

D.M. (PAEDIATRIC ONCOLOGY)
[Syllabus Approved by Board of Studies, Medical & Health Sciences]

Programme Code	:	HLTH10A02
Programme Details	:	DM PAEDIATRIC ONCOLOGY
Programme Learning Outcomes (PLOs/PSOs)	:	ANNEXED IN THE BELOW FORMAT
Eligibility Criteria	:	AS PER NMC NORMS
Duration of the Course	:	3 YEARS
Programme Structure (Credit-Based)	:	NA
Detailed Course Syllabus	:	ANNEXED IN THE BELOW FORMAT
Teaching–Learning Methodologies	:	3 YEARS RESIDENCY PROGRAM
Examination & Evaluation System	:	ANNUAL APPRAISALS FOLLOWED BY FINAL YEAR EXAMINATION AS PER NMC NORMS
Internship / Project / Dissertation Guidelines	:	1 YEAR MANDATORY BOND
Program In Charge	:	HEAD, DEPT OF PAEDIATRIC ONCOLOGY Dr. Girish Chinnaswamy girish.chinnaswamy@tmc.gov.in Academic Coordinator: Dr. Shyam Srinivasan srinivas.shyam@gmail.com
Annexure (Books / Journals etc)	:	ANNEXUED

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Programme Outcome:

- 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.
- 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 aim is for acquisition of a fundamental knowledge base in Pediatric Hematology, Oncology and BMT and development of clinical skills in Pediatric Hematology, Oncology and BMT along with development of skills in interpreting basic.
- The aim is to prepare the future Pediatric Oncologists who will represent the clinical work force, educators, investigators and researchers in the field of pediatric oncology.
- Development of skills in preparing clinical presentations, discussions of cases, and case reports.
- The programmer would teach the student to facilitate learning of medical/nursing students, practicing physicians, para-medical health workers and other providers as a teacher-trainer;

DETAILED SYLLABUS

■ AIMS AND OBJECTIVES

To train a pediatrician having requisite postgraduate qualification (MD Pediatrics or its equivalent) as a specialist in Pediatric Oncology who at the completion of the program would be able to :

- Diagnose and provide comprehensive care to children with hematological and solid malignancies
- Is able to carry out all necessary diagnostic and therapeutic procedures as required for the care of children with hematological and solid malignancies
- Is equipped with adequate basic and applied knowledge to deliver optimal treatment for all childhood malignant disorders
- Counsel parents and relatives of the the patient with empathy and compassion
- Design and execute research projects
- Interact with medical colleagues in multiple disciplines
- Conduct teaching sessions, bedside seminars and lectures

■ ELIGIBILITY

M.D. Pediatrics or equivalent

* At present candidates with MD Pediatrics or equivalent degree are eligible for DM in Medical Oncology which is being stopped after the DM Pediatric Oncology is established.

■ Duration of the course

Three years residency program (6 semesters)

■ Admission to the Course

As per MCI rules

▪ **PROPOSED TRAINING PROGRAM**

• **INDOOR SERVICE**

- The candidates 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 candidate will maintain a weekly continuity clinic that provides the opportunity to care for patients longitudinally and to continually improve clinical skills. Candidates establish an ongoing relationship with patients and their families and, under the guidance of a faculty member in pediatric 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, true cut biopsy, use and care of central venous access, lumbar puncture along with administration of intrathecal chemotherapy, pleurocentesis, pericardiocentesis, peritonocentesis, stem cell harvest (PBSC and bone marrow) etc. wherever indicated and learn the use and maintenance of various equipment used for patient care

1. OUTDOOR SERVICE

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

2. SUBSPECIALITY CLINICS:

They will also get opportunity to be involved in the care of Pediatric Oncology patients with special needs :

- a) Day Care Centre: for giving chemotherapies, blood transfusions, care of central venous lines conducting routine procedures
- b) Leukemia/Lymphoma Clinic
- c) Solid tumour clinic
- d) Neuro-oncology Clinic
- e) Bone-soft tissue tumor clinic

- f) After completion of therapy (ACT) clinic: for long term follow up of patients completed chemotherapy
- g) Palliative care clinic

■ RESEARCH

The candidate would be introduced to research methodologies and would be expected to complete an independent research project under the supervision and guidance of the faculty to be submitted as a dissertation.

■ TEACHING PROGRAMME

1. In addition to the daily instructions that candidates receive from faculty on the inpatient services, and mini-rotations, there will be daily clinical/ academic activities designed to enhance the candidate's learning experience for which they will maintain a Logbook, to be submitted at the time of final examination.
2. The candidate would participate in all teaching activities both intradepartmental as well as interdepartmental. The academic activities should include :
 - Morning in-patient rounds
 - Case presentations
 - Ward grand rounds
 - Mutidisciplinary joint meeting/round with pathologist/ haemato-pathologist ; radiologist; radiotherapist; pediatric/ neuro/ortho surgeons
 - Seminars & Journal Clubs Clinico-pathological conferences
 - Mortality meetings
 - Autopsy conferences

A minimum of one hour a day should be devoted for academic activity .

■ RESEARCH ACTIVITIES

In addition to prospectively following their cases for 3 years, the candidate would be encouraged to undertake independent research projects and also actively associate with the ongoing research activities. He/she would be expected to publish the results of his/her research in journals of repute.

It is expected that the candidate would have at least 1 publication at the end of 3 years in a reputed journal.

▪ **ASSESSMENT AND EVALUATION**

1. Internal assessment: This will be done at the end of each year and will include theory, practical and evaluation of skills. The results of internal assessment will be given due weightage in the final examination.

2. Evaluation at the End of the Course

(a) **Final theory papers:** At the end of three years, theory examinations would be held like all other DM courses.

a. **PAPER I:** Basic and Applied Sciences as related to Pediatric Oncology

b. **PAPER II:** Principles and practice of Clinical Pediatric Oncology part 1

c. **PAPER III:** Principles and practice of Clinical Pediatric Oncology part

d. **PAPER IV:** Recent advances as related to Pediatric Oncology

(b) **Practical examination:** This will include clinical cases, Pediatric Oncology ward round and viva voce. Viva voce shall include skiagrams, spots, clinical problems, investigative data, procedures etc. the candidate is also required to submit his/her Logbook, Thesis and Research works.

3. Examiners

There will be four examiners with two internal and two externals. For qualifications and experience of the examiners, the same rules will apply as for the examiners of any other DM courses of the Institute.

▪ **Course Faculty**

• **Intra-Departmental Faculty:** Faculty of the Dept of Medical Oncology.

• **Inter-Departmental:** Faculty of department of Hematopathology, Molecular cytogenetics, Histopathology, and Transfusion Medicine and of the Bone Marrow Transplant Unit will be involved. Related Departments of Radiodiagnosis, Pediatric Radiation Oncology, Nuclear Medicine, Pediatric Oncosurgery, Orthopedic Oncology,

Neurosurgery, Head & Neck oncology will provide all necessary help for the teaching and training of the candidates undergoing the course.

- 1. Extra-Institutional:** Proposed (pending MOU) for training in benign hematology
Division of Pediatric Hematology, Bai Jerbai Wadia Hospital for Children

▪ SYLLABUS

General Principles of Pediatric Oncology:

- Epidemiology of Childhood Cancer
- Childhood Cancer and Heredity
- Molecular and Genetic Basis of Childhood Cancer
- Biology of Childhood Cancer
- Tumor Immunology and Pediatric Cancer
- Pathology and Molecular Diagnosis of Pediatric Malignancies
- Imaging Studies in the Diagnosis and Management of Pediatric Malignancies
- Principles of Chemotherapy
- Principles of Surgery
- Principles of Radiation Oncology
- Principles of supportive care & oncologic emergencies
- Infants and Adolescents with Cancer: Special Considerations
- Cancer Clinical Trials: Design, Conduct, Analysis, and Reporting
- Good clinical practice
- Cell and Gene Therapies – Role in pediatric oncology
- Evolving Targeted Therapies and biotherapeutics

1. Hemato-oncology

[Acute lymphoblastic leukemia; Acute Myelogenous Leukemia; Chronic Leukemias of Childhood; Myelo-proliferative and Myelodysplastic Disorders; Hodgkin lymphoma; Non- Hodgkin Lymphomas; Lymphoproliferative Disorders and Malignancies Related to Immunodeficiencies; Histiocytoses]

- Diagnosis including morphology, cytochemistry, immuno- phenotyping & cytogenetics & participation in clinico pathological meetings
- Inpatient and outpatient care
- Management of emergencies and treatment related complications
- Risk stratification & appropriate treatment planning
- Treatment as per clinical protocol
- Response evaluation
- Follow up guidelines
- Late effects
- Diagnosis & treatment option for relapse
- Data collection

2. Extra Cranial Solid Tumour : [Retinoblastoma; Tumors of the Liver; Renal Tumors; Neuroblastoma; Rhabdomyosarcoma and soft tissue sarcomas; Ewing Family of Tumors; Osteosarcoma; Germ Cell Tumors; Endocrine Tumors & Rare Cancers of Childhood]

- Inpatient and outpatient care in conjunction with Pediatric Surgical Oncologist/ Pediatric Surgeon, orthopedic Surgeon, Radiotherapist [preferably dedicated to pediatrics] Radiologist & Pathologist/Molecular Pathologist and participation in tumor boards.
- Management of emergencies and treatment related complications
- Staging, Risk stratification & appropriate treatment planning
- Treatment as per clinical protocol
- Response evaluation
- Follow up guidelines
- Late effects & Rehabilitation
- Diagnosis & treatment option for relapse
- Data collection

3. CNS Tumours :

- Inpatient and outpatient care in conjunction with Neurosurgeon, Radiotherapist [preferably dedicated to Neuro-oncology] Radiologist & Pathologist/Molecular Pathologist and participation in tumor boards.
- Management of emergencies and treatment related complications
- Staging,Risk stratification & appropriate treatment planning
- Treatment as per clinical protocol
- Response evaluation
- Follow up guidelines
- Late effects & Rehabilitation
- Diagnosis & treatment option for relapse
- Data collection

4. Haematopoietic Stem Cell Transplant [HSCT]

- Indications for HSCT
- Tissue 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

5. Laboratory Training:

- Interpretation of peripheral blood and bone marrow aspiration smears.
- Basic knowledge of bone marrow biopsy and solid tumour histopathology.
- CSF cytology
- Cytochemistry/Immunohistochemistry

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

6. 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
- Chemotherapy drug handling, administration & management of acute side effects including intrathecal & intracavitary chemotherapy.
- Care of infants and adolescents
- Late effects monitoring & survivorship issues
- Pain evaluation & management
- Palliative care
- Counselling of patients and parents
- Organization & managerial skills
- Leadership of multidisciplinary team

7. Other Issues

- 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 the Pediatrician
- Resources for Children with Cancer, Their Families, and Physicians
- Role of Telemedicine in Pediatric Cancer Care

Role of Other Departments:

Bone Marrow Transplant Unit: For training of the candidate in the preparation of the patient for the procedure, methodology of the procedure, care of such patients and management of the complication which may arise during the procedure and long term follow up of such patients.

Transfusion Medicine : For training of the candidate in various aspects of blood component therapy, their storage and usage, aphaeresis and stem cell separation for bone marrow transplantation.

Hematopathology : For training of the candidate in the laboratory aspects of Pediatric hematology and oncology like routine hematological investigations, interpretation and reporting of bone marrow aspirate and biopsy, flowcytometry, cytogenetics, chromosomal analysis, Hb electrophoresis, factor assay, hemolytic anemia and bleeding disorder work-up, FISH etc.

Cytopathology : For training of the candidate in the routine cytological investigations related to hematology and oncology, interpretation and reporting of FNAC, Immunocytochemistry etc.

Immunopathology : For training of the candidate in the routine immunological investigations related to Paediatric hematology and oncology, interpretation and reporting of HLA, Immunocytochemistry, PCR, chromosomal culture etc.

Histopathology : For training of the candidate in the routine histopathological investigations related to Paediatric hematology and oncology.

Microbiology : For training in relevance to Paediatric hematology and oncology.

Radiodiagnosis : For training of the candidate in interpretation of various radiologic diagnostic procedures in relevance to Paediatric hematology and oncology like X-rays, USG, CT scan, MRI, interventional radiology etc. Radiation Oncology: For training of the candidate in role of radiotherapy in childhood malignancies.

Nuclear Medicine : For training of the candidate in role of nuclear medicine in childhood malignancies, e.g. Bone scan, Gallium scan, MIBG, PET-CT scan.

Paediatric Surgery : For familiarizing the candidate with the surgical procedures in

relevance to Paediatric hematology and oncology and placement of central venous catheters.

Orthopedic Oncology: For familiarizing the candidate with the orthopedic aspects in relevance to Paediatric oncology, e.g. Ewing’s sarcoma, osteo- sarcoma, LCH, amputation, limb sparing surgeries, etc.

Radiation Oncology: For familiarizing the candidate with the principles & practice of radiotherapy procedures in relevance to pediatric oncology.

Proposed Time Schedule:

The rotations are divided as follows:

Sr.No.	Rotation	Duration
1.	Clinical Hematology-Oncology	24 months
	1. Hemato-oncology	12 months
	2. Solid tumors	12 months
2.	Bone Marrow Transplantation	4 months
3.	Laboratory Hematology-Oncology*	4 months
4.	Research & Elective**	3 months
5.	Exam preparation leave	1 month
<p>*Rotations in Transfusion Medicine, Hematopathology, Molecular cytogenetics, Cytopathology, Histopathology, Immunopathology.</p> <p>**Rotations of 2-3 wks in various specialties associated with Pediatric hematology and oncology such as radiation oncology, Pediatric Oncosurgery, bioimaging, catheter clinic, Radiodiagnosis etc.</p>		

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

The candidates will participate in the night and weekend call schedule as per roster in Dept. of Pediatric Oncology throughout the three years of training program.