

Guidelines
for
Competency Based Training Programme
in
DNB- MEDICAL ONCOLOGY



NATIONAL BOARD OF EXAMINATIONS

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INTRODUCTION

The number of patients with malignancies in the world continues to increase. It is estimated that ten million new cases are diagnosed every year and that two million people are either receiving treatment or are living with their disease. The last decades have seen a rapid growth in medical technology and in the advances of fundamental knowledge of cancer cell biology with impact on genetics, screening, early diagnosis, staging, and overall treatment of cancer. This development has also led to a more coordinated, multi-disciplinary approach to the management of the individual malignancy and the need to establish formal training based on a set of guidelines or a curriculum in the various major specialties such as surgery, radiotherapy and medical oncology.

PROGRAMME GOAL

- Provide specialized training in medical Oncology, including Hospital based oncology practice, Community Oncology development and Community Intervention Strategies.
- Instill the concept of wholesome management of a cancer patient. Instill team spirit by involving the radiation oncologist, surgical oncologist, Nuclear medicine & allied imaging departments, palliative care specialists & pathologists as team players in all patients and other departments as & when necessary.

PROGRAMME OBJECTIVES

At the end of the training program the candidate should have: -

- 1) **Basic Scientific Principles** – The trainee should have clear concepts regarding the basic principles of Biology of normal cells, basic processes of carcinogenesis, gene structure, expression and regulation, cell cycle and interaction with therapy, tumor cell kinetics, tumor cell proliferation, tumor immunology and molecular techniques.
- 2) **Basic Principles in the Management and Treatment of Malignant Diseases** – The trainee at the end of training program, should be thorough with the basic principles of malignant disease management including clear understanding of pathologic techniques, serum markers, cell membrane and DNA markers, TNM staging systems, Indications for clinical, radiographic and nuclear medicine procedures, response assessment.
- 3) **Management and Treatment of Individual Cancers and their associated complications** - The management of malignant diseases requires the expertise of many different medical subspecialties, and the majority of patients with malignant diseases are best managed in a multidisciplinary approach with integration of the various sub-specialties because of increasing complexity of modern treatment.

- The trainee should recognize the contributions of each of these subspecialties in making the diagnosis, assessing disease stage, and treating the underlying disease and its complications.
 - The trainees should interact with each of these disciplines in order to gain an appreciation of the benefits and limitations of each modality.
 - Participation of the trainees in interdisciplinary meetings is encouraged.
 - After completion of the training program the trainee should be well versed with the management of all human cancers, chiefly Head and neck, Lung, Gastrointestinal, genitourinary, gynecological, breast, mesenchymal, skin, endocrine, neurological and hematological malignancies
 - He also needs to be competent in managing pediatric oncology patients
- 4) **Psychosocial Aspects of Cancer** – The trainee should become skillful in handling cultural issues, spiritual conflicts, adaptive behavior, coping mechanisms, communication.
 - 5) **Patient Education** – The trainee should learn to consciously involve in educating the patients in matters of genetic counseling (screening and assessment of risk), health maintenance (Diet, smoking, alcohol consumption), long term complications, risk of treatment induced cancer, endocrine dysfunctions. 6) Bioethics,
 - 6) **Legal, and Economic Issues** – The trainee should be fully proficient in dealing with issues of taking informed consent for research activities, ethical conduct of medical research, legal issues (Life support and its withdrawal), cost efficiency and professional attitude
 - 7) **Skills** – During the training period the trainee should imbibe and develop the skills of anticancer agent administration (Prescribing, administering, Handling and disposal of chemotherapeutic and biologic agents), clinical procedures (bone marrow aspiration, biopsy, lumbar punctures, abdominal and thoracic paracentesis), ommaya reservoir management.
 - 8) **Community responsibilities** – He should be well versed with community aspects of cancer screening including cancer registry and other aspects of preventive

oncology. He should become competent to plan and implement community intervention strategies and should be well trained to link up with the existing health care system and be able to address screening, early detection and health awareness issues.

- 9) **Constant Development** – He should be aware of the recent developments in the field of Medical Oncology, chemotherapeutics, preventive oncology, molecular biology. Communication Trainees should be able to communicate to patient and their family. They should be able to break bad news and act adequately in difficult situations. Trainees should learn to communicate and work together with other professional health care takers in a team.

Patient Education

Genetic Counseling: The trainee should be capable of assessing the increased risk of cancer in the patient and the patient's family.

- They should be aware of the principles for genetic screening and counseling. 6.2 Health Maintenance
- The trainee should be capable of counseling the patients and their family about known risk factors for subsequent malignancy: - diet - smoking - alcohol - sun exposure.
- Trainees should have an understanding of the aetiology of genetic and environmental factors in oncogenesis.
- They should have a basic knowledge in epidemiological factors and descriptors of disease.
- Trainees should understand the basic principles of screening and risk assessment.
- They should know the sensitivity and specificity of the test employed and the cost-benefit ratio.
- They should know the situations in which screening has a well-defined role and the situations in which the role of screening is unclear or not defined.
- They should be aware of the principles and indications for genetic screening and counseling.

They should know the value of prevention in cancer development and what primary, secondary and tertiary preventive measures may be taken to prevent cancer development

- Clinical Research including Statistics Trainees must be provided an education in the design and conduct of clinical trials.
- They must have an exposure to the development and conduct of these trials through international cooperative groups or in-house protocols.
- basics of statistics: * statistical methods * requirements for patient numbers in designing studies * proper interpretation of data - toxicity assessment and grading - role and functioning of the Institutional Review Board and ethical committees - experience obtaining informed consent from patients - government regulatory mechanisms of surveillance - instruction in grant writing and information about mechanisms of support for clinical research - cost of therapy and the cost-effectiveness of therapy - instruction in preparing abstracts, oral and visual presentations and writing articles.
- They should be able to critically evaluate the scientific value of published articles and their influence on daily clinical practice.

Basic Principles in the Management and Treatment of Malignant Tumours

- The trainees should be capable of assessing the patient's co-morbid medical conditions that may affect the toxicity and efficacy of treatment in order to formulate a treatment plan and be aware of the special conditions which influence the treatment of the growing population of elderly patients with malignant disorders.
- Pathology/Laboratory Medicine/Molecular Biology: The trainee should know that the definite diagnosis of cancer is based on a cytology or biopsy.
- The trainees should have the opportunity to review biopsy material and surgical specimens with a pathologist. They should appreciate the role of the pathologist in confirming the diagnosis of cancer and in determining the severity and extent of disease. Trainees should be familiar with newer pathologic techniques, and the contribution of these techniques to the staging and management of patients with cancer
- Trainees should be aware of the appropriate testing and intervals for follow-up.
- Bioethics, Legal, and Economic Issues.
- Informed consent the trainee should know the requirements for obtaining informed consent.
- Ethics The trainee should understand the ethics involved in the conduct of medical research.
- Legal issues they should know the legal issues related to anti-cancer treatment, institution of life support and withdrawal of life support systems.
- Cost efficiency Trainees should appreciate the cost effectiveness of medical intervention in the management of cancer. 7.5 Conflict of Interest Guidelines to define conflict of interest within professional activities.
- Professional attitude Trainees must demonstrate professionalism and humanism in their care of patients and their families.

The main objective of these certification systems is to improve the quality of patient treatment and care, to set standards of clinical competence for the practice of medical oncology, and encourage a continued scholarship for professional excellence over a lifetime of practice

Professionalism – Ethics Professionalism must be fostered during medical oncology training. In addition to mastering the comprehensive clinical and technical skills of the consultant medical oncologist, trainees are expected to maintain the values of professionalism

ELIGIBILITY CRITERIA FOR ADMISSIONS TO THE PROGRAMME

(A) DNB Medical Oncology Course:

1. Any medical graduate with MD/DNB in General Medicine or *Paediatrics* qualification, who has qualified the **Entrance Examination** conducted by NBE and fulfill the eligibility criteria for admission to DNB **Super Specialty** courses at various NBE accredited Medical Colleges/ institutions/Hospitals in India is eligible to participate in the Centralized counseling for allocation of DNB **Medical Oncology** seats purely on merit cum choice basis.
2. Admission to 3 years post MBBS DNB **Medical Oncology** course is only through **Entrance Examination** conducted by NBE and Centralized Merit Based Counseling conducted by National Board of Examination as per prescribed guidelines.

Duration of Course: 3 Years

Every candidate admitted to the training programme shall pursue a regular course of study (on whole time basis) in the concerned recognized institution under the guidance of recognized post graduate teacher for assigned period of the course.

TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching program should include:

1. Case presentations & discussion- once a week
2. Seminar – Once a week
3. Journal club- Once a week
4. Grand round presentation (by rotation departments and subspecialties)- once a week
5. Faculty lecture teaching- once a month
6. Clinical Audit-Once a Month
7. A poster and have one oral presentation at least once during their training period in a recognized conference.

The rounds should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan) interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

Theoretical: The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.

Symposia: Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of three years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.

Clinical: The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

Bedside: The trainee would work up cases, learn management of cases by discussion with faculty of the department.

Journal Clubs: This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.

Research: The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

SYLLABUS

Section 1: Hallmarks of Cancer

1. The hallmarks of cancer
2. Growth factors and uncontrolled proliferation
3. Cell signaling pathways
4. Cell cycle control
5. Cancer cell death
6. Angiogenesis
7. Invasion and metastases
8. Genetic instability
9. DNA repair after oncological therapy
10. Biology of cancer stem cells
11. Biomarker identification and clinical validation
12. Cancer, immunity, and inflammation
13. Cancer and metabolism

Essentials of Molecular Biology

- Basic Principles. Genomics and Cancer, signal transduction, Immunology, Cytogenetics, Cell Cycle, Apoptosis, invasion and metastases, angiogenesis and carcinogenesis, - Genetics, viral physical and Chemical.
- Principles of cancer management surgical Oncology, Medical Oncology, Radiation Oncology and Biologic therapy.
- Cancer Chemotherapy
- Pharmacology of Cancer Biotherapeutics – interferons, interleukins, anti-hormonal therapy, differentiating agents, monoclonal antibodies, antiangiogenic factors.
- Clinical Trials
- Cancer Prevention - tobacco related cancers, diet chemoprevention.
- Cancer Screening
- Cancer Diagnosis - Molecular pathology and Cytology, Imaging, Endoscopy, Laparoscopy
- Principles of Cancer Management – Surgical Oncology, Radiation Therapy, Chemotherapy, Biologic therapy
- Pharmacology of Cancer Chemotherapy
- Clinical trials in cancer
- Cancer prevention Tobacco related cancer, Diet & Risk reduction Chemopreventive Agents, Hormones 9. Cancer Screening
- Imaging Techniques of Cancer Diagnosis & Management
- Specialized techniques of Cancer Diagnosis and Management
- Vascular Access and Specialised Techniques of drug delivery

Section 2: Etiology and Epidemiology of Cancer

- Epidemiologic methods, descriptive and analytical epidemiology
- Smoking and cancer
- Viruses
- Chemical carcinogens
- Radiation
- Body fatness, physical activity, diet, and other lifestyle factors

Section 3: Principles of Oncology

- Practice points for surgical oncology
- Practice points for radiation oncology
- Principles of chemotherapy
- Delivery of multidisciplinary cancer care
- Principles of clinical pharmacology: Introduction to pharmacokinetics and pharmacodynamics
- Design and analysis of clinical trials
- Medical ethics in oncology
- Health economic assessment of cancer therapy

Section 4: Population Health

- Cancer control: The role of national plans
- Cancer prevention: Vaccination
- Cancer prevention: Chemoprevention
- Population cancer screening
- Familial cancer syndromes and genetic counseling

Section 5: Support for the cancer patient

- Supportive palliative care, hospice care, home care, bereavement counselling
- Pain management
- End of life care
- Quality of life: metrics and measures
- Cancer survivorship and rehabilitation

Biologic Therapy

Trainees should be familiar with the activities and indications for biologic therapy including cytokines and haematopoietic growth factors.

basic concepts of targeted molecular therapies, such as monoclonal antibodies, tumour vaccines, cellular therapy, and gene-directed therapy.

Disease

Cancer of the head and neck. the risk factors for head and neck cancers

- Natural histories of the individual primary tumour sites.
- Staging of head and neck cancers as the proper evaluation for therapeutic recommendations. Panendoscopy is needed for staging.
- Selecting surgery and/or radiation therapy as definitive treatment.
- Role of chemotherapy and palliation of advanced disease
- Organ preservation long term management of these patients and of risks of second malignancies.
- Oesophageal cancer
- Gastric cancer

- Rectal cancer
- Colon cancer
- Pancreatic cancer
- Hepatobiliary cancer
- Peritoneal mesothelioma
- Cancer of the breast
- Gynaecological cancers
- Genitourinary cancer
- Lung cancer / **Mesothelioma**

Risk factors for developing lung cancer or mesothelioma.

1. Small-Cell Lung Cancer: Multi-modality approach to limited-stage disease and the role of chemotherapy in patients with advanced disease.
2. Non-Small-Cell Lung Cancer: Criteria of inoperability and the surgical and non-surgical staging of patients with localized disease. Value of surgery, chemotherapy, and radiation therapy in localized disease often given as combined modality treatment, and the role of chemotherapy and/or radiation therapy in the palliation of advanced disease.

- Neoplasms of the thymus
- Pleural mesothelioma
- Skin cancer: melanoma
- Skin cancer: non-melanoma
- Acute leukemia
- Chronic leukemias
- Myeloma
- Lymphomas
- Sarcomas of the soft tissue
- Cancer of the central nervous system

- Cancer of the eye and orbit
- Endocrine cancers
- Cancer of unknown primary site
- Para-neoplastic syndromes
- Cancer in immunosuppressed host
- Oncologic emergencies – SVC syndrome, spinal cord compression, metabolic emergencies, urologic emergencies
- Treatment of metastatic cancer - brain, lung, bone, liver, malignant effusions and ascites
- Haematopoietic therapy - transfusion, growth factors, autologous, allogenic, haplo identical and matched unrelated stem cell transplantation
- Infections in the cancer patient
- Supportive care and quality of life - pain management, nutritional support, sexual problems, genetic counselling,
- Psychological issues
- Community resources
- Care of the terminally ill patient
- Adverse effects of treatment - nausea and vomiting.
- Oral complications, pulmonary toxicity, cardiac toxicity, hair loss, genital dysfunction, second cancers, miscellaneous toxicity.
- Rehabilitation of the cancer patient.
- Oncology nursing including venous access.
- Ethical issues in oncology
- Information systems in Oncology.
- Alternative methods of cancer treatment.
- Newer approaches in cancer treatment – Immunotherapy, Gene therapy, molecular therapy, cancer vaccines, image guided surgery, heavy particles in radiation therapy.
- Reconstructive surgery

- Cancer prevention
- Tobacco related cancer,
- Diet & Risk reduction Chemopreventive Agents
- Hormones
 - Cancer Screening
 - Imaging Techniques of Cancer Diagnosis & Management
 - Specialized techniques of Cancer Diagnosis and Management
 - Vascular Access and Specialised Technique of drug delivery
- Cancers of childhood

Rehabilitation

- The role of physical therapy particularly in the postoperative setting, occupational therapy, speech therapy and swallowing therapy

Supportive and Palliative measurements.

- The indications of the different supportive treatments, their limitations and side effects and its indications.

1. Supportive measurements -- Nausea and vomiting:

- Pain: They should have a working knowledge of the World Health Organization (WHO) pain ladder and an understanding of the pharmacology and toxicity of the opiate narcotics and other analgesics
- Infections and neutropenia: They should know the indications and contraindications of the use of haematological growth factors.

2. Anaemia:

- Thrombocytopenia: Marrow and Peripheral-Blood Progenitor Cells (PBPC)

3. Organ protection

- Gonad preservation to ensure the fertility of the patient (cryopreservation techniques)

4. Oncologic Emergencies:

- Trainees should recognize the clinical presentations that require immediate intervention (e.g. spinal cord compression, pericardial tamponade)

5. Nutritional Support: Indications for and complications of enteral and parenteral support

- They should be able to manage cancer pain with the available modalities and recognize when referral for an invasive palliative intervention

Recent Advances in Oncology

1. Essentials of Molecular Biology
2. Molecular Biology of Cancer: Oncogenes Cytogenetics
3. Bone Marrow dysfunction in cancer patient
4. Infections in cancer Patients and neutropenic patient
5. Adverse effects of treatment
6. Supportive Care and Quality of Life
7. Rehabilitation of Cancer Patient
8. Newer approaches in cancer treatment
9. Newer drugs in cancer treatment

Research Methodology and Data Base

1. Clinical Trial Protocol designing.
2. Statistical evaluation & Kaplan-Meyer plot, etc.
3. Bioethics.

Biostatistics, Research Methodology and Clinical Epidemiology

Ethics

Medico legal aspects relevant to the discipline

Health Policy issues as may be applicable to the discipline

Competencies

The candidate works in the department of medical oncology as following

1. INPATIENT POSTING This may vary from 8 to 12 months: the candidate is allotted certain beds and he is required to work up patients admitted on those beds. He plans out a diagnostic work up and treatment plan, discusses it with the concerned consultants, presents it on the grand rounds and assumes complete responsibility of the patients during their hospitalization. He should work in harmony with the ward nurses.
2. OUT PATIENT DEPARTMENT (OPD) POSTING Duration is 16 months. The candidate is posted to chemotherapy evaluation clinics and various specialty clinics including breast cancer, gastrointestinal, urology, lymphoma-leukemia, pain evaluation, bone and soft tissue, pediatric tumors, head and neck, gynecology oncology, pulmonary oncology. The candidates posted to these clinics work under the supervision of consultants. They are expected to see new as well as follow-up patients so as to plan out the management and assess the therapeutic responses of a particular patient.
3. DAY CARE AND OPD PROCEDURES (MINOR OT) POSTING Duration is 4 months. During this posting a candidate is expected to learn skills In introducing per cutaneous subclavian, internal jugular, and femoral vein catheters Familiarity with different venous access devices likes Hickman catheter, subcutaneous port etc. Institution of chemotherapy and supervision of side effects Procedures like bone marrow biopsy, liver biopsy, trucut biopsy, lumbar puncture, intrathecal chemotherapy and aspiration of fluids.

4. BMT UNIT POSTING Duration is 2 months. The candidate works under the supervision of concerned consultants and assumes responsibility of managing the patients undergoing high dose chemotherapy.
5. ELECTIVE POSTING It is for 6 weeks. The trainee selects the area of his or her interest; it may be training within the institute or at other specialized centers within or out side India. The candidate is required to seek acceptance from the concerned departments/centers where he wishes to work and also permission from the Chief IRCH.
6. ANCILLARY POSTING It will be for 3 months as follows:
 - Surgical oncology (3 weeks)
 - Radiation oncology (3 weeks)
 - Laboratory (4 weeks)
 - Rotation to blood bank and nuclear medicine department (1 week each)
 - Radio diagnosis & nuclear medicine (2 weeks)
7. LABORATORY TRAINING The candidate, apart from understanding the value of laboratory tests in a given malignancy must possess the basic knowledge of interpreting the laboratory data and correlating it with clinical data.
 - For this purpose, candidate is posted in various laboratories through laboratory posting or dissertation topic.
 - The trainees are posted to various laboratories, some o which are attached to medical oncology itself, such as Cytogenetics laboratory, in-vitro tissue culture laboratory. In addition, candidate is posted in immunology, microbiology, HLA and pathology laboratory.
 - These postings enable the candidate to understand histopathology, immunopathology, histochemsitry, cytopathology, genetics of tumors, their functional properties and modes of spread etc.

- He is also made familiar with the various types of stem cell mobilization, harvesting, and cryopreservation techniques.
 - The candidate is required to learn the basic techniques of tissue culture, Cytogenetics, staining and study of peripheral/bone marrow smears, operation of blood cell counter and cell separator machine.
8. RESEARCH TRAINING The candidate is introduced to the field of research in medical oncology; both at clinical and laboratory level.
9. Practical Hand on Training
- 9.1 Anti-cancer agent administration. The trainee should have knowledge how to prescribe and safely administer anticancer agents. He should be able to care and access indwelling venous catheters. He should have knowledge about the handling and disposal of chemotherapeutic and biologic agents.
- 9.2 Bone Marrow Aspiration, Biopsy, and Interpretation: Trainees should be able to perform a marrow aspiration and biopsy. They should have an experience in the interpretation of marrow aspirations and biopsies. Trainees should have a fundamental knowledge about marrow interpretation
- 9.3 Lumbar Puncture Training must demonstrate an ability to perform a lumbar puncture and to administer chemotherapy by that route.
- 9.4 Administration of medication by subcutaneous device. The trainee should be able to use a subcutaneous device to administer medication. He should be able to recognize and solve complication of such device. Trainees must be capable of administering chemotherapy through an Ommaya reservoir.
- 9.5 Paracentesis: ascitic fluid tapping, indications, fluid analysis and interpretation
- 9.6 Intraperitoneal chemotherapy: indications and practical aspects
- 9.7 Intravesical chemotherapy with BCG, mitoxantrone, etc: Indications and complications
- 9.8 Thoracocentesis and chest tube placement for drainage along with pleurodesis using talc, tetracycline and chemotherapeutic agents

9.9 PICC line placement

9.10 Central venous access, including tunneled catheter placement and chemoport placement

THESIS PROTOCOL & THESIS

The candidates are required to submit a thesis at the end of three years of training as per the rules and regulations of NBE.

Guidelines for Submission of Thesis Protocol & Thesis by candidates

Research shall form an integral part of the education programme of all candidates registered for DNB degrees of NBE. The Basic aim of requiring the candidates to write a thesis protocol & thesis/dissertation is to familiarize him/her with research methodology. The members of the faculty guiding the thesis/dissertation work for the candidate shall ensure that the subject matter selected for the thesis/dissertation is **feasible**, **economical** and **original**.

Guidelines for Thesis Protocol

The protocol for a research proposal (including thesis) is a study plan, designed to describe the background, research question, aim and objectives, and detailed methodology of the study. In other words, the protocol is the 'operating manual' to refer to while conducting a particular study.

The candidate should refer to the NBE Guidelines for preparation and submission of Thesis Protocol before the writing phase commences. The minimum writing requirements are that the language should be clear, concise, precise and consistent without excessive adjectives or adverbs and long sentences. There should not be any redundancy in the presentation.

The development or preparation of the Thesis Protocol by the candidate will help her/him in understanding the ongoing activities in the proposed area of research. Further it helps in creating practical exposure to research and hence it bridges the connectivity between clinical practice and biomedical research. Such research exposure will be helpful in improving problem solving capacity, getting updated with ongoing research and implementing these findings in clinical practice.

Research Ethics: Ethical conduct during the conduct and publication of research is an essential requirement for all candidates and guides, with the primary responsibility of ensuring such conduct being on the thesis guide. Issues like Plagiarism, not maintaining the confidentiality of data, or any other distortion of the research process will be viewed seriously. The readers may refer to standard documents for the purpose.

The NBE reserves the right to check the submitted protocol for plagiarism, and will reject those having substantial duplication with published literature.

PROTOCOL REQUIREMENTS

1. All of the following will have to be entered in the online template. The thesis protocol should be restricted to the following word limits.
 - Title : 120 characters (with spacing) page
 - Synopsis [structured] : 250-300
 - Introduction : 300-500
 - Review of literature : 800-1000
 - Aim and Objectives : Up to 200
 - Material and Methods : 1200-1600
 - 10-25 References [ICMJE style]
2. It is mandatory to have ethics committee approval before initiation of the research work. The researcher should submit an appropriate application to the ethics committee in the prescribed format of the ethics committee concerned.
3. All chapters, subchapters, sections and subsections must be numerically numbered
4. All figures, tables, graphs and diagrams must be self explanatory, without reference to the text.
5. All borrowed figures, tables, graphs and diagrams must be adequately acknowledged underneath
6. Thesis must be written in indirect speech. There must not be any reference to the words, "We and Ours"
7. The conclusions must be based only on the aims and objectives of the study only
8. Omnibus guides and co-guides are not to be encouraged.

Guidelines for Thesis

1. The proposed study must be approved by the institutional ethics committee and the protocol of thesis should have been approved by NBE.
2. The thesis should be restricted to the size of 80 pages (maximum). This includes the text, figures, references, annexures, and certificates etc. It should be printed on both sides of the paper; and every page has to be numbered. Do not leave any page blank. To achieve this, following points may be kept in view:
 - a. The thesis should be typed in 1.5 space using Times New Roman/Arial/Garamond size 12 font, 1" margins should be left on all four sides. Major sections viz., Introduction, Review of Literature, Aim & Objectives, Material and Methods, Results, Discussion, References, and Appendices should start from a new page. Study proforma (Case record form), informed consent form, and patient information sheet may be printed in single space.
 - b. Only contemporary and relevant literature may be reviewed. Restrict the introduction to 2 pages, Review of literature to 10-12 pages, and Discussion to 8-10 pages.

- c. The techniques may not be described in detail unless any modification/innovations of the standard techniques are used and reference(s) may be given.
 - d. Illustrative material may be restricted. It should be printed on paper only. There is no need to paste photographs separately.
- 3. Since most of the difficulties faced by the residents relate to the work in clinical subject or clinically-oriented laboratory subjects, the following steps are suggested:
 - a. The number of cases should be such that adequate material, judged from the hospital attendance/records, will be available and the candidate will be able to collect case material within the period of data collection, i.e., around 6-12 months so that he/she is in a position to complete the work within the stipulated time.
 - b. The aim and objectives of the study should be well defined.
 - c. As far as possible, only clinical/laboratory data of investigations of patients or such other material easily accessible in the existing facilities should be used for the study.
 - d. Technical assistance, wherever necessary, may be provided by the department concerned. The resident of one specialty taking up some problem related to some other specialty should have some basic knowledge about the subject and he/she should be able to perform the investigations independently, wherever some specialized laboratory investigations are required a co-guide may be co-opted from the concerned investigative department, the quantum of laboratory work to be carried out by the candidate should be decided by the guide & co-guide by mutual consultation.
- 4. The clinical residents are not ordinarily expected to undertake experimental work or clinical work involving new techniques, not hitherto perfected OR the use of chemicals or radioisotopes not readily available. They should; however, be free to enlarge the scope of their studies or undertake experimental work on their own initiative but all such studies should be feasible within the existing facilities.
- 5. The DNB residents should be able to freely use the surgical pathology/autopsy data if it is restricted to diagnosis only, if however, detailed historic data are required the resident will have to study the cases himself with the help of the guide/co-guide. The same will apply in case of clinical data.
- 6. Statistical methods used for analysis should be described specifically for each objective, and name of the statistical program used mentioned.

General Layout of a DNB Thesis:

- **Title-** A good title should be brief, clear, and focus on the central theme of the topic; it should avoid abbreviations. The Title should effectively summarize the proposed research and should contain the PICO elements.
- **Introduction-** It should be focused on the research question and should be directly relevant to the objectives of your study.
- **Review of Literature** - The Review should include a description of the most relevant and recent studies published on the subject.
- **Aim and Objectives** - The 'Aim' refers to what would be broadly achieved by this study or how this study would address a bigger question / issue. The 'Objectives' of the research stem from the research question formulated and should at least include participants, intervention, evaluation, design.
- **Material and Methods-** This section should include the following 10 elements: Study setting (area), Study duration; Study design (descriptive, case-control, cohort, diagnostic accuracy, experimental (randomized/non-randomized)); Study sample (inclusion/exclusion criteria, method of selection), Intervention, if any, Data collection, Outcome measures (primary and secondary), Sample size, Data management and Statistical analysis, and Ethical issues (Ethical clearance, Informed consent, trial registration).
- **Results-** Results should be organized in readily identifiable sections having correct analysis of data and presented in appropriate charts, tables, graphs and diagram etc.
- **Discussion**—It should start by summarizing the results for primary and secondary objectives in text form (without giving data). This should be followed by a comparison of your results on the outcome variables (both primary and secondary) with those of earlier research studies.
- **Summary and Conclusion-** This should be a précis of the findings of the thesis, arranged in four paragraphs: (a) background and objectives; (b) methods; (c) results; and (d) conclusions. The conclusions should strictly pertain to the findings of the thesis and not outside its domain.
- **References-** Relevant References should be cited in the text of the protocol (in superscripts).
- **Appendices** -The tools used for data collection such as questionnaire, interview schedules, observation checklists, informed consent form (ICF), and participant information sheet (PIS) should be attached as appendices. Do not attach the master chart.

Thesis Protocol Submission to NBE

1. DNB candidates are required to submit their thesis protocol within 90 days of their joining DNB training.
2. Enclosures to be submitted along with protocol submission form:
 - a) Form for Thesis Protocol Submission properly filled.
 - b) Thesis Protocol duly signed.
 - c) Approval letter of institutional Ethical committee. (*Mandatory, non receivable of any one is liable for rejection*)

Thesis Submission to NBE

1. As per NBE norms, writing a thesis is essential for all DNB candidates towards partial fulfillment of eligibility for award of DNB degree.
2. DNB candidates are required to submit the thesis before the cut-off date which shall be 30th June of the same year for candidates appearing for their scheduled December final theory examination. Similarly, candidates who are appearing in their scheduled June DNB final examination shall be required to submit their thesis by 31st December of preceding year.
3. Candidates who fail to submit their thesis by the prescribed cutoff date shall NOT be allowed to appear in DNB final examination.
4. Fee to be submitted for assessment (In INR): 3500/-
5. Fee can be deposited ONLY through pay-in-slip/challan at any of the Indian bank branch across India. The challan can be downloaded from NBE website www.natboard.edu.in
6. Thesis should be bound and the front cover page should be printed in the standard format. A bound thesis should be accompanied with:
 - a. A Synopsis of thesis.
 - b. Form for submission of thesis, duly completed
 - c. NBE copy of challan (in original) towards payment of fee as may be applicable.
 - d. Soft copy of thesis in a CD duly labeled.
 - e. Copy of letter of registration with NBE.
7. A declaration of thesis work being bonafide in nature and done by the candidate himself/herself at the institute of DNB training need to be submitted bound with thesis. It must be signed by the candidate himself/herself, the thesis guide and head of the institution, failing which thesis shall not be considered.

The detailed guidelines and forms for submission of Thesis Protocol & Thesis are available at www.natboard.edu.in.thesis.php.

LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s) The candidate will maintain the record of all academic activities undertaken by him/her in log book .

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.

Leave Rules

1. DNB Trainees are entitled to leave during the course of DNB training as per the Leave Rules prescribed by NBE.
2. A DNB candidate can avail a maximum of 20 days of leave in a year excluding regular duty off/ Gazetted holidays as per hospital/institute calendar/policy.
3. MATERNITYLEAVE:
 - a. A female candidate is permitted a maternity leave of 90 days once during the entire duration of DNB course.
 - b. The expected date of delivery (EDD) should fall within the duration of maternity leave.
 - c. Extension of maternity leave is permissible only for genuine medical reasons and after prior approval of NBE. The supporting medical documents have to be certified by the Head of the Institute/hospital where the candidate is undergoing DNB training. NBE reserves its rights to take a final decision in such matters.
 - d. The training of the candidate shall be extended accordingly in case of any extension of maternity leave being granted to the candidate.
 - e. Candidate shall be paid stipend during the period of maternity leave. No stipend shall be paid for the period of extension of leave.
4. Male DNB candidates are entitled for paternity leave of maximum of one week during the entire period of DNB training.
5. No kind of study leave is permissible to DNB candidates. However, candidates may be allowed an academic leave as under across the entire duration of training program to attend the conferences/CMEs/Academic programs/Examination purposes.

DNB COURSE	NO. OF ACADEMIC LEAVE
DNB 3 years Course (Broad & Super Specialty)	14 Days
DNB 2 years Course (Post Diploma)	10 Days
DNB Direct 6 years Course	28 days

6. Under normal circumstances leave of one year should not be carried forward to the next year. However, in exceptional cases such as prolonged illness the leave across the DNB training program may be clubbed together with prior approval of NBE.
7. Any other leave which is beyond the above stated leave is not permissible and shall lead to extension/cancellation of DNB course.
8. Any extension of DNB training for more than 2 months beyond the scheduled completion date of training is permissible only under extra-ordinary circumstances with prior approval of NBE. Such extension is neither automatic nor shall be granted as a matter of routine. NBE shall consider such requests on merit provided the seat is not carried over and compromise with training of existing trainees in the Department.
9. Unauthorized absence from DNB training for more than 7 days may lead to cancellation of registration and discontinuation of the DNB training and rejoining shall not be permitted.
10. Medical Leave
 - a. Leave on medical grounds is permissible only for genuine medical reasons and NBE should be informed by the concerned institute/hospital about the same immediately after the candidate proceeds on leave on medical grounds.
 - b. The supporting medical documents have to be certified by the Head of the Institute/hospital where the candidate is undergoing DNB training and have to be sent to NBE.
 - c. The medical treatment should be taken from the institute/ hospital where the candidate is undergoing DNB training. Any deviation from this shall be supported with valid grounds and documentation.
 - d. In case of medical treatment being sought from some other institute/hospital, the medical documents have to be certified by the Head of the institute/hospital where the candidate is undergoing DNB training.
 - e. NBE reserves its rights to verify the authenticity of the documents furnished by the candidate and the institute/hospital regarding Medical illness of the candidate and to take a final decision in such matters.

11.

- a. Total leave period which can be availed by DNB candidates is $120+28 = 148$ days for 6 years course, $60+14=74$ days for 3 years course and $40+10 = 50$ days for 2 years course. This includes all kinds of eligible leave including academic leave. Maternity / Paternity leave can be availed separately by eligible candidates. Any kind of leave including medical leave exceeding the aforementioned limit shall lead to extension of DNB training. It is clarified that prior approval of NBE is necessary for availing any such leave.
- b. The eligibility for DNB Final Examination shall be determined strictly in accordance with the criteria prescribed in the respective information bulletin.

EXAMINATION

FORMATIVE ASSESSMENT

Formative assessment includes various formal and informal assessment procedures by which evaluation of student's learning, comprehension, and academic progress is done by the teachers/ faculty to improve student attainment. Formative assessment test (FAT) is called as "Formative" as it informs the in process teaching and learning modifications. FAT is an integral part of the effective teaching. The goal of the FAT is to collect information which can be used to improve the student learning process.

Formative assessment is essentially positive in intent, directed towards promoting learning; it is therefore part of teaching. Validity and usefulness are paramount in formative assessment and should take precedence over concerns for reliability. The assessment scheme consists of Three Parts which has to be essentially completed by the candidates.

The scheme includes:-

Part I:- Conduction of theory examination

Part-II :- Feedback session on the theory performance

Part-III :- Work place based clinical assessment

Scheme of Formative assessment

PART – I	CONDUCT OF THEORY EXAMINATION	Candidate has to appear for Theory Exam and it will be held for One day.
PART – II	FEEDBACK SESSION ON THE THEORY PERFORMANCE	Candidate has to appear for his/her Theory Exam Assessment Workshop.
PART – III	WORK PLACE BASED CLINICAL ASSESSMENT	After Theory Examination, Candidate has to appear for Clinical Assessment.

The performance of the resident during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student

1. Personal attributes:

- **Behavior and Emotional Stability:** Dependable, disciplined, dedicated, stable in emergency situations, shows positive approach.
- **Motivation and Initiative:** Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.

- **Honesty and Integrity:** Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.
- **Interpersonal Skills and Leadership Quality:** Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

2. Clinical Work:

- **Availability:** Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.
- **Diligence:** Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.
- **Academic ability:** Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests.
- **Clinical Performance:** Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.

3. Academic Activity: Performance during presentation at Journal club/ Seminar/ Case discussion/Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.

FINAL EXAMINATION

The summative assessment of competence will be done in the form of DNB Final Examination leading to the award of the degree of Diplomate of National Board in Emergency Medicine. The DNB final is a two-stage examination comprising the theory and practical part. An eligible candidate who has qualified the theory exam is permitted to appear in the practical examination.

Theory Examination

1. The theory examination comprises of **Three/ Four** papers, maximum marks 100 each.
2. There are 10 short notes of 10 marks each, in each of the papers. The number of short notes and their respective marks weightage may vary in some subjects/some papers.
3. Maximum time permitted is 3 hours.
4. Candidate must score at least 50% in the aggregate of **Three/ Four** papers to qualify the theory examination.
5. Candidates who have qualified the theory examination are permitted to take up the practical examination.
6. The paper wise distribution of the Theory Examination shall be as follows:

Paper I:

Basic sciences in Oncology: Molecular basis of cancer, Radiation physics and radiobiology, Tumor Biology, Biochemistry, Biometry, Immunology and Pharmacology of anti-cancer agents.

Paper II:

General Oncology, Tumor Pathology, Staging, Diagnosis, Imaging in cancer, Nuclear Medicine, Molecular diagnostic tests in cancer, Radioisotopes in diagnosis and therapy, Principles of Surgical Oncology.

Paper III:

Medical Oncology including Chemotherapy of adult solid tumours and hematological malignancies, paediatric oncology (Solid Tumours and Hematological Malignancies)

Paper IV:

Epidemiology, Rehabilitation, End of Life and Terminal care, Palliative care and Hospice Care, Research methodology Clinical trials and the ethics of cancer research, Cancer Prevention.

a) Practical Examination:

1. Maximum Marks: 300.
2. Comprises of Clinical Examination and Viva.
3. Candidate must obtain a minimum of 50% marks in the Clinical Examination (including Viva) to qualify for the Practical Examination.
4. There are a maximum of three attempts that can be availed by a candidate for Practical Examination.
5. First attempt is the practical examination following immediately after the declaration of theory results.
6. Second and Third attempt in practical examination shall be permitted out of the next three sessions of practical examinations placed alongwith the next three successive theory examination sessions; after payment of full examination fees as may be prescribed by NBE.
7. Absentation from Practical Examination is counted as an attempt.
8. Appearance in first practical examination is compulsory;
9. Requests for Change in center of examination are not entertained, as the same is not permissible.
10. Candidates are required not to canvass with NBE for above.

Declaration of DNB Final Results

1. DNB final is a qualifying examination.
2. Results of DNB final examinations (theory & practical) are declared as PASS/FAIL.
3. DNB degree is awarded to a DNB trainee in the convocation of NBE.

RECOMMENDED TEXT BOOKS AND JOURNALS

1. American Journal of Paediatrics
2. Acta Oncologica Hematologica/Ontologica
3. British Journal of Cancer
4. Cancer
5. CA.A Cancer Journal for Clinicians
6. Cancer Detection & Prevention
7. Cancer Genetics and Cytogenetics
8. Cancer Journal (Scientific American) (NP)
9. Cancer Survey (NP)
10. Cancer Treatment Review
11. Clinical Oncology
12. Current Problem in Cancer
13. Current Opinion in Oncology
14. European Journal of Cancer
15. European Journal of Surgical Oncology
16. Genes, Chromosomes and Cancer
17. Gynecologic Oncology
18. Haematological Oncology
19. Haematology Oncology Clinics of North America
20. Indian Journal of Medical & Paediatric Oncology
21. Indian Journal of Cancer (Indian)
22. International Journal of Cancer (UICC)
23. International Journal of Gynecological Cancer
24. International Journal of Radiation Oncology Biology/Physics

25. Journal of Cancer Education (NP)
26. Journal of Clinical Oncology
27. Journal of National Cancer Institute (Gift)
28. Journal of Psycho social Oncology
29. Journal of Surgical Oncology
30. Medical & Paediatric Oncology
31. Nutrition and Cancer
32. Oncology (NP)
33. Psycho-Oncology
34. Radiotherapy & Oncology
35. Seminars in Oncology
36. Seminars in Oncology Nursing
37. Seminars in Radiation Oncology
38. Seminars in Surgical Oncology
39. Surgical Oncology Clinics of North America
40. Blood
41. British J. Hematology
42. Seminars in Haematology
43. Haematology & Oncology Clinics
44. Bone Marrow Transplantation

BOOKS FOR READING (LATEST EDITION)

1. Molecular Diagnosis of Cancer , COTTER.F.E.
2. Molecular Biology for Oncologists ,YARNOLD..J.R. et al
3. Cancer Chemotherapy Handbook, BAQUIRANJ DELIA~
4. The Lymphomas, CANELLOS,G.P.et al
5. Chemotherapy source book, PERRY,M.C,
6. Leukemia, HENDERSON,E.S.et al
7. Cancer Medicine, HOLLAND, J .F. et al.
8. Atlas of clinical Haematology, BEGEMANN
9. Text book of Malignant Haematology, Degos.L et al
10. Clinical Haematology, ROCHARD Lee. et al
11. Clinical Oncology, ABELOFF et al
12. Important Advances in Oncology, .DEVITA, V.T.
13. Cancer Principles and Practice of Oncology, DEVITA , V. T. et al,
14. Decision Making in Oncology Evidence Based Management, . DJULBEGOVIC. B & SULLIVAN.
15. AJCC Cancer' Staging Manual (American Joint Committee on Cancer Cancer Treatment, HALNAN E .K
16. Cancer' Treatment, HASKEL • Oncology for' Palliative Medicine, HOSKIN PETER & MAKING WENDY)
17. Regional Therapy of Advanced Cancer, RUBIN,J.T
18. MAGRATH, I. The Non-Hodgkin's Lymphoma,
19. Comprehensive Text book of Oncology, Vol 1-2,.MOSSA, A.R
20. Oxford textbook of Oncology PECKHAM, M. et al I
21. A Multi-disciplinary Approach for Physicians and Students, RUBIN Clinical Oncology.
22. Atlas of diagnostic oncology, SKARIN, A.T

23. Basic Science of Oncology, TANNOCK,E.I
24. Pediatric oncology ,Philip LANSZOWSKY
25. William's Haematology[Beutler, Lichtman, Coller & Kipps]
26. Wintrobe's Clinical Haematology [Greer et al]
27. Haematology – Basic Principles & Practice [Hoffman, Benz, Shattil, Furie, Cohen & Silberstein]
28. Practical Haematology [Dacie & Lewis]
29. Bone Marrow Transplantation. [Forman, Blume & Thomas]
30. Clinical bone marrow and blood stem cell transplantation [Atkinson et al]
31. The molecular basis of Blood Diseases [Stamatoyannopoulos, Neinhuis, Leder & Majerus].
32. Paediatric Haematology by [Nathan & Ozaskie] F.
