Editorial

Steps to standardize ophthalmology residency programs in India

Specialty medical training worldwide has evolved from an unstructured apprenticeship of unlimited duration to the modern, time-bound, curriculum-based and competency-driven model, with certification of the trainee and accreditation of the trainer.[1-3] Advanced medical training in India has been traditionally apprenticeship-based and the changeover to the contemporary system has been unenthusiastic, slow, patchy, and mostly incomplete.[4-13] Residency training programs in our country have an immense and untapped potential – clinical material is vast, teachers are experienced, and students are the best among their fraternity.[4] However, there is a striking disparity in the standard of infrastructure, quality of faculty, system of training, and mode of evaluation among the residency programs, which necessarily affects the final output.[4-13] A judicious investment of resources and efforts in standardizing the residency programs and a system-based approach will likely yield very rich dividends and positively affect the overall quality of health care in the country.[4]

Structural and Functional Alterations

Standardization of ophthalmology residency programs would involve structural and functional alterations. Adequate infrastructure, diagnostic and surgical equipment, facilities for patient care, substantial volume of patients, trained faculty, and creation of a teaching environment are the basic structural prerequisites that each training facility must systemically invest on. Logical steps in functional alterations include (1) adaptation of standard common curriculum, (2) incorporation of competency-based learning, (3) structured, objective and standardized formative and summative assessment, (4) certification of the trainee, and (5) accreditation of the training facility.[14] While provision of optimal structural support is a local issue that can be resolved at the level of the individual organization or the respective state government, functional alterations are systemic in nature and involve regulatory authorities such as the Universities, Medical Universities, Medical Council of India (MCI) (or National Medical Commission in its new form), and union and state governments. It will need focused advocacy on the part of the professional organizations (All India Ophthalmological Society [AIOS] and Indian Medical Association) to hustle through some of the reforms. Since the reforms essentially involve all the medical specialties, broad collaboration, ground level coordination, and a concerted effort may be required. The logical and systematic evolution of the residency training in the United States to what it is today shows us the path.[15,16]

Standard Common Curriculum

Adaptation of common national curriculum is the basic need and the first logical step in standardizing ophthalmology residency in India. We have made substantial progress in this regard.[17,18] The AIOS National Curriculum is a modification of the International Council of Ophthalmology (ICO) curriculum and is a collaborative and a consensus-driven effort.[19] It is being presented in its near-final structure in this issue of Indian Journal of Ophthalmology.[17] Broad components of the curriculum include (1) basic medical sciences, (2) clinical ophthalmology, (3) optics and refraction, (4) ophthalmic super-specialties, (5) ophthalmic pathological/microbiological/biochemical sciences, (6) community ophthalmology, (7) research methodology, (8) medical ethics and professionalism, and (9) management skills.[17] Each of these has specific inherent basic, standard, and advanced goals to be achieved in postgraduate year 1, 2, and 3, respectively.[17] Practical competencies in diagnostic tests, investigation procedures, and surgical procedures are clearly listed and a minimum desired number for optimal training is prescribed.[17]

Standard curriculum across the residency programs would set a common minimal training agenda that the trainers and trainees can refer to. It would further drive standardization of evaluation and certification. Obtaining regulatory approval for nation-wide implementation of the standard curriculum may be a time-consuming process. While this formal process is on, it may be good if the individual institutions and universities start implementing the new curriculum at local and regional levels.[4]

Competency-based Learning

Residents and faculty have a major role to play in having their training transformed into a wholistic experience incorporating the six Accreditation Council for Graduate Medical Education (ACGME) competencies – patient care and procedural skills, medical knowledge, system-based practice, practice-based learning and improvement, professionalism, and interpersonal and communication skills [Table 1].[3] Each of the components of competency-based learning may be customized for India and implemented in a staged manner.

Assessment

Structured, objective and standardized formative and summative assessment of the trainee is an integral part of residency training. A 360° assessment should encompass personal attributes, didactic knowledge, clinical skills, surgical skills and academic performance, and embody the six components of competency-based learning. The ACGME-American Board of Ophthalmology (ABO) Milestones project is an effort in this direction.[20-22] Milestones include knowledge, skills, attitudes, and other attributes for each of the ACGME competencies organized in a developmental framework from less to more advanced [Table 2].[20-22] These are descriptors and targets

Table 1: Six Accreditation Council for Graduate Medical Education competencies for ophthalmology residency programs

Patient care and procedural skills
Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and promotion of health
Residents will understand the care of the surgical patient, to have the medical and technical knowledge, as well as the skills, necessary to care for the surgical patient. Included here is the understanding of the preoperative ophthalmic and general medical evaluation and assessment of indications for surgery and surgical risks and benefits, informed consent, intraoperative skills, local and general anesthetic considerations, acute and longer-term postoperative care, and management of systemic and ocular complications that may be associated with surgery and anesthesia
Residents should be responsible for the care of an adequate number of outpatients who represent a broad range of ophthalmic diseases. There must be appropriate faculty supervision of the residents in all outpatient clinic visits. Appropriate faculty supervision occurs when the faculty provides direct supervision (resident primarily sees the patient, faculty sees patient with resident, and collaborative effort determines management), or when the faculty is on-site and readily available to see any patient on request of the resident
Residents should participate in a minimum of 3000 outpatient visits, in which the resident performs a substantial portion of the examination
Residents should have access to a simulated operative setting (e.g., wet lab) to allow them to develop proficiency in basic surgical techniques
Residents must perform and assist at a sufficient number of surgeries to become skilled as comprehensive ophthalmic surgeons
Residents must have graduated technical and patient care responsibilities in the surgery (including laser surgery) of cataract, strabismus, cornea, glaucoma, retina/vitreous, oculoplastic, and trauma to provide an adequate base for a comprehensive ophthalmic practice
Medical knowledge
Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care
Residents should have a minimum of 36 h of experience in gross and microscopic examination of pathological specimens, including the resident's review of pathological specimens of their patients with a pathologist who has demonstrated expertise in ophthalmic pathology
Residents should have documented experiences in practice management, ethics, advocacy, visual rehabilitation, and socioeconomics
Systems-based practice
Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care
Residents are expected to
Work effectively in various ophthalmic care delivery settings and systems relevant to their clinical specialty
Coordinate patient care within the health-care system relevant to their clinical specialty
Incorporate considerations of cost awareness and risk–benefit analysis in patient and/or population-based care as appropriate
Advocate for quality patient care and optimal patient care systems
Work in interprofessional teams to enhance patient safety and improve patient care quality and
Participate in identifying system errors and implementing potential systems solutions
Practice-based learning and improvement
Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning
Residents are expected to develop skills and habits to be able to meet the following goals
Identify strengths, deficiencies, and limits in one's knowledge and expertise
Set learning and improvement goals
Identify and perform appropriate learning activities
Systematically analyze practice using quality improvement methods and implement changes with the goal of practice improvement
Incorporate formative evaluation feedback into daily practice
Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems
Use information technology to optimize learning and
Participate in the education of patients, families, students, residents, and other health professionals
Professionalism
Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles
Residents are expected to demonstrate
Compassion, integrity, and respect for others
Responsiveness to patient needs that supersedes self-interest
Respect for patient privacy and autonomy
Accountability to patients, society, and the profession and
Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation

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Interpersonal and communication skills
Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, ophthalmology, and health professionals
Residents are expected to
Communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds
Communicate effectively with physicians, other health professionals, and health-related agencies
Work effectively as a member or leader of a health-care team or other professional group
Act in a consultative role to other physicians and health professionals and
Maintain comprehensive, timely, and legible medical records, if applicable
Receive experience in providing inpatient and outpatient consultation

for resident performance as the resident progresses from entry into residency toward completion. For each reporting period, review will involve selecting one of the numbered milestones that best describes the resident's current performance level.[20-22] Milestones describing patient interviewing (history-taking) skills, gonioscopy, strabismus surgery, and interpersonal skills are shown in Tables 3-6 just as examples.[21,22] A complete compilation of milestones is available online for immediate use.[21,22]

A general interpretation of levels for the ophthalmology milestones is as follows:[20-22]

1. Level 1: Demonstrates milestones expected of a resident who has had some education in ophthalmology
2. Level 2: The resident is advancing and demonstrating additional milestones
3. Level 3: The resident continues to advance and is demonstrating additional milestones; the resident consistently demonstrates most milestones targeted for residency
4. Level 4: The resident has advanced so that he or she now substantially demonstrates the milestones targeted for residency. This level is designed as the graduation target
5. Level 5: The resident has advanced beyond performance targets set for residency and is demonstrating "aspirational" goals which might describe the performance of someone who has been in practice for several years. It is expected that only a few exceptional residents will reach this level.

Assessment tools used to evaluate the milestones include 360° global evaluation, Ophthalmic Clinical Evaluation Exercise, chart audit/review, chart-stimulated recall, Objective Structured Clinical Examination (OSCE), focused skills assessment, simulation, oral/written examination, portfolio, case logs, outcome and assessment information set, Global Rating Assessment of Skills in Intraocular Surgery, surgical skills assessment, Ophthalmology Surgical Competency Assessment Rubric (OSCAR), video review, On-call assessment tool, and Organizational Capacity Assessment Tool. A recommended starter toolbox is as follows:[14]

1. Patient care – OSCE and patient surveys
2. Medical knowledge – written and oral examinations
3. Practice-based learning – record review, chart audit, and portfolios
4. Interpersonal skills – OSCE, direct observation, and patient surveys
5. Professionalism – OSCE and 360° global ratings
6. System-based practice – 360° global ratings
7. Surgery – OSCAR, OSCE, video review, and portfolio.

The AIOS National Curriculum lists out the assessment strategy, scoring pattern, and timelines in detail.[17] As we further evolve, we may have to streamline to integrate the objectives of competency-based learning into the formative assessment strategy. The steps involved may be as follows:

1. Without reinventing the wheel, we may simply customize the milestones and the incumbent assessment tools to Indian residents and build this into our residency programs. Comprehensive formative assessment is ideally performed during and after each clinical rotation
2. The OSCAR is a standardized, internationally-valid tool to teach and assess an ophthalmologist's competence in performing surgery.[23] This behavioral and skill-based rubric allows the evaluator to objectively assess the resident's competence in performing a specific procedure.[23] OSCAR rubrics are available currently for extracapsular cataract extraction, phacoemulsification, pediatric cataract surgery, small incision cataract surgery, strabismus, lateral tarsal strip surgery, trabeculectomy, and vitrectomy.[23] These may be used for in-program evaluation of surgical skills
3. An annual centralized online Ophthalmic Knowledge Assessment Program (OKAP) designed to measure the ophthalmic knowledge of residents relative to their peers using a set of standardized multiple-choice questions may be evolved by the AIOS. Short of it, OKAP International is already offered by the American Academy of Ophthalmology and is readily available to interested residency programs[24]
4. It is strongly recommended that each resident maintains a logbook (portfolio) to help track individual progress. Royal College of Ophthalmology's e-Portfolio is an eminent effort in systematizing and modernizing the portfolio.[25] It may be suitably customized to support the attributes of the AIOS National Curriculum
5. Structure for an exit examination at the end of residency is very well laid out in the AIOS National Curriculum.[17] It would be ideal to have a single national exit examination so that the quality can be benchmarked.

Table 2: Accreditation Council for Graduate Medical Education-American Board of Ophthalmology milestones for semi-annual formative assessment based on six components of competency-based learning

Patient care and procedural skills
Patient interview
Patient examination
Vision testing
External examination
Ocular motility
Pupils
Slit-lamp biomicroscopy
Gonioscopy
Tonometry
Ophthalmoscopy (direct and indirect)
Office diagnostic procedures
Perimetry
Corneal pachymetry and topography
Ocular lubrication testing
Ultrasonography
Optic coherence tomography, confocal laser tomography
Fluorescein angiography
Neuroimaging (CT and MRI)
Disease diagnosis
Nonsurgical therapy
Nonoperating room surgery
Laser procedures
Nasolacrimal probing and irrigation
Chalazion excision
Excision or biopsy of lid lesion
Temporal artery biopsy
Operating room surgery
Cataract
Strabismus
Cornea
Glaucoma
Oculoplasty and orbit
Retinovitreous
Globe trauma
Consultation
Medical knowledge
Demonstrate level-appropriate knowledge
Demonstrate level-appropriate knowledge applied to patient management
System-based practice
Work effectively and coordinate patient care in various health-care delivery systems
Incorporate cost-effectiveness, risk/benefit analysis, and IT to promote safe and effective patient care
Work in interprofessional teams to enhance patient safety, identify system errors, and implement solutions
Practice-based learning and improvement
Self-directed learning
Locate, appraise, and assimilate evidence from scientific studies related to their patient's health problems
Participate in a quality improvement project
Professionalism
Compassion, integrity, and respect for others; sensitivity and responsiveness to diverse patient populations
Responsiveness to patient needs that supersedes self-interest
Respect for patient privacy and autonomy
Accountability to patients, society, and the profession

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Table 2: Contd...

Interpersonal and communication skills
Communicate effectively with patients and families with diverse socioeconomic and cultural backgrounds
Communicate effectively with physicians, other health professionals, and health-related agencies
Work effectively as a member or leader of a health-care team or other professional group
Effectively present didactic and case-based educational material to physicians and other health-care professionals

CT: Computed tomography, MRI: Magnetic resonance imaging, IT: Information technology

Table 3: Accreditation Council for Graduate Medical Education-American Board of Ophthalmology milestones - patient care and procedural skills, PC 1 – patient interview

Has not achieved Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
	Obtains and documents basic history for ophthalmic complaint	Acquires accurate and relevant problem-focused history for common ocular complaints Obtains and integrates outside medical records	Obtains relevant historical subtleties that inform and prioritize both differential diagnoses and diagnostic plans, including sensitive, complicated, and detailed information that may not often be volunteered by the patient	Demonstrates, for junior members of the health-care team, role model interview techniques to obtain subtle and reliable information from the patient, particularly for sensitive aspects of ocular conditions	Incorporates new information from literature to tailor interview questions

Assessment tools: 360° global evaluation, the OCEX, chart audit/review, chart-stimulated recall, OSCE.

Table 4: Accreditation Council for Graduate Medical Education-American Board of Ophthalmology milestones – patient care and procedural skills, patient examination, PC 2 – specific skills (gonioscopy)

Has not achieved Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
	Describe purpose of gonioscopy	Describe principles and indications, and properly perform basic techniques of gonioscopy Recognize normal angle structure; identify angle closure	Grade more questionable angles using compression and lens tilting; identify more subtle features (e.g., neovascularization, recession, synechiae)	Perform in technically difficult examinations; detect or verify subtle abnormalities (e.g., pigmentation, plateau iris)	Recognize and classify gonioscopic abnormalities at subspecialty level

Table 5: Accreditation Council for Graduate Medical Education-American Board of Ophthalmology milestones – patient care and procedural skills, operating room surgery, PC 7 – specific procedures (strabismus)

Has not achieved Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
	Describe indications for and technique of strabismus surgery	Perform selected portions of strabismus surgery, including extraocular muscle suturing Perform postoperative care of strabismus surgery patients	Obtains informed consent for strabismus surgery Perform horizontal strabismus surgery recession and resection Manage intra- and postoperative complications of strabismus surgery	Perform vertical and oblique muscle strabismus surgery Describe surgical considerations for reoperations in strabismus surgery	Perform strabismus surgery at subspecialty level

Table 6: Accreditation Council for Graduate Medical Education-American Board of Ophthalmology milestones – interpersonal and communication skills, ICS 2 – communicate effectively with physicians, other health professionals, and health-related agencies – comprehensive, timely, and legible medical records; consultation requests; care transitions; conflict management

Has not achieved Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
	Produces comprehensive, timely, and legible nonophthalmic medical records Describes importance and procedure for request of consultation Lists steps for appropriate care transition Manages one-on-one conflicts	Produces comprehensive, timely, and legible ophthalmic medical records Recognizes the need for, identifies, and requests appropriate consultant Performs appropriate basic ophthalmology care transition Manages conflicts within peer group	Performs more complex subspecialty care transitions Ensures accurate documentation and face-to-face communication where needed Manages conflicts within department	Effectively and ethically uses all forms of communication, including face-to-face, telephone, electronic, and social media Coordinates multiple consultants Manages complex multisystem care transitions	Develops models and approaches to managing difficult communications Manages conflicts with superiors and payers

Assessment tools: 360° global evaluation, OCEX, OSCE, portfolio, chart review

Certification

Certification, incorporating profession-driven standards and requirements, is granted to those who meet a series of accredited medical training requirements in ophthalmology and complete an intensive evaluation process. The basic requirements for certification are that there should be a formal certification authority (such as the ABO) and a well-defined process.[26] It would take organized efforts to build in the concept and process of certification and time-bound recertification into the Indian medical education system.

Currently, the ICO examinations provide a method of individual certification.[27] The examinations promote the excellence of eye care worldwide by encouraging individuals to acquire and maintain the highest standard of practice of ophthalmology and are the only worldwide medical-specialty examinations.[27] Hundreds of residents from India voluntarily participate in the ICO examinations every year.

Certification currently remains an aspirational goal in India. At best, we could move toward an informal and a voluntary certification process spearheaded by AIOS. We could perhaps explore the prospects of initiating a common Indian National Certification Examination based on the attributes of AIOS National Curriculum, and thereafter engage in positive advocacy to enthuse the regulatory authorities to formally implement it. Ophthalmology has been the first mover for certification in the United States in 1916, and it can be the trendsetter in India as well, albeit well over a century later.

Accreditation

Robust accreditation of the training programs is the most important missing link in standardizing medical subspecialty training in India. Accreditation is broadly used to understand the "Quality Status" of an institution. Accreditation status indicates that the training facility meets the standards of quality as set by the accreditation authority in areas of educational processes and outcomes, curriculum, teaching/training, learning, evaluation, faculty, research, infrastructure, learning resources, organizational governance, financial health, etc. The MCI and proposed National Medical Commission are supposed to be the accreditation authorities in India. Despite MCI inspections over the years, there is no evident standardization of ophthalmic training facilities (both structure and function) in India.

ACGME has already moved toward the Next Accreditation System (NAS) in the United States.[28] Under the NAS, ACGME will accredit US residency programs and systematically track steady resident progress in the common and specialty-specific competency-based milestones.[28] It is understandably a well thought-out and an integrated system of competency-based learning, assessment using milestones, and that, feeding to accreditation.[28] The ICO has worked to provide tools to establish accreditation systems in countries where the concept does not exist or is at best rudimentary.[27] It has developed "ICO International Guidelines for Accreditation of Ophthalmology Training Programs" and "ICO Accreditation Self-assessment Template."[29,30] These are two powerful tools that can be offered for voluntary use in India. AIOS may indulge in strong and strategic advocacy to help incorporate the system of accreditation in its true form and spirit into the functions of the proposed National Medical Commission.

Energetic and enthusiastic incorporation of the national curriculum for training, competency-based learning, robust formative and summative assessment, common certification of the trainees, and rigorous accreditation of the training programs are much needed to standardize ophthalmic training in India and take it to the next level. Voluntary adaptation of the national curriculum perhaps may be the all-important first catalytic step in this predictably long, but a potentially a rewarding journey.

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