Participate in MOCK Code for Pediatric Cardiac High Dependency staff
4. Demonstrate commitment to life-long learning via attendance of workshops and conferences.
5. Work as a team leader.

PROFESSIONALISM

1. Demonstrate professional communication with health care members
2. Develop skills to resolves conflict in the work environment.

SYSTEMS-BASED PRACTICE

1. Contribute to the unit polices and guidelines.
2. Provide patient care within the health care system resources.
3. Participate in resource management decisions.

METHODS TO ACHIEVE OBJECTIVES:

- Daily bedside, handover and fellow teaching rounds.
- Attend regular teaching sessions including sessions in simulation and quality.
- Self-directed learning.
- Journal Club.
- Attend national and international workshops and conferences.
- Perform procedures on patients in ICU, ER, or the ward.
- Attend morning safety huddle in post cardiac ICU and daily morning hand over.
- Work as acting consultant during the third year of fellowship training.

- Attend case discussions and debriefing sessions.
- Plan transfer plan from referring hospitals to the unit and coordinate patients transfer from the unit to other hospitals.
- Communicate with cardiac ICU medical team/Supervise transfer notes and handover
- Attend unit discussions and family meetings
- Participate and present in unit meetings, grand rounds and clinical audits

ANESTHESIA ROTATION

Duration: FY 1: 2 Blocks

Training Center: Royal Hospital and Sultan Qaboos University Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

Pediatric Intensive Care trainees are expected to develop a knowledge base and practice skill set which is similar to that of the anesthetic trainee. This mainly focuses on wider use of pharmacological agents and airway management of the critically ill patient requiring airway support. Pediatric Intensive Care fellows are required to undergo this training in the first year of fellowship for duration of 2 blocks.

General Objectives:

1. Learn the pharmacology of local and general anesthesia
2. Gain knowledge of inhalational anesthesia indications and use
3. Review cardiac and respiratory physiology and the effect of anesthesia on the functions of these systems.
4. Understand management of airway in regards to a) bag- mask ventilation, b) use of supraglottic airway devices, c) laryngoscopy and endotracheal intubation using different devices.
5. Manage difficult airways
6. Acquire/improve skills in obtaining in vascular access

By the end of this rotation the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Understand the pathophysiology, management of patient's disease.
2. Demonstrate basic pharmacological knowledge of the sedative, analgesics, inotropes and other agents used in patients.
3. Explain how to monitor and read continuous Electro Encephalo Graph (EEG)
4. Read and manage and Intra cranial pressure (ICP) probes or Extra Ventricular Device (EVD) data

5. Demonstrate placement of central line with and without ultrasound probes and it's monitoring.

PATIENT CARE

1. Provide effective and compassionate patient care during general anesthesia.
2. Anticipate, recognize and manage endotracheal intubation complications in a timely manner.
3. Perform cardiopulmonary resuscitation as a leader.
4. Recognize and manage child with difficult airway.
5. Perform assessment of airway and hemodynamics in patients post neurosurgery.
6. Understand the concept of futility of patient's condition.
7. Perform needful invasive procedures including intubations and invasive lines
8. Demonstrate competence in carrying out family counseling about disease progress and management options
9. Collect needful history and examination
10. Be involved in managing and organizing discharge of chronic patients, by being part in planning discharge of such patients.
11. Report on patient's condition to seniors in timely manner

INTERPERSONAL AND COMMUNICATION SKILLS

1. Understand the issues involved in communicating bad news to patients and families
2. Explain complicated medical issues in simple terms to families
3. Communicate with families and the medical team in tense situations or crises
4. Counsel families on the issue of withdrawal of life-sustaining treatment in patients with terminal or very poor prognosis
5. Sign over efficiently and accurately verbally and/or communicate patient plans in rounds and patient handover
6. Write comprehensive notes for complex patients, for admissions, transferring patients to another institute, discharge, and death summaries.
7. Communicate effectively and in a timely manner with consulting services
8. Communicate care plans clearly and precisely to members of the allied health teams

9. Work in a collaborative manner with rotating colleagues (Permanent staff, fellow learners and residents)
10. Demonstrate proficiency in obtaining informed consent

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Work on research and present critical care rounds
2. Demonstrate a basic understanding of biostatistics and study design
3. Work as a team leader
4. Be involved in self-directed learning, by attending reading articles and participating in giving lectures to juniors
5. Attend discussions of chronic patients with the PICU/department palliative care team
6. Participate in regular journal clubs.
7. Share recent articles to discuss during patient management
8. Develop a research protocol to present at department
9. Be familiar with recent critical care literature and have a sense of the state-of-the-art standards in the specialty

PROFESSIONALISM

1. Ensure detailed handover and complete follow-up of all patients under the fellows' care
2. Develop the appropriate conflict resolution skills necessary in a high stress environment
3. Demonstrate high level of ethical standards with parents/patients as well as the health care team
4. Develop a framework for recognizing and dealing with ethical issues that may arise in the PICU
5. Understand the stresses families face with infants requiring prolonged admission.

SYSTEMS-BASED PRACTICE

1. Balance time between patient care, learning and stress management
2. Prioritize a heavy workload effectively
3. Adapt policies and protocols for use of management of patients.

4. Be aware of the relative costs of different diagnostic and treatment modalities
5. Understand the responsibility, and the liability involved with the transfer of a patient from an institution to another
6. Participate in monthly PICU morbidity and mortality reviews.
7. Participate in bed-management decisions.
8. Organize transfer of patients to referring hospitals.
9. Discuss cost issues on rounds.
10. Coordinate needful consults and other subspecialty teams to provide the best treatment

METHODS TO ACHIEVE OBJECTIVES:

- Formal and informal teaching sessions
- Ensure attendance of simulation half days
- Performance of procedures on patients under supervision.
- Ensure attendance of workshops and conferences
- Ensure attendance and participation in classic PICU article journal club and subjects related to the rotation
- execute patient care and management plans
- Demonstrate increased responsibility in management of complex patients under supervision.
- Attend handover rounds
- Communication simulation
- Observed history and physical assessment of patients
- Feedback from key team members
- Formal academic seminars on the administrative aspects of running a PICU
- Lectures on negotiating tactics and ethical resource usage
- Receive feedback from referring centers and accepting services on wards.
- Hold primary responsibility for management of chronic PICU patient

ADVANCED PICU ROTATION

Duration: FY3: 6 Blocks

Training Center: King Faisal Specialist Hospital and Research Center, KSA

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Describe anatomy, physiology of airway and hemodynamics in traumatic patient and patients with burn/trauma/post-transplant/post neurosurgery.
2. Apply clinical knowledge in airway management in patients with burn/trauma/post-transplant/post neurosurgery.
3. Describe indications for placement of thoracotomy tubes and needle drainage of pneumothoraxes
4. Describe indications for paracentesis
5. Read and monitor continuous electro-encephalogram (EEG) data
6. Manage and read intracranial pressure (ICP) probes data
7. Describe physiology of reading intra-abdominal pressure and its indications.
8. Enumerate indications for fiber-optic bronchoscopy
9. Enumerate indications for pericardiocentesis.

PATIENT CARE

1. Demonstrate competence in collecting needful history and examination in patients with burn/trauma/post-transplant/post neurosurgery.
2. Provide effective and compassionate care for patients admitted in critical care area, by providing them effective management and providing family support.
3. Anticipate complications of the disease process in patients with burn/trauma/post-transplant/post neurosurgery
4. Recognize and manage them burn/trauma/post-transplant/post neurosurgery following up patient's hemodynamics and laboratory values on daily basis.
5. Recognize sick pediatric patients in the unit or in any other pediatric ward and manage them effectively with complete plan and further follow up.

6. Perform cardiopulmonary resuscitation as a leader in case of cardiac arrest situation.
7. Choose the right diagnostic test for the disease and treatment based on latest literature review and evidence base medicine for patients with burn/trauma/post-transplant/post neurosurgery.
8. Execute patient care and management plans to the supervisor during rotation.
9. Function as acting consultant.
10. Provide high level of care expected for the patient by fulfilling their needs and regular counseling.
11. Manage the unit as a leader in stressful condition by dividing tasks to different staff and bed mobilizing patients in disaster conditions.
12. Coordinate needful consults and other subspecialty teams to provide the best treatment
13. Organize and manage discharge of chronic patients especially post-transplant patients.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Understand the issues involved in delivering bad news to patients and families
2. Explain complicated medical issues in simple terms to families
3. Communicate with families and the medical team in tense situations or crises
4. Understand and counsel families on the issue of withdrawal of life-sustaining treatment in patients with terminal or very poor prognosis.
5. Communicate effectively and in a timely manner with consulting services
6. Discuss care plans clearly and precisely to members of the allied health teams
7. Work in a collaborative manner with rotating colleagues (permanent staff, fellow learners and residents)
8. Write notes for complex patients, for admissions, transferring patients to another institute, discharge, and death summaries.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Demonstrate the skills necessary to research and present at critical care rounds.
2. Organize critical care teaching rounds

3. Use information from the literature to assess the utility of therapeutic options in complex patients.
4. Develop research protocols to present in the department
5. Attend Journal club
6. Teach junior residents at the bedside.
7. Share recent articles to discuss during patient management discussions.
8. Be familiar with recent critical care literature and have knowledge of the state-of-the-art standards in the specialty.

PROFESSIONALISM

1. Ensure detailed handover and complete follow-up of all patients under the fellows' care
2. Develop the appropriate conflict resolution skills necessary in a high stress environment
3. Understand the responsibility, and the liability involved with the transfer of a patient from an institution to another
4. Demonstrate high level of ethical standards with parents/patients as well as the health care team
5. Develop a framework for recognizing and dealing with ethical issues that may arise in the PICU

SYSTEMS-BASED PRACTICE

1. Balance time between patient care, learning and stress management
2. Effectively prioritize a heavy workload
3. Participate in bed-management decisions.
4. Be familiar with administrative organization required for running PICU.
5. Determine unit staffing requirement and equipment requirements
6. Be aware of the relative costs of different diagnostic and treatment modalities

METHODS TO ACHIEVE OBJECTIVES:

- Assessment of fellow in daily bedside rounds, by discussion around the patients with burn/trauma/post-transplant/post neurosurgery

- Attendance of formal and informal teaching sessions
- Performance of procedures on patients in PICU, emergency room (ER), or the ward.
- Increase responsibility in management of complex patients.
- Attending handover and it's followed up.
- Organize transfer of patients to referring hospitals function as junior consultant during third year of training
- Case discussions and debriefing
- Feedback from key team members
- Run family meetings in the presence of unit consultant
- Lectures on negotiating tactics and ethical resource usage
- Attend fellow teaching rounds

ELECTIVE ROTATIONS

Pulmonology / Emergency medicine (EM) / Radiology

During the fellowship, the fellows will have 2 blocks as electives in one of the following subspecialties: Pulmonology, Emergency medicine or radiology. The fellow can also choose
to rotate in 2 elective subspecialties (one blocks each subspecialty)

Duration: FY 2: 2 Block

Training Center: Royal Hospital

Methods of Assessment: In-Training Assessment Report (ITAR) and 360 Feedback

Emergency medicine (EM):

By the end of this rotation, the fellows are expected to accomplish the following:

MEDICAL KNOWLEDGE

1. Obtain knowledge in common pharmacology agent used for conscious sedation in EM
2. List principles of "the golden hour" and being able to function as a Trauma Team Leader in EM.
3. Develop time-efficient and appropriate history, exam and differential diagnosis in the EM setting
4. Identify principles of transport physiology, being able to perform intra or inter-hospital transport of patients in EM.

PATIENT CARE

1. Triage patients according to their level of sickness and prioritize emergency care.
2. Recognize sick patients and those in respiratory and circulatory failure and provide emergency management in timely manner.
3. Perform emergency procedures such as intraosseous line, tracheal intubation and needle thoracotomy.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Explain complicated medical issues in simple terms to families
2. Communicate with families and the medical team in tense situations or crises.

3. Obtain consent for any invasive procedures for EM
4. Work in a collaborative manner with rotating colleagues (permanent staff, fellow learners and OMSB residents).
5. Understand the responsibility, and the liability involved with the transfer of a patient from an institution to another
6. Observe of nursing and other allied health staff interaction and incorporate their feedback during monthly evaluations.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Participate in teaching junior house staff and allied health professionals using both informal and formal teaching methods.
2. Ensure attendance and participate in journal club and grand round related to the rotation
3. Share updates in emergency management with other team members
4. Obtain regular feedback from consultant and allied health regarding teaching quality
5. Obtain consent for blood product administration, procedures and research.
6. Lead MOCK codes conducted for junior residents in ED

PROFESSIONALISM

1. Apply and execute conflict resolution skills.
2. Demonstrate the ability to lead and coordinate care with multiple health care provider

SYSTEMS-BASED PRACTICE

1. Learn how to effectively prioritize a heavy workload in emergency department.
2. Collaborate with different hospitals for patient management.
3. Effectively coordinate care with primary care providers and specialist physicians

METHODS TO ACHIEVE OBJECTIVES:

- Ensure attending fellow teaching rounds.
- Case discussion/presentation
- Lead the team during trauma and CPR codes in ED

- Performance of procedures on patients with conscious sedation
- Feedback from key team member
- Formal academic seminars on the administrative aspects of running a busy service
- Attend lectures on negotiating tactics and ethical resource usage
- Competence in delivering patient care and management plans

Pulmonology:

MEDICAL KNOWLEDGE

1. Learn pathophysiology, diagnostic tests and management of acute and chronic lung disease
2. Master the interpretation of pulmonary function and exercise testing
3. Learn the basics of bronchoscopy and understand the indications, complications, and limitations of the procedure
4. Gain familiarity with sleep studies

PATIENT CARE

1. Coordinate needful consults and other subspecialty teams to provide the best treatment.
2. Acquire the knowledge of possible complications in patients with chronic lung diseases that might require PICU care and be able to manage according to the physiology of each condition.
3. Organize transfer of patients to referring hospitals
4. Coordinate with different health care professionals the discharge of patients on home ventilation
5. Understand the indications to start home ventilation
6. Obtain consent for any invasive procedures for pulmonology

INTERPERSONAL AND COMMUNICATION SKILLS

1. Lead family meeting and develop counseling skill for patient and their family with chronic medical issues

2. Organize and collaborate with different health professionals for acceptance and transfer of patients from different institute
3. Observe of nursing and other allied health staff interaction and incorporate their feedback during monthly evaluations.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Use information in the critical assessment of new therapies and of the medical literature
2. Participate in journal club and grand round
3. Obtain regular feedback from consultant and allied health regarding teaching quality
4. Obtain consent for bronchoscopy
5. Involve in Teaching activities for residents and junior fellows.

PROFESSIONALISM

1. Reply to referrals in timely manner.
2. Develop conflict resolution skills.
3. Receive feedback from referring centers and accept services on wards

SYSTEMS-BASED PRACTICE

1. Learn costs of different diagnostic and treatment modalities.
2. Learn different types and modalities of home ventilation machine.
3. Coordinate management plan of patients with complex medical backgrounds with different subspecialty teams
4. Collaborate with different hospitals for patient management.
5. Manage consultations from different teams, ED and other referring institute
6. Execute plan orders given during patient's round; refer patients to other teams and hospitals as planned and communicate management plans with referring hospitals.

METHODS TO ACHIEVE OBJECTIVES:

- Ensure attending fellow's teaching rounds.
- Attend bronchoscopy with hands-on practice.
- Attend outpatient clinics and sleep study clinics

- Attend daily pulmonology patient's rounds and consults from other specialties
- Feedback from key team member
- Attend formal academic seminars conducted for fellows

Radiology:

MEDICAL KNOWLEDGE

1. Obtain the knowledge on indications, limitations and risks of different radiological modalities
2. Basic interpretation of different clinical imaging studies and pprovides appropriate differential diagnoses
3. Explain how ultrasound could help in insertion of different intravascular accesses like peripherally inserted central catheter (PICC).
4. Explain how to use ultrasound in differentiating between pneumothorax and fluid collection, or a consolidation.

PATIENT CARE

1. Perform point of care (POC) ultrasound for trauma patients.
2. Perform ultrasound guided vascular access.
3. Assess (by ultrasound) diaphragm palsy and pleural effusion and perform basic cranial study.
4. Attend ultrasound clinic and perform ultrasound under supervision.
5. Obtain consent for any invasive procedures for radiology

INTERPERSONAL AND COMMUNICATION SKILLS

1. Explain to the family risk of radiology exposure
2. Communicate the urgent reports to the primary team
3. Work in a collaborative manner with rotating colleagues (permanent staff, fellow learners and OMSB residents).

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Understand the concept of futility of medical equipment in radiology.

2. Use information from the literature to assess the utility of diagnostic and therapeutic options in complex patients
3. Participate in teaching activities within the radiology department
4. Present in departmental journal clubs
5. Obtain regular feedback from consultant and allied health regarding teaching quality

PROFESSIONALISM

1. Interact with other colleague respectfully.
2. Receive feedback from other departments /centers
3. Work effectively with department faculty, residents, and support staff

SYSTEMS-BASED PRACTICE

1. Learn costs of different diagnostic and treatment modalities.
2. Manage consultations between different teams.

METHODS TO ACHIEVE OBJECTIVES:

- Hands-on practice of using ultrasound for vascular access
- Attend pediatric radiology teaching activities
- Participate in case discussion/presentation held by the radiology department
- Participate in Tuesday radiology teaching session of child-health department
- Attend procedures in Ultrasound room
- Attend interventional radiology procedures
- Perform needful invasive procedures under supervision.

RESEARCH ROTATION

Duration: The research will be longitudinal throughout the fellowship year

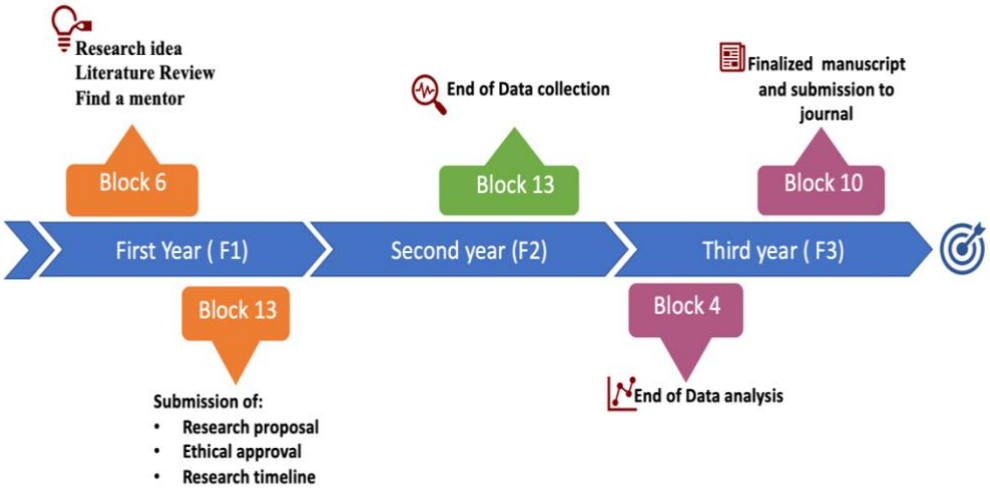
Training Center: Royal Hospital

Methods of Assessment: Research Project Assessment and 360 Feedback

The expected research outcome is an evidence of manuscript submission to a journal. The fellows may choose a mentor based on their research interest and the fellow may liaise with any of the faculty members should they discover a research topic of mutual interest. The evaluation and monitoring of research progress will be done by the program director. The expected research progress each year and the timeline are explained as following and summarized in the diagram and table below.

1) The fellow should have research idea, complete literature review and have a research mentor by Block 6 of the first fellowship year.
2) By Block 13 of the first year, the fellow is mandated to submit research proposal, ethical approval and research timeline (attached and explained below) to the program director.
3) By block 13 of the second year, the fellow should complete data collection.
4) Data analysis is expected to be completed by block 4 of the third year.
5) By block 10 of the third year, the fellow should have an evidence of manuscript submission to a journal.
6) The research progress evaluation by research mentor should be submitted to the program director every 6 months starting from the first year of fellowship.
7) If the fellow did not progress well in research and did not follow the above timeline and requirements, should go for remediation.
8) The minimum research outcome for the fellowship program is submission of a manuscript to a journal. This does not mandate acceptance by journal yet.
9) The fellow should fill with the research mentor the attached research project timeline by block 6 of the first year. It helps to track the research progress and to stick to the timeline in order to meet the research requirement every year.

PICU fellows research project plan



Research progress evaluation every 6 month by the research mentor to be submitted to the program director

PICU fellow Research Project Timeline

To be filled by fellows and research mentor and submitted to the education committee not later than Block 13 of the first year of residency

Research Title		
Supervisor		Hospital:
Fellow	1.	

Task	Research question & literature review	Proposal writing statistician consult	Proposal submission for ethical approval	Data collection	Data Analysis	Manuscript Writing	Manuscript submission to journal
Deadline	Date:						
Tick once completed	√						
Research members meetings	Date:						
Attendants							

The fellows are expected to accomplish the following:

FY 1:

MEDICAL KNOWLEDGE

1. Develop sufficient skills to convert research idea to a research question and to a research proposal.
2. Critically analyze the existing literature to understand the current state of knowledge and gaps in that knowledge,
3. Demonstrate sufficient understanding in choosing research designs.
4. Understand and obtain ethical approval.

PATIENT CARE

1. Appropriately integrate scientific concepts and research advances in routine clinical encounters.
2. Routinely assess the quality of evidence in clinical decisions.
3. Select the suitable study design to answer one's question.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Communicate appropriately with patients, their families and provide effective counseling on pros and cons of involvement in a research study and take consent.
2. Discuss the research project with the Research Supervisor, appropriate consultants and the Research Subcommittee, including statisticians and other specialists in research design and or scientific knowledge.
3. Work efficiently on a project as part of a team

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.
2. Appropriately integrate new or emerging medical evidence.
3. Participate in the design and implementation of a research project, either clinical or basic, including interpretation of results and preparation of abstracts and manuscripts.

PROFESSIONALISM

1. Demonstrate sensitivity to patient autonomy and safety in research.
2. Practice with integrity in the conduct of research, including understanding issues relating to relationships with industry.
3. Incorporate ethical and moral considerations in research project decisions and management.

SYSTEMS-BASED PRACTICE

1. Obtain ethical approval before start of the research
2. Report to his/her research supervisor on regular basis.
3. Visit wards or clinic for recruiting patients, taking consent for a prospective study and data collection if applicable.
4. Effectively access and utilize institutional data for research.
5. Know the role of and how to interact with institutional review board or ethical approval committee.

FY 2:

MEDICAL KNOWLEDGE

1. Summarize and submit available evidence by critical review of medical literature on the topic.
2. Know how to develop data collection sheet and choose the appropriate variables.
3. Learn how to do preliminary analysis of available data.
4. Demonstrate reliability in data collection and its interpretation.

PATIENT CARE

1. Use one's knowledge and skills in caring for patients to develop research questions.
2. Study health care delivery, management of specific disease processes, screening for diseases or other aspects of health care as an area to study.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Possess good interpersonal and communication skills that result in information exchange and partnering with health care professionals, patients and the research team.
2. Interpret and communicate results of the study to supervising faculty and other appropriate authorities and how this might impact clinical care (e.g., through presentations).

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Know the research processes in development of a hypothesis, formulation of research methodology to investigate the hypothesis, proper execution of the research project, appropriate statistical analysis, and presentation of data
2. Participate in routine academic discussions.
3. Attend and actively participate in research presentation
4. Understand the fundamentals of grant writing

PROFESSIONALISM

1. Demonstrate appropriate professional and ethical behavior in relation to the research project and in dealing with other health care professionals and/or subjects involved in the study.
2. Exhibits professionalism with respect to attendance and punctuality when attending courses or sessions in relation research.
3. Respect the patients' confidentiality and the privacy of medical information in performing research.

SYSTEMS-BASED PRACTICE

1. Be mindful of cost-effectiveness issues in research
2. Be sensitive to medical-legal issues
3. Have information technology/computer resources available
4. Enter data collected in electronic data form.

FY 3:

MEDICAL KNOWLEDGE

1. Learn and develop an approach to the understanding and interpretation of available literature.
2. Demonstrate how to analyze data under supervision.
3. Identify limitations in the research project and discuss them with the supervisor mentor of research
4. Understand and utilize bio-statistical methods to analyze its results,
5. Make logical conclusions from the results and write a publishable manuscript.

PATIENT CARE

1. Apply principles of biomedical ethics as they pertain to human subject research in the identification of patients as potential research subjects, obtaining of informed consent, and ensuring the security and confidentiality of clinical data used for research.
2. Ensure that the achievement of research does not compromise patient care.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Effectively present the research project in a proper venue.
2. Write a scientific abstract for potential
3. Demonstrate appropriate skills in preparing manuscripts and choosing journal for research publication.

PRACTICE BASED LEARNING AND IMPROVEMENT

1. Have information about resources available on relevant medical literature
2. Assess and effectively analyze published literature in critically acclaimed journals and texts
3. Apply clinical trials data to patient management especially to those who are part of the study.

PROFESSIONALISM

1. Recognize own limitations and strengths and the ability to ask for assistance when needed.
2. Demonstrate a commitment to executing professional responsibilities, adherence to ethical principles and sensitivity to diversity in relation to the study.

SYSTEMS-BASED PRACTICE

1. Demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.
2. Interpret research findings accurately and apply knowledge of the implications of the findings for patient care and system care.

METHODS TO ACHIEVE OBJECTIVES:

- Self-directed learning
- Classic PICU article journal club and subjects related to the rotation
- Be familiar with recent critical care literature and have a sense of the state-of-the-art standards in the specialty
- Attend research workshops and conferences based on evidence based national or international.

8. DIDACTIC TEACHING

The teaching schedule will include regular sessions with the PICU team on Monday, Tuesday, and Thursday. In addition, the fellows will attend the pediatric grand rounds on Wednesdays in Royal hospital. The pediatric grand covers presentations on different topics in pediatrics, including regular morbidity and mortality rounds every month.

Academic Teaching Program Map

Week	1	2	3	4
Sunday	PICU GR	PICU GR	PICU GR	PICU GR
Monday	Permanent registrar's presentation Topics include: • Journal club • New guideline • Review articles • Cases with unusual presentation	Fellow 's presentation Topics include: • Journal club • Landmark papers • New guideline • Review articles	Consultant's presentation Topics include: • Journal Club • New guidelines • Topics related to Quality and safety	Unit morbidity and mortality
Tuesday	Protected Time for Fellow's teaching (12-14 hours)	Protected Time for Fellow teaching (12-14 hours)	Protected Time for Fellow teaching (12-14 hours)	Protected Time for Fellow teaching (12-14 hours)
Wednesday	Pediatric Grand Rounds	Pediatric Grand Rounds	Pediatric Grand Rounds	Pediatric Grand Rounds
Thursday	Resident Presentation			PICU MMM

MMM = Mortality and Morbidity Meeting

GR= Ground Round

PICU= Pediatric Intensive Care Unit

General Objectives for the teaching sessions:

1. Discussion of evidence-based practices related to pediatric intensive care
2. Presenting review articles related to various management aspects in intensive care
3. Discussion of land-mark papers and review of the evidence for decision-making in the intensive care
4. Critically appraise new journal articles
5. Discussion of applied physiology and pharmacology, including organ systems such as respiratory physiology, cardiovascular and renal systems, etc.
6. Conducting simulation sessions to simulate common PICU scenarios and crisis management
7. Discussion of diseases seen in critically ill children related to metabolic, orthopedics, neurosurgical emergencies, etc.
8. Review the indications of using different organ support devices, including mechanical ventilators, nitric oxide, ECMO, renal replacement, etc.

Modules for applied physiology and pharmacology sessions include the following:

Module 1: Respiratory physiology, including pulmonary gas exchange, alveolar ventilation, and carbon dioxide exchange

Module 2: Applied respiratory physiology related to pulmonary mechanics, pulmonary circulation, and pulmonary control

Module 3: Respiratory system monitoring, including principles of pulse oximetry and capnography

Module 4: Neurophysiology and cerebrovascular auto-regulation

Module 5: Cardiovascular physiology and hemodynamic monitoring

Module 6: Cardiorespiratory interactions in children

Module 7: Physiology of the renal system

Module 8: Antimicrobials, indications, and common side effects

Module 9: Acid-base analysis and blood gas interpretation

Module 10: Common electrolyte imbalances

Module 11: Intravenous fluids and their different types

Module 12: Common medications used in cardiac ICU

Modules for common conditions in PICU and related organ support used:

Module 1. Mechanical ventilation

Objectives

- Discuss the effects of positive pressure ventilation on the hemodynamic state
- Review indications, contraindications of using high flow nasal cannula and non-invasive ventilation, initiation and weaning, identification of failures
- Discuss the basic concepts used in mechanical ventilation, including setting up the ventilator, different settings used, triggering and ventilator cycling, etc.
- Discuss and review different types of ventilation modes
- Describe the concepts, mechanisms, and indications for using high-frequency oscillatory ventilation and airway pressure-release ventilation (APRV)

Module 2. Sedation and analgesia in PICU

Objectives

- Review the pharmacology of common sedative and analgesia agents in PICU
- Discuss the different assessment tools used to assess sedation, comfort, withdrawal, and delirium
- Discuss the risk factors and treatment used for withdrawal and delirium

Module 3. Acute lung injury and ARDS

Objectives:

- Discuss different definitions, causes, pathophysiology, and ventilation modes used in ARDS
- Discuss other management strategies for treating ARDS, such as prone position, steroids, etc.
- Review indications of the use of nitric oxide in ARDS and participate in setting up the device used for NO delivery

Module 4. Septic shock

Objectives

- Discuss the definitions used for septic shock

- Review the pathophysiology and multi-organ failure seen in septic shock
- Discuss the concept of fluid responsiveness in septic shock
- Review and discuss the latest guidelines in the treatment of pediatric septic shock

Module 5. Postoperative Cardiac Care

Objectives

- Discuss the physiological consideration used in managing common cardiac lesions
- Review pathophysiology and management of common post-op complications, including bleeding, low cardiac output syndrome, pulmonary hypertension, pulmonary circulation, and cardiac arrhythmias
- Discuss the use of pacemakers and ECMO in postoperative cardiac patients

Module 6. Fulminant hepatic failure and management

Objectives

- Review the definition used to diagnose acute liver failure
- Discuss the pathophysiology and organ failure seen in patients with liver failure
- Discuss PICU management of acute liver failure
- Discuss indications of using CRRT and plasmapheresis in acute liver failure
- Participate in hands-on sessions of CRRT

Module 7. Acute kidney injury (AKI) and renal replacement therapy (RRT)

Objectives

- Discuss the definition and staging used in paediatric acute kidney injury
- Review the different dialysis modalities used in AKI with the advantages of each and the limitation
- Discuss fluid overload in PICU, its causes, and how to diagnose it
- Review indications of CRRT modalities and their mechanism of action
- Review how to successfully write the prescription for CRRT and plasmapheresis
- Participate in hands-on sessions for CRRT and plasmapheresis

Module 8. Cardiopulmonary interaction

Objectives

- Discuss the relationship between pulmonary and cardiovascular function under normal conditions and describe how pathologic cardiovascular and pulmonary states alter cardiopulmonary interactions
- Review the applications of cardiopulmonary interactions in the management of heart failure, cardiogenic shock, and the post-cardiac management of different cardiac lesions

Module 9. Equipment used in PICU:

- Common devices used for organ support in PICU will be discussed with hands-on sessions, including non-invasive and invasive positive pressure mechanical ventilation, pacemaker, extracorporeal cardiac support, CRRT, nitric oxide, etc.

Other subspecialty-related topics seen in PICU:

1. Management of metabolic crises in PICU
2. Interpretation of standard MRI and CT brain images
3. Management of orthopaedic emergencies in the PICU
4. Management of neurosurgical emergencies in PICU
5. Post-operative renal transplant care
6. Post-bone marrow transplant care
7. Upper/lower gastrointestinal bleed management
8. Topics related to ethics and leadership
9. Toxicology: Approach the child with the unknown ingestion, discuss decontamination, review selected overdoses and management
10. Management of burn cases in PICU
11. Management of Road Traffic Accident (RTA) victims in PICU: discuss the Advanced *Trauma Life Support* (ATLS) approach to evaluation and initial treatment of the injured child.

Monday's Teaching Activities:

Monday, teaching activities will be assigned to the consultants, fellows, and senior registrars. Discussions will include new journal papers, guidelines, critical appraisal, addressing clinical questions and issues related to patient quality and safety.

Tuesday's Teaching Activities:

Teaching schedule:

The followings are Tuesday teaching topics which will be conducted on Tuesday afternoon hours from 12:00-14:00.

The lectures will suit all three fellowship training levels (FY1-FY3).

Block	Week	Title of the Presentation	Presenter
1	I	Basic of respiratory physiology	**Dr. Najwa Al Rahbi**
	II	Mechanical Ventilation and common ventilation modes basic mode	**Dr. Samiuddin Shaikh**
	II	Mechanical Ventilation and common ventilation modes advanced mode (HFOV, Bivent)	**Dr. Suad Al Ismaili**
	III	Land mark paper discussion	**Fellow /supervised by Dr. Kholoud Said**
	IV	Simulation training: Pediatric Difficult Airway Status Asthmaticus	**Dr. Omer AL Defai**
2	I	Tracheal intubation equipment, intubation bundles and algorithms	**Dr. Mohammed Al Gaferi**
	II	Leadership	**External Speakers (Dr. Ismail Al Rashdi)**
	III	Approach to poly trauma /Hemorrhagic shock	**Dr. Ammar Al Zidjali**
	IV	Simulation training: Non-Accidental Injury	**Dr Najwa Al Rahbi**
3	I	Land mark paper discussion	**Fellow / supervised by Dr. Saif Awlad Thani**
	II	Cardiac Cath data interpretation and CV monitoring: staticvsdynamic, bedside analysis	**External Speaker**
	III	Critical heart failure and inotropes/cardiogenic shock	**Dr. Raghad Abdwani**
	IV	Simulation training: Coaractation of Aorta	**Dr. Said AL Hanshi**
4	I	Sedation, NMB, withdrawal and delirium	**Dr. Zahraa Al Lawati**
	II	Neuromonitoring: physiology ICP , management of TBI and raised ICP	**Dr. Raghad Abdwani**
	III	Landmark paper discussion	**Fellow /supervised Dr. Akram**
	IV	Simulation training: Increase ICP	**Dr. Samiuddin Shaikh**
5	I	AKI in PICU	**Dr. Kholoud Al Mukhaini**

Block	Week	Title of the Presentation	Presenter
	II	Renal replacement therapies	**Dr. Suad Al Ismaili**
	III	Renal replacement therapies including peritoneal dialysis /Hands on	**Safia Al Habsi**
	IV	Simulation training:	**Dr. Raghad Abdwani**
6	I	Sepsis and organ dysfunction	**Dr. Balqees Al Noobi**
	II	Nutrition in Critical illness	**Dr. Farhana Al Othmani**
	III	Land mark paper discussion	**Fellow /supervised by Dr. Omer**
	IV	Simulation training: Septic Shock	**Dr. Akram**
7	I	Ethics in PICU	**Dr. Said AL Hanshi**
	II	ARDS, Use of NO in PICU	**Dr. Saif AwladT hani**
	III	Arrhythmia and pacemaker use	**Dr. Omer AL Defai**
	IV	Simulation training: Pediatric ARDS	**Dr. Farhana Al Othmani**
8	I	Acute liver failure and management	**Dr. Balquis AL Noobi**
	II	Status Epilepticus Stroke	**External Presenter**
	III	Metabolic crisis and encephalopathy	**External Presenter**
	IV	Simulation training: Status Epilepticus	**Dr. Saif Awladthani**
9	I	DKA &Other endocrine issues in picu	**Dr. Zahraa Al Lawati**
	II	Post organ transplant management in PICU (kidney, liver , BMT)	**Dr. Akram**
	III	Critical care of haemato-oncology patients , Common oncology emergencies	**Dr. Najwa Al Rahbi**
	IV	Simulation training: Acute Chest Syndrome	**Dr. Kholoud Al Mukhaini**
10	I	Post-operative cardiac care	**Dr. Mohammed Al Gaferi**
	II	Mechanical circulatory support	**Dr.Said Al Hanshi**
	III	Cardiac US and shock management	**Dr. Samiuddin Shaikh**
	IV	Simulation training: Cardiogenic Shock Pediatric SVT	**Dr. Mohammed Al Gaferi**

Examples of Land Mark papers include the following:

1. **SAFE Trial (Albumin vs. Saline for fluid resuscitation)**
   A comparison of albumin and saline for fluid resuscitation in the intensive care unit. N Engl J Med. 2004 May 27;350(22):2247-56. doi: 10.1056/NEJMoa040232. PMID: 15163774
2. **ACURASYS(Cisatracurium for early ARDS)**
   ACURASYS Study Investigators. Neuromuscular blockers in early acute respiratory distress syndrome. N Engl J Med. 2010 Sep 16;363(12):1107-16. doi: 10.1056/NEJMoa1005372.
3. **Rivers 2001(Early goal-directed therapy for severe sepsis and septic shock)**
   Early Goal-Directed Therapy Collaborative Group. Early goal-directed therapy in the treatment of severe sepsis and septic shock. N Engl J Med. 2001
4. **Recovery Trail Dexamethasone for COVID-19**
   Dexamethasone in Hospitalized Patients with Covid-19. N Engl J Med. 2021 Feb 25;384(8):693-704. doi: 10.1056/NEJMoa2021436. Epub 2020 Jul 17. PMID: 32678530; PMCID: PMC7383595.
5. **PROSEVA Prone Positioning in severe ARDS**
   PROSEVA Study Group. Prone positioning in severe acute respiratory distress syndrome. N Engl J Med. 2013 Jun 6;368(23):2159-68. doi: 10.1056/NEJMoa1214103. Epub 2013 May 20. PMID: 23688302.
6. **FEAST Fluid boluses in African Children with severe infection**
   FEAST Trial Group. Mortality after fluid bolus in African children with severe infection. N Engl J Med. 2011 Jun 30;364(26):2483-95. doi: 10.1056/NEJMoa1101549. Epub 2011 May 26. PMID: 21615299.
7. **ChiP Tight glycemic control in Pediatric patients**
   CHiP Investigators. A randomized trial of hyperglycemic control in pediatric intensive care. N Engl J Med. 2014 Jan 9;370(2):107-18. doi: 10.1056/NEJMoa1302564. Erratum in: N Engl J Med. 2014 Apr 10;370(15):1469. PMID: 24401049.
8. **THAPCA Trial Therapeutic Hypothermia after In-Hospital Cardiac Arrest in Children**
   Therapeutic Hypothermia after In-Hospital Cardiac Arrest in Children. N Engl J Med. 2017 Jan 26;376(4):318-329. doi: 10.1056/NEJMoa1610493. Epub 2017 Jan 24. PMID: 28118559; PMCID: PMC5310766.
9. **ARISE early goal directed therapy vs. usual care in early septic shock**
   Goal-directed resuscitation for patients with early septic shock. N Engl J Med. 2014 Oct 16;371(16):1496-506. doi: 10.1056/NEJMoa1404380. Epub 2014 Oct 1. PMID: 25272316.
10. **ARDSnet 2000 lower tidal volume for ARDS**
    Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory distress syndrome. N Engl J Med. 2000 May 4;342(18):1301-8. doi: 10.1056/NEJM200005043421801. PMID: 10793162.
11. **DECRA early decompressive craniectomy in traumatic brain injury**
    Decompressive craniectomy in diffuse traumatic brain injury. N Engl J Med. 2011 Apr 21;364(16):1493-502. doi: 10.1056/NEJMoa1102077. Epub 2011 Mar 25. Erratum in: N Engl J Med. 2011 Nov 24;365(21):2040. PMID: 21434843.

12. **FIRST ABC Step down Effect of High-Flow Nasal Cannula Therapy vs Continuous Positive Airway Pressure Following Extubation on Liberation From Respiratory Support in Critically Ill Children**
    FIRST-ABC Step-Down RCT Investigators and the Paediatric Critical Care Society Study Group. Effect of High-Flow Nasal Cannula Therapy vs Continuous Positive Airway Pressure Following Extubation on Liberation From Respiratory Support in Critically Ill Children: A Randomized Clinical Trial. JAMA. 2022 Apr 26;327(16):1555-1565. doi: 10.1001/jama.2022.3367. PMID: 35390113; PMCID: PMC8990361.
13. **Kumar 2006 Delay in antibiotics increases septic shock mortality**
    Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. Crit Care Med. 2006 Jun;34(6):1589-96. doi: 10.1097/01.CCM.0000217961.75225.E9. PMID: 16625125.
14. **Meduri protocol for early ARDS**
    Methylprednisolone infusion in early severe ARDS: results of a randomized controlled trial. Chest. 2007 Apr;131(4):954-63. doi: 10.1378/chest.06-2100. PMID: 17426195.

During the sessions on finding the evidence for intensive care practice, the fellow is expected to discuss the rationale briefly behind the intervention or medication indicated and then critically review certain conclusions from the paper.

For example, if the task is finding evidence for the use of inhaled nitric oxide in ARDS, the fellow is expected to discuss the pharmacology of nitric oxide and its role in improving oxygenation and then speak about the supportive evidence for that intervention.

Thursday's Teaching Activities:

These will be assigned to the pediatric residents rotating in PICU. Topics will include reviews related to pediatric intensive care, journal club, and discussion of cases with unusual presentations. The consultants and the fellows will supervise these discussions.

9. THE PEDIATRIC INTENSIVE CARE SIMULATION PROGRAM:

The pediatric intensive care simulation for year 1:

Objectives:

1. Allow the fellow to practice and acquire the competences and the expected skills needed in the field of pediatric intensive care.
2. Provide a practice environment for the various scenarios related to pediatric advanced life support and trauma codes.
3. Demonstrate effective team dynamics during mock sessions.
4. Practice key clinical knowledge and skills, and improve communication in a psychologically safe environment.

The technical skills practice sessions During Year One:

1. Demonstrate clinical skills of competent performance of central venous access under ultrasound guidance with supervision and advance to independent performance.
2. Practice screening lungs, heart, and hemodynamics with the useof the ultrasound machine.
3. Chest drain insertion by Seldinger technique and using surgical drains.
4. Operating the conventional ventilators and high frequencyoscillatoryventilation(HFOV) for different ventilatory scenarios. In addition, recognizing the different parts and functions of these ventilators.

Method:

The simulation lab will be used to gain the above-mentioned skills. High-fidelity manikins will be utilized for the various mock scenarios. The mock scenarios will be followed by group debriefing. Ultrasound machines will be used for skill gain in vascular access and in the use of ultrasound in critical care. The fellows will practice using the various task trainers for use of ultrasound and chest drain insertions.

Assessment

Skill gain will be assessed using various checklists. The fellows are required to have 1:1 mentoring with the trainer/trainers. The mock scenarios will be assessed using key learning points for each scenario. The activity as well as the trainer/trainers will be evaluated using OMSB evaluation forms.

<u>The pediatric intensive care simulation for year 2:</u>

Objectives:

1. Demonstrate investigatory and analytic thinking approaches to various difficult clinical scenarios in a real-time.
2. Establish effective team communication with members of the health care team (including nurses, residents and other fellows)during mock sessions in the PICU.
3. Handle conflicts and give constructive feedback to team members involved in the mock simulation.

The technical skills practice sessions during year 2:

1. Illustrate the indications for ECMO usage in different critical care situations including post cardiac surgery emergencies and for other hemodynamic support. This will include recognizing the different parts of the ECMO circuits and their functions, and how to troubleshoot malfunctions or complications.
2. Use of temporary pacemakers in a post cardiac intensive care unit. This will include recognizing the different parts of the pacemakers and how to operate them.In addition, demonstrating how to troubleshoot pacemaker malfunction or complications related to use.
3. Analyze ventilator graphics, and assess the appropriate procedures for optimal patient ventilator synchrony.
4. Use of non-invasive ventilation(NIV) for acute respiratory distress including the different accessories used and troubleshoot failures.

Method

High fidelity manikins will be used for conducting the various mock scenarios (in simulation lab and in PICU) and this will be followed by discussion and group debriefing to highlight the scenario's key points. In addition, there will be hands-on sessions for non-invasive ventilation practice and temporary pacemakers. The fellow's knowledge will be assessed using checklists and direct feedback. The fellows will be requested to attend an ECMO workshop and they must provide proof of their attendance.

Assessment

The fellow's performance will be assessed using checklists for the technical skills and their performance during the mock CPR. The activity and the trainers will be assessed using the OMSB evaluation forms.

The pediatric intensive care simulation for year 3:

Objectives

1. Demonstrate the knowledge and the skills to supervise junior fellows and residents for skill stations and during different mock scenarios.
2. Demonstrate competence in year 1 and year 2 skills.
3. Design clinical cases and run mock sessions in the PICU with the involvement of different PICU staff (including nurses, residents and respiratory therapists).
4. Demonstrate good debriefing skills and management of stressful situations.

The technical skills practice sessions during year 3:

1. Renal replacement treatment modalities including Continuous Renal Replacement (CRRT) and Peritoneal Dialysis (PD). Recognize the different modes and how to use these in acute care settings. Demonstrate the ability to recognize associated complications and how to address them.
2. Supervise the junior fellows for year 1 and 2 technical skills acquisition.

Method

High fidelity manikins in the simulation lab will be used during the various case scenarios. The fellows are expected to conduct debriefing at the end of the sessions. Devices used for CRRT and PD will be demonstrated. The fellows are expected to complete the required checklists for these skills.

Assessment

Both activity and the trainers will be evaluated using the OMSB evaluation forms.

The simulation sessions will be conducted once in every block. They will be conducted on Tuesdays from 12-14:00 during the protected teaching time in the Simulation lab. All technical skills as well as mock scenarios stations are mandatory. The fellows must show proof of completing the listed skills and attendance of the mock stations.

The expected case scenario-based simulations during first, second and third years:

1. The management of septic's hock during initial resuscitation and post admission to the pediatric intensive care.
2. The management of upper airway emergencies including severe croup and foreign body aspiration.
3. Management of a child with difficult airway.
4. Management of the various arrhythmias.
5. Management of a child with tracheostomy emergencies(blocked and dislodged tracheostomy).
6. Management of a critical child post open heart surgery including management of a child with low cardiac output syndrome, Junctionaltachy-arrythmia, pacemaker emergencies and ECMO emergencies.
7. Management of a child with life-threatening asthma.
8. Management of massive transfusion in a sick child.
9. Management of status epilepticus.
10. Management of a child with trauma and multiple organ injuries.
11. Management of child with severe lung injury and Pediatric Acute Respiratory Distress Syndrome (PARDS).

10. SUGGESTED REFERENCE READING

Books:

- John B. west. Respiratory physiology, the essentials. 9th edition. Lippincott Williams and Wilkins,2012
- Mark A. Helfaer, David G. Nichols. Rogers handbook of paediatric intensive care. 4thedition. Lippincott Williams andWilkins,2009.
- T. E. Peck, S. A. Hill. Pharmacology for anaesthesia and intensive care. 3rdedition. Cambridge university press. 2008

Journals:

- Pediatric Critical Care Medicine
- Critical Care Medicine
- Current Opinion in Critical Care
- Critical Care Clinics

11. LIST OF COURSES AND WORKSHOPS

Year	Mandatory Course	Recertification	Optional Courses
FY1	Pediatric Advanced Life Support (PALS)	2ND annually	- Attend NIV and invasive ventilation workshops
	Pediatric Fundamental Critical Care Support (PFCCS)	No recertification (if not already done during residency)	- Attend research and basic epidemiology workshops - Attend evidence-based medicine workshop
	Patient Safety Course (online)	No recertification	- Attend the hospital course on inter-personal communication
FY2	Continuous Renal Replacement Therapy Coarse (CRRT)	No recertification	- Attend workshops on transport medicine
	Pediatric Critical Care Ultrasound course	No recertification	- Attend workshops on home ventilation and tracheostomy care - Attend palliative care courses
FY3	Extra Corporeal Membrane Oxygenation Coarse (ECMO)	No recertification	- Attend hospital leadership training course - Attend LEAN management workshops and participate in the unit's LEAN projects - Attend pacemaker workshop and other national and international workshops related to cardiac intensive care

- The candidate has to present a prove that he/she attended the course and certified for it
- The courses will be monitored every 6 months by the program director
- The mandatory courses are included in progression criteria

Graded Responsibility for Each Year of Fellowship

Year 1 (F1):

This year constitutes 6 blocks in pediatric intensive care unit, 2 blocks in pediatric cardiac intensive care unit, 2 blocks in anesthesia, and 2 blocks in medical high dependency.

By the end of this year, the fellow will be able to:

- Review and give feedback on admission and progress notes written by the juniors.
- Follow up unit admission and discharge plans.
- Supervise and teach residents and junior doctors.
- Assign patients to residents.
- Organize the journal club once per the schedule.
- Provide feedback to the resident for each procedure performed under the fellow's supervision.
- Be proficient in completing morbidity and mortality reports.
- Comfortably use innovative therapeutic modalities like inhaled Nitric Oxide.
- Be familiar with different modes of dialysis and hemofiltration, including renal replacement therapy and plasmapheresis.

Year 2 (F2):

This year constitutes of further 6 blocks in pediatric intensive care unit, 2 blocks in pediatric cardiac intensive care unit, 1 block in medical high dependency, 1 block in cardiac high dependency, and 2 elective blocks. This year concentrates on adopting a more decision-making role in day-to-day practice. During this year, the fellow will have the chance to choose 2 elective rotations.

The fellows will fulfill the following responsibilities in addition to consolidating the ones acquired through F1:

- Become proficient in writing medical reports and other communications
- Getting exposed to subspecialty training like cardiology and pulmonology.
- Review all consults received to the PICU team.
- Supervise the junior staff and residents during morning and afternoon handover rounds

- Give one didactic lecture per month to the residents.
- Be competent with peri-operative management of complex and high-risk cardiac surgery.
- Be competent in peri-operative management of organ transplant recipients: liver and kidney.
- Acquire the skills of self-directed learning and preparation for examinations.
- Assume more administrative roles such as preparing duty roster and CME program calendar.
- Timely complete the required steps for a research project.

Year 3 (F3):

During the last year of fellowship, the fellow will have 4 more blocks in 6 in pediatric intensive care unit, 1 block in medical high dependency, and 1 block in cardiac high dependency. In addition, the fellow will go abroad for advanced intensive care training in Saudi Arabia to cover areas that have not been covered in Oman, like trauma and organ transplantations. The training during this year focuses on taking higher responsibilities in patient care and decision-making. At this year, the fellow will work as a junior consultant.

The fellows will have the following additional responsibilities to the above:

- Be the primary leader of rounds. This means they will become responsible for directing discussions concerning patient status, treatment decisions, and teaching points.
- Initiate and lead the academic discussion in an evidenced-based manner with appropriate reference to recent medical literature.
- Assume the primary responsibility for the teaching and supervision of the technical procedures by the residents, and they are expected to fill out the evaluation form.
- Assume the primary responsibility for communication with patients and their families.
- Demonstrate an active role in Continuous Quality Improvement. They will be responsible for monitoring and recording complications of therapy.
- Involve in writing up policies and protocols for the unit.

12. FELLOWSHIP ASSESSMENT AND FEEDBACK

The fellow will be given:

- Bi-weekly feedback on progress will be provided to fellows by the in-service physician.
- Monthly assessment using the OMSB form and PICU form. (is it the ITAR form?)
- Four monthly assessment by Program Director using the OMSB form

The following forms are used in evaluating the fellows by the supervisor and the team:

- **In-Training Assessment Report (ITAR):**

This form is used by the supervisor of the rotation to assess the fellow and give feedback on competence in multiple areas as medical knowledge, patient care, professionalism, practice-based learning and improvement, interpersonal and communication skills, and system-based practice.

- **4-Month assessment and feedback:**

Will be done by the Clinical Competency Committee (CCC) and reviewed by Education Committee. Feedback to the fellow will be provided by the program director.

- **Assessment form for presentation:**

This form is used to assess a fellow's presentation, such as Journal club presentations. This is used by a supervisor who is in-charge of the fellow for that presentation. Evaluation is based on the content of the presentation and presentation skills.

- **Mini-clinical assessment (MINI-CEX):**

This form is used to quickly assess clinical competence of a fellow by the in-charge consultant of the team.

- **Multisource feedback (360-degree assessment):**

This form is used by any of the team members with which the fellow is working; even the junior person of the team could use this.

- **Quality Assurance – Mortality - Morbidity Presentation Report:**

This is used to assess the case that is presented by the fellow in the meeting, the summary of the case and findings in the case file are assessed.

- **Educational Supervisor's Comments/ Feedback form:**

This form is used by the educational supervisor nominated for the fellow to give feedback in form of issues, concerns, and discussion details between the supervisors and fellow, in the end the agreed plan for the same.

- **Case-Based Discussion Form**

Case Based Discussion (CBD) is a structured discussion of the clinical case managed by the fellow. It is used to assess clinical approach and reasoning, to provide opportunity to present and discuss the cases with the trainer, to obtain systematic and structured feedback, to assess decision-making and the application of medical knowledge and to enable the discussion of the ethical and legal framework of practice.

- **Final In-Training Assessment Report (FITAR):**

This form is used to assess in depth the fellow on the six different ACGME competencies as an overall performance. It is completed at the end of the program by the Program Director.

Assessment Forms:

Fellows will also have the opportunity to fill out a written evaluation on rotation, trainers, Research mentor and the program.

These forms and others are used in the fellowship assessment according to the following description:

	Form	Frequency	Assessor	Remarks
1	In-Training Assessment Report (ITAR)	Once per block	Trainer/Supervisor	Assess the performance of the Fellow in the specified block
2	Entrustable Professional Activities (EPA)	To complete 13 assessments per year	Trainer/Supervisor	
3	Rotation Evaluation	Once per block	Fellow	Evaluate the specified rotation by the fellow and to give the feedback to the program director
4	Six-monthly Assessment	Two per year	Program Director	Face to face feedback to the fellow about his/her performance.
5	Final In-Training Assessment Report (FITAR)	Towards the end of training	Program Director	Done 3 months before graduation. Summative assessment of the fellow performance
6	Multisource Feedback (360-degree Assessment)	Twice per year	At least 6 assessors including self-assessment	As described earlier in the text
7	Presentation Assessment Form	4 times per year	Trainer	Assess the presenter
8	Journal Club Assessment Form	Twice a year	Trainers	Assess the journal club presenter
9	Research Assessment Form	Twice per year	Research mentor	Assess the Performance of the Fellow on research
10	Research mentor Evaluation Form	Twice per year	Fellows	Assess the effectiveness of the research mentor
11	Trainer Evaluation	Once per block	Fellow	Evaluate the Trainer
12	Trainer Evaluation Form by EC Chairperson/PD/APD	Once per year	EC Chairman/PD/APD	Evaluate the trainers
13	Program Evaluation Form by Trainers	At the end of the year	Trainers	Evaluate the entire program

	Form	Frequency	Assessor	Remarks
14	Program Evaluation Form by Fellows	At the end of the year	Fellows	Evaluate the entire program

Minimum Progression Criteria Pediatric Intensive Care - Fellowship

Trainee progression from one level to the next requires careful consideration of trainee performance and compliance. Below is a list of minimum criteria for progression from one level to the next. Cells highlighted in grey are not a requirement for that specific year. **The list below reflects targets that all PICU fellows are expected to meet and exceed. However, decisions regarding progression to the next level will be based on the cumulative collection and interpretation of evidence by the Clinical Competency Committee and not on a single data point**.

Level	Progression Decision	PERFORMANCE					COMPLIANCE								
		ITARs	Entrustable Professional Activities (EPAs)	Workplace-based Assessment (WBA) May include written assessments or quizzes	6-monthly & Annual Assessment	Presentations	Review rotation curriculum	Evaluation of Faculty	Evaluation of Rotation	Academic Activity Attendance	Active logging of Duty Hours	Fellow Development Workshop Attendance	Research	QI/PS Project	Life support certifications BLS PALS NRP
F1	**Progress to Next Level**	Pass all blocks with a scoreof3or above with no area requiring attention	Satisfactory completion of all 13 EPAS for level within 6 months determined by CCC	Satisfactory completion and scores on all WBA as determined by CCC	Meets expectation in all domains	M&M x1 per year Grand Rounds x1 per year Journal Club x1 per year Leading Mock CPR x1 per 6 months (attempt 100%)	100% review	100% review	100% review	Attended 75% or more	Logs average of >50 Hrs. /week	Attended 100% assigned resident's workshops	R1-writing research proposal and Apply for ethical approval	Initiate QI project: Proposal/ Idea/ Question Attended OMSB workshops	Valid
	Progress with Remediation	-2sequential low scores in the same domain or a total of 4 out of 6 months in different domains -Overall assessment ofbelow3 (BE), on2 blocks -There is a proven/ documented misconduct	10 or less completed EPAs for level within 6 months.	Below expectations scores on <30% and/or below required number of WBA	**6-month:** If Fellow received "Requires Attention" in less than 3 competencies **Annual:** If Fellow received "Requires Attention" in less than 3 competencies	< 75% of Required	>80%<100 review	>80%<100 review	>80%<100 review	Attended between 50-75%	Logs average hours per week 40-50hours	Less than 75-99% (unless otherwise justified)	No research proposal but have evidence of research topic/idea and approved research questions from the research supervisor	Missed attending the Workshop Has QI project Ideas	Valid
	Do not progress	Failing to meet any of the above	8 or less completed EPAs for level within 6 months.	Below expectations scores on >30%and/or below required number of WBA	Failing to meet any of the above	Failing to meet any of the above	Failing to meet any of the above	Failing to meet any of the above	Failing to meet any of the above	Attended less than 50%	Less than 40hours	Attended below75% workshops	No research idea and research question	None of the Above	Not Valid

13. SUPERVISION OF FELLOWS

The fellows will be supervised at different levels as follows:

Level – 1: Direct supervision: Supervising physician will physically be present with the fellow and patient.

Level – 2: Indirect supervision:

A. Direct supervision immediately available: The supervising physician will be physically available within the confines of the site of patient care, and immediately available to provide direct supervision.

B. Direct Supervision available: The supervising physician is not physically present within the confines of the site of patient care, but immediately available through phone to provide direct supervision.

Level – 3: Oversight: The supervising physician is available to provide review of procedures/encounters with feedback provided after care is delivered.

Fellow level	History and Physical Examination	Interpretation of specialty-specific diagnostics	Formulation of assessment and management plans	Communication of care plan with family
Year 1	2-B	2-A	2-A	2-A
Year 2	3	2-B	2-B	2-B
Year 3	3	3	3	3

14. FELLOWSHIP EXAMINATION

Please refer to OMSB training bylaws, policies and procedures for examinations approved by the Central Examination Committee for fulfillment of certification requirements

15. OUTCOME MEASURES AND EXIT QUALIFICATION

At the end of the training, the fellow should have:

1. Should have been assessed as satisfactory at 4 months and end of year assessment Completed Final in Training Assessment Report (FITAR).
2. Provided evidence of at least one (1) research project completed satisfactorily.
3. Provided evidence of one (1) specific scholarly activity during the fellowship.

Examples of specific scholarly activity:

Research: a peer-reviewed publication in which a fellow played a substantial role or an in-depth manuscript describing a completed project.

Quality improvement projects (QI): demonstrate understanding of quality improvement process through didactic education and experiential learning by meaningful engagement in an approved QI project.

Education: participate in the education of other trainees (e.g. Pediatric Residents, medical students and fellows) and to develop their teaching skills through giving didactics lectures.

4. Completed all other program-specific requirements.

16. EXIT EXAMINATION ROLES AND CERTIFICATIONS:

- The Exit Examination will be conducted after completing all training program requirements successfully.
- The Exit Exam is conducted during the final year of training. The fellow is allowed three (3) attempts to pass the Exit Exam.
- The final Examination may consist of written and oral parts, OSCE, and short clinical cases.

- The OMSB shall issue the Oman Medical Board PICU Fellowship Certificate after completing the training program and passing the Exit examination.

17. QUALITY ASSURANCE (QA)/PATIENT AND FELLOW SAFETY

The fellowship-training program adopts quality assurance activities to improve the quality of training delivered, patients' safety and quality of health care. The program adopts existing QA activities already existing at the training centers:

1. Morbidity and mortality rounds
2. Internal audits
3. Annual program review
4. Lean and quality improvement projects

TRAINEE WELL BEING

This follows the Trainee performance and well-being services provided by the OMSB performance and wellness team. The services include counseling sessions to address overall well-being and challenges under confidential terms by a designated person in the wellness and performance team. Referrals to the wellness and performance team may include self-referred fellows or referral of a fellow by any faculty member of the pediatric intensive care fellowship training program. Appointments can be made by contacting the designated email at wellness@omsb.org.

How can the program ensure quality of the curriculum?

- Annual review of the curriculum by OMSB and or international education certification bodies.
- Looking into the curriculum and getting feedback from the trainers and fellows about the curriculum using designated evaluation forms.

How do we get the feedback?

- The quality assurance can be measured from the annual Program Evaluation Committee report. Through this, the trainers can meet and review the curriculum and get feedback.

18. CURRICULUM IMPLEMENTATION, MANAGEMENT AND REVIEW

- **How does the program implement the curriculum?**
  - Dissemination of the curriculum among trainers and trainees. The dissemination is done through distribution of the soft and hard copies of the curriculum during meetings.
  - The senior trainer of the specified block/rotation is mandated to inform other trainers and fellows of the curriculum objectives, elaborate the importance of these and ensure that the objectives are fulfilled by the end of each block rotations.
- **Curriculum feedback evaluation**

  Trainers and fellows will meet to discuss the strengths and weaknesses and raise it to the curriculum subcommittee for improvement planning.
- **Curriculum review and update**

  The Program Evaluation Sub-committee will be responsible for the continuous review of the curriculum and will receive feedback from Education Committee and allied specialties.

  The Sub-committee will continuously monitor and evaluate the feedback of different rotations in the program and discuss methods to improve based on trainees and trainers review. It will also assess the program teaching activities and workshops periodically and review needs to modify or change them. Accordingly, the curriculum will be updated regularly as per this feedback and will report directly to the Education Committee. The curriculum will be evaluated as per OMSB guidelines in liaison with OMSB Curricula & Faculty Development Section.
- **Logbook for the fellowship program**

  The program utilizes the Pediatric Intensive Care Logbook to keep an up-to-date record of all learning progress achieved by each fellow. The logbook is completed electronically through the Online Management System (New Innovations)
- **Fellowship Exams**

  After analyzing the results of the fellowship exam, certain modifications might be recommended to improve the curriculum.

19. PROGRAM POLICIES

Fellows are expected to be in compliance with departmental and hospital administrative requirements and policies.

I. Duty Hours and On Call Activities

- Fellow duty hours are limited to a maximum of eighty (80) hours per week when averaged over a four-week period. The Fellow will have at least one day in seven free from all patient care and educational obligations, averaged over four weeks.
- The Fellow must not take more than one in-house call every four (4) days and maximum of six (6) in-house calls per block.
- The weekend call must not exceed twice each block and each weekend call must be one day long – 24 hours – only.
- The Fellow's shift must not exceed 24 hours

The fellows' assignment of on-call duties

During on-call duties the fellow should:

- Examine all new patients admitted to the ICU and he should supervise the resident in evaluation and preparation of a diagnostic and therapeutic plans.
- Review all consults received to the PICU team either internal or external during on call time and to provide advice and follow it up.
- Discuss all cases with PICU consultant to review plans and recommendations and communicate these recommendations and plans to other staff involved in the care of these patients.
- Review and give feedback on admission and progress notes written by the juniors. However, in severely ill patients, and for patients in whom acute intervention is required, a brief note must be written by the fellow.
- Follow up unit admission and discharge plans and ensure that proper transfer orders and notes are written and the receiving team has been called.

- Participate in, or supervise, procedures done on each patient in the PICU. Initially, all procedures performed by the fellow must be supervised by the attending physician on service till the fellow gains skill and confidence.
- Supervise residents on use of different therapeutic modalities like different mechanical ventilator modes, Nitric Oxide, different modes of renal replacement therapy and plasmapheresis.
- Supervise the juniors (FY1 fellows and residents) during morning and afternoon handover rounds
- Be the primary leader on call rounds (FY3 level). This means they will become responsible for directing discussions concerning patient status, treatment decisions, and teaching points.
- Assume the primary responsibility for communication with patients and their families during on call time. (FY3 level)
- Demonstrate an active role in Continuous Quality Improvement. They will be responsible for monitoring and recording complications of therapy during on call time. (FY2-FY3 level)

II. Vacation and Leave:

- The Fellow shall be entitled to an annual leave of four weeks which can be spliced in two occasions only. This is in addition to official holidays if it does not affect the training and smooth running of the work.
- The training period shall be extended for an equivalent period to compensate for sick leave, maternity leave and exceptional "emergency" leaves before the Fellow is awarded a certificate of completion of training if the leave exceeds seven days.
- The Fellow may be granted a leave for scientific purposes (attending scientific conferences and seminars, specialty examinations, etc.) not exceeding 7 days per training year provided that Fellow presents the proof of attendance of such activities and had prior approval to attend from the Education Committee.

III. Grievance Policy:

- The fellows may file a grievance if a reasonable basis exists to support an allegation that they have been treated contrary to the existing policies governing the fellowship training program.
- The fellow must file with that chairman/program director any allegation grievance in writing within 10 days of the date on which the alleged grievance occurred. Any grievance not timely filed shall be waived and not processed. The writing complaint should be as specific as possible regarding the action that precipitated the grievance: date, place, people involved, including witnesses, if any. I summary of the incident, efforts made to settle the matter informally, and the remedy sought.
- The chairman/program director shall appoint an Ad hoc committee to review and investigate the grievance, negotiates, and try to resolve it. The Ad hoc committee members should not have any direct involvement with the circumstances in question. The fellow shall be allowed to explain the circumstances and his/her point of you. The Ad hoc committee responds to the grievance in writing within 15 days of receipt of the complaint. The response shall outline the actions that will or will not be taken to resolve the grievance.
- The resolution of the Ad hoc committee will be discussed in the following program education committee meeting.
- The program education committee will make a consensus on the final decision to take in response to the fellow's grievance in writing within 15 days from the date the Ad hoc committee sends their resolution report. The program education committee response must be copied to the OMSB executive president.
- If the fellow is dissatisfied with the program education committee‘s resolution, he/she may request a second appeal in writing to the executive president within 15 days of receiving the program education committee’s resolution. The fellow shall submit copies of the original grievance and the program education committee's response.
- The executive president will forward the grievance case to the executive academic/appeal committee for review and investigation. The executive

academic/appeals committee will write a resolution to the grievance within 15 days from the date the fellow sends his/her second appeal.

- The resolution report and decision made by the Executive Academic Committee is final.

IV. Remediation Policy:

Definitions and abbreviations:

CCC: Clinical Competency Committee.

Remediation: A period of targeted and structured training where the supervisor and trainee focus specifically and intensively on academic-related matters to strengthen areas that a trainee shows deficiency or lack of skills or knowledge.

Remediation plan: A plan put forth by the clinical competency committee with the focused area(s) specified as an attempt to resolve the trainee's difficulty or lack of skills or knowledge.

Policy statement: This policy has been established to define the terms and conditions related to the remediation program for poor academic performance to remediate a trainee with identified weaknesses or deficiencies in clinical and academic performance.

Reason for policy:

Regulatory part for implementing the OMSB training bylaws.

Purpose for policy

The policy aims to assist trainees rectify problems noticed in their clinical and academic performance by designing a remediation program suited for the intended purpose. The Clinical Competency Committee (CCC) should develop the remediation plan with specific goals and objectives for the remediation period. The plan The Education Committee should

then approve the planned program. The remediation plan must be discussed with the trainee.

Scope of application:

This policy applies to all trainees enrolled in Graduate Medical Education (GME) programs at Oman Medical Specialty Board (OMSB).

Policy owner:

The policy owner is the Graduate Medical Education Department at OMSB and is responsible for developing, overseeing, reviewing, and updating the policy under consideration.

Approval body:

Board of Trustees.

Procedure:

The following should be considered when designing and implementing a remediation program:

Criteria for Remediation

Any of the following criteria is sufficient to warrant remediation:

- Two “Below Expectations "overall assessments (ITAR) in one academic year.
- Agreement and recommendation of CCC on some assessment criteria, such as low scores in specific competencies’ subcategories despite completion of rotation. For example, receiving an unsatisfactory or below expectation in evaluation subcategories of medical knowledge, interpersonal and communication skills…etc., regardless of whether attaining meets expectations or exceeds expectations score in the overall assessment (ITAR).
- Trainee failing in assessment examination, i.e., End of year (when applicable).

Duties of the Clinical Competency Committee (CCC)

- Confirm the issue and the need for remediation.
- Investigate and classify the type of the issue (e.g., failing an examination).
- Define the problem. (Identify reasons for failure (lack of knowledge, anxiety, personal issues, burnout, etc.
- Determine appropriate intervention. (Additional readings, referral to the Counseling and Guidance Unit, one-on-one coaching).
- Develop Academic Performance Improvement Plan with the Assessment and Performance Section (under GME Department).
- Summarize a written Academic Performance Improvement Plan (after the CCC presented to the PD) that includes the following:
    a. Academic reasons for remediation.
    b. Aspects want to achieve in the remediation program, specifying the aims and results that must be achieved at the end of the remediation program period. The program may include a plan to repeat the rotations or some requirements related to the training program.
    c. Remediation plan time and the implemented date and expected results
    d. Not exceed 3 rotations
    e. Assessment tools (e.g., improve trainee's skills in practice for the exams).

Duties of Remediation Supervisor

- Provides supervision of the trainee on a remediation program during the remediation period.
- Discusses the timeline and remediation plan with the trainee.
- Supports trainee by providing:
    a. Clarification of the trainee's difficulties.
    b. Guidance in areas of concern.
    c. Guidance on the improvement of procedural skills.

d. Assessments using clinical observations, examinations, etc.

- Meets with the trainee at a frequency agreed by the CCC to review and discuss progress in attaining the objectives of the remediation rotation, keep records of these meetings, and submit these to the Program Director as required by CCC.
- Submits a written report at the end of the remediation period to the CCC, which will recommend the remediation outcome to the Education Committee of the Program.

Duties of Trainee under Remediation

- A trainee under remediation must work on achieving the objectives of the remediation plan under the guidance of the remediation supervisor.
- The trainee is responsible for making the necessary arrangements to meet the remediation supervisor. In case of difficulty arranging the meetings, the trainee should inform the Program Director.
- The trainee must meet with the remediation supervisor at intervals decided by the CCC during the remediation period to discuss the progress and ongoing objectives.

Evaluation

- The trainee's progress on remediation must be discussed with the remediation supervisor at an interval specified by the CCC.
- Successful completion of a remediation period requires successful completion of the remediation plan.
- "Failed" remediation rotation will require referral to the CCC to consider further action (e.g., anextension of the remediation duration).
- A final written report must be submitted by the Remediation Supervisor to the CCC. The CCC will discuss the remediation outcome with the Education Committee for a final decision.
- All remediation outcomes must be reported to the Graduate Medical Education (GME) Office for information and data.

Possible Outcomes of Remediation

- Upon completion of the remediation period, one of the following outcomes may occur as determined by the CCC with approval of the Education Committee of the Program, depending on the trainee's performance:
- If the trainee's performance improves in all aspects:
  a. Reinstatement of the trainee in the program with no loss of time or extension of training; or
  b. Reinstatement of the trainee, with training extended as recommended by the CCC and approved by the Education Committee, based on the remediation program
- If the trainee's performance improves in some aspects:
  a. An additional period of remediation as recommended by CCC, but not to exceed 3 blocks;
- If the trainee's performance in not improved:
  a. Placing the trainee on probation for a maximum period of 3 blocks or recommend termination of the trainee if he/she fails to complete the probation period successfully or exceeds the number of opportunities to remediate.
- Any other scenario not mentioned above should be discussed on a case-by-case basis by the Education Committee of the Program and referred to the GME Office for consultation if required.

Remediation Plan Outline

- The decision to place the trainee on remediation should be conveyed to the trainee by the Program Director. This should be done in writing and in person within a week of the Education Committee's decision.
- The Program Director must discuss the plan with the trainee, sign the remediation plan, and email the plan to the trainee with a copy to the Assessment and Performance Section.
- A trainee on remediation must be referred to the Counseling and Guidance Section. A report from the Unit will be provided to the Program Director.

- Trainees on remediation training must not be permitted to take annual leave or complete a rotation abroad.
- In all cases, the trainee is given only two (2) opportunities for remediation related to academic difficulties during the period of joining the OMSB and one (1) chance to extend each time. And the training program should consider that the trainee does not exceed all remediation plans for two (2) years of the total period of the training program

20. LIST OF PROCEDURES

The following table delineates the minimum procedures required by the fellow throughout the training period and his/her role:

Airway / Breathing:	Minimum number	Fellow's role
Oral airway insertion	20	Mont
Nasopharyngeal airway insertion	5	Perf
Oral ETT intubation	50	Peer/ Mont
Nasal ETT intubation	5	Perf
Bag-mask Ventilation	80	Mont
Nitric Oxide Administration	5	Perf
Thoracostomy tube insertion	5	Perf
LMA insertion	10	Perf
Modified bronchio-alveolar lavage	15	Mont
Tracheostomy tube change	10	Perf
NIF and PEF	5	Obs

Cardio-vascular	Minimum number	Fellow's role
Intra-osseous insertion and use	10	Perf
Arterial line insertion	25	Perf
Central line insertion	20	Perf
Dialysis catheter insertion	5	Perf
External pace maker use	5	Perf
Dual chamber temporary pacemaker use	10	Perf
Cardio-version/ Defibrilla-tion	5	Perf
Point of care U/S use	20	Perf
Renal:		
Set-up/orders for CRRT	10	Perf

Neurologic	Minimum number	Fellow's role
Lumbar Puncture	5	Mont
CSF drainage for elevated ICP	5	Obs
EVD use	5	Obs
EEG monitoring in PICU	10	Obs
ICP monitoring	5	Obs

Gastro-intestinal:		
NJ tube insertion	10	Perf
Intra-abdominal pressure monitoring	5	Perf
Peritoneal tap	5	Perf
Abdominal drain insertion	3	Perf

Others:		
Exchange transfusion	5	Perf

- Mont: Monitored by the fellow
- Obs: Observed by the fellow
- Perf: Performed by the fellow

21. EDUCATION COMMITTEE MEMBERS

	NAME	QUALIFICATION	HOSPITAL
1	Dr. Said Ali Masoud Al Hanshi	BSc, MD, DCH (Glasgow), FRCPCH (UK), Fellowship - Pediatric Intensive Care	Royal Hospital
2	Dr. Mohammed Hamed Rashid Al Ghafri	BSc, MD, FRCPCH (UK), FCCP, Fellowship- Pediatric Intensive Care	Royal Hospital
3	Dr. Suad Salim Mohammed Al Ismaili	MD, DCH, CABP, Fellowship - Pediatric Intensive Care- SF-Ped CC and KFSH&RH CCM (SA)	Royal Hospital
4	Dr. Shaikh Samiuddin	MD, MBBS, MRCPCH (UK), Fellowship in Pediatrics Cardiac Intensive Care	Royal Hospital
5	Dr. Khulood Said Al Mukhaini	MD, DCH, MRCPCH, Fellowship in pediatric critical care	Royal Hospital
6	Dr. Farhana Ishaq Al Othmani	MBBS, DCH (Glasgow), CABP, OMSB in pediatric, Fellowship in Pediatric Intensive Care – LHSC Canada, PALS instructor under AHA	Royal Hospital
7	Dr. Balqees Al Nobi	MD, OMSB, Arab board, Fellowship in PIC, KSA	Royal Hospital
8	Dr. Saif Awladthani	MD,OMSB, Arab board, Fellowship in PIC, Canada	Royal Hospital
9	Dr. Akram Bait Koraa	MD,OMSB, Arab board, Fellowship in PIC, Canada	Royal Hospital
10	Dr. Omar Al Dafaei	MD, OMSB, Arab board, Fellowship in PIC, Canada	Royal Hospital
11	Dr. Ahmad El Khamisy	MD, MRCPCH	Royal Hospital
12	Dr. Raghad Al Abdwani	BHs, MD, DCH, FRCPC Pediatrics, FRCPC Pediatric Critical Care, Canada.	SQUH
13	Dr. Najwa Al Rahbi	BHs, MD, MRCPCH, OMSB, Arab board, Fellowship in PICU, Canada.	SQUH
14	Dr. Zahra Al Lawati	BHs, MD, , FRCPC Pediatrics, FRCPC Pediatric Critical Care, Canada, ABP	SQUH

22. APPENDICES

Appendix I: ADMINISTRATION AND GOVERNANCE

To follow OMSB fellowship guidelines.

Education Committee:

The Pediatric Intensive care fellowship training program will be under OMSB Pediatric residency training program. The education committee as per OMSB requirement will assist and be in charge of the Fellowship program progress. The committee is consisted of four members. The fellowship subcommittee administrative structure consists of:

- Fellowship Program director(PD)
- Program evaluation committee
- Clinical competence committee

Education Committee Members	
Program director	• Dr.
Members	1. Dr. 2. Dr. 3. Dr.
Program Evaluation Committee	
Chairperson	• Dr.
Members	1. Dr. 2. Dr. 3. Dr.
Clinical Competency Committee	
Chairperson	• Dr.
Members	1. Dr. 2. Dr. 3. Dr.

Training Faculties

There must be sufficient number of qualified trainers, with adequate skills and highly trained, for instruction and supervision of the Fellows.

The trainers:

- Will be appointed by the Education Committee
- Must be qualified in Pediatric intensive care
- Must show evidence of maintaining their CPD credits
- CVs of all the staff must be available in the file department
- Must show commitment for educating Fellows
- All trainers must have or undergone some form of training in medical education
- They must be competent in the area of:
  - Setting up educational objectives
  - Teaching methods
  - Assessments

Faculty criteria as per OMSB fellowship guidelines:

1. **Program Director**
   a) There must be a single Program Director with authority and accountability for the operation of the program. Any change in the Program Director must be approved by the Graduate Medical Education Committee (GMEC) and submitted to Accreditation Data System (ADS) if applicable.
   b) The Program Director must be available at the primary training site.
   c) The Program Director must dedicate, on average, a minimum of 15 hours per week of his/her professional effort to the administrative and educational activities of the educational program.
   d) The Program Director must administer and maintain an educational environment conducive to educating the fellows in each of the ACGME-I competency areas.
   e) The Program Director must formally meet with each fellow to discuss his/her semiannual or final evaluation, which is based on the review of the Clinical Competency Committee (CCC) of the Fellowship Subcommittee.

f) Qualifications of the Program Director

- Minimum of two years documented experience as a clinician, administrator, and educator in the program subspecialty.
- Board certification or equivalent in the concerned sub-specialty.

2. Faculty

- There must be a sufficient number of faculty members with documented qualifications to instruct and supervise all fellows in the program.
- Faculty of OMSB Fellowship Programs are selected by the Fellowship Subcommittees of the concerned Program based on the following Selection Criteria** and presented to Core Education Committee for discussion and approval. The Core Education Committee of the program then recommends a list of faculties to H.E. the Executive President of OMSB.

3. Core Fellowship Faculty

a) The education subcommittee members are considered “core faculty.”

b) Core faculties are physicians who dedicate, on average, 10 hours per week throughout the year to the program.

c) The minimum core faculty-to-fellow ratio is 1:2.

Appendix II: TRAINING CENTERS

1. The Royal hospital (Pediatric Intensive Care and Medical High Dependency Unit (MHD)).
2. National Heart Center (Pediatric Post Cardiac Surgery Unit (PPCSU) and High Dependency Unit (CHD).
3. Sultan Qaboos University Hospital (SQUH)
4. King Faisal Hospital and Research Center

The Royal Hospital Pediatric intensive care unit (PICU) is the largest critical care service for children in Oman. It is designed to deliver the highest quality medical care and meet the specific needs of each child. It has 30 beds, divided between PICU, Pediatric Post-Cardiac Surgery Unit (PPCSU), Medical High Dependency Unit (MHD) and Cardiac High Dependency Unit (CHD). It is a multidisciplinary, tertiary care unit that admits children from all over Oman. Its primary goal is the provision of highly specialized medical and surgical services, education, and training. We admit more than 800 children in PICU/PPCSU and more than 1400 children in MHD and CHD annually.

In PICU and MHD we admit a wide variety of patients with life-threatening conditions such as severe Infections, Shock and Multi-organ failure, Respiratory diseases, Congenital and Acquired Cardiac Disease, Hematology and Oncology, Immunologic conditions, Metabolic disorders, Endocrinology, Renal disorders including post Kidney transplant, and post-operative care of various complex surgeries.

PPCSU and CHD are part of the National Heart center (NHC) receiving patients from all around the sultanate with different varieties of heart diseases ranging from simple to more complicated cases such as single ventricle requiring complex corrective surgeries.

Sultan Qaboos University Hospital (SQUH), the PICU/PHDU combined is an 11-bed multidisciplinary medical/surgical critical care unit that has a high turnover and has an average of 680 admissions (combined) per year. It caters to multiple subspecialties including cardiac, all major system subspecialties, metabolics, neurosurgical, neurocritical, ENT, maxillofacial, orthopedics and bone marrow transplant. We are one of the two main trauma centers in Muscat. We also provide highly specialized therapeutic technologies including continuous renal replacement therapy, both non-invasive and invasive mechanical ventilation including high frequency oscillation and provide inhaled nitric oxide, ICP monitoring and plasmapheresis. With the volume and high turnover, trainees would get plenty of chances to get practice in the important procedural skills in critical care including insertion of peripheral lines, central lines, arterial lines, chest and abdominal drains.

King Faisal Specialist Hospital & Research Centre in Riyadh (KFSH&RC-R), is recognized internationally for its world-class facility, latest medical technology and equipment, experienced and professional doctors and health care providers, and excellent medical care. The hospital has reached an international standard of excellence equivalent to that of leading global academic medical centers.

The PICU in KFSH&RC-R is an 18-bed multidisciplinary critical care unit for medical and surgical patients, the service and turnover are considered to be the busiest in the country. The services in cardiovascular, neurosurgery, ENT, orthopedics, solid organ transplant and bone marrow transplantation admit patients to the Unit. Care is provided by the staff of the Unit. The Unit has all kinds of highly specialized therapeutic technologies such as high frequency ventilation, inhaled nitric oxide and continuous renal replacement therapy.

EDUCATIONAL RESOURCES AT ROYAL HOSPITAL

- **Training Centers, Facilities and Resources**
  - Royal Hospital – https://www.moh.gov.om/en/web/royal-hospital
- **Clinical Teaching Facilities**

- The Royal hospital PICU has a training area attached to the unit. It includes a seminar room, a simulation area and a procedure training area.
- There are 3 oncal rooms in the unit and a doctor's working lounge with computers.
- The unit has a common coffee room.
- No certain dress code is mandatory; however, the fellow should wear a medical scrub during work.
- More details are available for reference on the respective websites as mentioned above.

- **Information Resources and Library Services**

- The hospital provides Wifi internet services for Fellows and have e-library services. The E-library includes Willey on line books, Cochrane library, Karger open access journals, Cinahl complete, micromedx and Lippincott procedures

- Other facilities are

  - OMSB E-library
  - Oman Pediatric Critical Care website which is a free access containing educational materials in the form of recorded presentations, videos of common PICU related procedures, guidelines and review articles.

EDUCATIONAL RESOURCES AT SQUH

- **Training Centers, Facilities and Resources**
    - SQUH Training Department which offers multiple courses and workshops all year round
    - Medical Library with an e-library
    - Main University Library with an e-library

- **Clinical Teaching Facilities**

- SQUH PICU has a large seminar room with facilities for presentations and arranging for manikins (from the Training Dept) for training purposes.
- 2 oncall rooms available with computers that have access to SQUH e-library as well as other medical related engines such as UpToDate etc
- The unit has a common pantry/coffee room.
- No certain dress code is mandatory; white coats are not allowed and medical scrubs are encouraged.

- **Information Resources and Library Services**

- The hospital provides Wifi internet services for fellows with access to the following:
    - Intrahospital protocols for different subspecialties of pediatrics as well as hospital policies and infection control measures policies and guidelines
    - SQUH e-library https://www.squ.edu.om/libraries
    - Includes plenty e-journals as well as e-books with available remote access and direct access to various articles though the hospital net Include Springer journals, Lippincott Williams Journals, Medline, BMJ, Cinahl, Oxford University Press journals, Cambridge Uni Press journals, Sage journals, ScienceDirect etc.
    - Ovid, UpToDate
    - LexiComp
    - Oman Pediatric Critical Care website which is a free access containing educational materials in the form of recorded presentations, videos of common PICU related procedures, guidelines and review articles.

Appendix III: LIST OF ABBREVIATIONS

No.	Abbreviation	Definition
1	AHA	American Heart Association
2	AKI	Acute Kidney Injury
3	APRV	Airway pressure released Ventilation
4	ATLS	Advanced Traumatic Life Support
5	CPR	Cardio Pulmonary Resuscitation
6	CRRT	Continuous Renal Replacement Therapy
7	CSF	Cerebral Spinal Fluid
8	CVL	Central Venous Line
9	DI	Diabetes Insipidus
10	DIC	Disseminated Intravascular Coagulopathy
11	ECMO	Extra Corporal Membranous Oxygenation
12	EEG	Electro Encephalon Graph
13	ER	Emergency Room
14	ETT	Endo Tracheal Tube
15	EVD	Extra Ventricular Device
16	FITAR	Final In Training Assessment Report
17	HD	High Dependency
18	HFOV	High Frequency Oscillatory Ventilator
19	ICP	Intra Cranial Pressure
20	ITAR	In Training Assessment Report
21	LAMA	Leave Against Medical Advice
22	LMA	Laryngeal Mask Airway
23	Mini – CEX	Mini Clinical Evaluation Assessment
24	MMM	Morbidity and Mortality Meeting
25	NIRS	Near Infra-Red Spectrometry
26	NIV	Non-Invasive Ventilation
27	NJ	Naso-Jejunal
28	OMSB	Oman Medical Specialty Board
29	PALS	Pediatric Advanced Life Support
30	PARDS	Pediatric Acute Respiratory Distress Syndrome
31	PD	Peritoneal Dialysis
32	Pediatric GR	Pediatric Grand Round
33	Pediatric RM	Pediatric Radiology Meeting
34	PFCCS	Pediatric Fundamental Critical Care Support
35	PICU	Pediatric Intensive Care Unit
36	PRRT	Pediatric Rapid Response Team
37	RRT	Renal replacement Therapy
38	RTA	Road Traffic Accident
39	SIADH	Syndrome of Inappropriate Anti-Diuretic Hormone Secretion
40	U/S	Ultra Sound

Appendix IV: PEDIATRIC ICU QUALITY IMPROVEMENT & PATIENT SAFETY

Quality improvement (QI) is an essential component of medical practice. Its initiatives strengthen our ability to deliver the best outcomes for patients that are safe, effective, and equitable. The Accreditation Council for Graduate Medical Education (ACGME) require that fellows to be involved in QI projects to develop skills and habits to systematically analyze their practices using QI methods and implement changes to improve their practices.

QI aims to make a difference to patients by improving safety, effectiveness, and experience of care by: using understanding of our complex healthcare environment, applying a systematic approach, designing, testing, and implementing changes using real time measurement for improvement.

Mastering these skills requires self-evaluation and reflection to engage in habitual PDSA cycles and practice using evidence-based medicine. Fellows must also learn and practice teaching skills to enable them to effectively educate patients, families, students, and other fellows and health care professionals.

QI skills may be obtained by active participation of a QI committee that is involved in planning and implementing an intervention, analyzing the intervention on a practice outcome, and incorporating it into practice; if QI has occurred or initiating a new PDSA cycle; if improvement has not occurred.

Goals of the Curriculum:

1. Prepare fellow to be stewards of safe, high quality, high value, patient centered care.
2. Work in interdisciplinary teams to improve patient safety and quality of care.
3. Participate in and complete at least one QI project during fellowship training.
4. Understand the important role of physician leadership in QI efforts.
5. Improve faculty involvement with QI activities.
6. Develop a culture of safety and quality that trainees will carry with them throughout their career.

Learning Objectives:

1. Appropriately identify and define an opportunity for improvement
2. Measure and analyze the performance gaps found, and recognize their possible impact on patient care
3. Identify structure, process and outcome components appropriate to the project setting, and the associated patient population
4. Ensure the structure, process and outcome components chosen are measurable and clearly linked to patient care
5. Understand how each quality measure identified affects patient care

Educational Strategies/Activities:

1. Core Didactic Lessons
   - ✓ The fellow will attend a hands-on full two days' workshop.

- ✓ The workshop will introduce fellows to the basic principles, QI tools and methodology. During which they will also participate in an interactive case-based discussions to review the elements of patient safety using shared experiences to drive the discussion.

2. Design and complete QI project under supervision.

3. Present the project findings in the departmental educational meetings, part of the departmental leadership GEMBA round or in the research day for selected projects.

4. Fellowes will be also participating in the unit quality activities, which includes patient clinical audits, adverse events summary and root cause analysis.

Target learners at different levels:
Level One (FAY1)

1. Conducting a Quality Improvement (QI) project
   Objectives:
   The fellow will be able to:
   - ✓ Learn the principles of quality management, patient safety and QI projects
   - ✓ Determine how to organize a QI team for a clinical process
   - ✓ Select a clinical area for a QI project and a venue for data collection
   - ✓ Generate a flow chart for QI of a clinical process
   - ✓ Conduct root cause analysis for the project
   - ✓ Complete one PDCA cycle
   - ✓ Develop a QI charter (A3 Form- Appendix Four)

Timeframe: 2-4 Blocks

2. Learning the principles of conducting a clinical practice audit
   a. Understand the importance of reporting and analyzing adverse events
   b. Attend regular unit M&M meeting
      Fellows will have opportunity to learn more about patient safety and quality care by participating in the PICU/PPCSU mortality & morbidity meetings and root cause analysis conducted in the unit. They will be focusing on identifying key systems issues identified during clinical case review and discussion. The fellow will be working one-on-one bases with consultants from the PQMC during the process.

Level Two (FAY 2)

1. Conducting a Quality Improvement project
   Objectives:
   The fellow will be able to:
   - ✓ Select a clinical area for a new QI project, gather a team consist of junior doctors in the unit, nurses, RT …etc., a venue for data collection, and develop plans for data collection to ensure feasibility and sustainability

- ✓ Perform PDCA small cycles;(minimum 3 cycles)
- ✓ Develop a QI charter (A3 Form- Appendix Four)
- ✓ Analyze the data collected, with the aid of QI analysts, in the form of run charts and/or control charts
- ✓ Present the project findings to department of child health

Timeframe: 2-4 Blocks

2. Fellow as a clinical auditor
   a. Participate in analysis of the unit adverse event and in setting strategies to reduce/eliminate them.
   b. Prepare M&M cases and present them in M&M unit/department meeting

Level Three (FAY 3)

1. Fellow as a Mentor for QI projects
   Objectives:
   The fellow will be able to:
   - ✓ Form a QI team consist of pediatric residents to carry out a QI project.
   - ✓ Mentor the team in data collection plans to ensure feasibility and sustainability and take them through PDCA small cycles at list 1 cycle for each resident's team.
   - ✓ Supervise the data analyze, with the aid of QI analysts, to produce appropriate charts e.g. run charts and/or control charts.
   - ✓ Assist the team in their presentation of the project findings.

Timeframe: 2-4 Blocks

2. Fellow as a Clinical Auditor
   a. Participate in educating staff on the importance of reporting adverse events and be a member of the unit/department/hospital M&M committee.
   b. Supervise residents/junior fellows on how to prepare and present M&M reports

3. Fellow as a Trainer
   The fellow will be participating in conducting training QI workshop for the pediatric residents and Junior fellows.

Topic Examples

A QI project can be built around any initiative that aims to:

- Reduce error
- Examine variation
- Examine service, improve the provider–patient interface
- Change the work environment, improve workflow, manage time, and eliminate waste
- Optimize health care inventory

The following are selected optional topics for QI projects (for extended list please refer to appendix four):

1. Improving the quality of doctor's documentation
2. Implementation of golden hour in patients with septic shock (ER or Wards)
3. Reducing Department of Pediatric Outpatient Clinic No-show rates

Note: Fellow can select his/her own project topics not included in the list

Didactics Session

- During the sessions, the fellows will identify and plan an individual performance improvement project via an interactive worksheet.
- They will learn about the model of improvement.
- They will be working in small groups to practice:
  - ✓ Generating an aim statement for a QI project
  - ✓ Identifying a clinical problem
  - ✓ Practicing Root Cause Analysis
  - ✓ Reviewing the Plan-Do-Study-Act (PDSA) Cycle for Improvement
  - ✓ Learning how to fill up the project charter (A3 form)
  - ✓ Implementing small-scale interventions through multiple PDSA cycles with the goal of improving care
  - ✓ Discussing the different QI activities

QI Project Development:

1. Fellows are divided into QI teams, 3-5 members in each team including residents and nurses (or other medical staff).
2. Selecting a priority area for improvement (departmental quality improvement or QMC team may be a source of support and useful development resource).
3. Identify a mentor (good mentors are usually continuity clinic supervisor, an advisor, or a sub-specialist within the field of study with required QI skills).
4. Produce an aim statement for the QI project with measurable goals.

Estimated time required: 2 hrs

QI Planning & Data Collection

1. Create a flowchart of process impacting key quality indicator.
2. Conduct a background literature review related to key quality characteristic.
3. Create a cause-effect (fishbone) diagram outlining relationship of key quality characteristic to key drivers.
4. Submit an Ethical committee approval related to the QI project if it is expected that findings may be presented externally or for publication.

It is recommended that the fellow meet with the team at least twice during this phase.
Estimated time required: 10-15 hrs

Deciding On the Key Process Variable & Intervention Design

1. Decide on the key process variable intended to be changed.
2. Identify a plan for measuring the key process variable during the pre-implementation and post-implementation phases of the project using run charts.
3. Create a SMART aims statement.
4. Decide on the intervention and timeline for data collection and implementation.

Estimated time required: 2hr

Data Collection & Implementation (Level two)

1. Collect pre-implementation data.
2. Coordinate the implementation of the intervention.
3. Collect post-implementation data.

Estimated time required: 2-3 blocks

Data Analysis & Conclusions (Level two)

1. Analyze data using appropriate statistical techniques and draw conclusions on the effectiveness of the intervention as well as recommend future directions.
2. Summarize project in presentation or poster format for presentation.

Estimated time needed: 5 hrs

Project Presentation:

There are few options to present the projects:

1. Departmental Ground Round presentation
2. Research day (for selected projects)
   - ✓ Utilize the power point template.
   - ✓ State the problem that you identified in our system.
   - ✓ List the objectives of your project.
   - ✓ Briefly describe your project.
   - ✓ Discuss the markers by which you assessed your project.
   - ✓ Discuss your outcomes.
   - ✓ Keep your presentations to 10 minutes (15 minutes max with questions).
3. Poster presentation
   - ✓ These will be discussed during GEMBA rounds (at Royal Hospital).

Learner Assessment

1. Completion of fellow QI charter and submission to the research committee.
2. For the fellow members of the QMC they need attend at list 70% of the meeting and submit 2 Mortality and morbidity reports, and 1 RCA report.
3. Evaluation of completed QI projects.
4. Presentation in ground round, research day or poster presentation in Gemba walk

Top Tips for the Trainers

1. Make sure the project is sufficiently narrow to enable timely delivery.
2. Ensure regular evaluation to assess impact.
3. Support trainees to implement sustainable pathways that do not require their ongoing input.

Resources

1. Institute for Healthcare Improvement (IHI)**:** http://www.ihi.org/ihi
2. Agency for Healthcare Research and Quality (AHRQ) – Quality Measure Tools & Resources
3. American Academy of Pediatrics (AAP) – Quality Improvement

References

Roger Y. Wong. TeachingQuality Improvement in Residency Education. Royal College of Physicians and Surgeons of Canada. 2015.

Michelle E., Thomas Bertagnoli. A Project-Based, Fellow-Led Quality Improvement Curriculum within a Pediatric Continuity Clinic. *MedEdPORTAL*.2018; 14:10738.

Laura J Monahan. Stony brook children's pediatric residency quality improvement program. *Fellow Guide*. 2015-2016

LubaDumenco, et al. An Interactive Quality Improvement and Patient Safety Workshop for First-Year Medical Students. *MedEdPORTAL*. 2018; 14:10734.

Lawrence Cheung. SAFE QI – A framework to overcome the challenges of implementing a quality improvement curriculum into a residency program. Advances in Medical Education and Practice 2017:8 779–784.

Usha V., Moiz K., Vikram P. Introduction of a quality improvement curriculum in the Department of Internal Medicine, Lincoln Medical Center. Journal of community hospital internal medicine perspectives, 2017. VOL. 7, NO. 1, 2–7

Appendix V: Guiding Principles for Trainers

1. **Assures fellow's project is a QI project versus research project.**
   - ✓ QI projects are defined as the systematic approach of measuring and identifying gaps between actual and desired quality of care and applying tools and improvement methods (i.e. PDSA cycles) to make changes to the system that result in measurable improvements.

2. **If a fellow *chooses to participate in your QI project:***
   - ✓ Introduce them to the QI project team and provides information and resources that will be helpful in understanding the project, such as a project charter.
   - ✓ Provide guidance in selecting a focused area for their participation in the QI project (e.g to do a PDSA cycle).
   - ✓ Meets with them regularly to provide guidance and offer feedback. Be available to answer questions.

3. Select something meaningful to those doing the work. Ensure that what will be studied is not undergoing change from another source.

4. Review the fellow's first PDSA cycle and provides feedback

5. Connect the fellow with appropriate clinical content area expert (if needed)

6. Promote scholarly activities (i.e. presenting their QI work at the Fellow Research Day, GEMBA-walks or other meetings) and give feedback and guidance as needed on preparing materials for specific activities.

7. Meets with the fellow at the end of the project for a closeout meeting to review completed PDSAs, discuss ways to improve the learning experience, and the importance of lifelong learning and application of QI knowledge throughout their career

8. Fill up the OMBS QI fellow evaluation form

Appendix VI: Closeout Meeting Agenda

Agenda Items:

1. Review pre- and post-assessment survey and discuss learning (appendix 6).
2. Review final report, including tools used and PDSA cycles.
3. Discuss what went well with the project and what could have been done differently.
4. Discuss suggestions by the fellows to improve the learning experience during the QI project (i.e. resources, readings, etc.)
5. Discuss key learnings, which will be applied in the fellow future work.
6. Discuss the sustainability of your project when the fellow completes the program. Who will sustain the project? What will it look like?
7. Discuss importance of lifelong learning and application of QI knowledge and skills throughout their career.

Appendix VII: QI Project Checklist

Specific steps for conducting QI in a clinical system include:

- ☐ Select the members of your QI team.
- ☐ Decided on a clinical area and topic for your QI project.
- ☐ Write aim statements that are clear, concise and population specific and that have a measurable outcome over a specified time frame.
- ☐ Determine a timeline that is realistic and feasible
- ☐ Establish appropriate division of tasks among team members, including identification of support and resource requirements
- ☐ Flowchart the steps of the clinical process (process mapping).
- ☐ Sample just enough baseline data to be able to make a sensible judgment.
- ☐ Collect baseline data (e.g. complete run and control charts).
- ☐ Develop a plan for a change.
- ☐ Communicate the plan to stakeholders.
- ☐ Implement the plan.
- ☐ Collect data to evaluate the plan (PDSA cycling).
- ☐ Provide feedback to the team.
- ☐ Repeat the relevant steps to implement the next change.

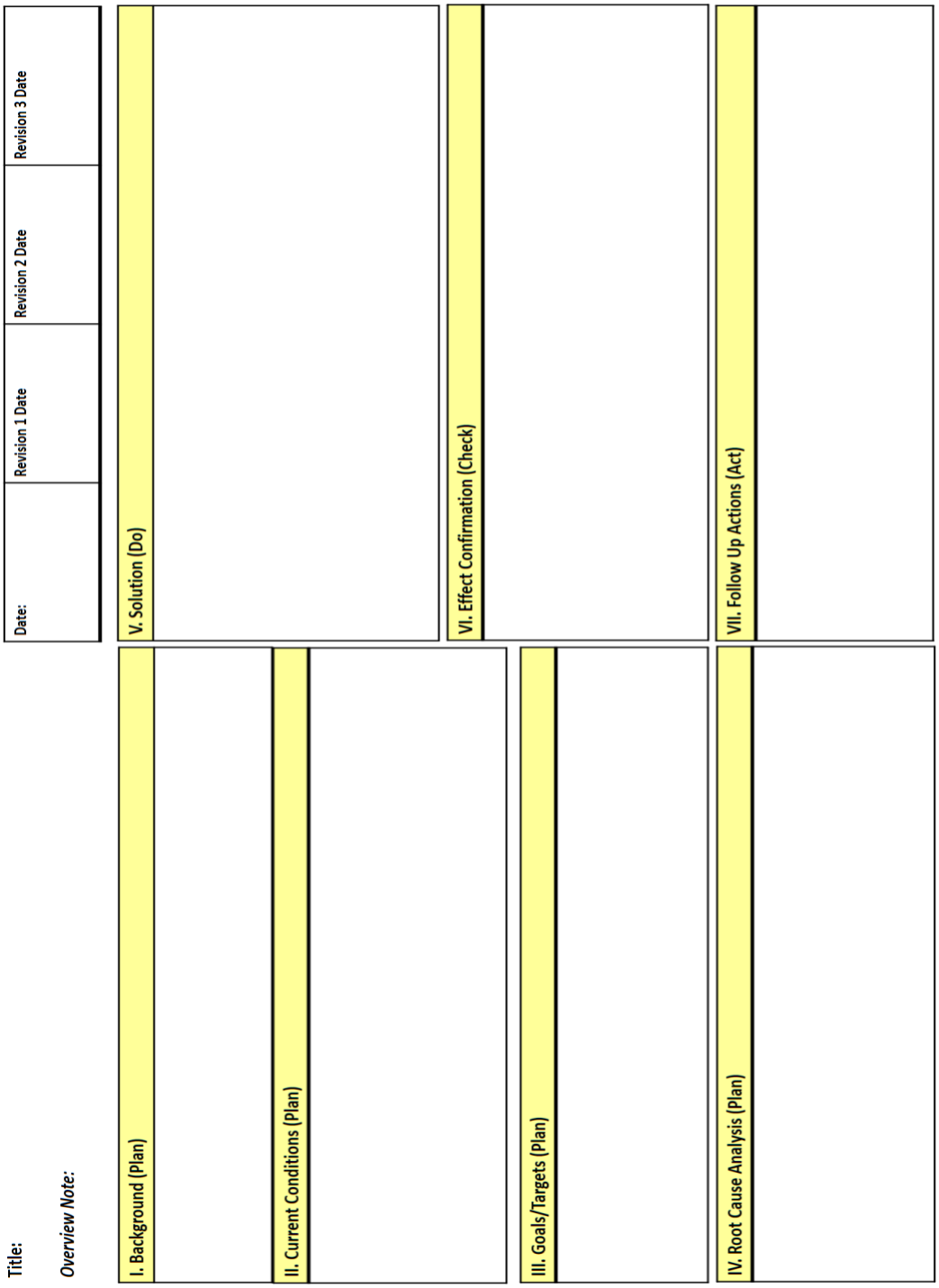
Appendix VIII: List of Possible Topics/Projects & Faculty Sponsors

Specialty	Sponsor	Institute	Fellow Names & Role	Topic of the project
PICU		Royal Hospital		Reducing Unplanned admission to the PICU & the outcome of CPR in the ward
				Improving the quality of doctor's documentation
PICU		Royal Hospital		Implementation of golden hour in patients with septic shock Wards
Ambulatory		Royal Hospital		Reducing Pediatric Outpatient Clinic No-show rates
				Reducing medication errors in the wards by improving the medication reconciliation process
				Improving DNR patient's family satisfaction in the Ward
				Improvement of the quality and timeliness of discharge summaries
				Improving efficiency and quality of fellow hand-over in the Ward
				Reducing withdrawal syndrome in the PICU
				Reducing unplanned extubation in the NICU
				Improving of code documentation in the system
Nephrology		Royal Hospital		Rate & factors of peritonitis & factors of peritonitis in pediatric chronic peritoneal dialysis patients
Pulmonology		Royal Hospital		Standardized assessment of aerochamber use technique in children admitted with asthma exacerbation
P-ER		Royal Hospital		Improving home care of patients discharged from ER with gastroenteritis

Appendix IX: Balanced Score Card

Balanced Score Card *This tool is to be used after completion of the QI project.*						
Title of project: Team members:						
Please circle appropriate number for each question						
Assessment Criteria	Not Met	Met Some	Met	Good	Very Good	Excellent
1. Have the fellows worked effectively as a team?	0	1	2	3	4	5
2. Do the project findings indicate a patient focus?	0	1	2	3	4	5
3. Do the project findings indicate knowledge of process?	0	1	2	3	4	5
4. Do the project findings incorporate PDSA/small tests of change?	0	1	2	3	4	5
5. How would you rate the aim statement (including use of appropriate methodology to identify causes of the problem)?	0	1	2	3	4	5
6. How would you rate the measurement/collection/use of data? (0 = no actual data)	0	1	2	3	4	5
7. Has the team engaged stakeholders in planning, executing and evaluating the change?	0	1	2	3	4	5
8. How would you rate the change suggested/achieved? (0 = no change suggested)	0	1	2	3	4	5
9. Do the three elements (aim, measure, change) bear some relationship to each other?	0	1	2	3	4	5
Comments:						
Total Score				**/45**		

Appendix X: PDSA worksheet



Appendix XI: Pre & Post Training Assessment

No	Criteria			
1.	**What is your understanding of quality improvement (QI)?**			
	None	Minimal	Knowledgeable	Very Knowledgeable
2.	**How confident do you feel in undertaking/leading a QI project?**			
	Not Confident	Somewhat Confident	Confident	Very Confident
3.	**To what extend do you think that physicians should undergo training on QI?**			
	None (Should be done administrator)	**Partially**	**Totally** (Physician should initiate & lead)	
4.	**How interested are you in initiating a QI project?**			
	Not at All	Somewhat Interested	Interested	Very interested
5.	**Have you participated in a QI?**			
	Yes		No	