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FACULTY OF POSTGRADUATE MEDICINE

DOCTOR OF MEDICINE (MD)
CURRICULUM
ORTHOPEDICS (2018)



Khesar Gyalpo University of Medical Sciences of Bhutan

CONTENT

BACKGROUND.....	.....
RATIONALE.....	.....
GOALS.....	.....
OBJECTIVES OF THE COURSE.....	.....
LEARNING OUTCOME.....	.....
AN OVERVIEW OF ROTATIONAL SCHEDULE.....	.....
THE CORE COMPETENCIES.....	.....
EDUCATIONAL STRATEGIES.....	.....
Teaching and learning methods.....	.....
Competency –based Education.....	.....
The Practice- based, learner centered and experiential learning Education.....	.....
As a teachers, learners and leaders.....	.....
Independent Self-Directed Learning.....	.....
Assessment methods.....	.....
360 degree feedback.....	.....
Mini-CEX.....	.....
Objective Structured Clinical examination (OSCE).....	.....
The Short Answer Question (SAQ).....	.....
Direct Observation of Procedural Skills (DOPS).....	.....
Multiple Choice Questions (MCQ).....	.....
Key Feature Questions (KFQ).....	.....
Simulation with standardized patients.....	.....
Logbook.....	.....
Case-based Discussion (CbD).....	.....
Portfolio assessment.....	.....

**DETAILS OF CORE COMPETENCIES WITH LEARNING
METHODS AND TOOLS OF ASSESSMENT.....**

- Communication and patient-doctor relationship.....
- Applied Professional knowledge and skills.....
- Systems-based Practice.....
- Professional and ethical role.....
- Organizational and legal dimension.....

INTRODUCTION TO CONTENT.....

- Generic curriculum.....
- Learning outcomes.....

CLINICAL COURSE CONTENT.....

- First Year Residency Programme (second Semester).....
- Second Year Residency Programme.....
- Third Year Residency Programme.....
- Fourth Year Residency Programme

DISTRICT HOSPITAL.....

- Learning outcome.....
- Content outline.....

EXAMINATION SYSTEM AND OVERVIEW.....

EVALUATION.....

ANNEXURE: I.....

ANNEXURE: II.....

BACKGROUND

The Orthopaedic Surgery Residency Training Program in Bhutan is organized under the auspices of Faculty of Postgraduate Medicine (FoPGM), Khesar Gyalpo University of Medical Sciences of Bhutan. It requires the successful completion of four years of full-time training in the accredited teaching hospitals and regular evaluations and formal examinations to ensure that candidates will obtain the knowledge, skills and experience required for the provision of high quality care in Orthopaedics.

The mission of the Orthopaedic Residency Program is to ensure that all Orthopaedic residents possess sound knowledge, skills and experience through uniform high quality training to enable them to be competent Orthopaedic surgeons providing the highest level of quality care in Bhutan at par with the international standard. At the end of fourth year the residents are expected to manage all kind of trauma independently and general orthopaedic conditions.

The curriculum is structured over four years to give the residents adequate experience to develop the skills necessary to manage all kinds of orthopaedic problems. The training is an outcome-based education where the resident has to show targeted outcome at the end of the 4 years. During the four years the resident will be given gradually increasing responsibility and by the fourth year they will be functioning independently. Besides the clinical training the residents will be given weekly lectures to cover all the important topics prescribed in the curriculum. The residents will start their elective postings from first year onwards. In the second, third and fourth year the residents will be sent for elective posting to other universities outside the country to give them exposure in subspecialties that are not in Bhutan. The fourth year residents will have one month of regional/district posting where there is orthopaedic facilities to give them the opportunity to function and learn in difficult settings.

The residents will have to maintain a proper logbook to record all the educational activities/ procedures done over the four years. Monitoring and supervision will be carried all the time and feedbacks will be given to facilitate proper learning and development. At the end of three and half years the residents will have to complete the thesis and defend it before the final examination.

RATIONALE

GOALS

The goal of Orthopaedic residency is to produce competent, professional, compassionate and specialist in Orthopaedic surgery who is capable of practicing all types of general orthopaedic surgery efficiently and competently backed by scientific knowledge and skills.

OBJECTIVES OF THE COURSE

- i. To impart knowledge on the principles and practices of orthopaedic surgery
- ii. To train residents to acquire surgical skills necessary for the management of routine and emergency orthopaedic cases
- iii. To facilitate the development of clinical decision making and problem-solving skills;
- iv. To infuse the sense of lifelong learning and acquire good surgical ethics.

LEARNING OUTCOME

At the end of training, the trainee of orthopaedic residency programme will be able to:

- i. Demonstrate theoretical and practical knowledge related to orthopaedic surgery.
- ii. Show Positive Attitude, professional habits, moral and ethics in their practice.
- iii. Obtain good communication and interpersonal skills.
- iv. Display technical and operative skills (critical thinking and reasoning).
- v. Apply clinical skills and judgment in patient care.
- vi. Demonstrate generic professional and leadership skills.
- vii. Illustrate an understanding of the values that underpin the profession of orthopaedic surgery and the responsibilities that comes with being a member of the profession.
- viii. Illustrate the special attributes needed to be a orthopaedic surgeon.
- ix. Exhibit commitment to their ongoing personal and professional development and practice using reflective practice and other educational processes;
- x. They should KNOW theoretically (level-1), SHOW how to do the basic surgical skill (level-2) and some DO it independently (level-3).

AN OVERVIEW OF ROTATIONAL SCHEDULE

Sl. No	Activity	PG 1		PG 2		PG 3		PG 4	
		1	2	3	4	5	6	7	8
1	Generic Curriculum								
2	IPD/OPD placement								
3	Lecture class								
4	Pathology rotation			2 weeks					
5	Physical Rehabilitation		1 week						
6	Radio-diagnosis rotation		1 week						
7	Anesthesia		1 week						
8	Hand and microsurgery								
9	Arthroplasty								
10	Sports Medicine								
11	Orthopaedic oncology								
12	Pediatric Orthopaedic								
13	Spine								
14	Overseas posting 4 weeks/year			February			March		
15	Assessment Schedule	2 nd week December		3 rd Week of May			1 st week of June		3 rd &4 th Week, May
16	Continuous assessment								

Term: July to December and January to June (6 months), 4 years is divided into 8 terms.

***: refer the section on assessment system for further details

THE CORE COMPETENCIES

The Core Competency shall comprise of the following:

- i. Communication skills and Patient-Doctor relationship
- ii. Applied Professional Knowledge and Skill
- iii. Systems-based Practice
- iv. Professional and Ethical Role
- v. Organizational and Legal dimensions and information technology/e-health

EDUCATIONAL STRATEGIES

Teaching and learning methods

The Curriculum is based on the following principles of learning:^{1,2}

Competency –based Education

Competency based education is defined by identifying the outcomes, defining performance levels, framework for assessing competencies and continuous evaluation process. The training of orthopaedic residents need to be focused on skill development, integrating with knowledge.

The Practice- based, learner centered and experiential learning Education

The training of orthopaedic residents will take place in a supervised clinical setting. After completing the 6 months of generic curriculum the residents will be fully attached to orthopaedic departments. The residents will be attending the on calls in rotation. They will be placed in the outpatient clinic as well as in the operation theatre. Regular assessments and feedback will be performed. The residents learn from the following methods but not limited to these:

- i. Case presentations and discussion
- ii. Case managements and discussion
- iii. Performing procedural skills under supervision, feedback and reflections
- iv. Learning & practising communication skills through role plays and
- v. de-briefing
- vi. Working professionally and ethically as a role model.

As a teachers, learners and leaders

Doctors need to develop educational and leadership skills as an integral part of their professional career. This curriculum aims to incorporate teaching, mentoring and leadership at all levels of professional life. The residents will be learning assessment and evaluation

¹ Kern D. Curriculum development for medical education. Baltimore: Johns Hopkins University Press; 1998.

² Key educational principles and concepts [Internet]. Royal Australian College of General Practitioners. 2011 [cited 28 May 2016]. Available from: <http://curriculum.racgp.org.au/statements/common-training-outcomes/>

skills, adult learning principles, instructional and supervision skills, and providing feedback and develop skills on how to learn and educate. The following methods allow residents to acquire the above skills.

- i. Paper presentations and question answer session
- ii. Journal clubs and discussion
- iii. Case presentation and discussion
- iv. Bedside teaching followed by demonstration and practice³
- v. Grand rounds and question answer session
- vi. Seminars, Workshops, Conferences, PBL, Research writing (thesis)
- vii. Teaching interns and allied health staffs

Independent Self-Directed Learning:

- i. Reading journals and articles, including web-based material
- ii. Maintenance of portfolio
- iii. Audit and research projects

Assessment methods

Assessment is a strong driving force behind learning and therefore is a main focus in the curriculum design.^{4,5} Since it addresses complex competencies, it requires both quantitative and qualitative information from different sources as well as professional judgment. No single assessment method is inferior or superior and all methods have their strengths and weaknesses. A complete assessment programme tries to balance these out. A further important issue to consider is the problem of domain specificity. Any assessment or test is factually a sample of questions (or assignments or observation) out of huge domain of possible questions, and how a candidate performs on one question is a poor predictor of their performance on any other question. This – slightly counter intuitive – notion of domain specificity^{6,7} requires examinations to be sufficiently long and sufficiently diverse. Assessment programmes can be described using the categorization of Miller’s Pyramid (fig. 5). This illustrates a helpful framework for assessment. The base of the pyramid represents knowledge (Knows), followed by competence (Knows how), performance (shows how) and action in the work place (does)⁸. No single method is able to assess all the layers and therefore multiple methods need to be employed.⁹ The following methods will be utilized for both formative and summative assessments.

³ Peters M, ten Cate O. Bedside teaching in medical education: a literature review. *Perspect Med Educ*. 2013;3(2):76-88.

⁴ Frederiksen N. The real test bias: Influences of testing on teaching and learning. *American Psychologist* 1984;39:193-202.

⁵ Cilliers FJ, Schuwirth LWT, Adendorff HJ, Herman N, Van der Vleuten CPM. The mechanisms of impact of summative assessment on medical students’ learning. *advances in health sciences education* 2010;15:695-715.

⁶ Eva K. On the generality of specificity. *Medical Education* 2003;37:587-8.

⁷ Eva KW, Neville AJ, G.R. N. Exploring the etiology of content specificity: Factors influencing analogic transfer and problem solving. *Academic Medicine* 1998;73:s1-5.

⁸ Miller G E. The Assessment of Clinical Skills/Competence/Performance. September supplement 1990, Volume 65, Number 9.

⁹ Kern D. Curriculum development for medical education. Baltimore: Johns Hopkins University Press; 1998.

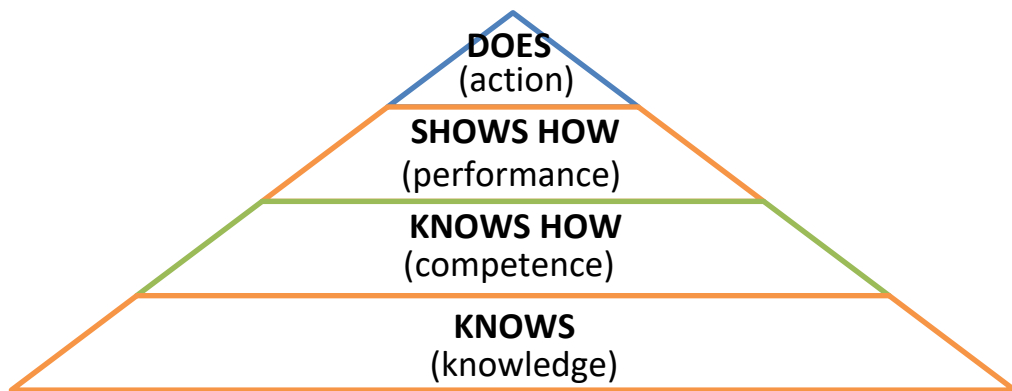


Figure 5: Miller's Pyramid, framework for clinical assessment

360 degree feedback

360-Degree Evaluation/Multisource Assessment consists of measurement tools completed by multiple individuals in a person's sphere of influence. Assessment by peers, other members of the clinical team, and patients can provide insight into trainees' work habits, capacity for team work, and interpersonal sensitivity.¹⁰

Mini-CEX

The Mini-CEX is a 10 to 20 minute direct observation assessment or "snapshot" of a trainee-patient interaction. The competencies that can be assessed by this method are: patient's history taking, physical examination, counseling skills, Clinical Judgment/reasoning and overall clinical competence¹¹.

Objective Structured Clinical examination (OSCE)

This consists of multiple stations in each of which the candidate is asked to perform a different defined task such as taking a focused history or performing a focused clinical examination of a particular system. A standardized marking scheme specific for each case is used¹².

The Short Answer Question (SAQ)

This is an open ended, semi-structured question format²⁵. They take more time to answer than for example multiple choice questions and therefore their reliability per hour of testing time is lower. Generally it is recommended that they should be used mainly when testing aspects which cannot be tested by closed questions format.¹³ A structured predetermined marking scheme improves reliability.

¹⁰ Tabish S. Assessment methods in medical education. International Journal of health Science. 2008;Volume 2(2); 2008 (PMC3068728).

¹¹ Assessment tools [Internet]. American Board of Internal Medicine. 2016 [cited 28 May 2016]. Available from: <http://www.abim.org/program-directors-administrators/assessment-tools/mini-cex.aspx>

¹² Tabish, S. A. Assessment methods in medical education. Int J Health Sci (Qassim). 2008 Jul; 2(2): 3–7.

¹³ Schuwirth W T Lambert, Vleuten P M Cees. ABC of learning and teaching in medicine.

Direct Observation of Procedural Skills (DOPS)^{14,25}

This is a structured rating scale for assessing and providing feedback on practical procedures. The competencies that are commonly assessed include general knowledge about the procedure, informed consent, pre-procedure preparation, analgesia, technical ability, aseptic technique, post-procedure management, and counseling and communication.

Multiple Choice Questions (MCQ)

MCQ tests can be useful for formative and summative assessments and good quality MCQ can be set through peer review process and efficient feedback system¹⁵. Although time consuming to set, these tests typically have a high reliability per hour of testing time (than open ended questions), because they can easily mitigate the impact of context specificity, i.e. a large number of items can be tested and marked within a relatively short time frame¹⁶.

Key Feature Questions (KFQ)

This is a clinical scenario-based question. A description of the cases is followed by a limited number of questions that focus on critical, challenging actions or decisions²⁵.

Simulation with standardized patients.²⁷

A standardized patient is a person trained to accurately and consistently portray a patient with a particular medical condition. Based on an encounter between the standardized patient and a student, both the standardized patient and medical professionals can make judgments about the quality of the performance along a number of dimensions (e.g., history-taking, physical examination, interpersonal, and communication skills)

Logbook

In the Logbook students keep a record of the patients seen or procedures performed either in a book or in a computer. It documents the range of patient care and learning experience of students. Logbook is very useful in focusing students on important objectives that must be fulfilled within a specified period of time.¹⁷

Case-based Discussion (CbD)

This is a valuable workplace formative assessment tool and is used to assess the resident's professional judgments in clinical areas. In this method, a comprehensive review of a clinical case is conducted between a resident and an assessor. After the discussion, the assessor provides feedback to help the resident improve and structure their future learning. The

¹⁴Norcini J, McKinley D. Assessment methods in medical education. *Teaching and Teacher Education*. 2007;23(3):239-250.

¹⁵Bunmi S. Malau-Aduli, Dwight Assenheimer, Derek Choi-Lundberg & Craig Zimitat (2014) Using computer-based technology to improve feedback to staff and students on MCQ assessments, *Innovations in Education and Teaching International*, 51:5, 510-522, DOI: 10.1080/14703297.2013.796711

¹⁶Wass V, Bowden R, Jackson N. ResearchGate. (2014). Principles of Assessment Design.

¹⁷Tabish, S. A. Assessment methods in medical education. *Int J Health Sci (Qassim)*. 2008 Jul; 2(2): 3–7

clinical areas that can be assessed by these methods are record keeping, history taking, clinical findings and interpretation, management plan, follow up and future planning.¹⁸

Portfolio assessment^{19, 20}

This method is the most important process that will be utilized to assess GP residents. They are required to collect every bit of learning experience and data like a logbook, reflections and all records of learning activity and assessments reflecting five domains of Orthopedics, throughout the training period. It will be seen as both the process and the outcome of the GP residency programme. As a process, it will enable the residents to monitor their own learning systematically, reflecting on their learning using the five domains of Orthopedics leading to learning goals. As a product, it holds the work records and documents the resident has produced representing their achievements. The portfolio will be assessed (fig. 6 and appendix 1 - 6) regularly by the residents, specialist supervisor and the GP supervisor. It will be further assessed by internal and external examiner at two low stakes examinations (institute examination I and II – IE 1, IE 2) and finally at high stake examination (University examination - UE), after completion of the residency programme. A good documentation process will be followed to ensure credibility. The following figure (figure 6) illustrates the assessment process of the portfolio. The concept for the flow chart is adapted from the Journal article - Assessing tomorrow's learners: In competency-based education only a radically different holistic method of assessment will work by Lambert Schuwirth and Julie Ash.²¹

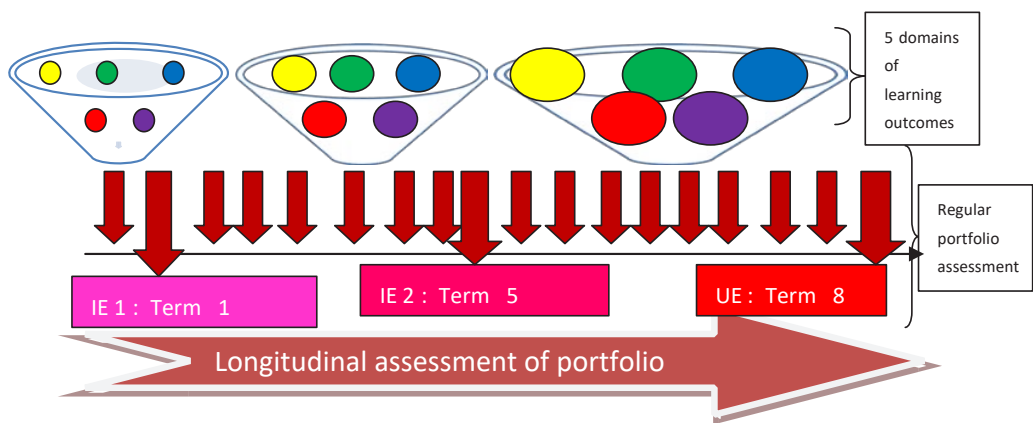


Figure 6: Utility of portfolio as an assessment method

18 Case-based Discussion [Internet]. RACP. [cited 29 May 2016]. Available from: <https://www.racp.edu.au/trainees/assessments/work-based-assessments/case-based-discussion>

19 17. Zaidi S Nasir M. Teaching and learning methods in medicine.

20 Assessing by portfolio [Internet]. UNSW, Australia. [cited 29 May 2016]. Available from: <https://teaching.unsw.edu.au/assessing-portfolio>

21 Schuwirth L, Ash J. Assessing tomorrow's learners: In competency-based education only a radically different holistic method of assessment will work. Six things we could forget. *Medical Teacher*. 2013;35(7):555-559.

DETAILS OF CORE COMPETENCIES WITH LEARNING METHODS AND TOOLS OF ASSESSMENT

Communication and patient-doctor relationship

At the end of the training, the residents are able to communicate effectively and appropriately with patients, relatives and caregivers and develop skills to maintain good patient-doctor relationship.

Specific Learning Outcome	Teaching/learning activity	Assessment methods
1. Communication is clear, respectful, empathetic and appropriate to the person and socio-cultural context Create and sustain a therapeutic and ethically sound relationship with patient	Role play and de-contextualization relating the experiences to first principles. Interviewing Patients and debriefing	Mini-CEX 360 degree feedback Real patient observation
Effective communication is used in challenging situations like: Breaking bad news Agitated family or patients Discussing prognosis of diseases Managing patients experiencing current or consequences of trauma	Self-reflection on experience Role play and de-contextualization relating the experiences to first principles.	Portfolio assessment
3. Communication with family, caregivers and others involved in the care of the patient is appropriate and clear Involvement of family member & caregiver in patient management Impacts of patient care burden on caregivers	Interviewing Patients and debriefing Self-reflection on experience	
4. Complaints and concerns are managed effectively Approaches to address patient complaints Plans to reduce risk of arising complaints in future		
5. Ways in which health can be optimized and maintained are communicated to patients, family members and caregivers. Self-care strategies Nutrition Managing stress Managing safety risk for older people		

Learning resources

Kurtz S, Silverman J, Benson J, Draper J (2003) Marrying Content and Process in Clinical Method Teaching:

DOCTOR OF MEDICINE (MD) CURRICULUM

Enhancing the Calgary-Cambridge Guides Academic Medicine;78(8):802-809http://gp-training.net/training/communication_skills/calgary/index.htm

Warnecke E. The art of communication. Aust Fam Physician 2014;43(3):156–58, www.racgp.org.au/afp/2014/march/art-ofcommunication

Kurtz SM, Silverman JD, Draper J (1998) Teaching and Learning Communication Skills in Medicine. Radcliffe Medical Press (Oxford)

Silverman JD, Kurtz SM, Draper J (1998) Skills for Communicating with Patients., Radcliffe Medical Press (Oxford), http://gp-training.net/training/communication_skills/calgary/calgary.pdf

Richmond JS, Berlin JS, Fishkind AB, et al. Verbal de-escalation of the agitated patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA De-escalation Workgroup. West J Emerg Med 2012;13(1):17–25, www.ncbi.nlm.nih.gov/pmc/articles/PMC3298202

Fishkind AB. Calming agitation with words not drugs: 10 commandments for safety. Current Psych 2002;1(4), [www.currentpsychiatry.com/index.php?id=22661&tx_ttnews\[tt_news\]=181234](http://www.currentpsychiatry.com/index.php?id=22661&tx_ttnews[tt_news]=181234)

The Royal Australian College of General Practitioners. Abuse and violence: Working with our patients in Orthopedics (White book).Melbourne: RACGP, 2014, www.racgp.org.au/yourpractice/guidelines/whitebook

Adults Surviving Child Abuse. Practice guidelines for treatment of complex trauma and trauma informed care and service delivery. ASCA, 2012, www.asca.org.au/Portals/2/Practice%20Guidelines/ASCA%20Guidelines%202014_WEB_Final.pdf

The first National Suicide prevention Action Plan, <http://www.health.gov.bt/wp-content/uploads/moh-files/2015/12/Suicide-Action-Plan.pdf>

Centers for Disease Control and Prevention. Adverse Childhood Experiences Study 1997, www.cdc.gov/violenceprevention/acestudy

Forbes D, Creamer MC, Phelps AJ, et al. treating adults with acute stress disorder and post-traumatic stress disorder in Orthopedics: a clinical update. Med J Aust 2007;187(2):120–23.

Applied Professional knowledge and skills

At the end of the training, the residents are able to demonstrate relevant diagnostic and managerial skills in patients of all age groups and life stages and perform important procedures *relevant to orthopaedic Practice* through a holistic and patient-centered approach.

At the end of the training, the orthopaedic residents develop skills to practice evidence-based medicine innovatively and they collaborate and coordinate care.

Specific Learning Outcome	Teaching/learning Activity	Assessment methods
<p>1. Demonstrate relevant diagnostic and managerial skills in patients of all age groups and life stages with wide range of health problems as specified in the later sections: Procedural skills in Orthopaedic practice Content outline in the curriculum</p>	<p>Demonstration, practice and feedback Real Life Experience in different postings Simulations with Standardized patient Simulation with artificial models Case presentations and discussion Case managements and discussion Active involvement in procedural skills, feedback and reflections Paper presentations and question and answer session Journal clubs and discussion Bedside teaching followed by demonstration and practice Ward rounds and discussion Grand rounds and question answer session Seminars, Workshops Conferences, PBL Teaching interns and allied health staffs</p>	<p>OSCE Mini CEX MCQ SAQ DOPS 360 degree feed back Case based Discussion (CbD) OSLER Portfolio assessment</p>
<p>2. Demonstrate holistic and patient-centered care Effective history taking, physical examination, documentation Need based approach Continuity of care Therapeutic relationship Management plans Psycho -Socio-cultural factors Priority based</p>	<p>Real Life Experience in Orthopaedic Department and district postings Role plays and de-contextualization to understand relationship between case and first principles. Interviewing patients and de-briefing Small group discussion Readings and discussion</p>	

DOCTOR OF MEDICINE (MD) CURRICULUM

<p>3. Able to remain informed and innovative Evidence-based resources & practice Up-to- date prescribing knowledge Innovate approach to patient with multiple problems Different models of care- cure, care, rehabilitations etc.</p>	<p>Literature review, critique reflection Journal club and discussion Thesis writing Poster presentation</p>	<p>Portfolio assessment Thesis assessment</p>
<p>4. Able to collaborate and coordinate care Minimize fragmentation of care Effective communication with patient, relatives, caregivers and other specialists Multidisciplinary care Collaborate with other agencies to optimize patient care</p>	<p>Real Life Experience in different postings and reflections Role plays and de-contextualize</p>	<p>360 degree feedback Portfolio Assessment</p>

Systems-based Practice

At the end of the training, the residents should be able to demonstrate an awareness of and responsiveness to the larger context and system of healthcare and the ability to effectively call on system resources to provide care that is of optimal value.

Specific Learning Outcome	Teaching/learning Activity	Assessment methods
<p>Understand how their patient care and other professional practices affect: The health care organization The other health care professionals the larger society, how these elements of the system affect their own practice; Know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources. Advocate for high quality patient care and assist patients in dealing with system complexities. Know how to partner with health care managers and health care providers to assess, coordinate, and improve health care.</p>	<p>Work place guidance and implementation. Team Based Learning Small group discussion Large group discussion Lectures and QA session AV Real life experience and reflections Case management and discussion Workshops, Seminar</p>	<p>MCQ Mini-CEX 360 degree feedback Portfolio assessment</p>

Professional and ethical role

At the end of the training, the residents demonstrate self-awareness, professional and ethical role in daily practice.

Specific Learning Outcome	Teaching/learning Activity	Assessment methods
1. Adherence to relevant codes and standards of ethical and professional behavior Ethical dilemmas in practice situations and access to professional support Evaluate and review professional behavior against appropriate codes of conduct	Real life experience and Reflections PBL Small group discussions Role model	360 degree feedback Work place assessment Portfolio Assessment KFQ
2. Duty of care is maintained Manage obstacle to provision of duty of care Record and report any instances that may have been compromised	PBL Small group discussion Real life experience and Reflections	360 degree feedback Portfolio Assessment KFQ
3. Critical incidents and potential critical incidents are identified and managed.	PBL TBL Real life experience and reflections	Portfolio Assessment
4. Professional knowledge and skills are reviewed and developed.	Reading articles Workshops, seminars, conferences	Portfolio Assessment
5. Reflection and self- appraisal are undertaken regularly	Self- reflections	Portfolio Assessment
6. Personal health and wellbeing is evaluated, maintained and developed	Self- reflection Role Model	Portfolio assessment

Learning resources

Medical and Health Council Act 2002, http://www.bmhc.gov.bt/downloads/medical_and_health_council_act.pdf/

Bhutan Medical and Health Council Regulation 2005, <http://www.bmhc.gov.bt/wp-content/uploads/2012/06/MHCRegulationsFINAL.pdf/>

Continuing Medical Education guideline 2009, http://www.bmhc.gov.bt/downloads/cme_guidelines.pdf

Disciplinary proceedings for Malpractice and Negligence Regulations 2009 http://www.bmhc.gov.bt/downloads/disciplinary_proceedings.pdf

Guidelines for writing Medical Certificates and Reports 2009 http://www.bmhc.gov.bt/downloads/medical_certificate_guidelines.pdf

Organizational and legal dimension

At the end of the training, the residents demonstrate ability to work within statutory and regulatory requirements guidelines and they use quality practice management processes and systems to optimize safety in daily practice.

Specific Learning Outcome	Teaching/learning Activity	Assessment methods
1. Infection control and relevant clinical practice standards are maintained.	TBL Self- reflections	360 degree feed back Portfolio Assessment
2. Effective clinical leadership is demonstrated	Real life experiences and reflections	360 degree feedback Portfolio Assessment
3. Relevant data is clearly documented, securely stored and appropriately shared for quality improvement	Role Models Workplace-based self-practice	360 degree feedback Portfolio Assessment
4. Effective triaging and time management structures are in place to allow timely provision of care	Simulations exercises Real life experience and reflections	Portfolio Assessment
5. Patient confidentiality is managed appropriately	Case vignette Self-reflections	Portfolio Assessment
6. Shared decision making and informed consent are explained and obtained.	Real life experience and reflections TBL	Portfolio Assessment
7. Medico-legal requirements are integrated into accurate documentation	Lectures and QA sessions Real life experiences and self-reflections PBL	MCQ KFQ SAQ Portfolio Assessment

INTRODUCTION TO CONTENT

GENERIC CURRICULUM

The Generic Curriculum is designed to help resident doctors to develop competency in a number of areas including communication and consultation skills, patient safety and team work as well as the general principles and techniques of basic sciences including diagnostic and imaging and investigative medicine.

The resident doctors are also expected to develop and demonstrate a range of essential interpersonal and clinical skills for managing both acute and long-term conditions, regardless of the specialty. The concepts defined in the Generic Curriculum should continue to be visited, reflected upon, and honed throughout the residency training programme and lifelong professional carrier.

Learning outcomes

At the end of this curriculum, the residents are expected to be able to:

- I. Identify the general and specific learning needs and outcome of the whole residency programme.
- II. Apply the principles and techniques in basic sciences to clinical setting in the respective Specialty discipline.
- III. Synthesize the process of history taking, clinical observations, investigations, diagnosis and treatment plans for proper and effective management of the patients.
- IV. Illustrate a range of essential interpersonal and clinical skills for managing patients with both acute and long-term conditions, regardless of the specialty.
- V. Demonstrate different aspects of medical ethics and etiquettes for strengthening professionalism and patient care.
- VI. Identify and address the legal and ethical issues as applicable to clinical practice and healthcare.
- VII. Provide leadership and management oversight in patient management with emphasis on intra-and inter-disciplinary team work.
- VIII. Make independent clinical decisions with appropriate support.
- IX. Understand the principles and techniques in epidemiology, biostatics and research and apply research in clinical practice to promote and strengthen evidence-based care.

TEACHING METHODS MODULE

MEDICAL HUMANITIES MODULE

Note: Above two modules will be delivered from term 2 to term 7 of residency with compulsory attendance requirement of 90% to qualify for Institute Examination III

QUALITY IMPROVEMENT PROJECT

CLINICAL COURSE CONTENT

First Year Residency Programme (second Semester)

KNOWLEDGE:

To learn about

- I. The historical perspectives of orthopedic surgery.
- II. About basic orthopedic science
- III. The anatomy and biomechanics of musculoskeletal system.
- IV. The principles of splinting and the splint materials
- V. The techniques and complications of the digital blocks.
- VI. The diagnosis and treatment of infection
- VII. The skill in history taking and examination
- VIII. To get oriented to basic of orthopedic subspecialties
- IX. Surgical sterility and preparation
- X. To get familiarize with the orthopaedic surgery equipment and machines.
- XI. Basic musculoskeletal radiology
- XII. Post traumatic and post-operative rehabilitation program
- XIII. Various kinds of nerve and regional blocks.

SKILLS:

- I. Should be able to know about the bone biology
- II. Should know about the anatomy and biomechanics of musculoskeletal system in their practice
- III. Should be able to diagnose the bone infection and treat them.
- IV. Perform clinical history and examination in surgical practice
- V. Carry out pre-operative evaluation of patients.
- VI. Carry out instrument arrangement and trolley layout.
- VII. Demonstrate skills in sterilization techniques (O.T Layout and Asepsis).
- VIII. Perform skin Preparation-painting and draping
- IX. Exhibit the techniques of scrubbing and gowning.
- X. Should be able to perform all kinds of splinting and traction
- XI. Should be able to do the digital blocks and should be able to perform the minor procedures of the finger and toe tips.
- XII. Perform wound dressing and wound debridement
- XIII. Should know about post traumatic and post-operative rehabilitation program, ambulatory aids, splints, orthosis, shoes and braces.

Second Year Residency Programme

KNOWLEDGE

- I. To learn about the bone grafting technique
- II. Should learn about the anatomy of tendons and its clinical application.
- III. Learn about the principles of osteosynthesis- AO course (1 week)

- IV. Learn about the fractures and dislocations upper and lower extremities.
- V. Learn about the indications and contraindications of arthroplasty.
- VI. Learn about the fracture and dislocation around wrist.
- VII. Learn to examine the injured wrist.
- VIII. Learn about the basic knowledge of the compressive neuropathy and nerve injury.
- IX. Learn about the fingertip injuries.
- X. Learn about the pediatric upper limb injury.
- XI. Learn about the arthropathy and rheumatology
- XII. Learn about the basic science of hip, knee and ankle.
- XIII. Learn about the biomaterials of hip and knee arthroplasty.
- XIV. Learn about the biomechanics of hip and knee joint.
- XV. Learn about the disease and conditions of the hip, knee and ankle joint.
- XVI. Learn about the metabolic bone diseases.
- XVII. Learn about the pediatric diseases and congenital anomaly.
- XVIII. Learn about the spine injury.
- XIX. Learn about the spine deformity and spine infection.
- XX. Learn about the introduction of orthopedic sports medicine.
- XXI. Learn about the anatomical structures in and around the knee joint.
- XXII. Learn about the orthopedic oncology.
- XXIII. Learn about diabetic foot.
- XXIV. Learn about the image interpretation of the bone tumor.
- XXV. Learn various method of arthrocentesis

SKILLS:

- I. Should be able to do autogenic bone grafting
- II. Should able to do physical examination of the tendons and able to diagnosed it.
- III. Should be able to do the closed reduction techniques of shoulder, hip, elbow, ankle and wrist joint.
- IV. Perform the closed reduction technique of distal radius fracture.
- V. Able to perform the physical examination of DRUJ and conservative management.
- VI. Able to demonstrate the common surgical techniques of nerve injury.
- VII. Should be able to do the nerve injury grading and its diagnosis.
- VIII. Should be able to do the conservative management of the pediatric upper limb injury.
- IX. Should be able to diagnose the compartment syndrome and its treatment.
- X. Should be able to know the principles of skin graft and flap.
- XI. Should able to show tension band wiring and K wire technique.
- XII. Should be able to manage arthritis conservatively including inflammatory arthritis.
- XIII. Should be able to do the physical examination of hip, knee and ankle joints.
- XIV. Able to stabilize the spine injury cases.
- XV. Should be able to classify the fractures in adult and pediatric.
- XVI. Should be able to perform the thorough knee examination and diagnosed the condition.

- XVII. Should be able to take proper history taking in orthopedic tumor cases.
- XVIII. Able to perform various arthrocentesis

Third Year Residency Programme

KNOWLEDGE:

- I. Learn about the surgical approaches of upper and lower limbs surgery.
- II. Learn about the implant selection in the fractures.
- III. Learn about the advantages and disadvantages of the each and every procedure.
- IV. Learn about the surgical management of supracondylar fracture in children.
- V. Learn about the fixation technique of olecranon
- VI. Learn about the options of treatment in the long bones of lower extremity
- VII. Learn about foot deformities and its orthosis.
- VIII. Learn about the complications of the fracture
- IX. Learn about the complication of tendon injury
- X. Learn basic microsurgery.
- XI. Learn about the common bone tumor.
- XII. Learn about the management of the complex fractures.
- XIII. Learn about the diagnosis and prognosis of the pediatric diseases and congenital anomalies.
- XIV. Approach to adult spine trauma.
- XV. Approach to pediatric spine
- XVI. Approach to spine deformities
- XVII. Learn about spinal infection (pyogenic and TB)
- XVIII. Learn about the management of problems around knee joint.
- XIX. Should learn about the basic setting up of the arthroscopic procedure.
- XX. Learn about the principles of the bone and soft tissue tumors.
- XXI. Learn about the staging of tumor.
- XXII. Learn about the proper biopsy technique and its complications.

SKILLS:

- I. Should be able to perform plate osteosynthesis of the forearm fractures.
- II. Should be able to do CRIF/ORIF of supracondylar fracture in children
- III. Able to do ORIF with TBW or screw fixation in olecranon fracture.
- IV. Should be able to show IM nailing technique of femur and tibia.
- V. Should be able to do TBW in patella fracture.
- VI. Should be able to do external fixation in open fracture.
- VII. Should show how to do tendon transfer and nerve transfer.
- VIII. Should be able to do a biopsy.
- IX. Should be able to do Fasciotomy in compartment syndrome.
- X. Should be able to show the choices of treatment for the complex fractures: treatment options and implants selections.
- XI. Should be able to treat most of the pediatric fractures (closed reduction, Casting

or K wire pinning)

- XII. Should be able to show how to apply halo vest and Minerva cast.
- XIII. Should be able to treat spine infection conservatively.
- XIV. Able to treat the ligament injuries conservatively.
- XV. Should be able to do the closed biopsy.
- XVI. Should be able to read an image and give a differential diagnosis of the tumor.

Fourth Year Residency Programme

KNOWLEDGE

- I. Learn about the treatment and complications of the plate osteosynthesis of the forearm fractures.
- II. Learn about the surgical techniques of the proximal humerus and distal humerus fracture.
- III. Learn about the reduction techniques in fracture neck and intertrochanteric fracture of hip.
- IV. Learn about the fixation techniques around the hip and distal femur.
- V. Learn about the future directions and controversies in proximal humerus fractures.
- VI. Should learn about the total arthroplasty techniques (Hip, Knee, Shoulder and Elbow).
- VII. Learn about the management of diabetic foot both conservative and surgical.
- VIII. Learn about the amputations.
- IX. Learn about the athlete ankle pathology and its rehabilitation.
- X. Learn about the management of Adult and Pediatric BPI.
- XI. Learn about the non-microsurgical coverage and replantation of the upper limb.
- XII. Learn about the deformities of upper limb and contractures.
- XIII. Learn about the management of rheumatoid hands.
- XIV. Learn about the pediatric diseases: diagnosis and treatment
- XV. Learn about the surgical techniques in cervical spine injury and diseases
- XVI. Learn about the surgical techniques in thoracic and lumber spine.
- XVII. Learn about the management of the spinal deformity.
- XVIII. Learn about the ligament reconstructions around the knee joint
- XIX. Learn about the rotator cuff disease.
- XX. Learn about the metastatic bone disease.
- XXI. Learn about the excision techniques of tumor.

SKILLS

- I. Should be able to do plate and screws fixation in all the upper and lower extremities fractures.
- II. Should be able to manage fracture clavicle either operatively or non-operatively.
- III. Should be able to do internal fixation of the fracture neck of femur and intertrochanteric fracture.
- IV. Should be able to do hemiarthroplasty of the hip.

DOCTOR OF MEDICINE (MD) CURRICULUM

- V. Able to do antegrade and retrograde IM nailing techniques in femoral fracture.
- VI. Should be able to do IM nailing in tibia fracture.
- VII. Should be able to fix the fractures around the ankles.
- VIII. Should be able to demonstrate the techniques of arthroplasties.
- IX. Should be able to do total contact casting.
- X. Should be able to do all types of amputations.
- XI. Should be able to do taping technique.
- XII. Should be able to do arthrodesis of wrist, knee, hip and ankle.
- XIII. Should be able to manage DRUJ problem surgically.
- XIV. Should be able to repair a tendons and its rehabilitation.
- XV. Should be able to repair a major nerve and vessels.
- XVI. Should be able to do local flaps and skin grafts.
- XVII. Able to do the corrective surgeries and contracture release.
- XVIII. Should be able to do incisional and excisional biopsies.
- XIX. Should be able to do an excision of the benign tumors.
- XX. Should be able to treat common pediatric problems (e.g club foot and DDH)
- XXI. Should be able to do CRIF/ORIF in all kinds of pediatric fractures.
- XXII. Should be able to do pedicle screw fixation of the lumber spine.
- XXIII. Should be able to drain the epidural abscess.
- XXIV. Should be able to diagnosed the spinal deformity and manage conservatively.
- XXV. Should be able to do a mirel scoring and decide management of the metastatic bone disease.
- XXVI. Should be able to do curettage and fixation with bone cement.
- XXVII. Should be able to do marginal excision.

DISTRICT HOSPITAL

Learning outcome

The learning outcomes elaborated here are in alignment with the learning outcomes of the programme.

At the end of the training, the resident will be able to:

- I. Integrate clinical experiences from previous specialty rotations and be able to work competently in a district hospital.
- II. Work with district health administration personnel and be familiar with local public health activities, including those at Basic Health Unit (BHU).
- III. Demonstrate familiarity with the functions and activities of non-government organizations working in the district.
- IV. Demonstrate familiarity with community-based activities and initiatives in health, including the roles of Village Health Workers (VHW).

Content outline

The resident is able to describe and understand working system in district hospital and be able to apply the competencies acquired during earlier postings.

- I. Demonstrate clinical knowledge and skills commensurate with his level of training by managing orthopedic cases.
- II. Be able to implement the principal strategies for addressing orthopedic related public health problems in the district, particularly those based on Primary Health Care concepts, including:
 - a. Health education
 - b. Essential drugs
 - c. Nutrition
 - d. Community participation
 - e. Recognition of orthopedic problems in the community
- III. Be able to identify and refer those patients which require specialized hospital services.
- IV. Make contacts with BHU staff and assist them in making appropriate referrals to the district hospital.
- V. Participate in the formal or non-formal (i.e. in-service) training of other health care workers and staff in the hospital, BHU and the community.

EXAMINATION SYSTEM AND OVERVIEW

	Examinations	Schedule	Components		Total Marks	% Weightage*
			Written	Practical		
Term 1-2	Institute Examination I	End of term 1	Paper I – V (Each paper) MCQ: 50% SAQ = 5 marks * 10	OSPE = 20 stations * 3 mins = 100 marks	600	Exams = 10 % (CA = 5 %)*
	Continuous assessment(CA)		Mini-Cex, DOPS, CBD, 360-degree feedback	log book/portfolio	100	
Term 3-4	Continuous assessment(CA)		Mini-Cex, DOPS, CBD, OSLE, 360-degree feedback	log book	100	(CA = 5 %)*
	Institute Examination II	End of term 4	Paper I & II (Each paper) MCQs: 50 marks SAQ = 5 marks * 6 SLEQ = 10 marks * 2	OSCE, 10 stations (5 mins each) 100 marks short case (2): 50 marks * 2 Long case (1): 100 marks (OSLER)	400	Exams = 20 %
Term 5-6	Continuous assessment(CA)		Mini-Cex, DOPS, CBD, OSLE, 360-degree feedback	log book/portfolio	100	(CA = 5 %)*
	Submission of Thesis	End of term 6	Thesis content and Presentation: 50 marks Oral /viva voce: 50 marks	25 marks each	100	Thesis = 20 %
Term 7-8	Continuous assessment(CA)		Quality improvement project during 7 th term (July-December) with report writing and submission to Dean's office through supervisor for QI project		100	(CA = 5 %)*
	Institute Examination III	End of term 8	Paper I & II (Each paper) MCQs: 50 marks SAQ = 5 marks * 6 SLEQ = 10 marks * 2	OSCE, 10 stations (5 mins) 100 marks short case (2): 50 marks * 2 Long case (1): 100 marks (OSLER)	500	Exams = 30 %
Total Cumulative percentage						100 %

Continues assessment (CA): Preferably by a faculty member but in special situations a senior resident can do as a part of peer assessment

CA: will be assessed 6 monthly basis (term)

*** Institute examination I, II, thesis and III are considered bar exams, a candidate must secure minimum of 50% separately in each theory paper, OSCE and Cases

Institute Examination I:

Paper I: Anatomy and Physiology

Paper II: Biochemistry, Pharmacology and General Pathology

Paper III: Emergency Medicine and Patient safety

Paper IV: Laboratory Medicine, Chemical Pathology and Radiology

Paper V: Biostatistics, Epidemiology and Research

Institute Examination II:

Paper I:

Paper II:

Submission of Thesis:

Thesis Defense Examination

Institute Examination III:

Paper I:

Paper II:

EVALUATION

Curriculum evaluation will be approached as an ongoing process of continuous information collection and analysis to allow for a prioritization of quality improvement (QI) activities. At regular times, information will be collected from the stakeholders (residents, specialist supervisor, Medical University, Teaching Hospital, Ministry of Health and District Health officials) with a view to detect where optimization of the quality of the programme is needed. As it will be impossible to engage in quality improvement processes over the whole range, prioritization of QI activities is needed and the curriculum evaluation will be used for this purpose. In line with the assessment strategy, we envision a curriculum evaluation programme that will use a variety of information sources to address the most pressing questions. We foresee a yearly cycle of Plan-Do-Check-Act.

Annexure: I

FoPGM/Orthopedics-Portfolio 2018

Name:.....






Batch:

Placement:

Date from:

To:

Portfolio Assessment form: Global assessment of the 5 competency domains of learning

Portfolio Assessment Scale (Global ratings)		Domains of learning in Orthopedics								
 Not learned = 1  Needs further training = 2  Satisfactory = 3  Competent = 4  Mastery = 5		Communication skills and patient-doctor relationship	Applied Professional Knowledge and Skills	Systems-based practice	Professional and ethical role	Organizational and legal dimensions and information technology/e-health				
Frequency Check (✓) as applicable	Assessor Check (✓) as applicable						Total Score	Average Score	Signature	
Completion of Term/Rotation		Resident								
Completion of Term/Rotation		Specialist Supervisor								
At the end of assessment period	Term 1 Term 2-4 Term 5-6 Term 7-8	Course Coordinator								
Term Score (T)	Term 1 Term 2-4 Term 5-6 Term 7-8									

Guideline for assessors

The residents develop competency in cognitive, psychomotor and affective domains (described under five domains of Orthopedics) and progress towards mastery. The milestones are colour coded as red, orange, green, blue and grey, representing as not learned, needs further training, satisfactory, competent and mastery respectively. The following descriptions under each domain shall guide the assessors while coding the milestones. Log books, formative assessment tools and professional judgments based on workplace assessment are used to code the milestones

Domain 1: Communication skills and patient-doctor relationship

- I. Communication is clear, respectful, empathetic and appropriate to the person and socio-cultural context.
- II. Effective communication is used in challenging situations.
- III. Communication with family, caregiver, and others involved in the care of the patient is appropriate and clear.
- IV. Complain and concerns are managed effectively.
- V. Ways in which health can be optimized and maintained are communicated to patients, family members and care givers.

Domain 2: Applied Professional Knowledge and Skills

- I. Demonstrate relevant diagnostic and managerial skills in patients of all age groups and life stages with wide range of health problems.
- II. Demonstrate holistic and patient-centered care.
- III. Able to remain informed and innovative.
- IV. Able to collaborate and coordinate care.

Domain 3: Systems-based practice

- I. Understand how their patient care and other professional practices affect the health care professionals and the organization.
- II. Know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources.
- III. Advocate for high quality patient care and assist patients in dealing with system complexities.
- IV. Know how to partner with health care managers and health care providers to assess, coordinate, and improve health care.

Domain 4: Professional and ethical role

- I. Adherence to relevant codes and standards of ethical and professional behavior.
- II. Duty of care is maintained.
- III. Critical incidents and potential critical incidents are identified and managed.
- IV. Professional knowledge and skills are reviewed and developed.
- V. Reflection and self-appraisal are undertaken regularly.
- VI. Personal health and wellbeing is evaluated, maintained and developed.

Domain 5: Organizational and legal dimensions and information technology/e-health

- I. Infection control and relevant clinical practice standards are maintained.
- II. Effective clinical leadership is demonstrated
- III. Relevant data is clearly documented, securely stored and appropriately shared for quality improvement
- IV. Effective triaging and time management structures are in place to allow timely provision of care
- V. Patient confidentiality is managed appropriately
- VI. Shared decision making and informed consent are explained and obtained.
- VII. Medico-legal requirements are integrated into accurate documentation
- VIII. uses technology to accomplish and document safe health care delivery

360 degree feedback form (Interpersonal and communication skills)

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and professional associates.

1. Assessment by: Self Others

2. Name of Resident:

Competency group:					
Communicates effectively to create and sustain a therapeutic relationship with patients and families					
	Not Applicable	Rarely demonstrates (<25-50% of the time)	Sometimes demonstrates (25% of time)	Demonstrates in most cases (50-75% of the time)	Demonstrates in majority of cases (>75% of the time)
Obtains historical information from appropriate individual (patient, caregiver, etc)	NA	1	2	3	4
Makes appropriate introductions and explains personal roles	NA	1	2	3	4
Respects privacy of patient/family by using various areas in facility for conversation, exams, etc	NA	1	2	3	4
Shows evidence of being able to sustain a continuing relationship with the patient	NA	1	2	3	4
Uses appropriate language at the proper developmental/educational level for the patient and/or caregivers/family members	NA	1	2	3	4
Uses a variety of techniques to elicit information from the patient	NA	1	2	3	4
Uses effective listening skills to elicit information	NA	1	2	3	4
Makes the patient comfortable enough to extract all necessary information when engaging in probing conversation	NA	1	2	3	4
Ensures the patient understands instructions	NA	1	2	3	4
Provides instructions to patients in a variety of ways	NA	1	2	3	4

DOCTOR OF MEDICINE (MD) CURRICULUM

Competency: Work effectively with others as a member or leader of a health care team or other professional group					
	Not Applicable	Rarely demonstrates (<25-50% of the time)	Sometimes demonstrates (25% of time)	Demonstrates in most cases (50-75% of the time)	Demonstrates in majority of cases (>75% of the time)
Familiarizes with the health care team member	NA	1	2	3	4
Shows respect to team members and provides information when needed	NA	1	2	3	4
Facilitates team communication when in role of team leader	NA	1	2	3	4
Assumes the role of consultant where appropriate	NA	1	2	3	4
Provides constructive verbal and written feedback to other members of the health care team	NA	1	2	3	4
Medical records are thorough, readable, and done on time	NA	1	2	3	4

Date evaluated:

Case based discussion (CbD)

1. Department:

2. Brief case description:

3. Setting: OPD Ward Emergency ICU

4. Degree of difficulty: Low Moderate High

5. Basis for case discussion:

Inpatient record Discharge summary OPD prescription

Please score the trainee on the scale shown. Please note that your scoring should reflect the performance of the student against that which you would **reasonably expect at their stage of training** and level of experience. Please mark 'Unable to Comment' if you feel you have not observed the behaviour.

Assessments	Well below expectation	Below expectation	Borderline	Meets expectation	Above expectation	Well above expectation	Unable to Assess
Clinical assessment	1	2	3	4	5	6	UTA
Investigations & referrals	1	2	3	4	5	6	UTA
Management plan	1	2	3	4	5	6	UTA
Follow up & future planning	1	2	3	4	5	6	UTA
Record keeping	1	2	3	4	5	6	UTA
Overall clinical judgment	1	2	3	4	5	6	UTA

Feedback	
What went well?	
Any suggestion for improvement	

11. Assessor's Name and signature:

Trainee's reflection. What have I learnt? and Where I need to focus for improvement?

12. Trainee's name and signature:

Date: D/M/Y

Direct Observation of Procedural Skills (DOPS) form

1. Department:
2. Procedure:
3. Setting: OPD Ward Emergency
4. Conducted: on a patient during simulation exercise
5. Degree of difficulty: Low Moderate High
6. Reason for added difficulty:
7. Time pressure: Elective Critical
8. Number of times same procedure done before:

9. Assessment	Significant input required from assessor	Some guidance provided by assessor	Able to manage independently	Unable to assess
Clinical knowledge	<i>Understand indications and contraindication, understands relevant anatomy</i>			
	1	2	3	UTA
Consent	<i>Properly explain the procedure to patient and obtains informed verbal consent</i>			
	1	2	3	UTA
Preparation	<i>Properly explains the procedure and appropriately prepares for the procedure ensure assisting staff is present</i>			
	1	2	3	UTA
Infection control	<i>Demonstrates aseptic technique and follows universal precautions</i>			
	1	2	3	UTA
Technical ability	<i>Demonstrates manual dexterity and confidence; demonstrate adequate skill and practical fluency</i>			
	1	2	3	UTA
Patient interaction	<i>Communicates, reassures the patient, eye contact with patient for discomfort</i>			
	1	2	3	UTA
Insight	<i>Knows when to seek assistance, abandon procedure or arrange alternative care to prevent harm to patient</i>			
	1	2	3	UTA
Documentation	<i>Documents the episode including problems and complications; Clear post-procedure to the patients and staffs</i>			
	1	2	3	UTA
Team interaction	<i>Provides clear instructions to assisting staff and conveys relevant information concerning the patient and plans to team members</i>			
	1	2	3	UTA
Overall performance	1	2	3	

Feedback	
What went well?	
Areas that needed supervisory input	
Suggestions for getting greater independence	

11. Assessor's Name and signature:

Trainee's reflection on The procedure & learning

12. Trainee's name and signature:

Date: D/M/Y

**Mini – Clinical Evaluation
(Mini- CEX) Form**

Department: _____ Date: _____

Resident: _____ R-1 R-2 R-3 R-4

Patient Problem/Dx: _____

Setting: OPD Ward Emergency Other _____

Patient: Age: _____ Sex: _____ New Follow-up

Complexity: Low Moderate High

Focus: Data Gathering Diagnosis Therapy Counseling

Medical Interviewing skills (O Not Observed)	Facilitates patient’s telling of story; effectively uses questions/directionsto obtain accurate, adequate information needed; responds appropriately to affect, non-verbal cues.								
	1	2	3	4	5	6	7	8	9
	Unsatisfactory			Satisfactory			Superior		
Physical Examination Skills (O Not Observed)	Follows efficient, logical sequence; balances screening/diagnostic stepsfor problem; informs patient; sensitive to patient’s comfort, modesty.								
	1	2	3	4	5	6	7	8	9
	Unsatisfactory			Satisfactory			Superior		
Humanistic Qualities/ Professionalism	Shows respect, compassion, empathy, establishes trust;attends to patient’s needs of comfort, modesty, confidentiality, information.								
	1	2	3	4	5	6	7	8	9
	Unsatisfactory			Satisfactory			Superior		
Clinical Judgement (O Not Observed)	Selectively orders/performs appropriate diagnostic studies, considers risks,benefits.								
	1	2	3	4	5	6	7	8	9
	Unsatisfactory			Satisfactory			Superior		
Counseling Skills (O Not Observed)	Explains rationale for test/treatment, obtains patient’s consent, educates/ counselsregarding management.								
	1	2	3	4	5	6	7	8	9
	Unsatisfactory			Satisfactory			Superior		
Organization/Efficiency (O Not Observed)	Prioritizes; is timely; succinct.								
	1	2	3	4	5	6	7	8	9
	Unsatisfactory			Satisfactory			Superior		
Overall Clinical Competence (O Not Observed)	Demonstrates judgment, synthesis, caring, effectiveness, efficiency.								
	1	2	3	4	5	6	7	8	9
	Unsatisfactory			Satisfactory			Superior		

DOCTOR OF MEDICINE (MD) CURRICULUM

Mini-CEX Time: Observing _____ Mins Providing Feedback: _____ Mins

Evaluator Satisfaction with Mini-CEX

1 2 3 4 5 6 7 8 9 HIGH

Resident Satisfaction with Mini-CEX

1 2 3 4 5 6 7 8 9 HIGH

Feedback

Which aspect of the encounter went well?

Suggested areas of improvement?

9. Assessor's name and signature:

--

10. Trainee's reflections on patient and areas of learning:

--

11. Trainee's name and signature

Date: D/M/Y

--

Note 1: Reprinted with permission from the American Board of Internal Medicine, www.abim.org.

Note 2: Discussed in: Norcini JJ, Blank LL, Arnold GK, Kimball HR. The mini-CEX (Clinical Evaluation Exercise): a preliminary investigation. *Ann Intern Med* 1995;123:795-9.

Note 3: General Practice Curriculum, KGUMSB, 2016

Name:.....Placement:

Date from:..... To:..... Term.....

Sl. No.	Date	Learning activity	Remarks (observed, Assisted, Performed, Attended, Presented, Participated etc)	Sig. of supervisor

DOCTOR OF MEDICINE (MD) CURRICULUM

FoPGM Logbook 2018
Page No.

Sl. No.	Date	Learning activity	Remarks (observed, Assisted, Performed, Attended, Presented, Participated etc)	Sig. of supervisor

ANNEXURE II

GENERIC CURRICULUM

Content outline

The resident doctor, irrespective of discipline enrolled, must be able to describe and apply the values during training and throughout the professional life (KGUMSB, 2016)

MEDICAL EDUCATION: (30 Hours)

FUNDAMENTALS OF BASIC SCIENCE

- I. Fundamental principles and applications of anatomy
- II. Fundamental principles and applications of physiology
- III. Fundamental principles and applications of biochemistry
- IV. Fundamental principles and applications of pharmacology
- V. Fundamental principles and applications of pathology

BASIC LIFE SUPPORT AND ADVANCE CARDIAC LIFE SUPPORT SKILLS

BLS

- I. Key changes in basic life support, reflecting the new science from the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care
- II. Critical concepts of high-quality CPR
- III. The American Heart Association Chain of Survival
- IV. 1-Rescuer CPR and AED for adult, child and infant
- V. 2-Rescuer CPR and AED for adult, child and infant
- VI. Differences between adult, child and infant rescue techniques
- VII. Bag-mask techniques for adult, child and infant
- VIII. Rescue breathing for adult, child and infant
- IX. Relief of choking for adult, child and infant
- X. CPR with an advanced airway

ACLS

- I. Key changes in advanced cardiovascular life support, reflecting the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care
- II. Basic life support skills, including effective chest compressions, use of a bag-mask device and use of an AED
- III. Recognition and early management of respiratory and cardiac arrest
- IV. Recognition and early management of peri-arrest conditions such as symptomatic bradycardia
- V. Airway management
- VI. Related pharmacology
- VII. Management of acute coronary syndromes (ACS) and stroke
- VIII. Effective communication as a member and leader of a resuscitation team
- IX. Effective Resuscitation Team Dynamics

RADIO-DIAGNOSIS AND IMAGING

Plain Radiographs

- I. Identify normal anatomy on PA, AP, and lateral chest films
- II. Recognize abnormal chest films including pleural effusion, pneumothorax, pneumonia and lobe location, changes of congestive heart failure, changes of chronic obstructive pulmonary disease, atelectasis, pulmonary nodules and masses, and hyaline membrane disease of the newborn
- III. Identify normal anatomy on four views of the abdomen
- IV. Recognize abnormal abdominal films including ileus, small bowel obstruction, large bowel obstruction, free air, and calcifications
- V. Identify normal anatomy of the spine and long bones in both adults and children
- VI. Recognize abnormal bone radiographs including fractures, degenerative joint disease, osteoporosis (including vertebral collapse), and primary versus metastatic bone malignancy
- VII. Identify normal anatomy on barium enema, and upper gastrointestinal series

Computed Tomography

- I. Recognize and treat contrast allergy, its signs and symptoms, and implications to the patient
- II. Discuss principles of CT function and applications
- III. Discuss differences between CT, MRI, plain film, and US, including the comparative benefits/drawbacks, strengths/weaknesses of each modality
- IV. Discuss general indications of when to use CT as the imaging of choice
- V. Identify normal anatomy found on CT of the head, spine, chest, abdomen, and pelvis
- VI. Recognize abnormal head CTs including acute hemorrhage infarcts, edema, mass effect, and hydrocephalus in an infant and adult
- VII. Recognize abnormal chest CTs including pulmonary nodules and masses
- VIII. Recognize abnormal abdominal/pelvis CTs including diverticular disease, appendicitis, bowel obstruction, abdominal aortic aneurysms, pancreatitis, abdominal abscesses, ascites, and hepatic, pancreatic and renal masses
- IX. Recognize abnormal CTs of the spine, including metastatic disease, degenerative joint disease, and disc disease.

Magnetic Resonance Imaging

- I. Discuss principles of magnetic resonance imaging, including differences in abilities and applications of MRI versus CT
- II. Identify normal anatomy on MRI of the head and spine
- III. Recognize abnormal head and spine MRIs including central nervous system infection, masses, stroke syndromes, multiple sclerosis, disc disease, metastatic vertebral column disease, and cord compression

Ultrasound

- I. Discuss general principles of ultrasound including the differences between 2D, Doppler, and M mode
- II. Discuss indications and limitations of
 - a. ultrasound for specific OB/Gyn situations (molar pregnancy, anencephalic pregnancy, placenta previa, fetal age using biparietal diameter and femur length, and ectopic pregnancy)
 - b. vascular Doppler ultrasound (aneurysm, deep vein thrombosis, and carotid artery and peripheral vascular disease)
 - c. ultrasound for gallbladder, bile ducts and liver
 - d. echocardiogram (transthoracic versus transesophageal echocardiography, chamber size, valvular disease, and pericardial effusions)
 - e. renal ultrasound for cysts and tumors
 - f. prostate ultrasound (for evaluation of nodules and biopsy)
 - g. FAST ultrasound for trauma.

Mammography

- I. Discuss basics of normal and abnormal mammograms
- II. Discuss indications and utility of mammography, including usefulness as a screening method and as a surgical tool for resection and biopsy.

Nuclear Medicine

- I. Discuss general principles and therapeutic uses of nuclear medicine
- II. Discuss mechanisms, indications, and limitations of HIDA scans, bone scans, tagged RBC scans, myocardial perfusion and function scans, bone densitometry scans, and ventilation/perfusion scans.

Angiography

- I. Discuss diagnostic and therapeutic principles of angiography
- II. Discuss indications for obtaining angiograms
- III. Discuss applications and utility of MRA angiograms
- IV. Recognize normal anatomy of the great vessels and other vasculature on angiograms
- V. Discuss indications for angiograms for abnormal processes including subarachnoid hemorrhage and berry aneurysms, vascular stenotic lesions, pulmonary angiogram for PE, aortic dissection, aortic trauma, and gastrointestinal bleeding

Become familiar with the various treatment modalities provided by interventional radiologists

- I. Ultrasound-guided vascular access
- II. Paracentesis
- III. Thoracocentesis, chest tube insertion and management
- IV. Ultrasound-guided cyst aspirations and soft tissue biopsy

DOCTOR OF MEDICINE (MD) CURRICULUM

- V. Embolization procedures
- VI. Vertebroplasty
- VII. Vascular stenting
- VIII. Thyroid ablation therapy
- IX. Thrombolytic therapy for PE/DVT

LABORATORY MEDICINE

Foundations of Laboratory Medicine

- I. Concepts of diagnostic sensitivity and specificity of a laboratory test to a specific clinical situation; negative and positive predictive values, situations in which predictive values provide critical information for developing patient care screening, diagnostic, prognostic, and therapeutic pathways/algorithms;
- II. How reference intervals are derived and used and the different types of reference intervals, including those derived from population distributions, from expert consensus recommendation, or from evidence-based determination of “threshold” values based on a test’s predictive value in a clinical algorithm; how reference intervals may be compartmentalized by age, sex, race, clinical state (eg, pregnancy);
- III. Concept of variability in repeated measurements, as well as variability within and between individuals; describe the contributors to analytical uncertainty (precision, accuracy, bias, coefficient of variation);
- IV. Discuss the long-reaching consequences of ordering unnecessary testing; consider whether routine daily monitoring tests constitute unnecessary testing; based on an understanding of reference intervals, explain why unnecessary testing may lead to higher health care costs and increased risk for the patient; similarly, discuss the consequences of failing to utilize noninvasive or minimally invasive diagnostic procedures before proceeding to invasive approaches (tier 1).
- V. Distinction between testing appropriate to the clinical laboratory and those relating to research environment;
- VI. External and internal validation of clinical laboratory tests;

Chemical Pathology and Immunology

- I. Basic principles of toxicology - the diagnosis and management of common clinical toxicology scenarios (eg, overdoses of acetaminophen, antidepressants, salicylates, ethylene glycol, ethanol, opiates, methanol);
- II. Interpretation of the results of “drugs of abuse” panels, including causes for false positive and false negative tests, the role of confirmatory testing, and the impact of specimen adulteration;
- III. Principles of therapeutic drug monitoring, including the determination of peak and trough levels vs random drug levels;
- IV. Uses of metabolic testing, including electrolytes, acid-base balance, osmolality, and blood gases; interpret results for the above tests;
- V. Tests relevant to diagnosis of myocardial infarction and acute coronary syndrome,

- cardiovascular and stroke risk, and congestive heart failure;
- VI. Criteria for the laboratory diagnosis of diabetes mellitus and biochemical changes that are seen in diabetic ketoacidosis and nonketotic hyperosmolar coma;
 - VII. Evaluation of renal function, and criteria for chronic kidney disease; review basic microscopic urinalysis, and describe key abnormal findings;
 - VIII. Laboratory evaluation of hepatic, pancreatic, and gastrointestinal tract pathology;
 - IX. Common tests used for plasma protein analysis, including total protein, albumin, serum protein electrophoresis, and immuno-fixation electrophoresis and their disease-specific relevance;
 - X. Laboratory tests available for the evaluation of organ-specific and systemic autoimmune diseases, vasculitides, and immuno-deficiencies, including autoantibody testing, serum complement levels, and basic immuno-phenotyping of lymphocyte subpopulations;
 - XI. Role of testing for tumor markers, including the differences in their uses for screening, diagnosis, prognosis, and therapeutic monitoring;
 - XII. Tests available for use in reproductive biology, both prenatal and postnatal
 - XIII. Common approaches used in endocrinology testing, including pituitary-adrenal, parathyroid, and thyroid testing; stimulation and suppression test physiology and interpretation.

Molecular Diagnostics

- I. General principles of molecular diagnostics testing in the screening, diagnosis, and/or monitoring of infectious, genetic, and oncologic diseases; describe the place of pharmacogenetic testing in clinical care;
- II. Legal, ethical, and social implications of genetic testing (see law and ethics module);

Hematology

- I. Methods for determination of the complete blood count, including measured vs calculated values, indications for manual vs automated leukocyte differential, and important interferences;
- II. Physiology of normal hematopoiesis and the erythrocyte, leukocyte, and platelet response to pathologic stimuli;
- III. Significance of erythrocyte, leukocyte, and platelet morphologic variations on the peripheral smear; know the types of leukocytes defined in the differential and their significance;
- IV. Laboratory evaluation and differential diagnosis of anemia, erythrocytosis, leukopenia, leukocytosis, thrombocytopenia, and thrombocytosis;
- V. Laboratory evaluation, both cellular and chemical, of body fluids, including urine and cerebrospinal, pleural, peritoneal, pericardial, and joint fluid;
- VI. Physiology of coagulation, including the mechanisms of action of naturally occurring and therapeutic anticoagulants;
- VII. Laboratory tests used to diagnose common bleeding and thrombotic disorders, including the hemophilias, platelet disorders, von Willebrand disease, and

DOCTOR OF MEDICINE (MD) CURRICULUM

- acquired bleeding diatheses; describe appropriate testing strategies for monitoring hemostatic and anticoagulant therapies;
- VIII. Evaluation of hemoglobinopathies, and be able to diagnose common hemoglobinopathies such as sickle cell disease when presented with patient data;
- IX. General principles of flow cytometric, molecular, and cytogenetic approaches used in the evaluation of leukemias, lymphomas, and related neoplastic disorders;

Microbiology

- I. Describe the pre-analytic variables that determine the quality and yield of microbiologic testing:
 - a. presence of normal microflora on skin and mucous surfaces;
 - b. presence of contaminants in samples and the effect on culture results;
 - c. effects of sample collection techniques, specimen transport media, timing, and storage conditions;
 - d. importance of sample volume in identifying pathologic organisms in normally sterile sites that may be present in very low concentrations;
 - e. effects of timing of samples to increase the recovery of various pathogens; and describe how the microbiologic workup depends on the site/samples submitted to the laboratory, and describe the basics of optimizing this workup;
- II. Most frequent agents (bacterial, viral, fungal, parasitic) causing infections in different body sites or systems; and how an understanding of bacterial, parasitic, and viral pathogenesis impacts sample choice and test interpretations;
- III. Factors affecting turnaround time in microbiologic workups, eg, fastidious organisms requiring special media and longer incubation times, as well as unusual tests performed infrequently;
- IV. Explain the use and limitations of stains as rapid diagnostic tools; understand the use of Gram stain on sites/samples that may contain normal flora, as well as those from normally sterile body sites;
- V. Use and limitations of serology in infectious diseases, to establish immune status, to diagnose acute infection, and as a retrospective means to support diagnosis; recognize the need for the use of paired serology (acute and convalescent phase samples) and for screening and confirmatory methods (such as those used in syphilis); explain why the time course and nature of serologic response is critical in the diagnosis of common disorders, eg, viral hepatitis and HIV;
- VI. Mechanisms of action of antimicrobial drugs of different classes; interpret the antimicrobial susceptibility report ;
- VII. Mechanisms of bacterial resistance to antimicrobials and the spread of resistant organisms in institutions; describe the role of health care providers and of hospital epidemiology and other monitors of infection control in the hospital and the community;

Transfusion Medicine

- I. Explain the following:
 - a. the blood components available for clinical use;
 - b. the recommended and evidence-based thresholds and indications for transfusion of the various blood components;
 - c. the appropriate evidence-based dosing of blood components;
 - d. the types of recombinant and other “blood component substitutes” available; and
 - e. the alternatives to allogeneic blood product infusion (eg, hematopoietic cytokines, autologous donations, and intraoperative blood salvage);
- II. Lifespan of transfused platelets, red blood cells, and the clotting factors present in plasma and how the efficacy of transfusion is monitored by laboratory testing (eg, expected hemoglobin and platelet count increments);
- III. Pathophysiology, presentations, and acute management (and prophylaxis) of the different types of transfusion reactions;
- IV. Common infectious disease risks of blood products that remain despite donor screening and blood product testing, including current data on transfusion-transmitted disease incidence and prevalence;
- V. Importance of blood specimen labeling, with an emphasis on the impact transfusion errors have on patient morbidity and mortality; and the process of issuing and administering blood products, including required patient safety checks, required infusion times, and appropriate blood product storage limitations once products are issued from the blood bank (tier 1).
- VI. Meaning of and rationale for type and screen (type and cross-match) for blood products and the time limits of such testing; explain the appropriate settings and processes for emergency release of blood and the use of “universal donor” blood;
- VII. Define “massive transfusion,” and describe the special needs of the patients in terms of metabolic derangements and the administration of blood products;
- VIII. Various kinds of blood donors (eg, autologous, directed, altruistic) and the important elements of screening pre-donation;
- IX. Clinical use of therapeutic phlebotomy; various types of apheresis procedures, and examples of how each is used;
- X. The HLA system and its role in transfusion and transplantation;

INFECTION CONTROL

- I. Concept of infection prevention and control
- II. Common misconceptions of infection prevention and control
 - a. Incidence of infections at the health care facility
 - b. Prevalence of infections in the community
 - c. How infections are transmitted
 - d. HIV and HBV
 - e. Use of screening
 - f. Feasibility of adhering to appropriate infection prevention and control practices

- III. Need for infection prevention and control in the
 - a. Health care facility
 - b. Home
 - c. Community
 - d. Individual
 - e. Institution
 - f. Home
 - g. Community
 - h. Consequences of non-compliance
- IV. Levels of responsibility.
- V. Definitions:
 - a. Acute care settings
 - b. Ambulatory care settings
 - c. Long-term care settings
 - d. Home-based care
 - e. Community-based care
 - f. Standard Precautions
 - g. Transmission-Based Precautions
 - h. Isolation
- VI. Common infections in each care setting and methods of prevention
- VII. Factors predisposing staff, patients, families, and visitors to infection
- VIII. Description and methods of
 - a. Standard Precautions
 - b. Transmission-Based Precautions
 - c. Isolation
- IX. Antisepsis
 - a. Definition
- X. Antiseptics
 - a. Types and their uses
- XI. Principles of
 - a. Decontamination
 - b. Cleaning
 - c. Disinfection
 - d. Sterilization
- XII. Categories of disinfectant, their uses and limitations
- XIII. Calculation of strengths of disinfectants
- XIV. National standards and regulations governing infection prevention and control in health care facilities, homes and communities
- XV. Barriers to implementation
 - a. Lack of knowledge
 - b. Misunderstanding of associated risks
 - c. Inadequate equipment and supplies
 - d. Poor supervision
 - e. Other

- XVI. Quality assurance process
 - a. Definition
 - b. Standards
 - c. Indicators
 - d. Audit

PATIENT SAFETY

- I. Definition of terms
- II. What is patient safety
- III. What are human factors and why is it important to patient safety?
- IV. Understanding systems and the impact of complexity on patient care
- V. Being an effective team player
- VI. Understanding and learning from errors
- VII. Understanding and managing clinical risk
- VIII. Introduction to quality improvement methods
- IX. Engaging with patients and carers
- X. Minimizing infection through improved infection control
- XI. Patient safety and invasive procedures
- XII. Improving medication safety

MEDICAL LAWS AND ETHICS

- I. Medical Law and Ethics
 - a. Importance in the ambulatory healthcare settings
 - a. Codes of Ethics
 - b. Confidentiality
- II. Medical Practice Management
 - a. Group practices
 - b. Managed Care
 - c. Liabilities
 - d. Licensures, certifications, and registrations.
- III. Liability and Duties
 - a. Types of law- national and international
 - a. Controlled substances
 - b. Contracts
 - c. Statute of Limitations
 - d. Consent
- IV. Workplace Issues
 - a. Medical records
 - b. Employment practices
 - c. Legal implications
- V. Bioethical Issues
 - a. Ethical Issues in Biomedical research
 - b. Life, Death, and Dying and legal documents

BASIC EPIDEMIOLOGY

Principles of epidemiology

- I. Definition
 - a. Epidemiology
 - b. Epidemiology approach
 - c. Uses of epidemiology
- II. Phases of epidemiology approach
 - a. Descriptive epidemiology
 - ◇ What is the problem
 - ◇ Frequency of the problem
 - ◇ Who is involved
 - ◇ Where is the problem
 - ◇ When did it occur
 - b. Analytic epidemiology
 - ◇ Analysis of causes of disease
 - c. Experimental epidemiology
 - ◇ Clinical or community trials
 - d. Evaluation epidemiology
 - ◇ Measuring the effectiveness of different health services
- III. Key components of epidemiology data
 - a. What
 - b. Who
 - c. Where
 - d. When
 - e. How
 - f. Why
- IV. Sources of epidemiology data
 - a. Census
 - b. Vital statistics
 - c. Morbidity data
 - d. Mortality data
 - e. Reports of notifiable diseases
 - f. Hospital records
 - g. Private physicians' offices
 - h. Disease registers
 - i. Community
 - j. Other
- V. Measurements and their calculations
 - a. Ratios
 - b. Proportions
 - c. Incidence rates
 - d. Prevalence rates
 - e. Demographic rates

- VI. Relationship between predictive value and disease prevalence
- VII. Screening
 - a. Definition
 - b. Screening tests
 - c. Validity and reliability of screening tests
 - d. Screening programmes
- VIII. Surveillance
 - a. Definition
 - b. Methods
 - c. Approaches
- IX. Preparation of tables and graphs
 - a. Graphs
 - b. Histograms
 - c. Population pyramids
 - d. Bar charts
 - e. Pie charts
 - f. Scatter diagrams
 - g. Maps.

Infectious disease process

- I. Definition
 - a. Carrier
 - b. Endemic
 - c. Epidemic
 - d. Pandemic
 - e. Immunity
 - f. Immune response
 - g. Herd immunity
 - h. Immunoglobulins
 - i. Host response
 - j. Hypersensitivity
 - k. Infection
 - l. Infectivity
 - m. Pathogenicity
 - n. Virulence
 - o. Immunogenicity
 - p. Sporadic
- II. Dynamics of disease transmission
 - a. Chain of infection
- III. Classification of the mechanisms of disease transmission
 - a. Contact transmission
 - b. Direct transmission
 - c. Indirect transmission

DOCTOR OF MEDICINE (MD) CURRICULUM

- d. Droplet transmission
- e. Airborne transmission
- f. Common vehicle transmission
- g. Vectorborne transmission
- IV. Description
 - a. Immunity
 - b. Host response
 - c. Herd immunity
 - d. Carrier
- V. Nosocomial infection
 - a. Definition
 - b. Modes of transmission
 - c. Preventive measures
- VI. Risk factors for the occurrence of communicable diseases among population groups
 - a. Extremes of age
 - b. Presence of underlying disease/infection
 - c. Natural/Passive immunity
 - d. Trauma/Invasive procedures
 - e. Medications
 - f. Lifestyle
 - g. Cultural
 - h. Socio-economic
 - i. Environmental
 - j. Organization of health services

RESEARCH AND BIostatISTICS

Research methods

- I. Definition of common terms and concepts used in research
 - a. Quantitative research
 - b. Qualitative research
 - c. Variable
 - d. Subject
 - e. Sampling
 - f. Population
 - g. Pilot study
 - h. Validity
 - i. Reliability
 - j. Bias
- II. Types of research
 - a. Historical
 - b. Descriptive
 - c. Experimental
- III. Basic research process

- a. Identification of problem
 - b. Statement of problem
 - c. Definition of terms
 - d. Statement of hypothesis
 - e. Identification of assumptions
 - f. Literature search
 - g. Definition of setting: geographical, population, etc.
 - h. Definition of population to be studied
- IV. Problem statement
- a. Characteristics of a problem statement
- V. Methods of sampling and collection
- a. Sampling methods
 - b. Probability methods
 - c. Non-probability methods
 - d. Data collecting methods
 - ◇ Questionnaire
 - ◇ Interview
 - ◇ Observation
 - ◇ Focus group discussion
 - ◇ Document search
- VI. Principles of data collection, analysis, and interpretation
- a. Pre-testing of instrument
 - b. Validity
 - c. Reliability
 - d. Control for bias
 - e. Statistical analysis
 - f. Interpretation
 - ◇ Meaning
 - ◇ Limitation
 - ◇ Usefulness
- VII. Strengths and limitations of sources of health data
- a. Organizing data
 - b. Analyzing data
 - c. Interpreting data
 - d. Implications of findings
 - e. Limitations
 - f. Summarizing
 - g. Conclusion
 - h. Recommendations
- VIII. Ethical and legal issues relevant to research
- a. Consent
 - b. Benefits

- c. Confidentiality
- d. Acknowledgement
- e. Other
- IX. Research methods relevant to clinical practice
 - a. Surveys
 - b. Case studies
 - c. Experiments
 - d. Case-control studies
 - e. Cohort studies
- X. Design a research proposal in one's area of practice or related fields
- XI. Writing the research report
- XII. Presentation of study.

Biostatistics

- I. Definition of terms
 - a. Statistics
 - b. Biostatistics
 - c. Vital statistics
 - d. Descriptive statistics
 - e. Inferential statistics
- II. Purposes of statistics
 - a. Summarization of data
 - b. Comparison of data sets
 - c. Research methodologies
- III. Types of statistics
 - a. Descriptive
 - b. Inferential
- IV. Uses of statistics in clinical practice /public health
 - a. Surveillance
 - b. Presentation of data
 - c. Epidemiology
 - d. Identification of public health problems
 - e. Policy analysis and formulation
 - f. Planning
- V. Calculation of the following measures of central tendency
 - a. Mean
 - b. Median
 - c. Mode
- VI. Measures of variation and their calculation
 - a. Range
 - b. Variance
 - c. Standard deviation

- VII. Theoretical distribution of variables
 - a. Normal distribution
 - b. Binomial distribution
- VIII. Relationship between sample statistics and population parameters
 - a. Sample mean and population
 - b. Sample proportion and population proportion
 - c. Sample variance and population variation

