GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR DM IN PEDIATRIC ONCOLOGY

PREAMBLE

- The specialties of Hematology and Oncology are in a period of significant change and thus not to over emphasize are upcoming in a big way. Hematological and solid malignancies occurring during infancy, childhood, and adolescence are not uncommon and require a highly sophisticated approach to diagnosis and treatment based on molecular and cellular biology, epidemiology, and other academic disciplines. The rapid and impressive progress in the field in recent decades (and the expected advances in the future) require the specialty to be practiced in a milieu in which teaching and research are actively conducted. Outcome of childhood cancers is one of the most impressive among all cancers put together provided these cancers are treated early, diagnosed properly and treated appropriately by trained Pediatric oncologists. A dedicated Pediatric Hematology/Oncology team in a teaching milieu, with post-graduate trainees has been shown to have best patient outcomes worldwide.

- The Medical Oncologists and Hematologists care for adult patients. Their residency is in Internal Medicine rather than Pediatrics, and their superspeciality training emphasizes disorders common in adults. Pediatric oncology deals primarily with hematological cancers such as acute lymphoblastic leukemia and embryonal tumors. Adult specialists, on the other hand, focus more on oncology (especially solid tumors) and acquired hematologic conditions. Pediatric Oncologists more often treat with curative intent, whereas treatments are often palliative in adult oncology. It has been conclusively proven that adolescents with acute lymphoblastic leukemia have better outcomes when treated on 'Pediatric protocols' by Pediatric oncologists than on the adult protocols by medical oncologists. Other specialties that overlap with pediatric hematology -oncology are radiology and pathology, with a focus on cancer diagnosis or transfusion medicine; laboratory hematology; and cytogenetics. Although these specialists are engaged in

teaching and research, they have little or no direct patient contact, unlike pediatric hematologists-oncologists. Other specialists with whom pediatric hematology-oncology specialists interact do engage in direct patient care, including pediatric surgeons, radiation oncologists, and infectious-disease specialists.

- The Pediatric Oncology Program is designed to provide a diversified, organized educational environment that will allow the post graduate student to develop both the clinical and research skills necessary to become an academic Pediatric Oncologist. The program is dedicated to developing individual careers by providing a strong basic foundation in clinical and laboratory research that allows each trainee freedom to choose their career goals. The aim is to prepare the future Pediatric Oncologists who will represent the clinical work force, educators, and investigators during the first quarter of the 21st century.

SUBJECT SPECIFIC OBJECTIVES

- **Theoretical Knowledge :**
    - To be equipped with adequate basic and applied knowledge to deliver optimal treatment for hematological and malignant disorders
- **Practical and Clinical skills**
    - Diagnose and provide comprehensive care to children with hematological and solid malignancies
    - To carry out all necessary diagnostic and therapeutic procedures as required for the care of children with hematological and solid malignancies
- **Writing thesis/Research articles**
    - To identify knowledge gaps and to formulate research questions to address these.
    - To be able to design and write research/thesis protocol
- **Attitudes including communication skills**

- To counsel parents and relatives of the patient with empathy and compassion
- To interact with medical colleagues in multiple disciplines

- **Training in Research Methodology**
  - To understand basic principles of epidemiology and biostatistics
  - To learn about design, conduct, ethics and interpretation of results of a randomized controlled trials in oncology.
  - To acquire skills required for interpretation of scientific data for clinical practice.

- **Ethics in Practice**
  - To learn the Ethical practice in patient care and practice according to the updated guidelines.
  - To conduct research as per good clinical practice guidelines

SUBJECT SPECIFIC COMPETENCIES

By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain), as given below:

A. Cognitive domain

Upon completion of the course, the student should acquire the following theoretical competencies:

- Biological basis of childhood cancer
- Diagnosis, evaluation and treatment of childhood cancer
- Supportive care of children with cancer and Principles of infection control
- Issues related to survivorship
- Indications and principles of hematopoeitic stem cell transplantation
- Basic knowledge of hematopoietic and solid tumor pathology including interpretation of peripheral blood and bone marrow aspiration smears, flow cytometry, cytogenetics and molecular techniques

- Basic knowledge of Blood Transfusion & Component therapy

B. Affective domain (Attitudes including Communication and Professionalism)

1. The student should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. The student should always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. The student should develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.
4. The student should be able to: do counseling of patients and parents, develop organizational and managerial skills and leadership of multidisciplinary team.

C. Psychomotor domain

At the end of the course, the student should acquire the following skills and be able to perform independently the following techniques/procedures:

- **Generic training in practical skills**
    - Optimal use of diagnostic services
    - Ensuring good clinical practice
    - Recognition of a critically ill child and the need for high dependency care/ICU
    - Central venous access and care
    - Bone marrow aspiration, lumber puncture, peritoneal and pleural fluid aspiration, nasogastric tube insertion, etc.
    - Chemotherapy drug handling, administration & management of acute side effects including intrathecal and intracavitory chemotherapy.
    - Care of infants and adolescents
    - Late effects monitoring and survivorship issues
    - Pain evaluation & management

- Palliative care

Syllabus

Course contents:

A. Cognitive domain (Knowledge domain)

During the course, the student should be imparted and acquire learning in the following specific knowledge domains:

- **BIOLOGICAL BASIS OF CHILDHOOD CANCER**
    - Epidemiology of childhood Cancer
    - Childhood Cancer and heredity
    - Molecular and genetic basis of childhood Cancer
    - Biology of childhood Cancer
    - Tumor immunology and pediatric Cancer
- **DIAGNOSIS AND EVALUATION OF THE CHILD WITH CANCER**
    - Clinical assessment and differential diagnosis of the child with suspected Cancer
    - Pathology and molecular diagnosis of Leukemias and Lymphomas
    - Diagnostic pathology of pediatric malignancies
    - Imaging studies in the diagnosis and management of pediatric malignancies
- **PRINCIPLES OF MULTIMODAL THERAPY**
    - General principles of chemotherapy
    - General principles of surgery
    - Principles of Radiation Oncology
    - Infants and adolescents with cancer: special considerations
    - Hematopoietic Stem Cell Transplantation in Pediatric Oncology
    - Cancer Clinical Trials: Design, Conduct, Analysis, and Reporting
    - Regulating patient safety in cancer treatment
    - Cell and Gene therapies – Role in Pediatric Oncology
    - Evolving targeted molecular therapies and biotherapeutics
- **MANAGEMENT OF COMMON CANCERS OF CHILDHOOD**
    - Acute lymphoblastic leukemia

- Acute Myelogenous Leukemia
- Chronic Leukemias of childhood
- Myeloproliferative and Myelodysplastic Disorders
- Hodgkin lymphoma
- Malignant Non-Hodgkin Lymphomas in children
- Lymphoproliferative disorders and malignancies related to immunodeficiencies
- Histiocytoses
- Tumors of the Central Nervous System
- Retinoblastoma
- Tumors of the liver
- Renal tumors
- Neuroblastoma
- Rhabdomyosarcoma and the undifferentiated Sarcomas
- Ewing Sarcoma Family of Tumors: Ewing Sarcoma of bone and soft tissue and the peripheral primitive neuroectodermal tumors
- Non-rhabdomyosarcomatous Soft Tissue Sarcomas
- Osteosarcoma
- Germ Cell Tumors
- Endocrine tumors
- Management of infrequent cancers of childhood

- **SUPPORTIVE CARE OF CHILDREN WITH CANCER**
  - Oncologic emergencies
  - Tumour Lysis Syndrome
  - Hematologic supportive care for children with cancer
  - Infectious complications in Pediatric Cancer patients
  - Nutritional Supportive Care
  - Symptom Management in Supportive Care
  - Nursing support of the child with cancer
  - Rehabilitation of the child with cancer
  - Psychiatric and psychosocial support for the child and family

- The Other Side of the Bed: what caregivers can learn from listening to patients and their families
- Ethical considerations in Pediatric Oncology

- **OTHER ISSUES ARISING AT DIAGNOSIS, DURING TREATMENT, AND AFTER CESSATION OF THERAPY**

  - Late effects of childhood cancer and its treatment
  - Educational issues for children with cancer
  - Palliative care for the child with advanced cancer
  - Financial Issues in Pediatric Cancer
  - Pediatric Cancer: advocacy, insurance, education, and employment
  - Complementary and alternative medical therapies in Pediatric Oncology
  - Pediatric Oncology in countries with limited resources
  - Preventing Cancer in adulthood: advice for the pediatrician
  - Resources for children with cancer, their families, and physicians
  - Role of Telemedicine in Pediatric Cancer Care

- **HEMATOPOEITIC STEM CELL TRANSPLANTATION (HSCT)**

  - Indications for HSCT and HLA typing
  - Principles of:
    - Donor selection
    - Donor counseling
    - Conditioning regimens/stem cell manipulation/ immuno-suppression
    - Transplant immunology
    - Graft versus host disease
    - Other complications
    - Supportive care
  - Long term follow up and late effects

- **LABORATORY TRAINING**
- Interpretation of peripheral blood and bone marrow aspiration smears.
- Basic knowledge of bone marrow biopsy and solid tumor histopathology.

- CSF cytology
- Cytochemistry/Immunohistochemistry
- Flow cytometry & immunophenotyping
- Cytogenetics/Molecular diagnosis
- Coagulation
- Blood Transfusion & Component therapy
- Principles of infection control [microbiology]

B. Affective domain (Attitudes including Communication and Professionalism)

The post graduate student at the end of the course should know and be able to manage:

- Educational issues for children with cancer
- Financial issues in pediatric cancer
- Pediatric cancer: Advocacy, insurance, education and employment
- Complementary and alternative medical therapies in Pediatric Oncology
- Pediatric oncology in countries with limited resources
- Preventing cancer in adulthood: advice for paediatrician
- Resources for children with cancer, their families and physician
- Role of telemedicine in pediatric cancer care

C. Psychomotor Domain

At the end of the course, the student should acquire following skills and be able to perform independently the following techniques/procedures:

- **Generic training in practical skills**
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  - Care of infants and adolescents

- Late effects monitoring and survivorship issues
- Pain evaluation & management
- Palliative care

TEACHING AND LEARNING METHODS

Postgraduate Training

Teaching methodology

Didactic lectures are of least importance.

- Teaching should include seminars, journal clubs, symposia, tutorials, case discussions, and research presentations.
- Reviews and guest lectures should get priority for theoretical knowledge.
- Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning.
- Student should have hands-on training in performing various procedures (medical/surgical concerning his specialty) and acquire ability to interpret various tests/investigations.
- Exposure to newer specialized diagnostic/therapeutic procedures concerning his/her subject should be given.
- A post graduate student in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his post graduate studies so as to make him eligible to appear at the postgraduate degree examination.
- The post graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Department should encourage e-learning activities.

Teaching Programme:

Inpatient management: The post graduate student will learn the management of various hematological and solid tumors of childhood, and their early diagnosis as well as interpretation of various tests and procedures for optimal outcome.

- Throughout the three years of training, the post graduate student will maintain a weekly continuity clinic that provides the opportunity to care for patients longitudinally and to continually improve clinical skills. Post graduate students establish an ongoing relationship with patients and their families and, under the guidance of a faculty member in pediatric hematology-oncology, take primary responsibility for establishing chemotherapy treatment plans, participating in surgical and radiotherapy treatment decisions, and treating complications of a disease or its therapy.

- They would perform specialized diagnostic and therapeutic procedures like bone marrow aspiration and trephine biopsy, FNAC, preparation of peripheral smear and bone marrow smear, insertion, use and care of central venous access, lumbar puncture along with administration of intrathecal chemotherapy, pleurocentesis, peritoniocentesis, stem cell harvest (PBSC and bone marrow) etc. wherever indicated and learn the use and maintenance of various equipment used for patient care.

- **Outpatient management**: These would be an integral part of the functioning of the Pediatric Hemato-oncology Clinic and the Pediatric solid tumor Clinic.

  - Subspeciality clinics: The post graduate students will also get opportunity to be involved in the care of Pediatric Oncology patients with special needs:
  - Day Care Centre: for giving chemotherapies, blood transfusions, care of central venous lines conducting routine procedures
  - After completion of therapy (ACT) clinic: for long term follow up of patients completed chemotherapy
  - Leukemia Clinic
  - Neuro-oncology Clinic
  - Bone-soft tissue tumor clinic
  - Palliative/ Pain care clinic
  - Solid tumor clinic

- **Research:** The post graduate student would be introduced to research methodologies and would be expected to complete an independent research project under the supervision and guidance of the faculty. This should include training of research methodology including Biostatistics and Good Clinical Practice Guidelines.

- The post graduate student would participate in all teaching activities both intra-departmental as well as inter-departmental such as:
    - Clinico-pathological conferences
    - Mortality meetings
    - Case presentations
    - Ward grand rounds & daily rounds
    - Radiology rounds
    - Journal Clubs
    - Seminars

- The Department of Pediatric Oncology will also organize its academic programme for the post graduate students as follows:
    - Clinical Hematology Teaching Conference (weekly)
    - Oncology Teaching Conference (weekly)
    - Solid Tumor Board (weekly)
    - Pediatric Oncology Inpatient grand round (weekly)
    - Neuro-oncology tumor board (monthly)
    - Lymphoma tumor board (weekly)
    - Hematopathology slide Conference (weekly)
    - Protocol Conference (2-monthly)
    - After completion of therapy multi-disciplinary Care (monthly)
    - Journal Club (monthly)

- **Log Book**

The post graduate students shall maintain a log book of the work carried out by them and the training programme undergone during the period of training including details of procedures

done assisted or done independently by DM students. The log book shall be checked and assessed periodically by the faculty members imparting the training.

Clinical postings: Recommended schedule for three years training:

S.No.	Rotation	Duration
1.	Clinical Hematology-Oncology 1. Hemato-oncology 2. Solid tumors	24 months# 12 months 12 months
2.	Bone Marrow Transplantation	4 months
3.	Laboratory Hematology-Oncology*	3 months
4	Research & Elective**	4 months
5.	Exam preparation leave	1 month

Overlap of haematology oncology and solid tumour postings is permitted

*Rotations in Transfusion Medicine, Hematopathology, Molecular cytogenetics, Cytopathology, Histopathology, Immunopathology.

** Rotations of 2-3 wks in various specialties associated with Pediatric hematology and oncology such as radiation oncology, Pediatric Oncosurgery, bioimaging, Radiodiagnosis, Palliative care.

- The first and second semester of the programme is an intensive clinical experience designed to allow the post graduate student to develop cognitive and psychomotor skills in diagnosis and management of pediatric hematology-oncology problems.
- During the third and fourth semesters, the post graduate student will pursue independent clinical and laboratory based research. In addition, the post graduate student will take courses in biostatistics and clinical trials design offered by faculty.
- In the last 2 semesters, the post graduate student would enhance the skills related to allied specialties such as BMT, Laboratory oncology, radiation oncology, imaging & bioimaging and molecular diagnostics.

The post graduate students will participate in the night and weekend call schedule on Hematology-Oncology and Blood and Bone Marrow Transplant Unit throughout the three years of the programme.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT, during the training programme

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Quarterly assessment during the DM training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

The student is to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT i.e., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The summative assessment examination shall include two heads:

A. Theory examination.
B. Practical, Clinical examination and Viva-voce.

Theory examination and Practical/Clinical, Viva-voce shall be separate heads of passing.

Theory examination shall comprise of four papers. Passing percentage shall be cumulatively 50% with minimum of 40% marks in each theory paper.

Practical /Clinical examination consisting of at least one long case, three short cases and viva-voce. Passing percentage shall be 50%.

Passing shall be separate for each head and failing shall be common, meaning thereby that clearance at theory and failure at practical / clinical shall amount to failure at Summative examination and vice versa.

The Post Graduate examination shall be in two parts: -

1. **Theory**: There shall be four theory papers as follows:
   - Paper I: Basic and Applied Sciences as related to Pediatric Oncology
   - Paper II: Principles and practice of Clinical Pediatric Oncology: part 1
   - Paper III: Principles and practice of Clinical Pediatric Oncology: part 2
   - Paper IV: Recent advances as related to Pediatric Oncology

2. **Clinical/Practical examination:** The practical examination should consist of the following and should be spread over two days.
   - One long case: History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management.
   - 3 Short cases from various sections of the specialty.
   - Spotters/Ward rounds
   - Slides of hematology/pathology and radiology assessment, drugs and instruments pertaining to oncology

- **Oral examination** shall be comprehensive enough to test the student's overall knowledge of the subject.

Recommended Reading

Books (latest edition)

- Principles and Practice of Pediatric Oncology by PIZZO and POPLACK
- Principles of Pediatric Radiation Oncology by Halperin

Journals

3-5 International and two national (indexed) journals

Annexure I

Postgraduate Student Appraisal Form

Name of the Department/Unit :
Name of the PG Student :
Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____
_____
_____

***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD