

***Residency Program
Doctor of Medicine (MD)
Curriculum (Phase-B)***

***Pediatric Hematology and
Oncology***



**Bangabandhu Sheikh Mujib Medical University
Dhaka, Bangladesh**

C ontents		
01.	Introduction	03
02.	Goals and Objectives	04
03.	Phase B Admission Requirements for Training	05
04.	Phase B Curriculum structure	05
05.	Teaching and learning methods	07
06.	Record of Training	08
07.	Research	09
08.	Assessments	09
09.	Supervision and Training Monitoring	14
10.	Curriculum Implementation, Review and Updating	15
11.	Phase B Syllabus	15

1. Introduction:

1.1. Overview of the Specialty

To obtain a degree of Doctor of Medicine (MD) in Pediatric Hematology and Oncology, a candidate must need to complete Phase B residency program which deals with learning clinical skills, laboratory works and research related to hematological and oncological problem in children.

After completion of this program a new pediatric hematologist and oncologist will efficiently identify and manage diseases and disorders related to Pediatric Hematology and Oncology and he/she would develop skills and acumen to resolve emerging problem and capacity to carry out research related to the subject.

1.2. Pediatric Hematology and Oncology Residency Program

Residents will undertake a three year intensive Phase B training which is Specialty-specific training in Pediatric Hematology and Oncology after completion of Phase A training in order to achieve the levels of knowledge, skills and expertise required for clinical practice in the field of Pediatric Hematology and Oncology. It is a competency-based program emphasizing on meaningful integration and contextualization. During their two years phase A training program, the candidates have been introduced and developed the broad range of core knowledge, skills, attitudes and behaviors required to become a competent pediatrician. The knowledge and skills related to Pediatric Hematology and Oncology acquired during Phase A training are further focused and refined during Phase B training.

The teaching, learning and assessment of the curriculum is facilitated by the provision of comprehensive, educationally oriented supervision and support, which is provided to all trainees during this phase B training program.

2. Goals and objectives:

2.1. Overall Goals:

1. To create Pediatric Hematologist and Oncologist who would be able to meet and respond to the changing healthcare needs and expectation of the society.
2. To develop Pediatric Hematologist and Oncologist who possesses knowledge, skills and attitudes that will ensure competency, safety and efficiency, to practice Hematological and Oncological problem in children safely and effectively.
3. To ensure that they have appropriate foundation for lifelong learning and further training in the field of Pediatric Hematology and Oncology.
4. To help them develop to be critical thinkers and problem solvers when managing health problems in the community they serve.

2.2. General Objectives:

The educational and training process aims to produce Pediatric Hematologist and Oncologist who; -

- Can address all aspects of the healthcare needs of patients and their families
- Maintain the highest standards appropriate in their professional field
- Are aware of current thinking about ethical and legal issues.
- Are able to act as safe independent practitioners whilst recognizing the limitation of their own expertise and are able to recognize their obligation to seek assistance of colleagues where appropriate.
- Are aware of the procedures, and able to take appropriate action, when things go wrong, both in their own practice and in that of others.
- Will be honest and objective when assessing the performance of those they have supervised and trained

- Can take advantage of information technology to enhance all aspects of patient care
- Can develop management plans for the "Whole patient" and maintain knowledge in other areas of medicine which impinge on the specialty of Pediatric Hematology and Oncology.
- Understand that more effective communication between them and their patients can lead to more effective treatment and care
- Apply appropriate knowledge and skill in the diagnosis and management of patients.
- Establish a differential diagnosis for patients presenting with medical problems by the appropriate use of the clinical history, examination and investigations
- Are competent to perform the core investigations and procedures required in their specialties.
- Develop clinical practice which is based on an analysis of relevant clinical trials and to have an understanding of their research methodologies
- Are able to apply the knowledge of biological and behavioral sciences in clinical practice
- Are able to identify and take responsibility for their own educational needs and the attainment of these needs.
- Have developed the skills of an effective teacher.

3. Phase B Admission Requirements for Training:

- A. Residents who has successfully completed Phase A training and passed Phase A Final Pediatrics and Allied Examination are eligible for enrolment in the Phase B Program.
- B. Candidates with FCPS / MD in Pediatrics can be enrolled directly into Phase- B residency program.

4. Phase B Curriculum structure:

The training is designed to develop both the generic and speciality-specific attributes necessary to practice

independently as a consultant Pediatric Hematologist and Oncologist. The aim is to train individuals to provide the highest standard of service to children with pediatric hematological and oncological disorders. This includes the development of positive attitudes towards lifelong learning and the ability to adopt to future technological advances and the changing expectations of society.

4.1. Phase B: Pediatric Hematology and Oncology speciality Training:

It is an in-depth speciality-specific educational and training program. This phase will make the resident competent and prepare them for the speciality qualification. It will provide educational program covering the specialty of Pediatric Hematology and Oncology that includes laboratory works related to Pediatric Hematological and Oncological problem and Research Methodology, and Medical Education along with specific clinical training.

4.1.1. Expected outcomes at the completion of the Phase B Program:

Residents of this training program will be equipped to function effectively within the current and emerging professional, medical and social contexts. At the completion of the training program in Pediatric Hematology and Oncology, as defined by this curriculum, it is expected that Pediatric Hematologist and Oncologist will have developed the clinical skills and have acquired the theoretical knowledge for competent Pediatric Hematologist and Oncologist in practice. It is expected that a new Pediatric Hematologist and Oncologist will be able to:

- ◆ Utilize effective communication with patients and their families and with professional colleagues
- ◆ Be devoted to life long learning
- ◆ Be equipped to manage problems of children related to hematology and oncology

- ◆ Identify the pathophysiology and manifestations of Hematological and Oncological problem in children and modern therapeutics, which can be applied to patient diagnosis and management
- ◆ Apply appropriate skills to perform necessary diagnostic and therapeutic decisions
- ◆ Demonstrate a capacity to rationally analyze clinical data and published work
- ◆ Demonstrate an understanding of and commitment to the role of research in advancing medical care of Hematological and Oncological problem in children.
- ◆ Develop a commitment to compassionate, ethical professional behavior
- ◆ Identify health issues of importance to the community related to hematological and Oncological problem in children and contribute constructively to debate about those issues
- ◆ Apply primary and secondary prevention strategies in Hematological and Oncological problem in children

5. Teaching and Learning Methods:

The bulk of learning occurs as a result of clinical experiences (experiential learning, on-the-job learning) and self-directed study. The degree of self-directed learning will increase as trainees became more experienced. Teaching and learning occurs using several methods that range from formal didactic lectures to planned clinical experiences. Aspects covered will include knowledge, skills and practices relevant to the discipline in order to achieve specific learning outcomes and competencies. The theoretical part of the curriculum presents the current body of knowledge necessary for practice. This can be imparted using lectures, grand teaching rounds, clinico-pathological meetings, morbidity/mortality review meetings, literature reviews and presentations, journal clubs, self-directed learning, conferences and seminars.

5.1. Phase B Training Rotations:

Pediatric Hematology and Oncology specialty training comprises rotations in:

Inpatients, outpatient	- 18 months	
Hematology Lab	- 12 months	
Transfusion medicine	- 1 month	
Radiation oncology	- 2 weeks	
Radiology and Imaging	- 1 week	
Ophthalmology	- 1 week	
Neurosurgery	- 1 week	2 months
Pathology	- 1 week	
Virology/ Microbiology and Immunology	- 1 week	
Medical genetics	- 1 week	

6. Record of Training:

The evidence require to confirm progress through training includes:

- Details of the training rotations, the training plan agreed with weekly timetables and duty rosters; and numbers of practical procedures and outcomes.
- Confirmations of attendance at events in the educational Program, at departmental and inter-departmental meetings and other educational events.
- Confirmation (certificates) of attendance at subject-based/skills-training/instructional courses.
- Recorded attendance at conference and meetings.
- A properly completed **logbook** with entries capable of testifying to the training objectives which have been attained and the standard of performance achieved.
- CME activity.
- Supervisor's reports on Observed performance (in the workplace), of duties, practical procedures, of presentations made and teaching activity, of advising and working with others, of standards of case notes, correspondence and communication with others.

6.1. Logbook:

Residents are required to maintain a logbook in which entries of academic/professional work done during the period of training should be made on a daily basis, and signed by the supervisor. Completed and duly certified logbook will form a part of the application for appearing in Phase Final Examinations.

7. Research:

Development of research competencies forms an important part of the Residency Program curriculum as they are an essential set of skills for effective clinical practice. Undertaking research helps to develop critical thinking and the ability to review medical literature. Every Resident shall carry out work on an assigned research project under the guidance of a recognized supervisor; the project shall be written and submitted in the form of a Thesis/Research Report.

8. Assessment:

The assessment for certification of the MD degree of the University is comprehensive, integrated and phase-centered attempting to identify attributes expected of specialists for independent practice and lifelong learning and covers cognitive, psychomotor and affective domains. It keeps strict reference to the components, the contents, the competencies and the criteria laid down in the curriculum. Assessment includes both **Formative Assessment and Summative (Phase final) Examinations.**

8.1. Formative Assessment:

Formative assessment will be conducted throughout the training phases. It will be carried out for tracking the progress of residents, providing feedback, and preparing them for final assessment (Phase completion exams).

There will be Continuous (day-to-day) and Periodic type of formative assessment.

- **Continuous (day-to-day) formative assessment** in classroom and workplace settings provides guide to a resident's learning and a faculty's teaching / learning strategies to ensure formative lesson / training outcomes.
- **Periodic formative assessment** is quasi-formal and is directed to assessing the outcome of a **block placement** or **academic module completion**. It is held at the end of Block Placement and Academic Module Completion. The contents of such examinations include **Block Units** of the Training Curriculum and **Academic Module Units** of the Academic Curriculum.

8.1.1. End of Block Assessment (EBA):

End of Block Assessment (EBA) is a periodic formative assessment and is undertaken after completion of each training block, assessing knowledge, skills and attitude of the residents. Components of EBA are written examination, structured clinical Assessment (SCA), medical record review, and logbook assessment. Unsatisfactory block training must be satisfactorily completed to be eligible for phase final examination

8.1.2. Formative assessment for Academic modules for Biostatistics and Research Methodology and Medical Education to be done in the first nine months of Phase B training. Residents getting unsatisfactory grade must achieve satisfactory grade by appearing the re-evaluation examination to be eligible for the Phase B Final Examination.

8.2. Summative Examination:

Assessment will be done in two broad compartments.

- a) **Compartment A:** Consist of 3 (three) components.
1. Written Examination (Consisting of 2 papers).
 2. Clinical Examination (One long and four short cases).
 3. SCA and Oral (10 stations SCA, Oral one board consisting of 2 examiners).

Every Resident must pass all the 3 components of compartment-A separately. Candidates will be declared failed if he/she fails in one or more component (s) of the examination. He/she then have to appear all the 3 components in the next Phase B Final Examination.

b) **Compartment B:** Thesis and Thesis defense.

8.2.1. Written Examination:

Two Papers: Contents of written papers listed in Annexure II

Question type and marks:

- Two Papers (Paper I and Paper II); 100 marks each; Time 3 hrs for each paper. Pass marks-60% of total of 2 papers.
- **Each paper will consist of Two Groups:**
- **Group A:**
 - 10 short questions (5 marks each)
 - These will assess the knowledge of different level and its application
- **Group B:**
 - 5 scenario based problem solving questions (10 marks for each).
 - The questions should focus to assess the capability of handling clinical problem independently and comprehensively as a specialist.
 - Suggested format:-
 - A scenario followed by question(s).
 - Questions may include diagnosis, differential diagnosis, investigation plan, treatment, follow up and patient education.

8.2.2. Clinical Examination: Long case and Short case:

- There will be one long case and four short cases.
- i) **Long case: Marks-100**
 - Directly observed
 - Two examiners for each examinee.
 - History taking and examination by the examinee – 30min.
 - Discussion on the case 20 min.(presentation 6min, crossing 6x2min and decision 2min).

- Examiners will not ask any question nor stop the examinee in any way during history taking and physical examinations.
 - Discussion should be done preferably as per structured format and proper weightage on different segments of clinical skills.
- ii) **Short cases : Marks-100**
- Four in number
 - Time 20-30 min. (Time will be equally divided for each short case)
 - Crossing should be done with proper weightage on different segment of clinical skills.
- iii) **Pass marks: 60% of total of Long and Short Cases**

8.2.3. Structured Clinical Assessment (SCA): Marks-100

- 10 stations : 5 min each

8.2.4. Oral Examination: Marks-100

- One board consisting of 2 examiners.
- 20 minutes (9+9+2).

8.2.5. Pass marks in SCA and Oral: 60% of total (SCA and Oral.)

8.3. Thesis Evaluation:

- **Marks: Thesis writing-200; Defense-100: Marks for acceptance-60% of total.**
- To be evaluated by 3 (three) evaluators:- 2 subject specialists and one academician preferably involve in research and teaching research methodology.
- Among the subject specialists one should be external.
- Evaluators should be in the rank of Professor/Associate Professor.
- Supervisor will attend the defense as an observer and may interact only when requested by the evaluators.

- Thesis must be submitted to the controller of Exam not later than 27 months of enrolment in Phase-B.
- Thesis must be sent to the evaluators 2 (Two) weeks prior to assessment date.
- Evaluation will cover Thesis writing and its defense.
- For thesis writing evaluator will mark on its structure, content, flow, scientific value, cohesion, etc.
- For defense – Candidate is expected to defend, justify and relate the work and its findings.
- Assessment must be completed in next 3 months.
- Outcome of the assessment shall be in 4 categories – “Accepted”, “Accepted with minor correction”, “Accepted with major correction” and “Not Accepted”.

8.3.1. Description of terms:

- **Accepted:** Assessors will sign the document and resident will bound it and submit to the Controller of Examinations by 10 days of the examination.
- **Accepted with minor correction:** Minor correction shall include small inclusion/exclusion of section; identified missing references, correction of references and typographical and language problem. This should be corrected and submitted within 2 weeks.
- **Accepted with major correction:** Task is completed as per protocol with acceptable method but some re-analysis of result and corresponding discussion are to be modified.
- To be corrected, confirmed by Supervisor and submit within 3 (Three) weeks.
- **Not Accepted:** When work is not done as per protocol or method was faulty or require further inclusion or confirmation of study.
- To complete the suggested deficiencies and reappear in defense examination during its next Phase Final Examination.

- Candidate has to submit his/her thesis and sit for examination and pay usual examination fees for the examination.

8.3.2. Residents must submit and appear Thesis defense at notified date and time. However non- acceptance of the Thesis does not bar the resident in appearing the written, clinical and oral exam.

8.4. Qualifying for MD/MS Degree:

On passing both the compartments, the candidate will be conferred the degree of MD/MS in the respective discipline. If any candidate fails in one compartment he/she will appear in that compartment only in the subsequent Phase-B exam.

9. Supervision and Training Monitoring:

Training should incorporate the principle of gradually increasing responsibility, and provide each trainee with a sufficient scope, volume and variety of experience in a range of settings that include inpatients, outpatients, emergency and intensive care. All elements of work in training rotation must be supervised with the level of supervision varying depending on the experience of the trainee and the clinical exposure. Outpatient and referral supervision must routinely include the opportunity to personally discuss all cases. As training progresses the trainee should have the opportunity for increasing autonomy, consistent with safe and effective care for the patient. Trainees will at all times have a named Supervisor, responsible for overseeing their education.

Supervisors are responsible for supervision of learning throughout the program to ensure patient and / or laboratory safety, service delivery as well as the progress of the resident with learning and performance. They set the lesson plans based on the curriculum, undertake appraisal, review progress

against the curriculum, give feedback on both formative and summative assessments as well as sign the logbook and portfolio. The residents are made aware of their limitations and are encouraged to seek advice and receive help at all times.

The Course Coordinator of each department coordinates all training and academic activities of the program in collaboration with the **Course Manager**. The **Course Director** of each faculty directs guides and manages curricular activities under his / her jurisdiction and is the person to be reported to for all events and performances of the residents and the supervisors.

10. Curriculum Implementation, Review and Updating:

Both Supervisors and Residents are expected to have a good knowledge of the curriculum and should use it as a guide for their training program

Since Pediatric Hematology and Oncology has historically been rapidly changing specialty, the need for review and up-dating of curricula is evident. The Curriculum is specifically designed to guide an educational process and will continue to be the subject of active redrafting, to reflect changes in the development in hematological and oncological problem in children. Residents and Supervisors are encouraged to discuss the curriculum and to feedback on content and issue regarding implementation at Residency Course. Review will be time tabled to occur annually for any minor changes to the curriculum.

11. Phase B Syllabus:

The educational process in Pediatric Hematology and Oncology Medicine aims to provide basic knowledge, intellectual, clinical and transferable skills to produce competent specialists in Pediatric Hematology and Oncology. These specialists will be capable of providing specialized care of the highest order to patients with hematological and

oncological problem in children in the community as well as clinical tertiary centers. They shall recognize the health needs of the community and carry out professional obligations ethically and keeping their standards by engaging in continuing medical education. The program also aims to introduce the candidate to the basics of scientific medical research.

11.1. Learning Objectives:

A. SCIENTIFIC BASIS OF PEDIATRIC HEMATOLOGY AND ONCOLOGY

1. Explain physiology and anatomy of hemopoietic system
2. Explain physiology and patho-physiology of hematological problem.
3. Genetic aspect of hematological and oncological problem
4. Explain cell biology of malignancy in children.
5. Explain general principles of chemotherapy
6. Explain general principles of radiation oncology
7. Apply clinical skills to diagnose and manage hematological and oncological problem in children.

B. DISEASES AND PRESENTATIONS

I. Presentations and Manifestations of hematological and Oncological Disease

1. Assess and treat patients presenting with pallor
2. Assess and treat patients presenting with lymphadenopathy
3. Assess and treat patients presenting with purpura
4. Assess and treat patients with bleeding disorder
5. Assess and treat patients with coagulation disorders
6. Assess and treat patients with febrile neutropenia
7. Assess patients presenting with hematologic manifestation of systemic diseases

II. Diseases and Disorders of blood

1. Assess and treat patients with anemia in newborn
2. Assess and treat patients with anemia in childhood
3. Assess and treat patients with Iron deficiency anemia
4. Assess and treat patients with hemoglobinopathies
5. Assess and treat patients with hemolytic anemia
6. Assess and treat patients with megaloblastic anemia
7. Assess and treat patients with anemia of chronic disorders
8. Assess and treat patients with bone marrow failure
9. Assess and treat patients with polycythemia
10. Assess and treat patients with platelet disorders
11. Assess and treat patients with disorder of leucocytes
12. Assess and treat patients with leukemias- acute and chronic
13. Assess and treat patients with Nonhodgkins lymphoma
14. Assess and treat patients with Hodgkins lymphoma
15. Assess and treat patients with histiocytosis
16. Assess and treat patients with myeloproliferative disorders and myelodysplastic disorders

II. Solid tumors in children

1. Assess and treat patients with CNS malignancy
2. Assess and treat patients with renal tumors
3. Assess and treat patients with Liver tumors
4. Assess and treat patients with sarcomas
5. Assess and treat patients with bone tumors
6. Assess and treat patients with germ cell tumor
7. Assess and treat patients with Neuroblastoma
8. Assess and treat patients with Retinoblastoma
9. Assess and treat patients with rare tumor in children

III. Conditions need urgent attentions.

1. Assess and treat Oncologic emergency

2. Assess nutritional & supportive care
3. Assess hematologic supportive care
4. Assess and treat hazards of blood transfusion
5. Assess and treat infectious complication of pediatric cancer and hematological disorders

IV. At Risk Individuals and Groups

1. Assess and manage psychiatric and psychosocial support for the child and family.
2. Assess and manage for palliative care for incurable children with malignancy and hematological disorders

V. Monitoring late effect of childhood cancer and its treatment

C. PRACTICAL PERFORMANCE, PROCEDURES AND INVESTIGATIONS

I Peripheral blood film

1. Perform preparation of peripheral blood film
2. Perform staining of peripheral blood film
3. Perform reporting of peripheral blood film

II. Automated hematology analyzer

1. Understand basics of automated hematology analyzer
2. Interpret report by automated hematology analyzer

III. Coagulometer

1. Understand and interpret coagulation screening

IV. Bone marrow aspiration and biopsy

1. Perform bone marrow aspiration and biopsy
2. Be able to prepare bone marrow slide from aspiration and biopsy
3. Be able to stain slides prepared from bone marrow aspiration and biopsy
4. Be able to perform reporting of bone marrow aspiration and biopsy

V. Cytochemistry:

1. Understand basics of cytochemistry
2. Perform cytochemical staining
3. Interpret MPO, Sudan black, PAS stained slides

VI. Flowcytometry

1. Understand basics of flowcytometry for immunophenotyping
2. Interpret Immunologic diagnosis of leukemia, lymphoma and other hematologic malignancy

VI. Hemoglobin electrophoresis

1. Understand basics of gel and capillary electrophoresis
2. Perform and interpret Hb Electrophoresis

VII. Cytospin

1. Be able to report cytospin film prepared from CSF, Pleural fluid, Ascitic fluid and other body fluid

VIII. Blood grouping and transfusion

1. Understand genetics of blood grouping
2. Perform blood grouping
3. Perform cross matching
4. Knows indications of blood and blood product transfusions

IX. Intrathecal (IT) chemotherapy

1. Perform and manage Intrathecal chemotherapy

X. Imaging studies in Pediatric hematological and oncological disease and disorders

1. Knows indication of imaging studies for diagnosis and follow up for Pediatric hematological and oncological diseases and

disorders Knows interpretation of imaging studies Knows how to prepare the patients for imaging studies

XI. Bone marrow transplantation (BMT)/ Stem cell transplantation

1. understand the basics for bone marrow /Stem cell transplantation
2. Knows indication of BMT in pediatric hematological and oncological disease and disorders
3. Knows how to prepare a patient for BMT
4. Knows how to manage a patient after and before BMT