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DIRECTORATE GENERAL OF HEALTH SERVICES

MINISTRY OF HEALTH & FAMILY WELFARE
GOVERNMENT OF INDIA

REPORT OF TASK FORCE

ON

Medical Education

2024

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ON

Medical Education

Report of Task Force on Medical Education:

- **Competency**
- **Publications**
- **Interdisciplinary training**

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International charters declare health as a human right, which is extendable to every Global Citizen without any demarcation, differentiation of any type so that it ends up in being totally inclusive. Constitution of India contemplates health as a fundamental right accruable to every citizen with State as instrumentality described therein for the same. The realistic actualization of accrual of health for all turns out to be the core benchmark for realistic actualization of the concept of 'Welfare State' enshrined in Constitution of India. This is required to be translated to reality through a robust effective and efficient healthcare delivery system executed and dispensed by the efficient and effective trained health manpower. The mother repository of fulfilment of efficient and effective trained health manpower is medical education in its entire spectrum. The efficacy and the utility of the duly structured medical education system as an outcome has to generate trained health manpower to uphold healthcare delivery system. As such, quality-centric build-up of the medical education system turns out to be sine-qua-non for this mandatory fulfilment constitutional in nature and humanistic in character.

The report of the Task Force on Medical Education : Competency, Publication, Interdisciplinary Training provides a definitive roadmap in the structural domain of Transformative Model of Medical Education in its entire spectrum of Undergraduate, Postgraduate and Super speciality Medical Education in the context of Globally accepted Lancet Commission Report-2010 and also World Federation for Medical Education Guidelines pertaining to Under Graduate and Post Graduate Medical Education System and recommendations for the mitigation of the structural gaps identified thereto, which would cater to the cause of required quality build-up of medical education commensurate with the felt needs of the country as a whole including generation of trained health manpower for the cause of Global healthcare delivery.

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LIST OF ABBREVIATIONS

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1. *List of Abbreviations:*
   - *ABC : Academic Bank of Credit*
   - *AETCOM : Attitude , Ethics and Communication*
   - *ACLS : Advanced Cardiac Life Support*
   - *AI : Artificial Intelligence*
   - *AR: Augmented Reality*
   - *BCLS : Basic Cardiac Life Support*
   - *BOGs : Board of Governors*
   - *CBME: Competency-Based Medical Education*
   - *CIA : Continuous Internal Assessment*
   - *CO : Course Outcome*
   - *DRP : District Residency Programme*
   - *EPA : Entrustable professional Activities*
   - *FA : Formative Assessments*
   - *FDP: Faculty Development Programme*
   - *GOI : Government of India*
   - *GMER : Graduate Medical Education Regulations*
   - *HEI : Higher Education Institution*
   - *HPE : Health Professions Education*
   - *IMG : Indian Medical Graduate*
   - *IT : Information Technology*
   - *ICT: Information Communication Technology*
   - *K,S,A,C : Knowledge, Skill, Attitude, Communication*
   - *LMS : Learning Management System*
   - *MSR : Minimum Standards of Requirements*
   - *NMC: National Medical Commission*
   - *OBE : Outcome based Education*
   - *PO : Program Outcome*
   - *PSO : program Specific Outcome*
   - *NEP : National Education Policy*
   - *PG : Post Graduate*
   - *PGME : Post Graduate Medical Education*
   - *PGMEB: Post Graduate Medical Education Board*
   - *PME: Postgraduate Medical Education*
   - *QA : Quality Assurance*
   - *QCI : Quality Council of India*
   - *S A : Summative Assessment*
   - *S S : Super Specialty*
   - *TLA : Teaching Learning Assessments*
   - *UG: Under Graduate*
   - *VR :Virtual Reality*
   - *WFME : World Federation for Medical Education*
   - *WHO : World Health Organisation*

Operational Definitions of terms used in the report

2. *Operational definitions of terms used in the report:*

- **Trainee for generic areas of Undergraduate Medical Education Training.**

- **Resident is more specifically used when this trainee works in a clinical setting. (post graduate student)**

- **Competency-Based Medical Education - An outcome-based approach to design, implementation, assessment, and evaluation of medical education programs, using an organizing framework of competencies.**

- **Competency -Competency is the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community being served.**

- **Multidisciplinary - draws on knowledge from different disciplines but stays within the boundaries of those fields.**

- **Interdisciplinary – analyses, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole.**

- **Trans-disciplinary - integrates the natural, social and health sciences in a humanities context, and in doing so transcends each of their traditional boundaries. (Holistic)**

- **EPA- An essential professional task or assignment that involves several abilities and calls for specific knowledge and skills in the medical field.**

3. Executive Summary

Indian medical education system has substantially evolved post Lancet Commissions report in 2010. Presently, it is one of the major contributors of health care manpower across the Globe. Though the growing number of medical schools have increased Graduate & Postgraduate intake capacity, the challenge of concurrent efflux of talented minds (brain drain) to pursue medical education abroad is still daunting and a matter of concern. It is hence crucial to pause and reflect on the current regulations of medical education, weigh it against the need of Global demand in health care and conceive measures to improve the healthcare education system of the country, so as to generate effective trained health manpower capable of dispensing the onus of a meaningful, cogent, credible, efficacious and effective healthcare delivery system.

In the current scenario healthcare delivery is changing as a result of technological breakthroughs like telemedicine, Artificial Intelligence (AI), and Digital Health. More emphasis is being placed on the necessity for physicians and other healthcare professionals to collaborate as a team and as part of the broader healthcare system. Research has demonstrated that inter-professional education can lead to better patient outcomes and higher-quality treatment.

The present report critically analyses the structural dimensions as provided for in Graduate and Post-Graduate Medical education including Super speciality Education Regulations notified by NMC (as amended from time to time) that has evoked structural model rolled out as Competency Based Medical Education Model as against the 'Vision 2015' document and put forth by Lancet Commissions in 2010 and the WFME guidelines with posers in quest towards invocation of a upgraded and updated **'Structural model'** catering to generate future-proof competent Indian Medical Graduate, Postgraduate and Super specialists. It is aimed towards identifying key themes that warrants deliberation and structural modification and proposes recommendations for structural strengthening of Graduate, Post Graduate and Super specialty Medical Education of the country specially with reference **'Competency, Publication and Interdisciplinary Training'** that will enable Medical Graduates, Post Graduates and Super specialists to perform efficiently in an interconnected and interdependent healthcare system across the Globe as an outcome through a structurally updated 'Throughput' for 'Optimized output' by efficient 'Operation'.

The suggested timeframe as against recommendations should be interpreted as immediate within 1 to 2 years, similarly intermediate 2 to 5 years and long-term 5 to 7 years.

The crystalized recommendations of the Task force as against the Terms of Reference allocable to it in the context of present status, research and interdisciplinary training pertaining to the entire spectrum of medical education, identified gap thereto and recommended initiatives and modalities to bridge over the same as brought out in the report through the availed methodology of identification of the structural gaps in regard to the operational mode of medical education in vogue in the country in terms of prescribed policy by the Competent Authority as against Transformative Model of Medical Education envisioned in Lancet Commission Report and also notified guidelines in regard to Under Graduate and Postgraduate Medical Education by the World Federation for Medical Education are summarized as below in terms of a tabular form bringing out 'Structural Gaps', 'Operational Recommendations' and the 'Timeline' in which it is to be effected by the Competent and the concerned authorities as they be:

I) Competency

I-A: Under graduate Medical Education

Sr. No	Structural gaps	Recommendations	Timeline
1.	**CBME** : The competency based model has identified subject specific competencies, however, not in the order of ascendency in progressive professional years. Outcome attainment not feasible in current curricular framework.	*1.Transformative medical education :* • *4 step escalating Outcome based Education Model.* *An operational model depicted in Annexure-1.*	**Immediate**
2.	The identified skills and competencies are not in an apparent historically progressive manner, with each ability logically connected to the others through a progression of understanding due to higher order of cognition difficult to achieve.	*2.Critical thinker /Analyzer* • *Course content mapping of higher secondary education and graduate medical education to address the Higher order thinking skills as proposed in NExT Regulations.* *An operational model depicted in Annexure-8.*	**Immediate**

| 3. | Integration of technology: (AI incorporation)

No curricular provision and policy regarding formal training of learners and medical teachers respectively to enable optimum utilization of ICT in teaching learning activities.

Lack of Curriculum update for addressing knowledge and skills pertaining to AI in healthcare. | 3.*Technology enhanced medical education*
• *High Touch-High Tech– Holistic approach in curriculum design*
• *High-Tech integration (clinical skills)*
• *'Seven pronged Blended learning model for Indian Medical Graduate (IMG)'* *An operational model depicted in Annexure-3.*
• ***Intersecting role of AI in health care*** | **Immediate** | |
| 4. | **Academic flexibility -**
The medical curriculum is not credit based and hence not suitable for National and International mobility.

A framework of flexible pathways for a learner in health professions is not in place. | *4. **Choice based Credit System Equivalence to International standards***
*A shift from annual to **semester based structure** of Graduate Medical Education, fortified with an outcome-based framework, is advocated, for making provision for flexible, personalized learning pathways and analyze attainment of learning outcomes. An operational model depicted in Annexure-5.*
□ *A diligent emphasis on invocation of credits in tandem with international parlance.* | **Long term** | |

I-B: Post graduate Medical Education

Sr. No	Structural gaps	Recommendations	Timeline
1.	**Competency Based Curriculum** Assessment methods are not as per the competency based curriculum requirement.	*1.Transformative medical education* *a. Implementation of CIA and Formative Assessment* *EPA should be identified.*	**Immediate**

			Immediate
	District Residency Programme Competency for DRP are not identified.	*b. An inter-disciplinary EPA for DRP*	**Immediate**
	Faculty Development Programme Need FDP to meet the requirements of a postgraduate competency-based curriculum.	*c. Advanced Courses in Medical Education for Postgraduate Guides*	**Immediate**
2.	**Traditional Assessment tools** Need competencies in ascending order for higher order assessment and made objective assessment tools.	*2.Critical thinker /Analyzer* • *Progression of competence should be placed in the curriculum in an ever-increasing mode of complexity, engagement, and understanding*	**Immediate**
3.	**Emphasis over technology (AI incorporation)** Explicit training on AR/VR, simulations, AI and their assessment has not been addressed.	*3. Technology enhanced medical education* • *Simulation based Training, VR & AR.* • *VR & AR.* • *Judicious use of AI* • *Telemedicine* • *Guidelines for ethical use of patient data.*	**Immediate**
4.	**PG student participation in UG and paramedical teaching** However, the teaching and assessment modalities have not been determined.	*4. Pedagogy Skill* • *Certificate course in education technology for residents*	**Immediate**
5.	**Quality patient care** In order to construct a high-quality care system, concerns have been raised regarding the inclusion of the postgraduate doctor mistake and patient safety policy but in the existing regulations no such inclusions has been addressed.	*5.Patient Safety* • *Inclusion of guidelines in the MSR.*	**Immediate**
6.	**Academic flexibility**	*6. Choice based Credit System*	**Long term**

| | There is no academic flexibility in the present medical education system which restricted the carrier opportunities for the undergraduates. In absence of the choice-based credit system or how our post graduate degrees meet the requirements of postgraduate education around the world including providence of Academic Bank of Credits in terms of National Education Policy, 2020, not addressed. | *Equivalence to International standards* • *Academic flexibility model proposed with need for credit-based curriculum with flexible pathways. An operational model depicted in Annexure-5.* • *A diligent emphasis on invocation of credits in tandem with international parlance.* • *Academic flexibility will enhance the carrier opportunities for the medical undergraduates* | |

I-C : Superspeciality Medical Education

Sr. No	Structural gaps	Recommendations	Timeline
1.	**Curriculum :** Curriculum/syllabus with Overlapping topics and competencies	*1.Transformative Medical Education:* *Reformulation of competency-based curriculum and identification of EPA*	**Immediate**
2.	**Teaching/training modes:** No provisions for simulation-based learning High fidelity simulation lab provision lacking No depiction of utilization of Technology in the instructional methodologies	*2.Technology enhanced medical education (AI Incorporation)* • *AI inclusion* • *AR, VR,* • *High fidelity simulation laboratory for skill training.*	**Immediate**
3.	The progressing of competency and continuous internal assessment is the way we can accomplish higher order cognition These are not described in the present regulation.	*3.Critical thinker /analyzer* *Implementation of well-defined assessment system in tandem with ascendency of the competency.*	**Immediate**
4.	**Participation in Teaching** However, the teaching and assessment modalities have not been determined.	*4.Pedagogy skill* *A structured Course on pedagogy*	**Immediate**

II) - Publications

II-A : Under graduate Medical Education

Sr. No.	Structural gaps	Recommendations	Timeline
1.	**Clinician, Lifelong Learner, Professional and Researcher:** Though these four roles identify Research and Analytical skills as global competency, an 'Operational framework' to actualise the same within curriculum, spread across the continuum of medical education, is required.	*1.Generate, Interpret and Publish evidence Biomedical research module with Ascendency of research skills across the continuum of medical education*	**Immediate**

II-B: Post graduate Medical Education

Sr. No.	Structural gaps	Recommendations	Timeline
1.	**Research skills** Only one out of 3P (poster/paper/publication) dilute the application of research component. No emphasis on collaborative research and guidelines for the same has been documented. .	*1.Generate, Interpret and Publish evidence* • *4P model -Program, Poster, Podium Presentation and Publication in an indexed journal* • *Emphasis on collaborative research and guidelines for the same.*	**Immediate**

II-C: Superspeciality Medical Education

Sr. No.	Structural gaps	Recommendations	Timeline
1.	**Research skills** **Thesis / dissertation but** no publication mandate. Lack of guidelines and provisions for research and publications as higher degree students. .	*1.Generate, Interpret and Publish evidence* • *Routine training for critically appraising published articles, publishing mandatory* • *One review article and one original article publication in indexed peer reviewed journal.*	**Immediate**

III) Interdisciplinary training

III-A: Under graduate Medical Education

Sr. No.	Structural gaps	Recommendations	Timeline
1.	**'Leader and Member of Health care team'** Though opportunities exist by identifying IMG as 'Leader and Member of Health care team and provision of Electives, the overall competency framework is still discipline based, thereby defying the entire concept of inter/trans professional knowledge and skills for holistic health care.	*1. Team Medicine* • *Inter- professional and trans-professional team experience and opportunities.*	**Immediate**

III-B: Post graduate Medical Education

Sr. No.	Structural gaps	Recommendations	Timeline
1.	**Interdisciplinary training** Emphasis over basic management skills in human resources, materials, and resource management related to health care delivery, general hospital management, principal inventory skills, and counselling has been given. However the guidelines regarding how to conduct the training has not been specified. To accomplish these, no identifiable mechanisms have been found.	*1. Team Medicine* • *Modality for implementation Of Multidisciplinary Training for PG.* • *AI as need based integrative programme(s) to enhance the personalized learning.*	**Immediate**

III-C: Superspeciality Medical Education

Sr. No.	Structural gaps	Recommendations	Timeline
1.	**Emphasis on Interdisciplinary training** Lack of details regarding interdisciplinary training in super specialty courses, impacting the proficiency in addressing complex medical conditions.	*1. Team Medicine* • *Multidisciplinary training to enhance team-based approaches, collaboration, innovation, and holistic patient evaluation.*	**Immediate**

IV) Collateral Arenas

Sr. No.	Structural gaps	Recommendations	Timeline
1.	The evaluation of the education program has not been placed in the present GMER 2023. As of right now, there is no policy in place for programme assessment in education.	*1 : Evaluation Of Education Program* *Policy intervention is needed for providing for evaluation of Undergraduate, Postgraduate and Superspeciality programme. DANIDA Model can be availed as a basal model towards structuring the same.* *Standards for assessing educational programmes should be developed and implemented. For quality improvement and need-based implementation of new changes, a periodic evaluation of the curriculum should be incorporated. Demonstrable evidence of successful learning by determining attainment of course outcomes and resultantly program outcome can be a significant stride in evaluation of the MBBS, Post Graduate and Super-specialty programs.*	
2.	**Increasing Faculty Pool**	*2. Trained man power* • *Addressing the paucity of medical teachers through*	Immediate

	Presently there is no modality in place that can address the need of trained man power crisis. The gap between present occupancy versus prescribed numbers is to the extent of 30-40%.	*desired timely recruitment and also required alteration in governing service conditions in regard to pay, perks, privileges, placements and promotions.* • *Revive postgraduate diploma in terms of Postgraduate Medical Education Regulations 2023 be rechristened as 'Masters in Medicine (M. Med.)'.* • *Splitting the teaching cadre into four levels namely Lecturer, Assistant Professor, Associate Professor and Professor.* • *The eligibility for Lecturer could be Masters in Medicine qualification (2 years duration)* • *The providence for Adjunct Faculty be made in tune with the policy of the University Grants Commission to avail the professional expertise for teaching and training purposes in teaching institutions.* • *The age of permissibility for full time teachers computation from existing 70 years may be raised to 75 years on year to year continuation subject to required diligent certifications pertaining to physical and mental fitness.*	
3.	**Faculty Development Program** Inadequacy of the present Regional / Nodal Centre based Faculty Development Program	*3.Capacity Building* • *An institutionalized mechanism in the form of 'Academic Staff Colleges' for full time faculty development program through policy intervention*	**Immediate**
4.	**Accreditation Policy:** Lack of clear guidelines and regulatory frameworks for quality assurance in medical education.	*1Accreditation Policy* • *Development of an accreditation policy to set out Global accreditation benchmark through standard mechanisms in consultation with Quality Council of India.*	**Immediate**

	No National level policies and accreditation standards that mandate the adoption of CBME principles and ensure consistency across institutions.	• *The autonomous Accreditation Board created vide NMC Act, 2019 needs to place required Regulation on the Accreditation of Medical Education and put the system into operation.*	
5.	**Educational scholarships** & **Funding** Education Research presently limited to FDPs are insufficient to generate robust evidences pertaining to TLA in Indian context Lacunae in the area of contextual educational research for funding and educational scholarships	*5.Educational scholarships & Funding* • *Career advancements and Periodic appraisals of a medical teacher.* • *Identification of indicators towards Educational scholarships and research funding.* • *Interdisciplinary research* • *Integration to the Multidisciplinary Research Units of Department of Health Research (DHR).*	Immediate
6.	**Consortia and Collaborations** No prescribed guidelines. Single 'Standalone Institution Mode' and no 'Cluster Approach' as depicted in Lancet Commission Report 2010.	*6. Consortia and Collaborations* • *Establishing consortia and collaborations - 'Standalone Institution Mode to Cluster Approach'*	**Intermediate**
7.	**No providence for developmental funds for medical education**	• *Provision of corpus as applicable to the Institutions of Higher Education in terms of provision included under section 12(B) of the University Grants Commission Act, 1956.* • *A suitable amendment akin to Section 12(B) as included in the University Grants Commission Act, 1956 needs to be made in NMC Act, 2019.*	**Immediate**

Based on the summarized depiction the report brings out the way forward for the timely execution of the recommendations brought out in the report towards mitigation of the crystalized structural gaps in the concerned domains across the spectrum of medical education including the cogent and collateral arena thereto.

CONTENTS

LIST OF TABLES AND FIGURES

1. Introduction

The history of India dates back to antiquity. It is one of the most ancient civilisations and is endowed with the great cultural heritage, which also includes exemplary healthcare traditions through well laid out healthcare delivery systems. It is endowed with a grand legacy of education in all its manifestations with exemplary and emulative 'Gurukul' system as one of the many Global hallmarks that it has to its credit. It is a land dominated by cultural heritage with an absolute open-mindedness welcoming thoughts of every shade, colour and hue to embrace it in furtherance of evolution of conceptualizations catering to emancipation of men and mankind alike in the name of humanity and humanism in unison. The Indian Medical education system in the name of Ayurveda, Yoga and Naturopathy has a historicity of several thousand years with Global names in its fold namely Charaka, Sushruta, Vagabhat, Chakrapani and notably the Dalhan's commentary as an inerasable landmark on the sands of time. However, it has also a historicity of more than thousand years of slavery as well which is a matter of record.

It is in this backdrop, one is required to look into the aspect of advent of 'Western Medicine' in India which came to it through Portuguese in early 16th century. However, it was not institutionalized in a concrete sense until British East India Company constructed a hospital in Madras, followed by Surat and Machli Pattam which were the first trading ports of the British on the Indian soil. These hospitals were served initially by the British surgeons abode the training ships. These surgeons also tended to the British living in India. It was in 1639 through the construction of Fort St. George the British set up a permanent medical facility in India. For this very purpose they rented Mr Cogan's house as well. This rented house in 1664 was converted into a small Hospital lodging 8 to 10 sick British soldiers of the garrison. The hospital was located in Fort St. George and then moved to its current location in 1772, which today is known as Madras General Hospital. This was the place wherefrom training was imparted to Europeans, Eurasians, and Indians in 'Western Allopathic Medicine' although a formal medical school was not established till then. Realistically speaking, what began as a private medical hall came to be converted by the British in 1835 into Madras Medical School.

In the early 19th century, the British government of India was not willing to interest the healthcare of their own people in the hands of Ayurvedic and Unani practitioners. Hence, they had the compulsion of bringing Medical men from Europe. The British surgeons' did train few Indians pertaining to the elementary principles of diagnosis and treatment of disease and appointed them as native doctors to assist them as compounders and dressers. They did not receive any systematic prescribed formal education. However, the services of these men were appreciated by the British surgeons, and on 19th May 1822, the Medical Board of the British Surgeons in India wrote to the then Secretary to the Government of India for a more systematic education for the native Doctors in India.

With a Government order dated 1st June 1822, the first medical school in British India was established and opened in October 1824 at Calcutta Sanskrit College with Dr. James Janiesons as its first superintendent. The period prescribed for the training and end certification was of 3 years.

Founded by the then Governor of Madras Sir Friedrick Adam by a general order of the Government, dated 13th February 1835, a medical school was established in Madras and Indians came to be admitted to the said medical school from the year 1842.

On 1st October 1850, the school Council submitted a proposal for it to be accorded the status of a 'College' and then the school was christened as Madras Medical College wherefrom the first batch graduated and passed out in the year 1852.

The pattern of medical education was modelled in terms of the British system, for obvious reasons of colonial influence. The initial medical schools established at Calcutta, Bombay and Madras were with a limited objective of training apprentices with minimum qualifications to help the army personnel. The first full-fledged Medical College that came be established in Calcutta under the supervision of General Medical Council of Britain was after 1860. The period between 1838 and 1916 witnessed the establishment of approximately 16 Medical Colleges with the cumulative annual intake of one thousand students per year.

It was in the year 1916 that on the recommendations of British Education Commission for India, Indian Medical Degrees Act came to be adopted and was promulgated whereby Indian universities became entitled to confer medical degrees with the authority and Jurisdiction of

registration as registered medical practitioners being still vested with General Medical Council of Britain. It was following the adoption and promulgation of Indian Medical Council Act of 1933 that the Medical Council of India came into existence in 1934. Along with the establishment of medical colleges, yet another category that offered 3 to 4 years of training came to be established by the Provincial Governments, Missions, and Private organizations for the degree of Licentiate medical practitioner (LMP). This was primarily to overcome the acute shortage of medical manpower in India.

The appointment of the health survey and development committee commonly known as the Bhore Committee in the year 1946 was the maiden attempt to prescribe comprehensive blueprint of medical education, including health service in India in a real sense of internationalization of modern medical education. It was in terms of the recommendations made out by Bhore Committee that the foundation of the development of the national health care system evolved based on primary health centres. It recommended expansion of medical colleges, evaluation of Licentiate courses, upgrading of medical schools into full-fledged a medical colleges, suggesting measures to improve the quality of training and also establishment of All India Institute of Medical Sciences (AIIMS).

Upon gaining independence on 15th August 1947, and in genuine pursuance of the recommendations of the Bhore Committee, Government of India under the leadership of its first Prime Minister Pandit Jawaharlal Nehru witnessed a phenomenal rise in the generation of medical personnel as trained manpower in India in an open ended manner, which is depicted that from the early 17 medical colleges in 1947 the number rose to 87 in 1965 and from 10 years down the line therefrom in 1975, it came to be 105 with a lull period between 1975 – 85 during which only 1 new Medical College came to be created, followed by the number rising to 129 in the year 1991 but during the period from 1991 to 2012 it rose to a staggering high of 335 which within a period of another five years in 2017 it rose to 479 and as on date, the said number is 700+ for the academic year 2023-2024.

The aforesaid depiction clearly spells out that there has been a very substantial quantitative expansion of the medical colleges in different geographical locations especially in the last decade. However, if the same is viewed in the context of required number of medical personnel in the context of prescribed population ration 1:1000 by World Health Organization the cumulative ratio in 2019 is observed to be 0.9 per thousand population. However, distributional

inequalities as brought out in 2019 brings out that the same ratio is 2.5 per thousand for Goa and as against 0.06 per thousand for Nagaland.

In the context of geographical location of medical colleges still it is plagued by skewed distribution. The disparity between the undergraduate avenues in terms of the annual intake capacity as against postgraduate avenues has also been bridged to some extent. The **PG** to UG seat ratio to which as of now is 0.67:1 as compared with 1.85:1 in USA, 1.01:1 in China and 5.98:1 in U.K. India's **PG** to UG Ratio of <1 turns out to be a key barrier in regard to the input for generation of super specialists which is a palpable challenge.

Yet another important dimension worth taking note of is that in spite the fact that India has the highest number of medical schools in the world but its average number of seats per college is lower than that of other countries which is reflected in terms of the fact that India's annual output of graduates per medical colleges as reported in 2019 was 151 as compared with 220 in Eastern Europe and 930 in China.

Notwithstanding, the observed depiction the important aspect noteworthy is that the quantitative expansion is resulting in relaxation of the norms governing starting of the new medical colleges and the **qualitative development** being thrown into the rear seat, which is a definite matter of concern on the dictum **'less quantity with high quality when matched against high quantity with compromised quality, the first turns out to be the preferable choice rather than the latter'.**

Post-Independence period with reference to the development of medical education and healthcare delivery system evolved in terms of recommendations of Sokhey Committee (1948), First education commission report under the leadership of late **Dr.** S Radhakrishnan (19481949), Mudaliar commission, (1961 – 1963), Chaddha Committee (1963), Mukherjee committee (1965), Jungalwalla committee (1967), Kartar Singh committee (1973-74), Srivastava committee (1975), **Dr.** Balwantrai Mehta committee (1983), National policy of education (1986), Bajaj Committee (1986) knowledge Commission Report (2009), National medical commission Act (2019) and National Education Policy 2020.

Another set of landmark event in the evaluation of medical education in post-independence era includes repeal of Indian Medical Council Act of 1934 by the Indian parliament and it the

replacement by the Indian Medical Council Act 1956 where under the article pertaining to 'Definitions', the word 'Western Medicine' used in 1934 was converted to the word 'Medicine' with the text of definition remaining the same which continues to be so even under National Medical Commission Act, 2019'.

In the year 1983 in terms of the recommendations of Dr. Balwant Mehta Committee the national health policy was the culmination which also shaped the medical education policy of 1984. The incorporation of prescribed procedure for opening of Medical College and structuring of the scheme thereto has been prescribed vide amendment in terms of section 10(A) to the Indian Medical Council Act, 1956 in the year 1993 by the Indian Parliament. In terms of the pronouncement made by the Hon'ble Supreme Court in the year 1996, the guidelines and recommendations made by the Medical Council of India in respect of their ambit and Jurisdiction notified in the form of required 'Regulation' as envisaged under section-33 of the said Act gained mandatory effect by virtue of their binding nature.

Constituent thereupon, the era of **'Regulation'** as prescribed by the Medical Council of India began which set the tone for invocation of uniform standards of medical education. The Notifications of Regulations named Graduate Medical Regulation(1997), Minimum Standard Requirement Regulation (1998), segregated for the prescribed annual Intake of 50,100,150 to begin with and broadened to 200 and finally 250 annual intake capacity by the year 2006-2007, Postgraduate Medical Education Regulation 2000, Code of Medical Ethics and Etiquette Regulation 2002, which is further amended in 2009 are the examples of the regulatory jurisdiction by the regulatory authority for invocation of standardized medical education in India in the domain of uniformity.

In continuity of binding regulatory frames put into operation, in the year 2009, **'National Faculty Development Programme'** came to be launched by the then Medical Council of India through its Academic Council as a part of commemorative celebrations of its platinum jubilee. Under the very same programme through a standing mechanism created in the form of **'Nodal and Regional Centres'** under the caption **'Training the Trainers' 'Basic Medical Education Technology Course'** was launched to be executed by the notified centres. The required number of medical colleges came to be affiliated to the notified centres for conducting and orientation course for the registered full time teaching faculty drawn from the affiliated Medical Colleges. In the year, 2014 'Advance **Course in Medical Education'** (ACME) was launched, and also

the 'Basic Medical Education Technology Course' was revised and titled 'Revised Basic Medical Education Technology Course'. Under the rubric of National Faculty Development programme the full time teaching faculty in various Medical Colleges in the country have been trained and oriented in the arena of Curriculum, design and update, Teaching, learning and assessment, Education research and Education program evaluation respectively. This venture has resulted in strengthening the medical education units in each medical college in the country towards diligent dispensation of the objectives set out for them.

In addition, keeping in mind, the requirement of invocation of parity with the set out Global standards, the Academic Council of the Medical Council of India ventured into structuring of Competency Based Undergraduate Medical Education Curriculum, with an emphasis on problem-solving approach incorporating critical thinking and analytical skills. The entire structured curriculum approved by the Medical Council of India came to be effected, from the academic year 2019-2020 across the country. The first batch of MBBS students in the country admitted then would be taking their final MBBS examination in the November/December 2023, resulting in passing out of the first batch of undergraduate learners in the country vide the Competency Based Undergraduate Medical Education Curriculum with commensurate modes of teaching and learning through diligent incorporation of information and communication tools along with relevant modes of assessment. With the prescription of the structured Competency Based Undergraduate Medical Education Curriculum an important requirement towards 'accreditation' under Criterion-II of the standards set out by the **'World Federation for Medical Education'** stood mitigated in a tangible and measurable manner.

The resultant gain accrued to the country on 20th September 2023, when World Federation for Medical Education, recognized the National Medical Commission, the statutory regulator of Indian medical education, prospectively for a period of 10 years, endorsing that the standards operational in Graduate Medical Education in India were at par with the set out and prescribed Global standards.

Consequent upon the said Notification all the medical colleges in India duly recognized by the National Medical Commission and resultantly included in the First Schedule appended to the National Medical Commission Act, 2019, stand included in the directory of medical schools, maintained by the World Federation for Medical Education. Resultantly, 700+ medical schools/colleges geographically located in India duly recognized by the National Medical

Commission have legitimately found their place in the elite list of medical schools reflected in the directory maintained by World Federation for Medical Education. Consequently India turns out to be the country that has now single largest number of medical colleges (700+ as of now) stand included in the prestigious list making it as a front ranking player on the Global stage in the domain of medical education.

It is in this context, it is imperative to take in to consideration, the stellar role that Indian medical education is required to play as a front ranking player, especially in the backdrop of the fact that it is the single largest producer of trained Health manpower in the world. It is pertinent to note that Medical education is definitely plagued by **'challenges',** due to cross border education providers around the entire Globe. The interface between Medical Education on one side and the healthcare delivery on the other, it turns out to be a vital aspect that needs to be addressed with reference to the challenges and opportunities, germane to the cross border Providence of medical education.

Indian system of medical education also stands structured in terms of the Global documents namely the Flexner Report 1910, Reorientation of Medical Education (ROME-1983) and the most recent one the Lancet Commission Report-2010, which proposed the models of medical education as –

1. **Formative Model – Flexner's Report 1910**
2. **Reformative Model – Reorientation of Medical Education (ROME) WHO-1983**
3. **Transformative Model-Lancet Commission Report 2010**

Indian medical education system has substantially evolved post Lancet Commissions report in 2010. Presently, it is one of the major contributors of health care manpower across the Globe. Though the growing number of medical schools have increased Graduate & Postgraduate intake capacity, the challenge of concurrent efflux of talented minds (brain drain) to pursue medical education abroad is still daunting and a matter of concern. It is hence crucial to pause and reflect on the current regulations of medical education, weigh it against the need of Global demand in health care and conceive measures to improve the healthcare education system of the country, so as to generate effective trained health manpower capable of dispensing the onus of a meaningful, cogent, credible, efficacious and effective healthcare delivery system.

It invariably affects their expertise, understanding, and, in the end, how they provide patient care. Patient-centeredness, lifelong learning, a holistic approach, ethics, and professionalism are all embraced as core values of PGME. The postgraduate medical education programme aims to produce rich postgraduate experience with related in-depth learning and perform as an independent practitioner, WFME stated that a postgraduate curriculum should define the essential and minimum required outcomes and experiences.

In the current scenario healthcare delivery is changing as a result of technological breakthroughs like telemedicine, artificial intelligence (AI), and digital health. More emphasis is being placed on the necessity for physicians and other healthcare professionals to collaborate as a team and as part of the broader healthcare system. Research has demonstrated that inter-professional education can lead to better patient outcomes and higher-quality treatment.

In order to effectively handle complex health challenges, medical undergraduate and postgraduate programmes need to integrate many disciplines and concepts through interdisciplinary training. Through interdisciplinary training, which aims to foster collaboration, communication, and critical thinking among medical professionals from many backgrounds and disciplines, the quality of patient care, research, and teaching in the medical sector can all be improved.

In the quest of invoking the system of Indian Medical Education in the Transformative mode as envisioned in Lancet Commission report , venturing of competency based medical education beginning from the year 2015 ending up in its operational implementation commencing from the academic year 2019 onwards is a major landmark shift in the said direction.

The contours of structuring the competency-based curriculum in the Postgraduate and Super speciality medical education has also been ventured into by National Medical Commission through governing regulatory frames notified by it during the impending period beginning from the year 2019 onwards. As such, structurally a definite way has been paved by the regulatory authority in the entire spectrum of medical education with reference to operationalizing transformative model of medical education.

If looked analytically the entire depiction in its spectral ambit brings out that the transformative model of medical education in its entire spectrum of undergraduate, postgraduate and super speciality medical education is the way forward. This is also required to be looked into the

simplistic Input-Through-put, Out-put, generic model in terms of its applicability to medical education where Input is the learner, Throughput is the medical education teaching training system and Output is the Graduate, Postgraduate and Super specialist as the case may be.

The efficacy of the system so narrated above has to be viewed in the context of four **'O' Model** where the **4 'O's** stand for –

1. **O-Objective**
2. **O-Operations**
3. **O-Outcome**
4. **O-Optimization**

Viewed in the context of the entire spectrum of medical education the objectives stand well delineated. As such, the outcomes are also well crystalized commensurate with the set out objectives, it is the operation which inter alia means throughput which is the one which has to be looked critically.

Throughput which would be the entire system of medical education in its total spectrum needs to be viewed in regard to its efficacy and efficiency, so as to deliver the commensurate outcome with the set out objectives in an incremental mode so as to reach the levels of optimization. This entails –

a) **Structural update.**

b) **Operational update resulting in outcome update including its optimization.**

The regulatory frames that are notified by the National Medical Commission in regard to Graduate, Post Graduate including Super speciality medical education in the form of governing regulations provide for the objectives, structural dimensions, operations entailed and the expected outcome.

A critical appraisal of the structural dimensions included therein including the depiction of operations in the name of Competency Based Education Model ultimately is aimed at putting into place a Transformative Medical Education Model for its operation, which stands rolled out from 2019 onwards. **It** has definitely resulted in a great improvisation over the reformative model that was in vogue till them. However, in terms of its structural dimensions to presume that it subsumes the various depictions and dimensions as brought out in Lancet Commission Report and in the context of guidelines notified by World Federation of Medical Education

needs critical appraisal not as a part of auditing of the same but for deciphering the gap, if any, and suggest structural update of the same, so as to make it transformative model in its totality realising for sure that without a structural update operational update is neither open nor permissible.

The operability of the system in terms of it resulting in generation of desired and set out outcome as against the predetermined objectives is significantly based on the capacity of the operators to carry out the operation in effective and efficient manner. Therefore, the much-desired requirement of capacity update through institutionalized capacity building modalities has been and continues to be the answer.

As such, it becomes imperative to have a critical appraisal of the structural format of the entire spectrum of medical education in vogue in the country for the purposes of bringing out analytical gaps as against prescribed guidelines so as to invoke measures and modalities for bridging the same in a time bound manner ensuring that the impending scrutiny after the expiry period brings out the desired robustness of the entire medical education system of the country.

The present report critically analyses the structural dimensions as provided for in Graduate and Post-Graduate Medical education including Super speciality Education Regulations notified by NMC (as amended from time to time) that has evoked structural model rolled out as Competency Based Medical Education Model as against the vision put forth by Lancet Commissions in 2010 and the WFME guidelines with posers in quest towards invocation of a upgraded and updated structural model catering to generate future-proof competent Indian Medical Graduate, Postgraduate and Super specialists. It is aimed towards identifying key themes that warrants deliberation and structural modification and proposes recommendations for structural strengthening of Graduate, Post Graduate and Super speciality Medical Education of the country specially with reference **'Competency, Research and Interdisciplinary Training'** that will enable Medical Graduates, Post Graduates and Super specialists to perform efficiently in an interconnected and interdependent healthcare system across the Globe as an outcome through a structurally updated **'Throughput'** for **'Optimized output'** by efficient **'Operation mode'.**

2. *Background:*

In India, the Flexner's model blended with Reorientation of Medical Education Model (ROME) was prevailing till 2018. The 'Vision 2015', (Board of Governors, MCI, 2011) envisioning an 'Indian Medical Graduate (IMG)' with requisite knowledge, skills, attitudes, values and responsiveness was actualized with the advent of Competency Based Medical Education (CBME) in 2019. The Competency-Based Medical Education (CBME) identified competencies for Indian Medical Graduate (IMG), Postgraduates and Super speciality Graduates based on the principles of **'Transformative Model',** as envisioned by Lancet Commission, 2010. Since the publication of 'Health professionals for a new century: transforming education to strengthen health systems in an interdependent world, Lancet Commission 2010, many aspects of medical education in India have thus been revised, recent being introduction of competency-based education (CBE) and exploration of information technology (IT) for learning and health care in post COVID era.

There has been paradigm shift in health professions education system from traditional teaching to competency-based education with spurt of activities in faculty development as well as learner-oriented initiatives. As the Nation strives to provide quality healthcare education and service to its burgeoning population, the spotlight shines ever brighter on the issues and challenges embedded within its medical education framework. There has been rapid growth in number of medical colleges in India. With approximately 700+ medical colleges admitting more than 1 lakh students every year, India is one of the largest medical education systems in the world.

One of the desirable initiatives to bring inclusivity and addresses diversity in healthcare is to establish a dynamic and interconnected health care ecosystem. The crucial role of Allied health care disciplines, Inter-professional knowledge and practice for synergistic Personalised Medicine is an important step in this regard. Needless to say, the graduate medical education must embrace these aspects within the prescribed training program as well.

From the shortage of faculty and infrastructure to the persistent urban-rural divide in access to medical education, the journey to becoming a doctor in India is fraught with hurdles at every turn. The changes in curriculum are path breaking and in line with Global developments but

assessment component is weak due to slow adoption of these curriculum by universities and assessing agencies. Though faculty development program initiated by the Medical Council of India in 2009 and now run by National Medical Commission has trained more than 100000 faculty in various courses like Basic Course in Medical Education, Advance Course in Medical Education and Curriculum Implementation Support Programs, in spite of these efforts by Regional and Nodal centres, there has been variability in the faculty training and quality of curriculum implementation across various institutions in India.

Medicine is a constantly evolving field. Effective healthcare extends beyond technical expertise hence, post-graduates must have the abilities and mind-set to stay updated throughout their careers. Medical Postgraduate education play an important role in moulding the ethical and professional behaviour of future healthcare providers which involves promoting integrity, accountability, and respect for co-workers and patients. (The Belmont Report).

Inequities in healthcare, the incapacity of professional education to meet the demands of the modern healthcare environment, fragmented, antiquated, static curricula, inadequate teamwork, a lack of continuous care, a predominance of hospital orientation in training at the expense of primary care, and a lack of leadership to enhance health systems were some of the gaps identified in Lancet commission report 2010.

In the face of these challenges, however, lies an unwavering determination to catalyse change and forge a path towards excellence. Voices of reform echo through the corridors of academia and healthcare institutions, advocating for innovation, equity, and accountability. On this background we propose here to overview the challenges faced by medical education system in India, gaps in the implementation of CBME and the suggested path for the same. In addition the draft report critically analyses the Graduate and Postgraduate Medical education including Super speciality regulations by NMC, 2023 as against the vision put forth by Lancet commissions in 2010 and the WFME guidelines 2005 (as amended from time to time) with posers for graduate medical education in quest towards a future-proof competent Indian Medical Graduate and Postgraduate. It aims to identify key themes in terms of **'Structural gaps'** that warrant deliberation and action and proposes recommendations for strengthening Graduate, Postgraduate and Super speciality medical education in the country, enabling medical graduates and postgraduates to perform efficiently in an interconnected and interdependent healthcare system across the Globe.

3. Terms of Reference (TORs) :

The National Academy of Medical Sciences, Ministry of Health of family welfare assigned specific terms of reference to the National Task Force constituted vide Ref. NAMS/NAMS Task Force/ME /dated 02.12.2023 which are listed herein.

- **To identify the current status of "Medical Education: Competency, Publications and Inter disciplinary training".**
- **Identify the deficiencies which need to be addressed.**
- **To recommend measures for improving the interventions in the area of "Medical Education: Competency, Publications and Interdisciplinary training"**

As such, the dispensation of the assigned terms of reference would be for the entire spectrum of medical education encompassing Graduate, Postgraduate and Super speciality medical education with reference to competency, publications and interdisciplinary training blended with identification of deficiencies/inadequacies and recommending ways and means in terms of suggested measures for mitigation of the same as required interventions in the 3 assigned domains of **Competency, Publication and Interdisciplinary training.**

4. Methodology

In terms of the assigned terms of reference to the task force, commensurate methodology for the targeted dispensation was evolved so as to crystallise the required dimensions covered specifically under the ambit of each of the three terms of reference so assigned meaning thereby that identification of the status of the entire spectrum of medical education encompassing Graduate, Postgraduate and Super speciality medical education with reference to competency, publications and interdisciplinary training structurally, blending it with identification of **'Structural Gaps'** including inadequacies,/deficiencies on the three required counts and bringing out ways and means with reference to initiatives to be undertaken to mitigate *inter alia* bridge the same, facilitating an effective doable demonstrable and deliverable model of medical education in its entire spectrum in conformity with the recommendations in the form guidelines brought out by WFME **(Fig. 1).**
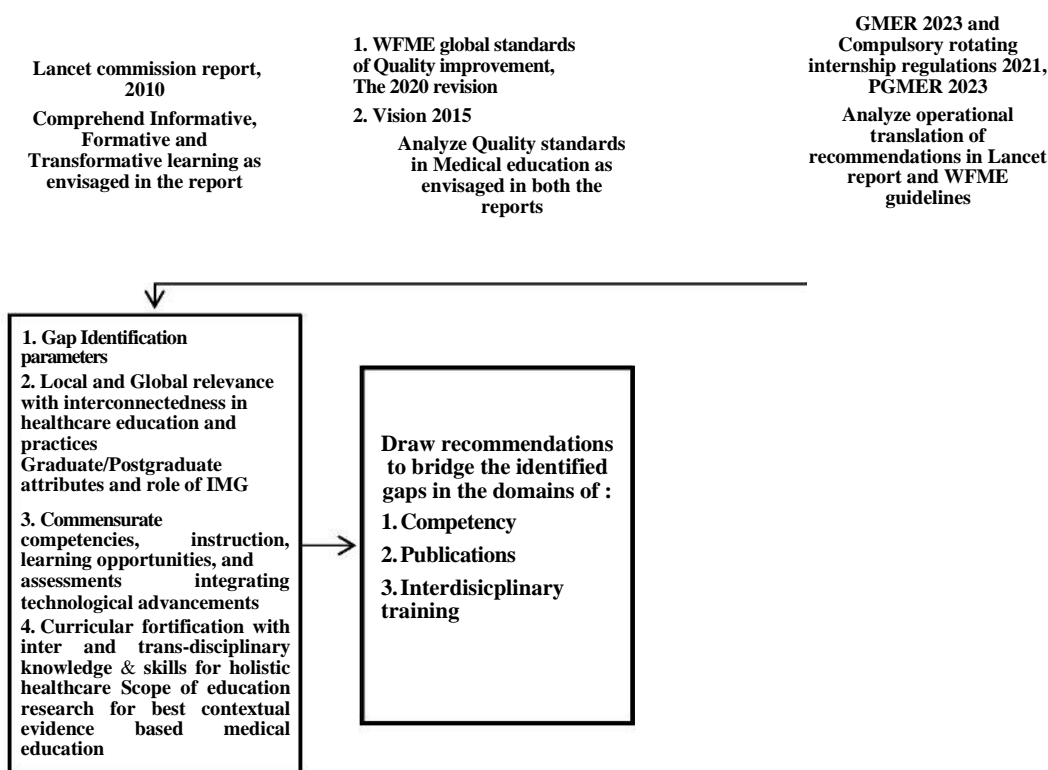
(Fig:1-Methodology adopted in generation of Task Force Report)

5. Observations/Critical Review

Current Status:

To conduct a critical analysis of the current state of medical education, the published regulations such as GMER, PGMER, and Super Specialty were examined. The three domains — **Competency, Publications, and Interdisciplinary training** specified in the term of reference were used to conduct the analysis. Regulations have been studied in the order of undergraduate, postgraduate, and super specialty programs.

A) Current status of Graduate Medical education

Undergraduate:

5.1 Competency
5.2 Publications
5.3   Interdisciplinary training

5.1 Competency:

Indian Medical Graduate (IMG) with five defined roles envisioned in **'Vision 2015'** document translated in **'Graduate Medical Education Regulations** (GMER)', 2019 (Clinician, Leader and Member of Health care team, Communicator, Professional and Lifelong Learner) and subsequently revised in GMER 2023 with addition of two new roles (Critical thinker and Researcher), forms the basis of present undergraduate medical program. The regulations have evolved to be more learner-centric, patient-centric, gender-sensitive, outcome oriented and environment appropriate through a competency based curriculum. The objective of the training program is to create an **'Indian Medical Graduate (IMG)'** possessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a physician of first contact of the community while being globally relevant(Fig.2).

Fig. 2: **Growth trajectory of Medical Education in India Flexner's report**
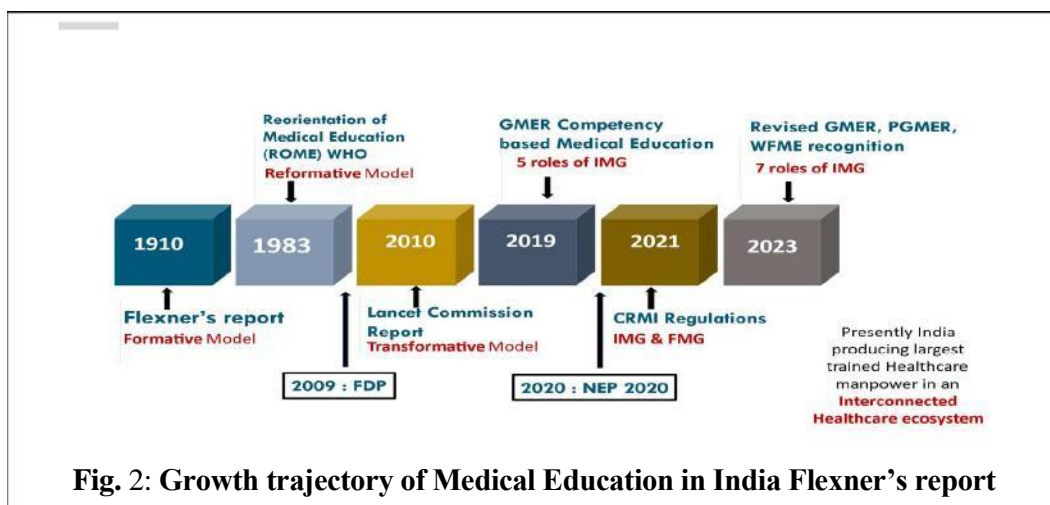
Modifications in the curriculum have been brought about to actualise the aspirations for a competent IMG in the form of Foundation course, Early Clinical Exposure, Alignment and Integration of subjects both horizontally and vertically (Sharing , Nesting and Co-relation), Student Doctor method of clinical training, Electives, Self-Directed Learning and Certifiable skills, build on the edifice of defined Core competencies.

The present curriculum is expected to produce an IMG who is competent to serve seven defined roles (two being newly incorporated in 2023 regulations) viz;

1. **Clinician** who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.

2. **Leader and member of the health care team** and system with capabilities to collect, analyse, synthesize and communicate health data appropriately.

3. **Communicator** with patients, families, colleagues and community

4. **Lifelong learner** committed to continuous improvement of skills and knowledge

5. **Professional** who is committed to excellence, is ethical, responsive and accountable to patients, community and profession.

6. **Critical thinker** who demonstrates problem solving skills in professional practice

7. **Researcher** who generates and interprets evidence
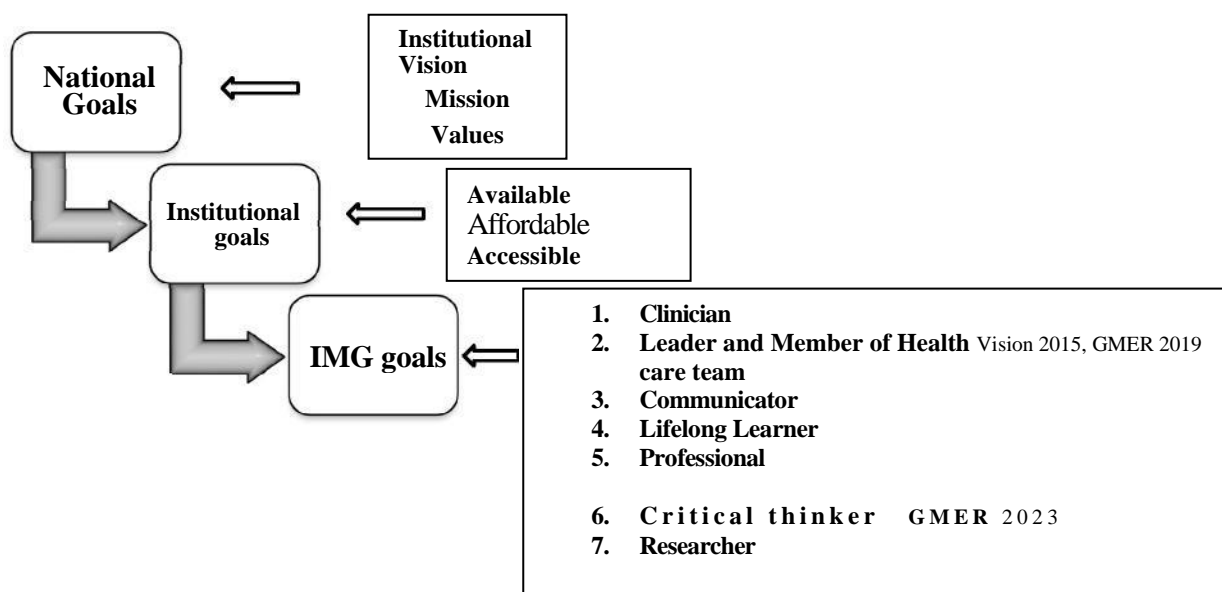
Fig 3 : UG Medical Education Model in vogue

The Global competencies to fulfil roles of IMG are translated into subject specific competencies within the curriculum of four and a half years. In particular, the curriculum

provides scope for early clinical exposure, self-directed learning opportunities and electives. Skill acquisition is ensured by necessitating certification of essential skills, including mandatory simulation lab in every medical school to provide multiple learning opportunities in a safe environment. The importance of ethical values, responsiveness to the needs of the patient and acquisition of communication skills is underscored by providing dedicated curricular hours in the form of a longitudinal program called **Attitude, Ethics and Communication (AETCOM)** skills and competencies. In addition, an attempt has been made to allow students from diverse educational streams and backgrounds to transition appropriately into the medical stream through a well laid out foundation course at the initiation of professional training. Formative and continuous internal assessment have been strategically placed to achieve the objectives of the curriculum. Minor tweaks in the summative assessment have been made to reflect evolving thought and regulatory requirements. Curricular governance and support have been strengthened. The parliamentary standing committee on medical education has recognised the importance and potential impact of the CBME particularly the AETCOM module and has emphasised the importance of implementing it with vigour.

5.2 Publications

The fundamental shift from rote learning to searching, analysis, and synthesis of information is duly acknowledged by identifying **'Researcher'** as one of the seven roles of an IMG. The role of Clinician, Lifelong Learner and Professional also has integral component of research skills as depicted below **(Table 1):**

Roles/Goals	Global competency
Clinician	Demonstrate familiarity with **basic, clinical and translational research** as it applies to the care of the patient
Lifelong Learner	Demonstrate ability to search (including through electronic means) and critically **evaluate the medical literature** and apply the information in the care of the patient.
Professional	Demonstrate a **commitment to the growth of the medical profession** as a whole
Researcher	**Generate** and **Interpret** evidence.

Table 1 : Global competencies against Four roles of IMG that necessitate inclusion of Research in UG curriculum

Though the above stated roles are defined well, the competencies catering to the specific above mentioned aspects of these role pertaining to 'researcher' is largely missing and so is the operational framework for developing analytical skills while undergoing the formal curriculum.

Equally pertinent in this context is the overall involvement of medical teacher in education research. Presently education research and publication is limited to being a mandatory component of Faculty development programs which is more often a voluntary initiative. In fact, education research as a concept has not been given enough credence by the regulatory authorities and policies in higher education. The faculty reward systems do not match the full range of academic functions which a medical teacher essentially undertakes as a curriculum planner, role model, facilitator, information provider, resource developer, mentor and assessor. The application of new knowledge to real problems through research, through synthesis, through practice and through teaching is not celebrated and is not considered as an indicator of enhanced teacher quality.

5.3 Inter-disciplinary education

The most comprehensive learning outcome of interdisciplinary learning is defined as **'Interdisciplinary thinking',** i.e. "the capacity to integrate knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement, such as explaining a phenomenon, solving a problem, or creating a product, in ways that would have been impossible or unlikely through single disciplinary means". Interdisciplinary thinking is a complex cognitive skill that consists of a number of sub-skills and learning outcomes. Besides advanced cognitive ability, interdisciplinary learning can increase the ability to recognize bias, think critically and tolerate ambiguity. In health care, knowledge and skills to arrive at comprehensive solutions, integration of knowledge and skills from different disciplines and knowledge domains is necessary.

GMER has placed emphasis on collaborative teamwork, professionalism and altruism by giving opportunities in the form of a defined role of IMG as **'Leader and Member of Health care team'** who works effectively and appropriately with colleagues in an inter-professional health care team respecting diversity of roles, responsibilities and competencies of other professionals. Opportunities also exist in the form of electives in interdisciplinary and trans-disciplinary domains, value added interdisciplinary courses. Students have the liberty to choose an elective course, like humanities, traditional medicine, biotechnology, and entrepreneurship. Internship period also has one week elective in Indian System of Medicine.

5. B. Current status of Post Graduate Medical education

Postgraduate

5.1 Competency

5.2 Publications

5.3 Interdisciplinary training

5.1 Competency

Admission: Admissions for post graduate courses are based on Entrance Exams conducted by a centralized manner, all over India. The test is National Eligibility cum Entrance Test for Postgraduate (NEET PG). This is the primary entrance exam for admission to MD (Doctor of Medicine), MS (Master of Surgery), and Postgraduate Diploma courses across India. Eligibility Criteria for admission for postgraduate are as follows:

a. MBBS Degree: Candidates must hold a recognized MBBS (Bachelor of Medicine, Bachelor of Surgery) degree from an institution recognized by the National Medical Commission (NMC).

b. Internship: Candidates must have completed a one-year compulsory rotating internship. c. NMC Registration: Permanent registration with the NMC or the State Medical Council is mandatory.

It has been observed and raised in 'Vision 2015' document also that not all the undergraduates get the opportunity to do postgraduation / super speciality medical education and they changed their stream due to less/NO other opportunities.

Curriculum: A recent curriculum revision also envisioned in the document "Vision 2015" from traditional to competency-based for post-graduate (2019) has brought about a makeover for the medical education system in India. In the 'Vision 2015' document it has been described the need to generate socially committed competent specialists for community health care. In the continuation of the same the goal of implementation of CBME is to train physicians who can compassionately provide preventative, motivating, curative, palliative, and holistic care. A framework of skills, or pre-defined abilities, is the basis of the curriculum and is used to organise the competency-based education that the NMC offers. These competencies are the observable skills of a health professional that incorporate multiple components across all domains, such as affective, psychomotor, and cognitive skills. It is composed of theory that

includes a thorough examination of the fundamental ideas, guidelines, and most current developments in the selected field. Practical training entails extensive hands-on training in managing patients, diagnosing diseases, performing procedures, and developing surgical skills where ever required. Students undertake a dissertation or thesis research work, contributing to the existing knowledge base within the field for inculcation of research skills. Some skills are deemed critical to the medical profession, and as such, NMC has made certification necessary. These skills are as under:

i) Research Skill- They must complete an online certificate program in basic research methodology successfully (BCBR), writing thesis and **at least one out** of poster/presentation/publication to make him/her eligible to appear in the final examination.

ii) Course in Ethics: The students have to complete a course in ethics including Good Clinical Practices or Good Laboratory Practices, whichever is relevant to become eligible to appear in the examination.

iii)Course in Cardiac Life Support Skills –It is mandatory to complete a course in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS) skills that has to conduct at the institution level.

iv)District Residency Programme (DRP): A compulsory rotation of three months in district hospitals / district health system as part of the course curriculum which has to be accomplished by the resident in rotation either in the third, fourth or fifth semester of their postgraduate programme.

Teaching and training modes, including tools, techniques, approaches and assessment tools: Present document of NMC entails that the Postgraduate training shall consist of training of the students through lectures, seminars, journal clubs, group discussions, participation in laboratory and experimental work, participation in research, clinical meetings, grand rounds, clinic-pathological conferences, practical training in the diagnosis and medical & surgical treatment, training in the basic medical sciences as well as in allied clinical specialities, etc. according to the requirement of speciality training. Also, it has been advised to use teaching strategies that introduce students to the practical aspects of the subject that are relevant to the basic and clinical sciences.

Assessment -Each medical college/institution has to conduct the Formative assessment (examination) and the University to conduct the summative assessment (examination). Both

the formative assessment (examination) and the summative assessment (examination) shall of Theory, Clinical/Practical, and Viva Voce as stipulated heads.

Accreditation: All approved post-graduate medical programmes must hold PGMEB accreditation as per PGMER 2023. However, the word **'Accreditation'** depicted in the said regulation is interchangeably availed with **'Recognition'** of the very course.

Minimum Standard requirements prescribed: The Minimum Standards of Requirements (MSR) has been prescribed by NMC for post-graduate medical education contains guidelines that medical colleges and institutes must adhere to.

5.2 Publications

For research skill development, postgraduate students are required to complete an online certificate program in basic research methodology successfully (BCBR) as per current PGMER regulations and to produce thesis, while publication of the work is not required. It gives students opportunity to actively get involved in research and to adopt evidence-based practices to improve patient outcomes. However, the fundamental idea of inquiry-based learning has been undermined by focusing on a single result from their research. Inter-disciplinary research with AYUSH asked to be encouraged.

5.3. Interdisciplinary training

Interdisciplinary training enhances the quality of patient care, research, and teaching in the medical field. Today's graduate needs to work together across disciplinary boundaries, as well as national and cultural barriers. There is no archival literature identifying learning outcomes, methods, or benchmarks for assessing interdisciplinary graduate programmes and associated student learning, particularly in medical education, despite the proliferation of interdisciplinary graduate programmes created to meet this need.

Medical professionals can gain a deeper comprehension of the socio-environmental aspects influencing their patients' health through interdisciplinary training. This method improves rapport with co-workers and improves patient care by fostering strong interpersonal relationships and open communication. Negative biases and preconceptions about disciplines could be lessened by emphasizing interdisciplinary education and improving the general standard of healthcare. As per current PG regulations the PG students must acquire basic management skills in human resources, materials, and resource management related to health care delivery, general hospital management, principal inventory skills, and counselling. In the

regulation it is also stated that institutions may arrange training in any other courses like **Awareness in medical audit, medical law, Exposure to human behaviour studies, Finance, Accounts,** which are beneficial to the postgraduate students. The new PG Curriculum encourages interdisciplinary training through the rotational postings in sister-departments. It also entails, inter-disciplinary research with AYUSH are to be encouraged, but guidelines for the same need to be determined for focused research.

C). Current Status in Super Speciality Programs

    5.1. Competency
    5.2. Publication
    5.3. Interdisciplinary Training

5.1. Competency

5.1 a. Infrastructure and Faculty experience:

The faculty experience and infrastructure

requirement of centers running super specialty courses are same as those running post graduate courses. There are no provisions for High fidelity simulation laboratories at the institutes running super- specialty courses.

5.1 b. Thesis /dissertation:

As thesis is mandatory during one's post-graduation, similarly it is also a part of the super-specialty program.

5.1c Assessment: The assessment guidelines are akin to the prescribed post graduate assessment methodology.

5.1d Faculty development programs:

It is generically depicted in a governing Regulation san specific.

5.1e Curriculum and syllabus:

1. The structuring of the curriculum and syllabi depict a substantial degree of tangible overlap specially in terms of thematic topics, skills, and competencies as well, which results in a palpable sacrifice of clarity, which resultantly ends up in an avoidable **'turf of war'** in regard to cases, beds, theatre time and insufficiency of clinical material germane to a specific department.

2. There is an observable mismatch between the objectives and corresponding syllabus and linked competencies thereto as listed.

3. Too many Super Specialty programs have been started in very niche topics which do not do justice to the training and without any required mapping of job opportunities in

the employment market for effective utilization of the highly skilled manpower, ending up in **'deployment surplus'** inter alia grossest underutilization of the super skilled manpower.

5.1.f Teaching and training modes, including tools, techniques and approaches linked thereto

The main mode of teaching is Self-Directed Learning with interactive sessions in the form of journal clubs, seminars, case presentations etc.

5.1 g Simulation based learning

Not explicitly prescribed in governing regulations.

5.1 h Modes of assessment including scheme of

examination and certification Assessment is the same as for broad specialty with no

difference.

5.1 i Minimum standard requirements prescribed:

The Postgraduate Medical Education Regulation in its ambit cover super speciality education as well.

5.1j Accreditation including ranking and rating

The word **'Accreditation'** depicted in governing regulation is used interchangeably with recognition of the course.

5.1 k Education programme evaluation

The end programme evaluation is still outside the ambit of governing regulations pertaining to the entire spectrum of medical education.

It is pertinent that a model needs to be availed for the purposes of education programme evaluation and the DANIDA Model could be the model of choice on the said count.

DANIDA MODEL:
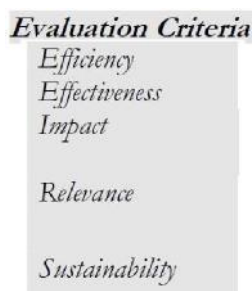
Fig 4 : **DANIDA MODEL**

(Evaluation guidelines, Ministry of Foreign Affairs, DANIDA, February 1999).

5.2. Publication

Presently it goes according to the Post Graduate Medical Education Regulations. The guidelines on Thesis are San Publications.

5.3. Interdisciplinary Training

There is no specific depiction in the governing **Regulation** as in vogue.

6. Recommendations

Undergraduate Medical Education:

6.1 Competency
6.2 Publications

6.3 Interdisciplinary training

6.1 Competency

6.1a Transition to Transformative Education: The transition from **Informative to Formative to Transformative,** as outlined in Lancet Commission's report, involve three fundamental shifts viz.

1. from fact memorization to searching, analysis, and synthesis of information for decision making;
2. from seeking professional credentials to achieving core competencies for effective teamwork in health systems; and
3. from non-critical adoption of educational models to creative adaptation of global resources to address local priorities.

The first fundamental shift, as recommended in Lancet Commission 2010, is largely addressed by introducing competency based medical education, however, it still does not take into consideration the redundancy of content already taught in higher secondary education which occupies a sizable space in 1st Professional year of medical training. A transition from fact memorization to higher level of learning need to include from 1st Professional year by restricting the contents already dealt in 12th Standard to just reinforcement and more provision must be made for learning application of basic sciences in clinical care and research. In fact, it is imperative to actualize this transition in view of National Exit Examination- NExT by NMC, proposed to be 90% based on analytical skills, problem solving and comprehension, for admission to PG programs and licentiate to practice.

CBME, though integrated in terms of defined global competencies; still operate in silos in the form of subject specific competencies, that too not in the order of **ascendency with progressive professional years.** For a competency to be converted to proficiency, it is necessary to build it in a step-by-step manner with gradually increasing the level of difficulty. The subject specific competencies need to be mapped with seven roles of IMG so that program outcomes can be succinctly measured. It is recommended to identify skills and competencies in an apparent historically progressive manner, with each ability logically connected to the others through a progression of understanding. This design places the curriculum in an ever-increasing mode of complexity, engagement and understanding. Ascendency of competencies, as the learner progresses in his academic term, is pertinent to ensure a logical progression towards development of skills and competencies. Also, aligning the so-called hidden curriculum by making the learning environment consistent with professional rhetoric and stated values can prove to be instrumental for catering to the role of 'Professional' along with few value added programs in transferable and life skills. The AETCOM module should also be suitably supplemented with **'Humanities',** especially in view of ever-expanding dominance of AI in Health care.

6.1b Outcome based education: The induction of India in the Washington Accord in 2014 with the permanent signatory status of the National Board of Accreditation (NBA) was considered a big leap forward for the higher- education system in India. Thus, an Engineering graduate from India can be employed in any one of the other countries who have signed the accord. Similar recognition was given by World Federation of Medical Education (WFME) in 2023 to National Medical Commission by accreditation to all 700+ existing medical colleges in India and the automatic accreditation of new medical colleges that will be set up in the coming 10 years. The recognition will pave way for aligning medical education with global best practices and benchmarks and enable Indian medical graduates to pursue postgraduate training and practice United States, Canada, Australia, and New Zealand. Indian students have now become eligible to apply for Education Commission on Foreign Medical Education and United States Medical Licensing Examination. One of the major initiative desirable in this direction is to fortify the existing curriculum in an outcome based structure with that has Clarity of focus (having specific outcomes gives a strong sense of purpose to everything teachers and students do), Design down, Deliver up (when planning curriculum, educators start with the outcomes and work backwards; when planning instruction, teachers teach what students need

to learn to demonstrate the outcomes), Optimal Expectations (the shift from traditional approach in its assumption that all students can learn well—although not in the same way and not necessarily on the same day), and Expanded opportunities (students must be permitted to demonstrate their learning in different ways, and they must have numerous opportunities to demonstrate the outcomes). A proposed framework for Outcome based education and assessment in HPE-A 4 step escalating model for Outcome based medical education is proposed as depicted **(Annexure -1)**

It is crucial that graduation is contingent on ascertainment of the ability of the learner to function independently as a physician of first contact. The acquisition of the performance **(P)** outcomes in the internship years must be an extension of the **'Shows How'** levels of achievement in pre - internship learning period and must be achieved through observation - assistance -supervised performance - apprenticeship - assessment and certification **(Annexure-8).** A list of critical certifications upon which graduation and registration as a medical practitioner are contingent **(Annexure -2).**

6.1c Technology Enhanced Medical Education:

Education landscape has drastically changed with the advent of technology, more so with the evolving role of **AI** in education. **It** has also resulted in a dramatic shift in the way medical education, practice and research was ever imagined. Access to entire body of knowledge in just click of a button has transformed the theoretical principles of teaching and learning in medicine as well and also so is the necessity of incorporating a formal basic training at both levels, i.e., learners and facilitators to enable optimum utilization of **IT** in teaching learning activities. Curriculum delivery in majority medical schools in the country is primarily face to face, either in large or small groups. The advent of Learning Management Systems to supplement and reinforce face-to-face instruction and learning experiences should now find an integral place in medical education at all levels. **It** can engage students efficiently in a competency driven curriculum by offering multiple learning opportunities, learning at their own pace and continuous assessments. LMS can record the complete learning life cycle of a student that can be accessed anytime and anywhere in future. **It** can aid in the delivery of medical education, broaden the capacity for tracking and reporting of teaching and learning, simplify and automate administrative tasks and aid in curriculum governance.

A 'Seven-pronged Blended learning model for Indian Medical Graduate (IMG)' is proposed that blends actual and virtual worlds of instructional delivery for optimising learning outcomes.(Annexure -3)

Equally pertinent is the need of curriculum update incorporating AI related competencies that brace future doctors for provision of optimum Health care. Taking into consideration the potential impact of AI in health care, there is an urgent need of incorporation of AI driven training wherein learners develop a clear understanding of the four Vs of big data: **Volume** (the amount of data today is vast compared with the amount in the past); **Variety** (data come from many different sources of varying validity); **Velocity** (data are being generated very fast and momentum is increasing); and **Veracity** (the quality of the data being generated needs to be assessed) in the domain of **'Digital Data Analytics'.** The arena of **Deep learning, Machine Learning and Neural Network Mechanisms** also need to be brought under the ambit of the curriculum. The intersecting role of Artificial Intelligence in identifying disease patterns by analyzing patient data, genetic make-up, lifestyle, medical history (AI) for enabling tailored treatments and preventive strategies have revolutionized the concept of personalized medicine. Hence, **Digital literacy** encompassing skills to effectively navigate digital environments, evaluate and create information using digital technologies becomes a crucial competency for an IMG. The inclusion of social and ethical dimensions of AI in health care should also be emphasized.

Courses through Distance learning, Massive Open Online platforms such as SWAYAM, NPTEL, Coursera, e learning platforms like Access Medicine, Royal Society of Medicine etc. are excellent sources to fortify curriculum with value additions in creative and divergent competencies by bringing experts from diverse fields across borders, a recommendation so vehemently put forth by Lancet Commission in its report in 2010.

6.2 Publication

6.2a. IMG as a 'Researcher':

Each of the four roles of IMG viz; Researcher, Clinician, Life Long Learner and Professional identifies 'Research and Analytical skills' as an integral component, however; the competencies catering to these roles are largely missing in the operational framework of formal

curriculum. Translating the four roles into operational framework of defined competencies and a structured module on Bio- medical research including Basics of research methodology, literature search, research gap analysis, research question, writing objectives & hypothesis, study designs , sampling, data collection & analysis, biostatistics and data Analysis (Quantitative & Qualitative Studies) ,writing research protocol, critical review of published research and scientific writing, is vital for inculcating research and analytical skills. Since the related competencies are expected to be of the level of **'Shows How';** instructional strategies must focus towards active, experiential learning by sensitizing students about research methodology during Foundation course. Adequate opportunities must be put place by offering electives in which Research projects, Community based research/cohort, identification as a part of community-based learning and opportunity to apply for research grants like ICMR – STS.

A provision for prospective consideration in the form of a teaching learning module titled **'Biomedical Research Module'** may be picturesque in the present scenario of improving and arming the IMG in terms of making him/her an valid, avid, vivid, clear headed researcher in medical subjects and medical education. There is a need of research module which will include all competencies related to biostatistics, biomedical research and epidemiology and will span across all 4 professional years of the Undergraduate MBBS course. The competencies thus selected will be arranged sequentially in a chronologically progressive fashion in an ascending manner of complexity of understanding across the 4 professional years of Undergraduate MBBS course. Proposing the **'Biomedical research module'** as suggested above that will introduce the undergraduate learner to basics of biomedical research across the undergraduate course progressively in an ascending manner of complexity of understanding. The ascendency of research skill competency extended to Postgraduate and Super Speciality Courses would be in terms of **'Outcome generation'** in the form of original research work carried out and embodied in the form of a Thesis, which is a separate head for end certification at the respective levels.

In the same vein the outcome basis should be in the form of generation of at least one publication in peer reviewed Indexed Journals by the undergraduate learner and 4P operational model applicable to Postgraduate and Super-speciality study and one Review research article and another Original article exclusively published in peer reviewed Indexed Journals as a prescribed binding requirements mitigates the outcome based flow of ascendency of the

research skills (Annexure 4). The list of such indexed and peer reviewed journals may be prescribed, catalogued and recommended by the apex regulatory body for such purposes.

The opportunities for the learner at Undergraduate, Postgraduate or Super-speciality levels of medical education may be handily provided via various research projects run by National and International agencies such as Indian Council of Medical Research (ICMR) in the form of Short Term Studentship projects **(SRS), 'electives'** based on biomedical research provided by various National and International Institutes, various National and International research funding agencies which enlist their thrust areas of research thereby guiding the learner to plan and select proper and apt research titles for thesis and/or dissertation purposes as a part of summative assessment at desired level of medical education with reference to Postgraduate and Superspeciality Medical Education. This is how, **'initiation'** and **'inculcation'** of research skills will get **'consolidated'** within the mind of the medical learner and will lead him/her to **'certification'** and further **'maturation'** of research skills subject to research pursuits in the field of medical subjects and/or medical education.

This proposal may be read in tandem with the **'curricular reforms'** proposed in the **'Vision 2015' document** by the **Medical Council of India** as a potential strategy to strengthen the Indian Medical Education so that the **Indian Medical Graduate (IMG)** excels against International Medical Education standards.

A depiction of progressive ascendency of research skills across the continuum of medical education in terms of outcome is depicted diagrammatically herein below (**Fig. 5**):
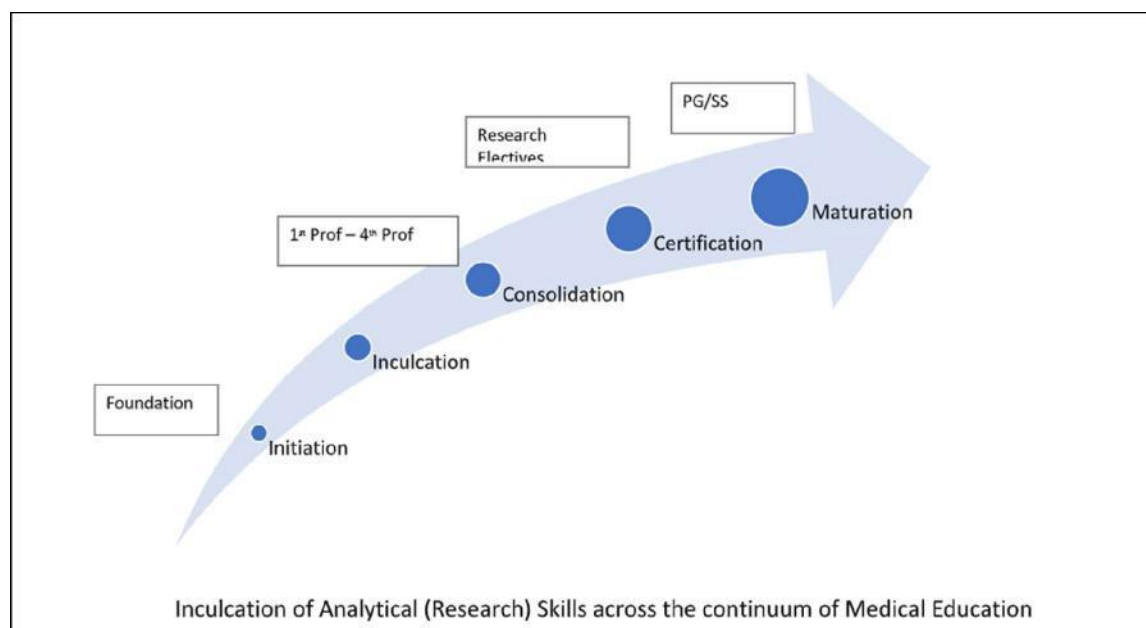

Inculcation of Analytical (Research) Skills across the continuum of Medical Education

Fig. 5 Ascendency of research skills across the continuum of medical education

6.2b Education Research, Publications and Scholarships

Educational research refers to a variety of methods, in which different aspects of education are evaluated, including but not limited to, student learning, teaching methods, teacher training, assessments, classroom dynamics, curricular aspects etc. The overall aim of educational research is to provide teachers, clinicians, managers and learners with systematically obtained information that helps to improve the quality of the learning process. Documenting the relationship between education and patient outcomes represents one of the biggest challenges and greatest opportunities in medical education research. Hence it is always aimed towards providing better quality health care to patients. The third desirable shift envisioned in Lancet commission 2010 of **contextual educational models,** based on local priorities, and are limited to a component of faculty development program which mandates education research. A very glaring recommendation in Lancet is establishment of a culture that encourages generation of contextual models in medical education, informed by theoretical principles and region complexities. A major initiative in this direction is desirable that encourage contextual multi-centric trials on medical education in the country, generate robust evidence for generalization of such educational models, methods and SOPs through scholarly approach.

The biggest challenge is doing educational research in naturalistic settings that carry threats to validity such as loss of subjects, selection bias, historical events or maturation. Generalizing such evidence-based practices in a different settings is a significant challenge. A collaborative effort with multi-centric studies among Institutions with similar standing will prove to be of major consequence to mitigate such challenges. Research in health care is often comprehended as basic biomedical or clinical research. Present education policies do not identify education research as one of the major indicators to validate teacher quality, promotions and scholarships. Inadequate funding for education research is another reason for lack of contextual models in medical education. A policy framework of recognition and reward system which strikes a balance between Education research and Biomedical research, by giving similar credence to evidence based education and evidence based health care practice is need of the hour. Institutional policies and Accreditation parameters may consider various categories of contextual, evidence based educational scholarships (human and digital) like Teaching excellence, Innovative Instructional pedagogies, Integrated curricular frameworks and engaging Teaching learning resources.

6.3 Inter-disciplinary Training:

6.3a IMG as Leader and Member of Health Care Team : Rapid growth in complexity of health care environment pose a major challenge to IMGs who may not be fully equipped to meet the demands of health systems in place. The current regulations have placed emphasis on collaborative teamwork, professionalism and altruism; however, the health care team extends beyond that of medical students, residents and attending physicians. Role of IMG as a 'Leader and member of health care team' addresses the second shift as envisioned in Lancet Commission, however, the overall curriculum is still segregated into core subject specific competencies rather than being integrated. Though opportunities exist in the form of electives, few interdisciplinary courses and value-added courses, the overall competency framework is still subject based, thereby defying the entire concept of working in a inter/trans professional health care team. The current **'Regulations'** provide opportunities for interdisciplinary learning opportunities with limited scope. Training in other allied health professions is vital to help mitigate patient misconceptions and utilize the full potential of each health care worker as an efficient team member. The core competencies must seamlessly integrate interdisciplinary elements and pave way for value additions in trans-professional space like health engineering, health law, health informatics, health finance and health management, Artificial Intelligence in health care etc. Ancillary modalities such as shared seminars that foster cross-professional interaction, cooperative course work, cooperative professional volunteering, and inter-professional living-learning accommodations should be considered. Bringing in health care industries to participate in designing curriculum and fortifying healthcare knowledge and skills in all its dimensions will also aid in integrating disciplines and understand the need and demands of profession. Inter-professional education and team learning are not limited to the classroom.

The concept of **'Team Medicine'** and learning opportunities to work in an Interdisciplinary and integrated health care team (both simulations based and in real life settings) must be included in early part of training to enable effective working in an inter-professional and trans-professional team keeping abreast with highly advanced medical technology and diversified patient needs. Correspondingly, the graduate curriculum must suitably embody opportunities for learning interdisciplinary and trans-disciplinary knowledge and skills. The curriculum requirements, faculty qualification infrastructure and training and assessment standards for Interdisciplinary training need to be explicitly specified in existing regulations.

The Inter-professional skill training primarily requires identification of related competencies and aligned teaching strategies. Encouraging collaboration between different disciplines as a part of instructional strategy, such as medicine, engineering and data science, can help students gain insights into how technology can be applied in health care. By fostering collaboration among multidisciplinary experts from various domains, medical education can create a comprehensive learning environment. Few strategic methods that can be adopted are as follows;

1. Strong partnerships between academia and the health care industry can help bridge the gap between theory and practice.

2. Collaborate with companies that specialize in health care technology by facilitating internships, guest lectures and research opportunities to ensure that students receive practical exposure to emerging technologies.

3. Clinical postings can be a practical approach where students can attend ward rounds and grand rounds with interdisciplinary team and specialists.

4. Training modules in simulation lab may specifically be designed to simulate interdisciplinary team approach like Accidents, lifestyle disorders, neurological disorders.

5. Incorporate collaborative experience and interdisciplinary projects during medical education will prepare graduates to thrive in team-based health care environments. **6.3b. Academic flexibility:**

Academic flexibility is one of the core principles of NEP 2020 that seeks to reform the Higher Education system by providing flexibility to students in terms of choice of subjects to study and academic pathways, thus abolishing the currently prevalent rigid boundaries. The idea is to enable the learner to choose and learn as per their preference, convenience, or necessity. The underlying foundation of liberal education that develops intellectual, social, ethical, analytical, and aesthetic capacities of all learners is still at a nascent stage as far as medical education of the country is concerned. A prudent step in this direction can be to make the entire curriculum **credit based** and a framework of **flexible pathways** for a learner in health professions. A framework is proposed **(Annexure -5)** to enable a more flexible education model in HPE with equal emphasis on intra, inter and trans-disciplinary components. Keeping in mind the envisioned principle enshrined in the **Vision 2015** document in regard to providence of **electives** for a duration of 6 months upon completion of core curriculum in **8 semesters (4 years),** another approach would be to reduce the duration of **'Core'** curriculum to 4 years and offer **6 months (1 semester)** for **'Elective'** courses as per learner's choice and aspirations. An

array of **'Electives'** may be offered in Inter/Intra/Transdisciplinary domains across the training period as a mark of genuine enrichment of the curriculum and associated outcome thereof.

A provision ought to be considered in Medical education for innovative and interchangeable curricular structures, is about enabling creative combinations of Courses or Programmes in Disciplines of study leading to Degree/Diploma/Post Graduate Diploma/Certificate of Study offering multiple entry and exit providence, while removing rigid curricular boundaries and creating new possibilities of life-long learning.

An academic service mechanism as a digital entity, established by the UGC to facilitate students to become academic account holders, is by creating a unique Academic Bank of Credit (ABC ID), which enables seamless student mobility through a formal system of **credit recognition, credit accumulation, credit transfers** and **credit redemption.** If academic flexibility is to be actualised in medical education, this formal mechanism needs to be embraced in letter and spirit for promoting flexibility of curricular framework and interdisciplinary / multidisciplinary academic mobility of students with diligent emphasis on invocation of credits in tandem with international parlance.

Academic bank account will enable all academic credits earned by the student from course(s) to be deposited, recognised, maintained, accumulated, transferred, validated or redeemed for the purposes of the award of degree/diploma/certificates etc. by an awarding Institution and also international mobility.

In a nutshell , the present report has identified the **'Structural gaps'** pertaining to the role of IMG as Lifelong learner, Professional, Leader and Member of Health care team, Researcher and Critical thinker and has recommended measures to mitigate those gaps as depicted in (Fig 6).

1. Life Long learner	2. Professional	3. Leader and member of Health care team	4. Researcher	5. Critical Thinker
• Academic flexibility - Flexible learning pathways and Electives	• Digital Literacy • Training in AI in	• Team Medicine • Interdisciplinary and transdiciplinary learning	• Ascendency of research skills across the continuum of medical education - Biomedical Research module	• Address redundancy in curriculum • Ascedency of competencies

Fig 6 : Recommendations to mitigate the structural gaps pertaining to 5 roles of IMG, as identified in the task force report

Under Graduate Medical Education

SUMMMARY STRUCTURAL GAPS - RECOMMENDATIONS

COMPETENCY:

Sr. No.		Recommendations
1.		**1.Transformative medical education** *To be fully actualized, the operational framework to cater to all seven Roles of Indian Medical Graduate (IMG) in terms of course outcomes a 4 step escalating model for Outcome based Medical education has been proposed.* *(Annexure-1 & 2), aligned instructional strategies, learning opportunities and valid assessment tools must be succinctly prescribed by the regulatory body (**Annexure-8**).*
2.	The skills and competencies are not in an apparent historically progressive manner, with each ability logically connected to the others through a progression of understanding. This hampers the development of higher order of cognition. To achieve the same the competencies should be integrated and should be prescribed in a logical ascending manner.	**Structural Gaps** The competency based model has identified subject specific competencies, however, not in the order of ascendency in progressive professional years. There is a need of framework for Outcome based education and assessment in HPE
3.		**2. Critical thinker /analyser** *It is required to map the course content of higher secondary education and graduate medical education, address redundancy and make space for competencies that ascend in logical progression towards inculcation of requisite knowledge and skills, in order to attain the Higher order thinking skills as proposed in National Exit Examinations (NExT) Regulations (**Annexure -3**).*

There is necessity of incorporating a formal basic training at both levels, i.e., learners and facilitators to enable optimum utilization of ICT in teaching learning activities. Equally pertinent is the need of curriculum update incorporating AI related competencies that brace future doctors for provision of optimum Health care.	*3 : Technology enhanced medical education* *Incorporation of ICT in the form of High Touch-High Tech– Holistic approach in curriculum design is recommended based on the concept of High touch enhancement (interpersonal skills) and High-Tech integration (clinical skills).* *Technological advancements in health professions training & practice and the intersecting role of Artificial Intelligence in analyzing patient data, genetic make-up, lifestyle, medical*

		history for personalized medicine warrants Digital literacy as a core competency for an Indian Medical Graduate which should also suitably address social and ethical dimensions of AI in Health care. *A 'Seven -pronged Blended learning model for Indian Medical Graduate (IMG) has been proposed that blends actual and virtual worlds of instructional delivery for optimising learning outcomes'. (**Annexure** -3)*
4.	**Academic flexibility -** The medical curriculum is not credit based and hence not suitable for National and International mobility. A framework of flexible pathways for a learner in health professions is not in place.	***4. Choice based Credit System Equivalence to International standards*** *A shift from annual to **semester based structure** of Graduate Medical Education, fortified with an outcome-based framework, is advocated, for making provision for flexible, personalized learning pathways and analyze attainment of learning outcomes.* *A dedicated semester to Electives in Intra-disciplinary, Inter-disciplinary or Trans-disciplinary domains may be considered in this regard. Creation of unique ABC ID for every learner shall enable seamless mobility across specialties and disciplines by a formal mechanism of **Credit allocation, recognition, Credit accumulation, credit transfers and credit redemption** respectively, ensuring its international parlance in conformity with the principle depicted in National Education Policy, 2020 (**Annexure -5**).*

PUBLICATION:

Sr.No.	Structural gaps	Recommendations
1.	To address the role of IMG as a researcher, there is modality for inculcation of research skill in an undergraduate. The instructional strategies are not described to accomplish this role. Similar to core competency this skill should be addressed in the curriculum.	*1: Generate, Interpret and Publish evidence.* *To cater to the role of 'Researcher' as identified in GMER 2023, the specific competencies to inculcate research and analytical skills, in the order of ascendency; need to be prescribed in graduate medical regulations along with specific professional year-wise objectives, training modules, teaching learning and assessment strategies ultimately culminating in a scientific publication. This will enable IMG to generate, interpret and publish evidence and contribute to the ever-expanding field of health care.* *A structured operational module on Bio-medical Research including Basics of research methodology, early from foundational to core curriculum, with ascending competencies has been recommended in (**Annexure-4**).*

INTER-DISCIPLINARY TRAINING

Sr. No.	Structural Gaps	Recommendations
1.	Though opportunities exist in the form of electives, few interdisciplinary courses and value added courses, the overall competency framework is still subject based, thereby defying the entire concept of working in a inter/trans professional health care team.	*1: Team Medicine* *Team Medicine should be introduced in graduate medical education with adequate training to practice in an inter-professional and trans-professional team, keeping abreast with highly advanced medical technology and diversified patient needs. Correspondingly, the graduate curriculum should suitably embody opportunities for learning interdisciplinary and trans-disciplinary knowledge and skills.* *The core competencies must seamlessly integrate interdisciplinary elements and pave way for value additions in trans-professional space like health engineering, health law, health informatics, health finance and health management, Artificial Intelligence in health care etc.*

6. Recommendations:

Postgraduate Medical Education:

6.1 Competency

6.2 Publications

6.3 Interdisciplinary training

6.1 Competency

6.1. a. Transformative medical education:

Curriculum: After a post-graduate student completes his programme, the institute and the regulating body have an obligation to ensure that they have attained the minimal level of competency required and are capable of working independently as experts, researchers, or medical educators. Competences have been recognized in the published PGMSR, but it is still necessary to identify the methods for achieving and evaluating the same. The competencies taught in medical curricula must be grounded in the local, national, and international contexts as well as patient-specific needs and requirements. There are following areas which requires to be addressed.

i) Finding the core skills applicable to all general specialties as well as the specialised skills exclusive to the field in medical education is crucial. As per WFME, rather than describing or prescribing the entirety of an individual rich postgraduate experience and related in-depth learning, or the full characteristics of the individual, safe, independent practitioner that the postgraduate medical education programme sets out to produce, a postgraduate curriculum should define the essential and minimum required outcomes and experiences. Entrustable professional activities (EPA) are essentially competences in context, or the integration of skills required to perform the professional tasks related to a specific specialty that a competent clinician is expected to perform.

ii) To reach the highest international standards, it required that medical education programs should be transparently and periodically assessed. The tools and techniques for internal assessment and formative assessment should be specified for the achievement of course outcomes in competency-based curriculum. According to WFME, the programme should include a number of **Formative and Summative assessments** that focus on how the postgraduate doctor is developing in his chosen speciality and what performance standards he

needs to meet to advance to more responsibility for patient care. Learning through patient care has unpredictable elements. Therefore, supervision and feedback rather than isolated teaching become important educational tools, in addition to teaching in the clinical environment as mentioned in Vision 2015 document as well. Since the system's goal is to make sure that doctors are prepared for independent practice, monitoring post-graduate doctors while they provide clinical services ought to be a key component. The competent authority should have an assessment system that is related to the objectives and processes of the postgraduate programme. To reach the highest international standards, it has been suggested that medical education offered by medical institutions should be transparent and periodically assessed. The tools that are accessible include the **Objective Structured Clinical Examination (OSCE), DOPS (Direct Observable Procedural Skill), and Mini-CEX (Mini Clinical Evaluation Exercise),** which are the methods of assessing the residents by attentively observing a history and physical examination followed by feedback. These can be implemented for CIA and formative assessment. Competencies should be shifted from predominant cognition to involvement and engagement of the learner in searching, analysis and synthesis of information and subjecting them to simulator decision making.

The Virtual training laboratories may act as the cornerstone for such problem-based learning and dedication of competencies wherein more of psychomotor and affective domains are involved, standardized patient programme may be considered to be a part of the standard curriculum and assessment of the learner forming some part of the continuous internal assessment.

iii). Faculty Development program - The Curriculum Implementation Support Programme for Undergraduate Competency Based Curriculum has been implemented in which medical faculty receives the training in competency-based education, including the objectives, concepts, scope, competencies to be learned, teaching and learning strategies, and evaluation and assessment formats. To meet the requirements of a postgraduate competency-based curriculum, faculty members should be trained in advanced technologies and need to participate in a similar type of programme also supported by' Vision 2015' MCI document. In the WFME report for standards for PGME, it has been emphasized that a successful postgraduate medical education programme depends on having a sufficient number of knowledgeable, devoted, and well-trained instructors, clinical supervisors, and support

personnel from various fields in addition to technical and administrative personnel. It is recommended that Advanced course in Medical Education should be mandatory for Postgraduate Guides. All postgraduate guides should be trained through the advanced course that is currently in vogue. Clinical supervisors and teachers are the two roles that has been emphasized in the WFME report. A teacher's job is to lead learning activities that target particular knowledge and skill areas, while a clinical instructor's job is to supervise and provide postgraduate medical education to postgraduates as they work.

iv) DRP - As recommended by WFME that there may be formal education and training events away from the workplace. The DRP was introduced, but the outcome of the same needs to be elaborated in the form of identified competencies to be attained and an assessment tool for the same.

6.1. b. Critical thinker /Analyzer:

i). Progression of competence - The skills are placed in an apparent historically progressive manner, with each ability logically connected to the others through a progression of understanding. This makes it easy to identify the assessment techniques. This design should be placed in the curriculum in an ever-increasing mode of complexity, engagement, and understanding.

In the context of post-graduate medical education, according to the WFME, a system of assessment must exist, which incorporates multiple assessments that achieve the purpose of the responsible body and its stakeholders, including the communities served. To support this, the programme must have a series of formative and/or internal assessments that address the development of the post-graduates in their chosen speciality, as well as levels of competence and performance that the post-graduates must achieve before moving on to increased responsibility for patient care. The observation of post-graduate physicians in the provision of clinical services should be central to the system, given its aim of ensuring readiness for independent practice **(Annexure-8).**

6.1. c. Technology Enhanced Medical Education:
i). Infrastructure is required for the use of simulated and guided settings to demonstrate the acquisition of skills in addition to the requirement that the student be competent enough to perform specific skills within the program. There should be mandatory inclusion of facilities as virtual resources and simulations, artificial intelligence, and information technology services to meet international standards.

ii). Inclusion of training in Technology: The introduction of technology and the growing significance of artificial intelligence (AI) in education have fundamentally altered the context of education. Additionally, it has led to a significant change in the way that medical practice, teaching, and research were previously thought about due to easy and convenient access to a vast body of knowledge.

To ensure the best possible use of IT in teaching and learning activities, both learners and guides must undergo formal training. It is necessary to fundamentally change the medical curriculum to prepare aspiring physicians for their new responsibilities in the AI era.

Curriculum revisions incorporating AI related competencies that brace future doctors for provision of optimum health care. Incorporation of information communication technology in curriculum is need of the hour.

The landscape of Indian Postgraduate Medical Education (PGME) is witnessing a significant transformation driven by the integration of various technologies. The COVID-19 pandemic has accelerated and expanded the adoption of e-technology specially Telemedicine Globally. Currently, even in low-income countries, diagnostic and medical services are becoming more accessible. However, many difficulties regarding digital health technology remain unresolved, including reliability, safety, testing, and ethical considerations. **Virtual Reality (VR) and Augmented Reality (AR) Simulations (SimMan, Medical Realities, EchoPixel, HoloMed),** offer immersive and realistic clinical scenarios for practicing procedures, enhancing decision-making skills, and reducing risks associated with real-patient practice.

6.1. d.: Pedagogy Skill:

According to PGMER the PG students must take part in the teaching of UG medical and paramedical professionals. PG students must achieve the competencies described in the regulations; however, the teaching and assessment modalities have not been determined. This is a notable entity, as candidates are selected directly for the teaching post after three years of residency.

6.1. e. Policies for patient safety:

i). It is required to include the regulation in the PG MSR related to the post graduates medical errors and patient safety in the context of postgraduate medical education in order to construct a high-quality care system.

ii). The authorities seem to stick to the Minimum Standards of the regulations, as a result, the maximum is never reached. Sanctioned posts for Faculty/Senior Resident/Junior Resident are based on the Minimum required. This leaves very little scope for increasing the number of teachers. Critical appraisal of the upholding of stipulated levels of patient safety need to be put to **'Periodic audit'** through **'standing mechanism'** created thereto.

6.1. f. Evaluation of education program:

i). Need strategies for Evaluation of education program – As of now, there is no policy in place for programme evaluation in medical education programs. Any educational programme needs to be periodically evaluated in order to be improved. The WFME states that it is crucial for the institutions to routinely evaluate the system as a whole for improved outcomes. **DANIDA Model** is proposed to be availed for the same.

Guidelines for Curriculum review – The postgraduate medical education program's management, outcomes, and activities should be regularly reviewed to ensure that they are appropriate, effective, and compliant with the program's mission, curriculum, and regulations. This will also allow for early problem-solving if issues do arise. WFME report reinforces that the responsible body should put in place a locally created quality improvement system that covers postgraduate medical education in practice, administration, programme outcomes, and mission accomplishment on a regular basis, along with suggestions for improvement.

Periodic review of the curriculum should be included for quality enhancement and need based timely implementation of new reforms. Curricular change must be incremental. Changes must be preceded by significant preparation of faculty through training along with creation of support mechanisms.

Recommended model for evaluation of education program – The formulation of guidelines for education program should be in place. The concept AICTE evaluation modality can be adopted which is already in vogue in our country. Other than that there are many models for the same for example - **CIPP Model (Context/Input/Process/Product):**

This model divides program evaluation into four domains:

- **Context Evaluation: Assesses learner needs and structural resources.**
- **Input Evaluation: Evaluates feasibility.**
- **Process Evaluation: Assesses implementation.**
- **Product Evaluation: Examines intended and unintended outcomes**

6.1.g Choice based Credit System and equivalence to international standards:

i). The current GMER makes no mention of the choice-based credit system or how our graduate degrees meet the requirements of postgraduate education around the world including providence of Academic Bank of Credits in terms of National Education Policy, 2020.

ii). the medical curriculum now includes learning outcomes, course outcomes, and program-specific outcomes. As a result, the current evaluation system must be strengthened in accordance with worldwide standards.

6.1.h Academic Flexibility (NEP 2020) and Impact :

It is a fact that duration of medical education is more than any other course and because of minimal seats for postgraduation against undergraduate seats many students go for second or more attempts which indirectly not only increase the duration but also gives frustration and they opt for change of stream, which is a loss to medical fraternity in the form of trained manpower. The gap in between the available annual intake of undergraduate programme as against postgraduate avenues is substantial and emergence of 1:1 ratio in between the two is still a far cry. As such suitable modality for filling the interregnum is desired.

The issues enlisted above need to be dealt by
1. By incorporating academic flexibility in tune with **NEP 2020.**
2. Commensurate increase in postgraduate avenues of education through **reviving the hitherto postgraduate diploma course by an altered nomenclature.**

Suggested operational modalities for the same as per **Annexure -9**

6.2 Publications:

6.2.a Researcher - Generate, Interpret and Publish evidence

i) Research and publications play a crucial role in **Indian Postgraduate Medical Education (PGME).** Conducting research exposes students to the scientific process. There are many advantages of research skill such as helping in teaching them to critically analyse information, formulate research questions, and design studies, nurtures critical thinking and inquiry skills. Engaging in research encourages students to delve deeper into specific topics, gaining expertise beyond the textbook. Publishing findings contributes to the existing knowledge base and keeps them updated with the latest advancements. Research helps in

inculcating the skill of clinical practice by providing evidence-based approaches to diagnosis, treatment, and preventive strategies. Limited research funding and lack of infrastructure in many institutions hinders the research activities as well as ensuring ethical research conduction.

ii). Research and publications are indispensable elements of PGME, contributing to well-rounded medical professionals with strong clinical, communication, and research skills. Addressing the existing challenges and fostering a research-conducive environment is essential to fully realize their potential and advance the field of medicine. Interdisciplinary research in medical education enriches our understanding, enhances teaching methods, and ultimately benefits patient care. Few proposed arenas of Interdisciplinary research in medical education are suggested (**Annexure -6**)

iii).Collaborative Research:

   □ Inter-disciplinary research with AYUSH asked to be encouraged, but guidelines for the same need to be determined for focused research.

   □ '**Consortia approach'** to **'Standalone institutions'** to do collaborative research with reference to health professional education wherein an outlook regarding inter-professional and intra professional research domains may be identified, thrust areas of research may be identified wherein multi-centric research may be specifically targeted and results generated may be stronger as compared to research conducted at standalone institutions.

   □ Funding deficiencies for research on health professions education, subtle areas of research in medical subjects related disciplines such as Allied Health Sciences must be addressed.

   □ To accomplish these, identifiable mechanisms need to be developed. In the current context, the development of management skills by PG students is critical. The requirements to master the skill must be taken into account.

iv). 4P Model – All 4 should made compulsory for postgraduates.
   1. Post Graduate Induction Program- first year in first term.
   2. Poster Presentation – Second year; third term
   3. Podium presentation - Second year; fourth term
   4. Paper publication – third year; fifth term

6.2.b Educational scholarships &Funding:

There is a need of provision for availing educational scholarships and research publications for faculties and PG students as a mandatory inclusion for career advancement. Adequate financing, capacity building and collaborative research is necessary in this context.

6.2. c Consortia and Collaborations:

i). Through partnerships with other prestigious scientific associations and Indian government-designated Institutions of Eminence and Excellence, medical research can be further stimulated to produce the best possible doctor-scientists. Promotion of AYUSH-related interdisciplinary research has been emphasized in the GMER but it should not be limited to this only. Trans-disciplinary research guidelines and recommendations need to be included.

ii). Multidisciplinary research, those extend beyond the fields of science, technology, engineering, and mathematics (STEM); the social, economic, and behavioural sciences are important contributors to the advancement of clinical practice and public health. The function of the arts and the humanities in general has been the subject of several contemporary study initiatives. Moreover, **'silo-thinking',** which is sometimes associated with a mono-disciplinary approach needs to overlook the real opportunities for progress presented by disciplines other than biology or medicine.

As such, integration through incorporation of **'Humanities'** spread across the curriculum in a structured manner would dispense the same.

According to the Lancet Commissions Report of 2010 titled "Health professions for a new century: transforming education to strengthen health systems in an interdependent world" and the Flexner Report of 1910, both reports a century apart from each other, the latter being centennial to the state that there is a need to initiate reforms on various levels – **'Institutional'** as well as **'Instructional'.** It addresses the growing gaps, differences, inequities noticed in between different nations and also in between different regions and areas of the same nation as well. This leads to an imbalance of uniform distribution of workforce and manpower across all concerned areas both within and across national borders. Another issue is the static and piece meal nature of educational curricula and syllabi thereto.

As such, the **'Institutional reforms'** depicted in Lancet Commission Report brings out a cardinal shift in terms of **'Standalone Institution'** to **'Cluster Institution approach'** turns

out to be the way forward for realistic transformation to **'Transformative Model'** succinctly brought out therein.

6.3 Interdisciplinary training:

6.3. a. Team Medicine

i). **Multidisciplinary Training into Practice** : As per current PG regulations the PG students must acquire basic management skills in human resources, materials, and resource management related to health care delivery, general hospital management, principal inventory skills, and counselling . The regulation states that institutions may arrange training in any other courses like awareness in medical audit, medical law, exposure to human behaviour studies, finance, accounts, which are beneficial to the postgraduate students. But the guidelines regarding how to conduct the training was not specified, nor identifiable mechanisms have been found. In the current context, the development of management skills by PG students is critical. The requirements to master the skill must be taken into account.

Interdisciplinary /Multidisciplinary topics/areas as social and economic determinants of health, telemedicine and artificial intelligence, field research, knowledge translation, corruption and conflicts of interest in the health services industry, spirituality, justice in health, personalised medicine, critical thinking, and the syndromic approach to diseases should be addressed with outcomes in the curriculum.

As per WFME, BME Regulations, online teaching learning and assessment may be given due diligence in the form of e-learning, distance learning wherein MOOC's such as SWAYAM, NPTEL, Coursera may be considered for such competencies which may be addressed in an appreciative mode and manner on account of teaching, learning and assessment on an online mode. The certification of such competencies may be transparent as the assessment through such MOOC platforms is nationally prescribed and desirable at the same time.

The healthcare landscape is increasingly complex, demanding collaboration between professionals from various disciplines to provide holistic and effective care. In this context, interdisciplinary training in Indian Postgraduate Medical Education (PGME) is gaining momentum with significant benefits. Interdisciplinary teams **foster comprehensive patient care** by considering diverse perspectives and expertise from different disciplines. Interdisciplinary training equips doctors with communication and collaboration skills to effectively work with other healthcare professionals. This fosters **a team-based**

approach, leading to better patient outcomes and improved healthcare delivery. Collaboration between diverse disciplines can lead to the development of new diagnostic tools, treatment strategies, and improved healthcare delivery models.

Integrating interdisciplinary training into existing PGME curricula can be challenging due to time constraints and resource limitations as well as equipping faculty with the necessary skills to facilitate interdisciplinary learning. And hence, academic flexibility should be implement in the courses and there should be a robust system to develop such training program and also effective methods for evaluating the impact of interdisciplinary training on student learning and patient outcomes.

ii). AI as an integrative programme in Indian Postgraduate Medical Education: The integration of Artificial Intelligence (AI) in Indian postgraduate medical education (PGME) holds immense potential to transform the learning and teaching experience. There are multiple benefits of AI. It supports **personalized learning.** AI-powered adaptive learning platforms can tailor content and assessments to individual learning styles and pace, catering to diverse needs. It is possible to enhance the process and time of Diagnosis and Treatment like AI-aided decision support systems can assist doctors in making diagnoses and suggesting treatment plans based on vast medical data sets. Another important area is Clinical Skills during postgraduate Training, Virtual reality simulations can provide immersive and realistic clinical scenarios for practicing procedures and decision-making in a safe environment. For research, AI can analyse large datasets of medical literature to identify research trends, predict disease outbreaks, and personalize patient care. AI-powered **chatbots** can provide 24/7 access to medical information and answer student queries, promoting self-directed learning. Technology and AI can revolutionize PGME by providing personalized learning, enhancing clinical skills, and promoting research innovation. However, addressing data privacy, ethical concerns, and infrastructure limitations is essential for successful implementation. By embracing and adapting to available technologies, PGME in India can become more personalized, accessible, engaging, and effective. Addressing the challenges and ensuring ethical implementation will be crucial for harnessing the full potential of technology in this vital field.

iii). Medical professionals can gain a deeper comprehension of the socio-environmental aspects influencing their patients' health through interdisciplinary training. This method improves rapport with co-workers and improves patient care by fostering strong interpersonal relationships and open communication. Negative biases and preconceptions could be lessened by emphasizing interdisciplinary education and improving the general standard of healthcare.

Sr. No.	Structural Gaps	Recommendations
1.	CBME a. There was paucity in the published PG regulations regarding tools and techniques for internal assessment and formative assessment. The continuous internal assessment and formative assessment should be specified for the achievement of competency-based curriculum competencies.	**1.Transformative medical education** *a. Implementation of CIA and Formative Assessment is required not only to attain the highest international standards but also to make it more objective and outcome based. (Annexure-8)*
	b. The DRP was introduced, but the outcome of the same needs to be elaborated in the form of identified competencies to be attained and an assessment tool for the same.	*b. An interdisciplinary EPA recommended for DRP and the outcome of the same should be elaborated in the form of identified competencies to be attained and an assessment tool for the same.*
	c. There is no faculty development program to meet the requirements of a postgraduate competency-based curriculum. Similar to undergraduate curriculum implementation support program there should be FDP for PG curriculum implementation support program.	*c. Advanced Courses in Medical Education for Postgraduate Guides should be included to update their competencies in the areas as research, curriculum, teaching learning methods and assessments etc.*
2.	The PG competency based curriculum has been implemented but there assessment tools are still of traditional curriculum. There should be identified competencies in ascending order which will help in implementing more objective assessment tools.	**2 : Critical thinker /analyzer** *Progression of competence should be placed in the curriculum in an ever-increasing mode of complexity, engagement, and understanding. Instead of emphasizing dominant cognition,*

	It has been recommended that skills should be placed in an apparent historically progressive manner, with each ability logically connected to the others through a progression of understanding.	*competencies should involve and engage learners in information exploration, analysis, synthesis, and simulation decision-making.*
3.	The emphasis over technology has been given in the PG regulations but explicit training on AR/VR, simulations, AI and their assessment has not been addressed.	3: **Technology enhanced medical education** *Simulation based Training, including VR & AR, should be emphasized in Postgraduate Medical Education. Judicious use of AI and Telemedicine must be a part of PG Training to improve patient outcome and quality healthcare.* *The guidelines for ethical use of patient data, privacy protection, and informed consent while using technology should be incorporated ensuring their use, dependability, and security.*
4.	According to PGMER the PG students must take part in the teaching of UG medical and paramedical professionals. PG students must achieve the competencies described in the regulations; however, the teaching and assessment modalities have not been determined. This is a notable entity, since candidates are selected directly for the teaching post after three years of residency, which has been designated as a teaching role.	*4: Pedagogy Skill* *Teaching-learning techniques such as near-peer and peer-assisted learning should be incorporated to emphasize collaborative skills, higher order cognitive skills and communication abilities.* *Certificate course in education technology for residents should be included as a mandatory component in the curriculum to inculcate pedagogical skills and justify the teaching experience of their residency period.*
5.	Concerns have been raised regarding the responsible authority's inclusion of the postgraduate doctor mistake and patient safety policy in the	*5. Patient Safety*

	context of postgraduate medical education in order to construct a high-quality care system but in the existing regulations no such inclusions has been addressed.	*There should be inclusion of guidelines in the MSR related to postgraduate errors and patient safety in order to build a high-quality care system.*
6.	The current GMER makes no mention of the choice-based credit system or how our graduate degrees meet the requirements of postgraduate education around the world including providence of Academic Bank of Credits in terms of National Education Policy, 2020. The medical curriculum now includes learning outcomes, course outcomes, and program-specific outcomes. As a result, the current evaluation system must be strengthened in accordance with worldwide standards. Not only to make assessment equivalent for international standard choice-based credit system is must but also for to fortified with an outcome-based framework.	**6. Choice based Credit System and equivalence to international standards** *Credit based structure of Graduate, Post Graduate and Super Speciality Medical Education, fortified with an outcome-based framework is advocated to analyze attainment of learning outcomes and provide flexibility for personalized learning pathways in Intra-disciplinary, Interdisciplinary or Trans-disciplinary domains. In this regard, creation of unique ABC ID for every learner will enable seamless mobility across specialties and disciplines by a formal mechanism of credit recognition, Credit accumulation, credit transfers and credit redemption respectively, including at the international parlance in conformity with the principle depicted in National Education Policy, 2020 (**Annexure -5**).*
7.	The gap in between the available annual intake of undergraduate programme as against postgraduate avenues is substantial and emergence of 1:1 ratio in between the two is still a far cry. As such suitable modality for filling the *interregnum* is desired.	*7.Academic Flexibility (NEP 2020)* *By incorporating academic flexibility in tune with* **NEP 2020.** ***Commensurate increase in*** *postgraduate avenues of education through* ***reviving the hitherto postgraduate diploma course by an altered nomenclature.*** *An operational model for academic flexibility depicted in Annexure -9.*

PUBLICATIONS

Sr.No.	Structural Gaps	Recommendations
1.	In Post graduates medical education program the certificate course in Basic course in research has been mandatory and out of poster/paper/publication only one is mandatory which has diluted the research component. There is no emphasis for the collaborative research that enhances the inter/intra/trans-disciplinary research opportunities and inculcate higher order of analytical skill which is very important for any physician to work as independent professionals.	*1 :* ***Generate, Interpret and Publish evidence*** ***4P model*** *consisting of Post graduate induction* ***Program, Poster, Podium Presentation and Publication*** *in an indexed journal should be a* ***mandatory*** *part of PG residency program. Regulations must emphasize towards multidisciplinary approach and Publications to actively involve students in research to adopt evidence-based practices and improve patient outcomes by inculcating the higher order analytical skills.*

INTERDISCIPLINARY TRAINING

Sr.No.	Structural Gaps	Recommendations
1.	The current regulations prescribed that PG students must acquire basic management skills in human resources, materials, and resource management related to health care delivery, general hospital management, principal inventory skills, and counselling. But the guidelines regarding how to conduct the training was not specified. To accomplish these, no identifiable mechanisms have been found. In the current context, the development of multidisciplinary skill to work in a team is essential.	*1:* ***Team Medicine*** ***Multidisciplinary Training*** *should be incorporated explicitly in the curriculum with their weightage, mode and modality of delivery and assessment, to train Post Graduates to work in an interdisciplinary and trans-disciplinary team. These should be in the form of simulation-based training, health communication and literacy, medical humanities, inter-professional education, collaborative research, medical audit, medical law, exposure to human behaviour studies, and finance &* ***accounts(Annexure -6).*** *AI* ***as need based integrative programme****(s) should be incorporated in Indian Postgraduate Medical Education. It will enhance the personalized learning, clinical skills, and promote research innovation.*

6. Structural Gaps and Recommendations:
Super Speciality Medical Education

6.1 Competency

6.2 Publications

6.3 Interdisciplinary training

6.1 Competency:

6.1 a. Desirable features of a Super specialty course:

There are few desirable features as per Super speciality course those are -

a) Educational practice varies between social, geographical cultural beliefs, existing health care systems etc. Therefore, it is imperative to develop a super-specialty (SS) training program that is contextually appropriate as well as one able to produce a specialist who is 'ready for purpose'.

b) The final outcome of post graduate or super specialty programs has a tremendous impact on the general health system models, delivery of health care at primary secondary and tertiary levels and most importantly on medical education per se.

c) Given the international differences in health care delivery systems, it is important that a super specialist be globally relevant and competent. However, the SS programme should be aimed at fulfilling the healthcare needs of our country.

d) The super specialty training should not be limited by a fixed curriculum with set boundaries. Therefore, in addition to the basic skills attained during graduation and post-graduation, there must be room for learning/ training under unpredictable, novel and challenging circumstances through real world clinical /laboratory exposure in specified centers.

e) More stress must be given to attaining expertise in skills pertaining to a particular super-specialty.

f) Therefore, in addition to fixed outcomes at the end, customary for any course, the super-specialty program has to cater to the development of a super-specialist with a sound knowledge of the national and international health care delivery system, with an ability to impart high quality medical education to graduates and post graduates and equipped

with decision making capability with skill and expertise to face any circumstance in his/her clinical practice without compromising patient safety. **(Annexure-8)**

6.1. b. Curriculum and syllabus

- As the topics and subject area of Super Specialty courses overlap, there are quite a lot of topics, skills and competencies that are common to two or more SS courses, there seems to be a lack of clarity as to what should be in the curricula of which course.
- There is a mismatch between the **objectives** and the **syllabus/competencies listed.**
- Too many Super Speciality programs have been started in very niche topics which do not do justice to the training and also do not open up sufficient job opportunities for the candidates after passing out.

6.1c. Teaching and training modes, including tools, techniques and approaches linked thereto

- Though one of objectives is to have these Super Speciality doctors teach students and other workers they are not taught principles of medical education pedagogy.

6.1. d Technology Incorporation:

- In present era use technology in the education cannot be ignored. There should be utilization of simulation based learning incorporated.
- Training as a group and training in soft skills to be done in a simulation center/lab.

6.1. e Modes of assessment including scheme of examination and certification

- Assessment is the same as for broad specialty with no difference.. A scheme has been proposed for Assessment. **(Annexure** -7)

6.1. f. Faculty Development Program

- Teachers need to undergo training in teaching-learning for methods for postgraduate courses. There is a need to train them to set question papers that test higher order thinking and design activities for the same.

6.2 Publications:

- Regarding training in research skill and research publications there are no guidelines. Being a higher degree there should be provisions for publications and research work.
- All Super Speciality students must be routinely trained to critically appraise published articles and assessed for the same during summative assessment. Publishing of at least two publication one as review article and other from the thesis as an original article in the entire duration of the course can be made mandatory.

6.3 Interdisciplinary Training:

- There are no details in the regulations regarding interdisciplinary training in the SS programs. These super specialty programs equip medical professionals with the expertise needed to address complex medical conditions and contribute significantly to patient care and research. In super specialty fields, patients often present complex and challenging mode. Also, super specialty medicine often involves interdisciplinary collaboration. Teams comprising surgeons, physicians, nurses, radiologists, and other specialists work together to provide comprehensive care.
- Hence, Inter-disciplinary training to be instituted as many of the Super Speciality programs depend on team work.
- There should be more emphasis on collaboration, innovation, and teamwork. Because aspiring super specialists embark on a journey that combines clinical excellence with a commitment to advancing patient care and medical knowledge.
- There is a need of Team-based approaches that ensure holistic evaluation and management in the super speciality courses.
- Topics such as patient safety, governing ethical norms can be incorporated as interdisciplinary approaches along with nursing staff, technicians and pharmacists together.

Super Specialty Medical Education
SUMMMARY STRUCTURAL GAPS -RECOMMENDATIONS

COMPETENCY:

Sr. No.	Structural Gaps	Recommendations
1.	**a. Competency Based Curriculum** As the topics and subject area of Super Specialty courses overlap, there are quite a lot of topics, skills and competencies that are common to two or more SS courses, there seems to be a lack of clarity as to what should be in the curricula of which course. The competencies are not defined. In the ground level, this is leading to a 'turf war' for cases, beds, theatre time and so on, leading to lack of sufficient clinical material in a particular department. There is a mismatch between the objectives and the syllabus/competencies listed. **Assessment is** similar as for broad specialty with no difference. There is no neither provision of continuous internal assessment (CIA) nor Skill certification by faculty.	*1 –Transformative Medical education* *i) The curriculum should be revised in accordance with the guidelines of competency based curriculum for all super specialty courses.* *ii)Identification of EPA and Core competency for each super specialty program severally ensuring that same caters to the specified nature of the course.* *iii).Providence of a well-defined system of formative and summative assessment, needs to be prescribed structured into different defined aspects, such as practical skills, pedagogy, appraisal of research methodology, national programs with emphasis on examining decision making skills in problem situations. (Annexure-7)*
2.	There was no description for use of technology in the super speciality education. No description regarding use of simulation in the regulations.	*2.Technology enhanced medical education* *Use of technology should be enhanced in the form of AR and VR for training and assessment*

		High fidelity simulation laboratory for skill training and or mandatory training in centers of excellence must be offered in institutes offering Super Speciality Programs.
3.	In higher education inculcation of higher order cognition skill is essential. Above can be accomplished by problem solving skill, assessment as per ascending order of competency. The progressing of competency and continuous internal assessment is the way we can accomplish them. These are not described in the present regulation.	*3.Critical thinker /analyzer* *Implementation of well-defined assessment system specifically according to the progression of competency.*
4.	Though one of objective is to teach the students and other workers but there is no modality how to inculcate pedagogy skill in them.	*4.Pedagogy skill* *A structured Course on pedagogy.* • *A structured Course on pedagogy, organized by the MEU of the medical college on basic principles of teaching-learning must be part of curriculum.* • *Microteaching sessions may be conducted by the concerned department from time to time.*

PUBLICATION:

Sr.No.	Structural Gaps	Recommendations
1.	Regarding training in research skill and research publications there are no guidelines. Being a higher degree there should be provisions for publications and research work.	*1: **Generate, Interpret and Publish evidence*** *Two publications one as a 'Review article' and second as an 'Original article' from thesis should be mandatory.* *All must be routinely trained to critically appraise published articles and assessed for the same during summative assessment. Publishing of at least two publication one as review article and other from the thesis as an original article in the entire duration of the course can be made mandatory.* *Regulations must emphasize towards conduct of Collaborative research, through multidisciplinary approach as Publications during super speciality programmes enable students to adopt evidence-based practices resulting in improved patient outcomes.*

INTERDISCIPLINARY TRAINING:

Sr.No.	Structural Gaps	Recommendations
1.	There are no details in the regulations regarding interdisciplinary training in the Super Speciality courses. These super specialty courses equip medical professionals with the expertise needed to address complex medical conditions and contribute significantly to patient care and research.	*1 :**Team Medicine*** ***Multidisciplinary Training** should be incorporated explicitly in the curriculum with their weightage, mode and modality of delivery and assessment.* *These should be in the form of simulation-based training, health communication and literacy, medical humanities, inter-professional education, collaborative research, medical audit, medical law, exposure to human*

	In super specialty fields, patients often present complex and challenging cases.

Super specialty medicine often involves interdisciplinary collaboration. Teams comprising surgeons, physicians, nurses, radiologists, and other specialists work together to provide comprehensive care. | *behaviour studies, and finance & accounts(Annexure -6).*

AI as need based integrative programme(s) should be incorporated. It will enhance the personalized learning, clinical skills, and promote research innovation. |

COLLATERAL RECOMMENDATIONS:

The quantitative expansion of medical education in last three decades has been substantial in as much as there are more than 700+ medical schools in vogue as of now with an annual intake of well over a million and Postgraduate annual intake hovering around 70,000+. In the teeth of this quantitative expansion quality-centricity is palpably lacking. The open ended growth and expansion and the policy thereto calls for a review in the context of paucity of teaching faculty, rationalization of requirement of infrastructure and other collateral requirements. The important parametric relevant situations have been catalogued herein below that merit prompt attention for sustenance of the started medical colleges and also building quality-centricity therein.

a) Augmenting Faculty Pool:

Further, in view of the quantitative multiplication of medical colleges across India (700+), the paucity of full time medical teachers is huge and substantial in as much as for the present number of medical colleges, the gap between present occupancy versus prescribed numbers is to the extent of 30-40%.

The issue an enlisted above need to be dealt by - Addressing the paucity of medical teachers through desired timely recruitment and also required alteration in governing service conditions in regard to **pay, perks, privileges, placements and promotions.** The suggested modality for the same can be-

1. The revived postgraduate diploma in terms of Postgraduate Medical Education Regulations 2023 be rechristened as **'Masters in Medicine (M. Med.)'** placing the same as an eligibility for recruitment as **'Tutor'** in every subject and upon conferment of the same would stand designated as **'Lecturer'** in the concerned subject if he/she so desires.

   He/she upon such designation would be entitled to appear for **NEET PG** and qualifying clearance thereto would be entitled for admission into the postgraduate degree course of his/her choice commensurate with merit which will be of **2 year duration** during which only **research thesis** would be the required exercise and clearance thereto would

result into conferment of the said postgraduate degree entitling the incumbent awardee to be elevated to the grade of **'Assistant Professor'** in the subject.

2. The providence for Adjunct Faculty be made in tune with the policy of the University Grants Commission to avail the professional expertise for teaching and training purposes in teaching institutions.

3. The age of permissibility for full time teachers from existing **70 years** may be raised to **75 years** on year to year continuation subject to required diligent certifications pertaining to physical and mental fitness.

b) Faculty Development:

Faculty development program initiated by then Medical Council of India in 2009 and now run by National Medical Commission has trained more than 100000 faculty in various courses like basic education technology course, advance course in medical Education and Curriculum Implementation Support Programs to fulfil the need of trained manpower for CBME.

The present MSR mandates every faculty to undergo training in Basic course in Medical education and basic research methodology. The teaching skills, quality of learning resources generated, student support initiatives, managerial skills, education research and publications, innovative TLA models and methods, contextual theoretical principles in medical education, additional qualification in higher education are few of the additional parameters that may be considered for teacher quality and subsequent recruitment and promotions.

Training faculty members to effectively implement CBME remains a significant challenge. Many educators are accustomed to traditional teaching methods and may require extensive retraining to adopt competency-based approaches. Additionally, faculty development programs tailored to CBME principles are limited in availability and need to expand. There are many new elements in the curriculum such as early clinical exposure, integration, electives as well and learner doctor clinical teaching.

There is need for faculty development for the same. Through the Clinical Implementation Support Programme for Undergraduate Competency Based Curriculum, medical faculty will receive training in competency-based education, including its objectives, concepts, and scope; competencies to be learned; teaching and learning strategies; and evaluation and assessment formats. To meet the requirements of an undergraduate competency-based curriculum, faculty

members using advanced technologies need to participate in a similar programme. In the WFME standards it has been emphasized that a successful undergraduate medical education programme depends on having a sufficient number of knowledgeable, devoted, and well-trained instructors, clinical supervisors, and support personnel from various fields in addition to technical and administrative personnel.

It is essential that in the context of inadequacy of the present Regional / Nodal Centre based Faculty Development Programme, an institutionalized mechanism in the form of **'Academic Staff Colleges'** for full time faculty development programme through structured **'Refresher courses'** for medical education needs to be evoked through an appropriate policy intervention by the Government of India as is applicable to higher education on the very count.

c) Regulatory Framework and Accreditation:

In 2023, the National Medical Commission has been granted World Federation for Medical Education (WFME) Recognition Status for tenure of 10 years. This has accorded accreditation to all 700+ existing medical colleges in India and the automatic accreditation of new medical colleges that will be set up in the coming 10 years. The recognition will pave way for aligning medical education with global best practices and benchmarks and enable Indian medical graduates to pursue postgraduate training and practice United States, Canada, Australia, and New Zealand. Indian students have now become eligible to apply for Education Commission on Foreign Medical Education and United States Medical Licensing Examination.

This WFME recognition has posed a major concern of assuring, sustaining and enhancing quality of medical education in an ongoing manner. There is dearth of clear guidelines on self-evaluation parameters of medical schools, quality benchmarks and external quality monitoring. Resultantly Stakeholder's satisfaction and fitness for purpose of any medical school is largely determined by its performance during inspections.

A sizable number of medical schools still have not undergone NAAC accreditation and NIRF rankings, which is more of a voluntary exercise than mandatory in nature. A positive step in this stride is recent MOU between Quality Council of India and the NMC's Medical Assessment and Rating Board (MARB). Along with QCI (Quality Council of India), to rate medical colleges, both private and government, the process of developing criteria based on global standard, parameters that are specific to medical education with an emphasis on continuous improvement and innovation in medical education, facilitation of academic

collaborations and exchanges, Standards and criteria, digital initiatives in TLA, educational scholarships, faculty development and fostering a culture of quality among medical educators, through issuance of a required **Regulation** on this count.

d) No providence for developmental funds:

It is a matter of record that in terms of the recommendations of First Education Commission Report Indian Parliament in the year 1956 prescribed two Parliamentary enactments viz. 1) University Grants Commission Act, 1956 governing a spectrum of higher education and ii) Indian Medical Council Act, 1956 repealing Indian Medical Council Act, 1934 governing the entire spectrum of medical education. The material difference in regard to the two regulatory bodies was that higher education got a Commission and medical education got a Council. The University Grants Commission Act had a Section at Sr. No. 12(B) which provided for Commission to have five yearly planned grants for disbursement to higher educational institutions under its ambit for developmental purposes which catered to the cause of development of higher education in a big way. However, such a provision was missing in the Indian Medical Council Act, 1956.

It is also a matter of record that Indian Medical Council Act, 1956 which did not have providence of a Section akin to Section 12(B) in the University Grants Commission Act, was repealed by National Medical Commission Act, 2019. This resulted in Indian Medical Council getting replaced by National Medical Commission, however the said Commission cannot be equated to the University Grants Commission for want of provision of Section 12(B) in NMC Act, to provide for planned disbursable grant from the Government of India to the developmental cause of medical education. It is this policy gap which has affected the required financial support to the medical colleges and institutions till date for want of a required statutory provision akin to Section 12(B) as incorporated in University Grants Commission Act, 1956. National Medical Commission therefore turns out to be a commission without financial sanctioning powers vested statutorily with it.

As such, the need of the hour is that it is strongly advocated to incorporate an amendment in National Medical Commission Act, 2019 by the Indian Parliament to provide for a Section akin to Section 12(B) as included in University Grants Commission Act, 1956.

COLLATERAL RECOMMENDATIONS

(UG, PG, Super Speciality &Faculty)

Sr.No.	Structural Gaps	Recommendations
1.	The evaluation of the education program has not been placed in the present GMER 2023. As of right now, there is no policy in place for programme assessment in education. Any educational programme needs to be periodically evaluated in order to be improved. It has been recommended that medical education program's management, outcomes, and activities will all be regularly reviewed to ensure that they are appropriate, effective, and compliant with the program's mission, curriculum, and regulations. Periodic review of the curriculum should be included for quality enhancement and need based timely implementation of new reforms.	*1 :* ***Evaluation*** *of* **Education Program** *Standards for assessing educational programmes should be developed and implemented. For quality improvement and need-based implementation of new changes, a periodic evaluation of the curriculum should be incorporated. Demonstrable evidence of successful learning by determining attainment of course outcomes and resultantly program outcome can be a significant stride in evaluation of the MBBS, Post Graduate and Super-specialty programs by availing DANIDA Model as a basal model for structuring the same.*
2.	**Increasing Faculty Pool** Presently there is no modality in place that can address the need of trained man power crisis. The gap between present occupancy versus prescribed numbers is to the extent of 30-40%.	*2.* ***Trained man power*** • *Addressing the paucity of medical teachers through desired timely recruitment and also required alteration in governing service conditions in regard to pay, perks, privileges, placements and promotions.* • *Revive postgraduate diploma in terms of Postgraduate Medical Education Regulations 2023 be rechristened as* **'Masters in Medicine (M. Med.)'.** • *Splitting the teaching cadre into four levels namely Lecturer, Assistant Professor, Associate Professor and Professor.*

		- *The eligibility for Lecturer could be Masters in Medicine qualification (2 years duration)* - *The providence for Adjunct Faculty be made in tune with the policy of the University Grants Commission to avail the professional expertise for teaching and training purposes in teaching institutions.* *The age of permissibility for full time teacher's computation from existing 70 years may be raised to 75 years on year to year continuation subject to required diligent certifications pertaining to physical and mental fitness.*
3.	It is essential that in the context of inadequacy of the present Regional / Nodal Centre based Faculty Development Programme, an institutionalized mechanism in the form of Academic Staff Colleges for full time faculty development programme through structured refresher courses for medical education needs to be evoked through an appropriate policy intervention by the Government of India as is applicable to higher education on the very count. Faculty Development Programs tailored to CBME principles are limited in availability and need to expand.	*3. Capacity Building* *It is essential that in the context of inadequacy of the present Regional / Nodal Centre based Faculty Development Programme, an institutionalized mechanism in the form of **'Academic Staff Colleges' for** full time faculty development programme through structured 'Refresher program' for medical education needs to be evoked through an appropriate policy intervention by the Competent Authorities as is applicable to higher education on the very count.*
4.	Lack of clear guidelines and regulatory frameworks for quality assurance in medical education. There is a need for national-level policies and accreditation standards that mandate the adoption of CBME principles and ensure consistency across institutions.	*4. Accreditation Policy* *The regulatory bodies must develop accreditation policy keeping in mind the set out global accreditation benchmark, standards, criteria along with QCI (Quality Council of India) to rate medical colleges, both private and government, based on the parameters that are specific to medical education with an emphasis on facilitation of academic collaborations and*

		*exchanges, continuous improvement and innovation in medical education, digital initiatives in TLA, educational scholarships, faculty development and fostering a culture of quality among medical educators and educational system as a whole, through issuance of an appropriate **Regulation** thereon.*
5.	A major lacuna in the area of contextual educational research has been identified in the Indian medical education. Presently there is no or miniscule provision of funding for educational research. In addition, neither weightage in carrier advancement. There should be an adequate financing for faculty building and collaborative research is necessary in this context.	*5: **Educational scholarships &Funding** The Career advancements and Periodic appraisals of a medical teacher must identify indicators to recognise various forms of Educational scholarships (human and digital) that align with Education research, Quality Publications in medical education, Teaching excellence, Educational Innovations and its applications to name a few.* *Interdisciplinary research should be emphasized in medical education to enrich the understanding of role of various disciplines in health care. It can be integrated to the Multidisciplinary Research Units of Department of Health Research (DHR).*
6.	Promotion of AYUSH-related interdisciplinary research has been emphasized in the GMER but there is no prescribed guidelines for the same, which needs appropriate broadening. Trans-disciplinary research guidelines and recommendations ought to be broadened in regard to their ambit and inclusion. The Single **'Standalone Institution Mode'** is not in tune with the Cluster	*6.**Consortia and Collaborations** Institutions must focus towards establishing consortia and collaborations, within and across border, with eminent organisations for curriculum design, educational research, multi-centric trials in education, joint publications, information / faculty / student exchange for strengthening medical training through cross border learning opportunities and*

		Approach Institution Mode depicted in Lancet Commission Report.	*sharing best practices, in tune with the paradigm shift brought out in the Lancet Commission Report-2010 with reference to Institutional Reforms evoked in terms of shift from* **'Standalone Institution Mode to Cluster Approach Institution Mode.'**	
	7.	**No providence for developmental funds for medical education**	*A mechanism should be developed that fosters developmental support to the Medical Colleges through required funding as is applicable to the Institutions of Higher Education in terms of provision* **included under section 12(B)** *of the University Grants Commission Act, 1956 (as amended from time to time).* *This entails a policy decision for providing a provision akin to* **Section 12(B) of the UGC Act, 1956** *in the National Medical Commission Act, 2019 through a required parliamentary amendment catering to the cause of developmental funds for medical education to the medical colleges in the country independent of their nature (Public/Private).*	

7. Way Forward:

a. Realistic structural revamp of the Competency Based Medical Education Model, so as to ensure it is tuned to Transformative model of Medical Education as envisioned in Lancet Commission Report-2010, through bringing out the structural gaps in the domain of Competency, Research and Interdisciplinary Training in terms of the assigned Terms of Reference attributed to the Task Force.

b. **Institutional and Instructional reforms:** The report promotes academic systems that integrate education, research, and service delivery; competency-based curricula that are in line with population health needs; and inter-professional and trans-professional education that encourages teamwork and collaboration through Institutional Reforms in terms of paradigm-shift from **'Standalone Institution Mode'** to **'Cluster Approach Institution Mode'.**

c. **Removal of redundancy and modernizing basic science education-** A revamp of basic sciences education introducing modern elements such as OMICS molecular biology and data science is advocated in the report. This must be done while simultaneously trimming redundant areas that are not relevant to the core mission of the MBBS program. An emphasis on correlative and applied basic science as opposed to traditional or classic basic science is warranted.

d. Paucity of medical teachers needs to be mitigated through desired timely recruitment and also required alteration in governing service conditions in regard to **pay, perks, privileges, placements and promotions.** The suggested modality for the same can be-

i) Creating 4 tier cadre of teaching posts as Lecturer, Assistant Professor, Associate Professor and Professor. In the teeth of the gap between availability of Postgraduate seats as against the number of graduate seeking admission thereto through NEET every year the pool of aspirants who do not qualify for admission to Postgraduate courses in terms of a policy could be accommodated for **'Masters in Medicine (M. Med.)'** a two year course and making it as an eligibility for recruitment of **'Lecturer'** in the concerned subject. The learner during the two years period of the study would be designated as **'Tutor'** and subsequently as Lecturer can take the PG NEET to qualify for admission to a two year postgraduate course in the very speciality where he is

Lecturer and on getting the postgraduate Degree (two years course) would be eligible to be designated as **'Assistant Professor'** in the concerned speciality.

ii) The providence for Adjunct Faculty be made in tune with the policy of the University Grants Commission to avail the professional expertise for teaching and training purposes in teaching institutions.

iii) The age of permissibility for full time teachers from existing **70 years** may be raised to **75 years** on year to year continuation subject to required diligent certifications pertaining to physical and mental fitness.

e) **Capacity Building in terms of faculty development:** The report places a strong emphasis on the need to increase both the number and calibre of health educators, as well as to build teaching and learning environments that are supportive of faculty members' creativity and leadership. The institutionalized mechanism for capacity building needs to be evoked in terms of working out **'Academic Staff Colleges'** on the lines as stand evoked for higher education, so that the 'Refresher Courses' through these Academic Staff Colleges as applicable to medical education stand worked out through an appropriate policy intervention by the competent authorities.

f) **Accreditation and regulation:** The report suggests the creation of international standards and guidelines for the accreditation of medical schools, and control of health-professional education, in addition to systems for the reciprocal recognition and transnational movement of health professionals through issuance of an appropriate **Regulation** thereon.

g) A policy intervention for providence of developmental funds for the cause of medical education to medical colleges independent of their nature (Public / Private) by a required amendment to the National Medical Commission Act, 2019 akin to the one included as **Section 12(B)** in the University Grants Commission Act, 1956 (as amended from time to time).

h) **Global and local social accountability:** The report calls upon on health-professional schools to embrace social missions that align with societal norms and values, interact with communities and stakeholders, and support social justice and health equity.

i) **Team Based Learning** - Identification of competencies and their implementation as interdisciplinary team work, evidence-based practice, awareness ongoing quality improvement, innovative informatics use, and public health integration.

j) **Interdisciplinary Training through E- Learning** -Incorporation of online courses for sensitization of post graduates on policy, legal, managerial, and leadership competencies are highly regarded, as are research skills.

k) **Interdisciplinary Education in competency based curriculum** -The emphasis should be given to Interdisciplinary education in outcome based education. Inter-professional education and team learning are not limited to the classroom. Ancillary modalities such as shared seminars that foster cross-professional interaction, cooperative course work, cooperative professional volunteering, and inter-professional living-learning accommodations should be considered.Inter-professional education, which involves PG medical students collaborating with members of other health-care disciplines such as medical students and faculty from other specialties, nurses and nursing students, pharmacists, social workers, clinical laboratory personnel, and hospital administrators. IPE has been demonstrated to promote job satisfaction and improve patient outcomes (e.g., shorter hospital stays and fewer medical errors).

l) **Accreditation, and academic centres,** are essential for improving the institution on the lines of Internal Quality Assurance Cell in an accredited institution in terms of Accreditation Policy of National Assessment and Accreditation Council under the aegis of University Grants Commission.

m) Initiatives to enhance **interdisciplinary competencies** in the postgraduates.

n) Inculcating the practice of **interdisciplinary education and research.**

o) When trying to adopt flagship programs of famous institutions for the nation mindfulness of their applicability in other environments must be considered. For example when contemplating residential programs physical safety of students is a key consideration - and cannot be a given in many parts of country. Basic provisions such as safety clean accommodation including toilets and hygienic food cannot be considered as luxury. The safety of students and the dignity must be the paramount consideration at all times.

Limitations:

The present appraisal has resulted in crystalizing out of **'Structural gaps'** and suggested ways and means for bridging the same in view of the time bounded dispensation of the task, however, in the fitness of things it is necessary that by analytical appraisal the **'Operational gaps'** are also crystalized, so that the required measures for mitigation of the same are worked out and crystalized into required suggestions. This would entail totalistic dispensation of the required task, so as to give shape to a desired 'Transformative Model of Medical Education' in its entire spectrum including Graduate, Postgraduate and Super speciality Medical Education resulting in generation of **'Optimized outcome'** as against well-defined and set-out objectives of each one of them resulting in generation of effective and efficient trained health manpower capable of upholding the entire spectrum of healthcare delivery system for better clinical outcomes and thereby catering to the cause of mitigation of the requirement of deliverance of quality health as an accruable right to every citizen in the context of invocation of **'Welfare State'** as enshrined in the Constitution of India.

As such, the Task Force if desired and entrusted would dispense the same as an add-on indulgence in continuation of the present exercise, so as to give it its required sumptuousness by crystalizing 'Operational gaps' and ways and means for bridging / mitigating the same, which would be entailing greater quantum of time at its disposal.

Declaration of conflict of interest:

The authors/contributors of this draft have no conflict of interest to declare. All authors/contributors have seen and agree with the contents of this draft with the highest degree of objectivity and integrity with no financial interest to report.

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9. ANNEXURES

Annexure 1:

The 4 Step Escalating – Outcome Based Education Model For Higher Education (Copyright no: L-94272/2020)

Outcome-Based Education" (OBE) is the buzzword in Indian higher education today. It is being adopted at a fast pace in various colleges at the moment. OBE is considered as a giant leap forward to improve the quality of higher education, particularly technical education and help Indian graduates compete with their global counterparts.

The induction of India in the **Washington Accord in 2014** with the permanent signatory status of The National Board of Accreditation (NBA) is considered a big leap forward for the higher-education system in India. It means that an Engineering graduate from India can be employed in any one of the other countries who have signed the accord. Similar Efforts are underway in the Health Sciences Education under the able leadership of **Hon Dr VedPrakash Mishra** with WMA, **WFME** and Indian Government pitching strongly for parity to be obtained between the Medical Graduates from India and the Developed world.

Developing Competency based curriculum by the Medical (GMER amendment 2019) and Nursing Council of India are part of the larger picture of Health Sciences Education as the future for India.

Accreditation agencies NAAC, other accrediting and ranking agencies like NIRF TIMES QS are also expecting all the education institutes applying OBE Models for the curricular transaction.

Comparison of OBE Vs Traditional Model
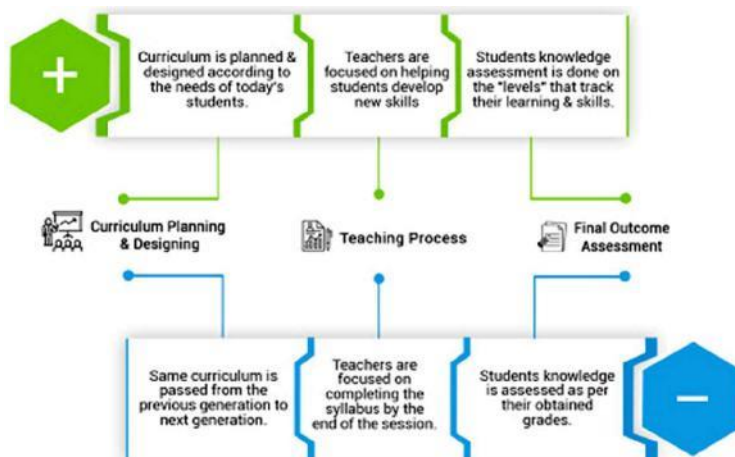
The OBE model measures the progress of graduates in three parameters, through:

- Program Outcomes (PO)
- Program Specific Outcomes (PEO)
- Course Outcomes (CO)

As a step towards fortification of conventional OBE Model, the updated model integrates;

1. All the Apical Councils norms and their suitability to OBE

2. Global, National, Societal Expectations from a Higher Education Institute

3. Proposed National Education Policy and its exigencies.

4. Parameters of NAAC, NIRF and other accrediting agencies with the Programme Outcomes and Programme Specific Outcomes

The Model Additionally incorporates following principles governing OBE

- **Clarity of focus** (having specific outcomes gives a strong sense of purpose to everything teachers and students do).

- **Design down, Deliver up** (when planning curriculum, educators start with the outcomes and work backwards; when planning instruction, teachers teach what students need to learn to demonstrate the outcomes).

- **Optimal Expectations** departure from traditional education in its assumption that all students can learn well—although not in the same way and not necessarily on the same day), and

- **Expanded opportunities** (students must be permitted to demonstrate their learning in different ways, and they must have numerous opportunities to demonstrate the outcomes, not just one.).

The proposed model expects the learner to have:

1. **Knowledge of a discipline:** command of a discipline to enable a smooth transition and contribution to professional and community settings

2. **Intellectual rigor:** a commitment to excellence in all scholarly and intellectual activities, including critical judgment.

3. **Creativity, Critical Thinking and Reflective Skills:** an ability to develop creative and effective responses to intellectual, professional and social challenges.

4. **Ethical Professional Practices:** a commitment to sustainability and high ethical standards in social and professional practices.

5. **Lifelong learning:** the ability to be responsive to change, to be inquiring and reflective in practice, through information literacy and autonomous, self-managed learning.

6. **Communication and social skills:** the ability to communicate and collaborate with individuals, and within teams, in professional and community settings.

7. **Cultural competence:** an ability to engage with diverse cultural and Indigenous perspectives in both global and local settings.

THE 4 STEP ESCALATING– OBE MODEL ensures identification of Graduate Attributes and escalated POs , PSOs and COs on the basis of guiding principles at each level. The strategic initiatives are aligned towards attainment of the desired outcomes (PO-PSO-CO) in terms of qualitative and quantitative parameters.

A. **Step I:** Graduate Attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution (Bowden, 2000). These generic graduate attributes outline the overarching capabilities

that will be developed by students. The graduate attributes are intended to equip graduates to be global citizens, and effective members of society who can be agents of 'social good" envisons Graduate attributes that are adapted to Global, National & societal needs and addresses the Higher Education Policy of India.

THE 4 STEP ESCALATING– OBE MODEL

4 Step Escalating DMIMS OBE Model

1 — Graduate Attributes
Global, national, societal needs, NEP

2 — P O
NAAC/ NIRF/ PDP/UGC /MHRD
VISION 2025

3 — P S O + C O s
Apical Councils

4 — Attainment
Quantitative and Qualitative parameters
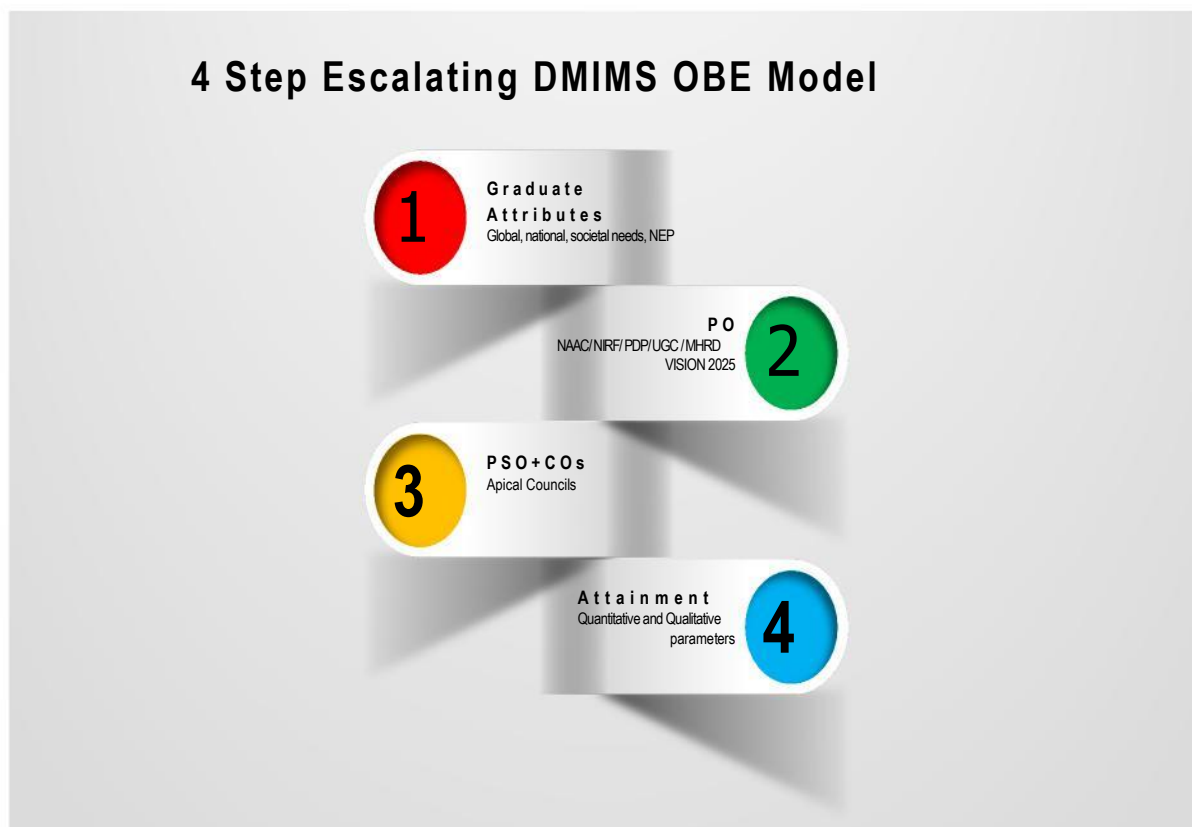
B. **Step** 2: Graduate attributes define outcomes of a program. Program outcomes (PO) are specific enough to explain how the broad expectations are accomplished within a given program. The model proposes Program Outcomes to be influenced by core values of the University Grants commission, Ministry of Health and Family Welfare, National Assessment and Accreditation council (NAAC), National Institutional Ranking Framework and Vision 2025 document of the University in addition to the outcomes arising out of step1.

C. **Step 3:** The Program specific outcomes (PSO) and course outcomes (CO) are the areas of operation and intervention within an educational program. Course outcomes are more detailed and specific than program outcomes because they identify the unique knowledge and skills expected to be gained from a given course. The model proposes identification of PSO and COs as proposed by the apical councils of Health sciences Universities, mapped and escalated with outcomes in consonance with step 3.

D. **Step 4:** Emphasis of outcome based education (OBE) system is on quantifying what the students are capable of doing and learning outcomes of the students is one of the key components. Attainment of course outcomes is fundamental towards achievement of desired program outcomes and graduate attributes. It is pertinent to have indicators (qualitative and quantitative) that specifically addresses the pre-identified outcomes. The HEI should adopt strategies focussed towards addressing these indicators for a focussed trajectory.

Annexure -2:

A suggested list of graduation outcomes:

Sr. No.	Outcome
	The learner should be able to :
1	Perform a preventive and promotive health assessment of patients independently
2	Document clinical encounters appropriately including in an electronic health record
3	Provide age gender and comorbidity based preventive care independently
4	Provide first contact trauma care and stabilisation (at level 5)
5	Provide first aid and wound care independently
6	Perform minor surgical procedures with appropriate local anaesthesia and informed consent independently
7	Provide guideline based antenatal care and conduct uncomplicated labor and delivery in women without high risk and comorbidities independently
8	Perform an age gender and comorbidity (including pregnancy) appropriate nutritional assessment and provide nutrition counselling
9	Order and interpret common diagnostic tests and imaging as required for clinical care independently
10	Assess diagnose declare and document death correctly
11	Counsel and administer age gender and comorbidity appropriate vaccination independently
12	Refer patients to the appropriate specialty and level of care as required in a timely fashion
13	Respect professional boundaries in patient care relationships with health care colleagues and pharmaceutical industry
14	perform a functional assessment of patients especially elderly based on comorbidity and provide appropriate care or referral for care and rehabilitation
15	function effectively as a member and leader of a health care team in a community clinic or hospital
16	provide health care education as required to the community that he or she serves
17	assess diagnose and provide guideline based continued care for uncomplicated non communicable diseases in the community
18	assess diagnose and provide guideline based preventive and therapeutic care for common and notifiable communicable diseases in the community

19	assess and provide community education care and support during a disease outbreak in a community
20	Display appropriate respect and responsiveness in communication with patients and health care team members always
21	Stabilize support and treat patients with poisonings and envenomation

Annexure 3:

Seven pronged Blended learning model for Indian Medical Graduate (IMG) (Copyright no : L-95175/2020)

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Background :

Undergraduate Competency based Medical curriculum necessitate integration of contents and learning domains. It envisions the product - an Indian Medical Graduate encompassing all the competencies to funtion as a first contact physician by realising the roles of Clinician, Leader and member of health care team, Communicator, Life long learner and Professional. Needless to say that the Instructional process must be aligned accordingly. As much as continous assessments remain the mainstay of CBME, continous learning is equally pertinent for a smooth transition to a competent health professional. Continous learning and assessments, in fact, is the key to furnish the IMG as a Life long Learner.

A prerequisite to ensure students commitment to learning is a favorable learning environment that address all learning styles, gives flexibility of time and opportunities and provides an immersive experience by engaging them intellectually. The blended model of curriculum delivery, encompassing face to face and virtual modes of instruction, is a much researched and has depicted favourable learning outcomes in this perspective.

The Seven Pronged blended learnig model for IMG:

The authors propose a blened learning model for undergraduate competency based medical education encompassing seven types instructional strategies to optimise learning. These strategies should be essentially informed by evidence and should be subjected to continous monitoring & evaluation. The observations from evaluation must, in turn, inform evidence.

Specifics of the model :

1. Foundation : Evidence based Education

One of the earliest and most cited definitions (Sacket et al, 1996) describes evidence-based practice as 'integrating individual clinical expertise with the best available external evidence from systematic research.' The concept of evidence-based practice has its origins in medicine. The essential idea is that decisions made by medical practitioners should be based on the best available evidence collected through rigorous research and contextual evidence relating to patients' presenting conditions and symptoms. This evidence based practice is essential to informed decision making.

Similarly, Evidence-based education, including teaching, learning and assessments, involve more than the implementation of practices that have been effective in controlled research studies. As in medicine, evidence-based edcuation depends on the integration of local, reliable, teacher-collected evidence judiciously blended with evidence from systematic, external research. While framing policies and decisions, it is important to consider this broader, more integrated understanding of the role of evidence in teaching and learning.

2. The seven prongs :

i. **Face to face training** : Face to face training remain the mainstay of competency based Education. Consolidation of knowledge and training of skills in Health care education cannot happen without face to face interactions between student and teacher. Hence the first prong of the model proposes onsite training at the fore of instructional model. All other modes should be designed in a way to fortify the onsite training in an effective way.

ii. **Virtual classrooms** : The model proposes virtual classrooms as a second prong; emphasizing the need of a seamless blend of actual and virtual learing environments within the curriculum. The virtual classrooms can aid in adopting flipped classrooms , thereby enabling a more judicious and customised use of onsite discussion time.

iii.   **Simulation /AR/VR/MR** : Simulation in the form of low & high fidelity mannequins, Standardised patients and gamification lends a desirble approach to learning trajectory of a health professional by taking him/her from simulated to real life conditions stagewise. Augmented reality (AR) is a technology that adds virtual content to the physical real world, thereby augmenting the perception of reality. AR provides the ability of projecting virtual information and structures over physical objects, thus enhancing or altering the real environment. The integration of AR applications in the understanding of anatomical structures and physiological mechanisms is beneficial. Virtual reality (VR) provides a 3D and dynamic view of structures and the ability of the user to interact with them. The recent technological advances in haptics, display systems, and motion detection allow the user to have a realistic and interactive experience, enabling VR to be ideal for training in hands-on procedures. Consequently, surgical and other interventional procedures are the main fields of application of VR. The proposed model integrates Simulation , AR , VR and Mixed reality (MR) in instructional approaches, thus providng a stepwise learning curve, ensuring content validity, providing equal opportunities and ample space for hands on expereinces.

iv.   **Artificial Intelligence** : Artificial Intelligence (AI) applies to the development

of systems endowed with the intellectual processes characteristic of humans. The AI era is likely to profoundly impact present system of Health care. A radical change in medical curriculum is warranted to prepare future doctors for their new roles in the era of AI. Curriculum revisions incorporating AI related competencies that brace future doctors for provision of optimum Health care should be focused upon. Taking into consideration the potential impact of AI in health care, the model proposes incorporation of AI driven training wherein learners develop a clear understanding of the four Vs of big data: Volume (the amount of data today is vast compared with the amount in the past); Variety (data come from many different sources of varying validity); Velocity (data are being generated very fast and momentum is increasing); and Veracity (the quality of the data being generated needs to be assessed). A curriculum that successfully deals with technology, interactive learning environments and

managing AI systems with relevant information is envisaged through the proposed model.

v.   **Webinars and web links** : The webinars and weblinks offers the advantage of reaching out to large number of learners in a nick of time. The web offers a vast pool of information that is evidence based and reviewed. The fifth prong of the model incorporated webinars and weblinks as an instructional modality experts from across the globe can contribute in training the learners.

vi. **Mentoring** : Mentoring is a professional relationship, where a more experienced person will help to the other person to grow personally and professionally. In medical education, mentoring subsumes a very important place in overall development of a health professional. One on one mentoring, group mentoring , peer mentoring etc. are various ways in which mentorship program must be strategised to ensure a wholistic development of a learner and offer an empathetic perspective during the stressful years of training. The model proposes mentoring as the sixth prong of strataegy that works parallel to all instructional modes.

vii. **Continuous assessments** : The mainstay of any competency based curriculum is continous formative assessements for learning. Assessements linked to feedback and reflection is the final and crucial step and hence the last and final prong of the model. The continuous assessments should essentially include assessement modalities in sync with all six prongs viz. onsite examination, virtual assignments assessments on simulations, Ar & VR, AI based assessments and feedback and reflections as a part of mentorship program.

3. Continous Evaluation :

The model proposes continuous evaluation of the entire ongoing instruction as per CIPP – Context, Input , Process and Product. Thw results of evaluation will offer evidence based results that can inform ongoing instruction and make interim changes for better outcomes. The credible evidence so generated will also add to the pool of evidence that can be disseminated for peer review and genralisation.

Implications of the model:

The proposed blended learning model will help in transforming medical education and offer an effective & engaging learning experience. The integration of instructional

modalities, with a judicious mix of onsite and technology enhanced learning, conform to theories of learning, optimal use of faculty and genralised acceptability to tech savvy generation. In addition the model allows the learner to inculcate life long and self directed learning skills.

Seven pronged blended learning model for Indian Medical Graduate (IMG)

Continuous Evaluation : Context, Input, Process & Product

| 1. Face to face training | 2. Virtual classroom | 3. Simulation /AR/VR/ MR, SP | 4. LMS | 5. MOOCs | 6. Webinars Web talks | 7. LMS based e-CIA, remote OSCEs |

Evidence based Education
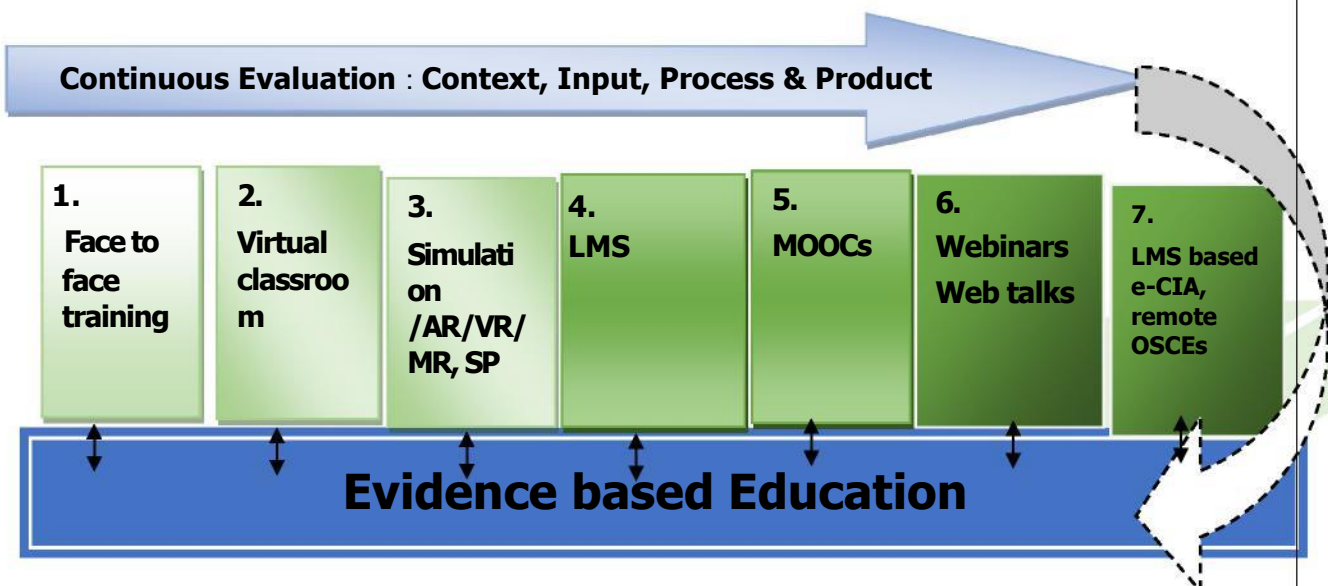
Annexure 4

Biomedical Research Module

Year 1 - literature search, research gap analysis

Year 2 - research question, writing objectives & hypothesis, study designs

Year 3 - sampling techniques, data collection & analysis

Year 4 - critical review of published research, scientific writing, submission of a draft of mini review/scoping review/narrative review/systematic review as a part of scheme of examination with at least one publication in peer reviewed journal

Postgraduate level – Thesis with Proposed 4P model in peer reviewed indexed journal

Superspeciality level – thesis with one review and at least one original article in peer reviewed indexed journal

Academic Flexibility

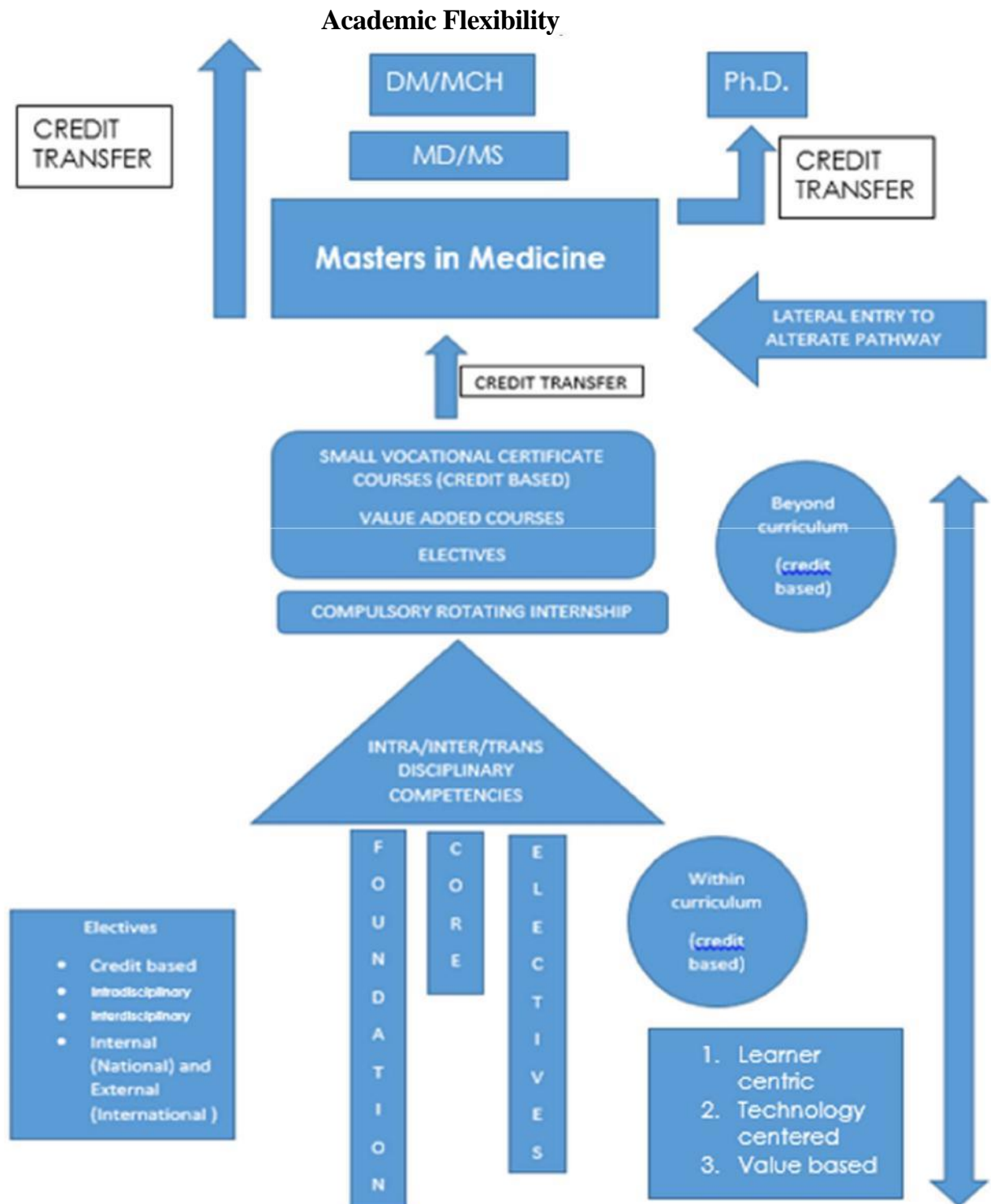**Figure: Proposed framework for academic flexibility, Multidisciplinary and Trans-disciplinary learning in Graduate medical education**

ANNEXURE -6

Few proposed arenas of Interdisciplinary research in medical education

A. Simulation-Based Training:

- Through the integration of knowledge from education, psychology, and medicine, researchers investigate the efficacy of simulation-based training for healthcare workers and medical students.

- Multidisciplinary teams create realistic scenarios, make use of sophisticated simulators, and evaluate the clinical and decision-making capabilities of learners.

B. Health Communication and Literacy:

- To increase health literacy, researchers from public health, medical education, and communication studies work together.

- They look into the effects of good communication on informed decision-making, treatment plan adherence, and patient outcomes.

C. Medical Humanities:

- This area of study incorporates history, philosophy, the arts, and literature into medical education.

- Multidisciplinary studies investigate how exposing medical students to the humanities improves their capacity for empathy, moral reasoning, and cultural competency.

- Students from a variety of healthcare specialties, including medical, nursing, pharmacy, etc., collaborate to learn through inter-professional education.

D. Inter-professional Education (IPE):

- Researchers look at how IPE affects communication abilities, teamwork, and patient-centred care.

E. **Technology-Enhanced Learning:**

- Innovations in e-learning, virtual reality, and mobile apps can be the result of collaboration between medical educators, instructional designers, and technology specialists.

- The usefulness of these resources in medical education is assessed through interdisciplinary research.

F. **Social Determinants of Health:**

- Scholars in the fields of sociology, anthropology, and medicine study the ways in which social determinants (such as cultural attitudes and socioeconomic status) affect health outcomes.

- Clinical practice and medical education curriculum are informed by an understanding of these factors.

Pattern of Assessment – Super Specialty Program

1.   Summative examination -Duration should be at least two days – examiners will need to stay for two days. It should have the following components. The external examiners in these two full days will be expected to:

- a. Correction of theory paper – this should not be done during the practical examination as the candidates prowess in eliciting history, clinical examination should be assessed.
- b. Clinical/practical exam – one long and four short cases
- c. Pedagogy – topic to be given and the candidate will plan a presentation for 10 minutes including making slides
- d. Critical appraisal of a published paper
- e. OSCE stations – at least eight out of which one should be a communication station (e.g. high -risk consent, breaking bad news etc)
- f. Presentation of thesis and viva on thesis
- g. Viva voce (instead of global marking it should be broken down into therapeutics, diagnostics, instruments and marks allocated for each

2. **Pattern of Theory Paper:** Only long questions – each for 10 marks (10X10=100). No MCQ or short answer questions as these can be asked during viva voce.

3. **Pattern of Questions -**

- Questions to be made more "specific" such as (a) Describe the components of the written informed consent form or List the various members of an institutional ethics committee and state their roles and responsibilities

   The second question can be (a) explain the terms 'de-escalation' and 'restriction' in the context of the antimicrobial stewardship programme in a hospital and discuss its importance.

4. **Correction of the theory papers**

- Each paper of the candidate is corrected by one examiner.
- All examiners must individually mark the candidate in each paper.

□ Correction rubric to be prepared for theory papers and assessment should be made against it.

5. Formative assessment & CIA: Formative assessment should be held once in three months by the medical college.

   Theory – one paper for three hours and clinical/practical's and viva voce should be conducted. The performance should be discussed with the candidate. Procedures may be tested using simulation centers.

6. Skill certification by faculty – The list of procedures that need to be done independently by candidate at the end of the course should be identified and the HOD should certify that the candidate has independently performed at least a prescribed minimal number.

ANNEXURE – 8:

Proposed - Assessment Model

UG, PG & Super speciality:

Rightfully there is a shift in the emphasis in the GMER from the cognitive to behavioural domains - from ¨Knows How¨ (KH) to Shows How (SH). Ascertainment of SH levels of competency cannot occur in the traditionally structured summative examination. **Learning** - **Practice** - **Testing** - **Corrective Feedback** - **Relearning** - **Testing** leading to certification of the skill set is key - at least in the more critical of skill sets essential for the learner.

The competencies defined by the WFME for the Graduate and postgraduate are common. From an article by E. Dreyfus and Hubert L. Dreyfus, **"A FIVE-STAGE MODEL OF THE MENTAL ACTIVITIES INVOLVED IN DIRECTED SKILL ACQUISITION".** In it description *of **five stages** of skill development. The stages are Novice, Competency, Proficiency, Expertise and Mastery.* Each of the four mental functions has a primitive and a sophisticated form, and the functions are so ordered that attaining the sophisticated form of each presupposes the prior attainment of the sophisticated form of all those lower numbered in the ordering. After completing MBBS training, a graduate should be competent and proficient, a specialist with postgraduate training should be proficient, and an expert and a super specialist should not only be proficient and expert but a master in his super speciality, as depicted herein below:

E. Dreyfus and Hubert L. Dreyfus, Five-Stage Model

Mental Function	Skill Level				
	Novice	Competent	Proficient	Expert	Master
Recollection	Non situational	Situational	Situational	Situational	Situational
Recognition	Decomposed	Decomposed	Holistic	Holistic	Holistic
Decision	Analytical	Analytical	Analytical	Intuitive	Intuitive
Awareness	Monitoring	Monitoring	Monitoring	Monitoring	Absorbed

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ANNEXURE-10

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