

Restoring Sight, Transforming Vision: The Past, Present, and Future of Ophthalmology in Indonesia

From institution-based services to an integrated, digital, and equitable national eye-care system

Muhammad Bayu Sasongko

Department of Ophthalmology, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada – Dr. Sardjito General Hospital, Yogyakarta, Indonesia

The evolution of ophthalmology in Indonesia reflects substantial clinical progress achieved within a complex and demanding service environment. Across this vast archipelago, diagnostic and therapeutic technologies—including microsurgery, imaging, laser therapy, and pharmacotherapy—have been introduced and widely adopted. Yet these advances have not translated into equitable population benefit. Geographic isolation, the maldistribution of human and financial resources, and fragmented referral pathways continue to restrict access to timely, effective, and high-quality eye care, particularly in underserved communities. The central question is therefore no longer whether Indonesia can acquire modern ophthalmic capabilities, but whether these capabilities can be organised systematically into an accessible, equitable, and accountable national eye-care system. In 2022, the World Health Organization (WHO) launched its framework for integrated people-centred eye care (IPEC), which places the needs of individuals and communities at the centre of service delivery and promotes a coordinated continuum encompassing health promotion, prevention, diagnosis, treatment, disease management, and rehabilitation across all levels of the health system. Viewed through this lens, the evolution of ophthalmology in Indonesia should be assessed not solely by the adoption of modern technologies and procedures, but by the extent to which it serves a broader public purpose: from hospital-centred treatment to population-centred prevention and integrated care; from episodic charitable outreach to sustainable and equitable coverage; and from expertise concentrated in major cities to connected service networks across provinces. This Perspective traces major milestones in Indonesian ophthalmology, identifies persistent gaps, and proposes priorities for translating clinical and technological progress into equitable and effective population eye care.

1. The Past: Building a Profession and Restoring Sight

Ophthalmology in Indonesia initially developed around hospitals and academic centres in major cities. Beyond these urban centres, access frequently depended on intermittent outreach, cataract campaigns, or referral over considerable distances. The establishment of the Indonesian Ophthalmologists Association (PERDAMI) in 1964 represented more than a professional milestone; it created a national platform for clinical standards, specialist education, and institutional collaboration [1]. The subsequent expansion of university departments and specialist training

programmes further strengthened the country's ophthalmic workforce and its clinical and academic capacity.

From the 1960s through the early 2000s, the dominant challenge was avoidable blindness, particularly from untreated cataract [2, 3]. The introduction of operating microscopes, intraocular lenses, phacoemulsification, vitrectomy, and laser therapy—supported by improvements in specialist training—broadened therapeutic capacity and made ophthalmic surgery safer and more predictable. Ophthalmology consequently emerged as one of the most technically advanced disciplines in Indonesian medicine, with increasing capacity to restore sight and manage complex eye disease.

Nevertheless, expanded technical capability did not automatically translate into effective population coverage. Rapid Assessment of Avoidable Blindness surveys conducted across 15 provinces between 2013 and 2017 estimated a blindness prevalence of 3.0% among people aged 50 years or older. Untreated cataract remained the leading cause in every surveyed province, accounting for 71.7%–95.5% of blindness [4]. These findings exposed a persistent paradox that Indonesia had developed the clinical capacity to restore sight, but not a system capable of delivering that benefit consistently to populations with the greatest need. The lesson is clear: a successful procedure in an operating theatre is a clinical achievement, but it does not guarantee effective national coverage.

2. The Present: Modern Capability, Unequal Reach

Recent decades have seen rapid adoption of modern technologies, equipment, and surgical techniques. Indonesian ophthalmology now encompasses small-incision cataract surgery, corneal transplantation, complex vitreoretinal surgery, glaucoma devices, paediatric services, optical coherence tomography, widefield imaging, and intravitreal pharmacotherapy. Leading centres provide care comparable to international standards, and Indonesian ophthalmologists contribute increasingly to research, training, innovation, and regional professional leadership.

Indonesia's health-financing landscape has also changed fundamentally. By December 2023, Jaminan Kesehatan Nasional (JKN)—the national health insurance scheme introduced in 2014 and underpinning Indonesia's progress towards universal health coverage—covered more than 95% of the population [5]. This expansion has strengthened financial protection for covered health services, including eye care. Nevertheless, insurance coverage is not equivalent to effective access. JKN cannot eliminate indirect costs, including travel, accommodation, and lost income, nor can it compensate for the absence of nearby specialists, functioning diagnostic equipment, essential medicines, or effective referral pathways. Financial coverage becomes meaningful only when services are available, reachable, timely, and of assured quality.

Indonesia is also undergoing an epidemiological transition in eye disease [4, 6, 7]. Although cataract and uncorrected refractive error remain major causes of avoidable vision loss, population ageing and the increasing burden of diabetes, glaucoma, age-related retinal disease, childhood visual disorders, and myopia are shifting clinical priorities towards earlier detection, prevention, and longitudinal care [2, 8]. For example, a population-based study conducted in urban and rural Yogyakarta found diabetic retinopathy in 43.1% of adults with type 2 diabetes, with vision-

threatening disease in 26.3% [9]. Subsequent follow-up documented substantial incidence and progression, reinforcing the need to integrate surveillance, timely referral, and treatment into routine diabetes management [10].

The principal constraint is no longer knowledge of what works, but the architecture of delivery. Eye-care facilities remain scarce in many areas, while ophthalmologists and advanced treatment facilities are concentrated in urban centres and on Java [11]. Consequently, many Indonesians living elsewhere must travel hundreds or thousands of kilometres across districts, islands, and multiple referral levels to obtain definitive care. Screening without treatment capacity identifies disease without necessarily changing outcomes; conversely, without accessible screening, at-risk populations who could benefit from earlier, less costly intervention remain undetected. Indonesia therefore needs end-to-end pathways encompassing screening and early detection, effective referral, diagnostic confirmation, treatment, and continued follow-up.

Digital innovation offers an opportunity to alter this equation. Portable diagnostic devices, smartphone-based platforms, interoperable health records, tele-ophthalmology, cloud-based referral, and artificial intelligence-assisted triage can bring selected diagnostic and decision-support functions closer to primary health facilities and communities [12]. Their value lies in shortening the pathway to treatment, reducing unnecessary travel, improving referral completion, and enabling specialists to prioritise patients at greatest risk. Success should therefore be measured by treatment uptake and visual outcomes—not merely by the number of images captured, patients screened, or algorithmic outputs generated.

3. The Future: Transforming Ophthalmology into a National System of Eye Care

Ophthalmology in Indonesia has evolved substantially, but the advancement of a clinical specialty is not synonymous with the development of an eye-care system. Ophthalmology defines what specialists can diagnose and treat; eye care determines whether those capabilities reach people across the full continuum of health promotion, prevention, early detection, treatment, rehabilitation, and long-term follow-up [13]. The central task is therefore to translate specialist capability into population benefit. This transformation requires coordinated service networks, sustainable financing, an appropriately distributed and competent workforce, functional referral pathways, and accountability for equitable access and visual outcomes.

In late 2024, the Ministry of Health of the Republic of Indonesia launched the Vision Health Roadmap 2025–2030 [14, 15]. The Roadmap sets five-year targets and collaborative strategies, reflecting Indonesia's commitment to transform eye care in alignment with the WHO IPEC framework [13, 16, 17]. Effective integration requires eye health to be embedded across all levels of care—not confined to secondary and tertiary services—and incorporated into cross-cutting programmes, including non-communicable disease prevention and management, maternal and child health, school health, and healthy-ageing services [13, 16, 17].

Data will be central to this transformation. Integrating eye-health data into the national health information system could connect screening results, diagnostic images, referrals, treatment, and outcomes across facilities [18]. A standardised eye-health dataset is essential for real-time monitoring of service quality and outcomes and for identifying populations with the greatest unmet

need. System redesign must be accompanied by workforce and financing reform. Indonesia needs not only more ophthalmologists, but also more equitable specialist distribution, stronger regional training capacity, competent ophthalmic nurses and refractionists, and structured task-sharing supported by appropriate training, supervision, and quality assurance.

4. Summary

Indonesia's ophthalmic journey has progressed from building a profession and restoring sight to mastering sophisticated diagnostics and therapies, yet its most consequential task remains unfinished: translating clinical excellence into equitable population outcomes. Advanced technology, national insurance, and expanded screening are necessary, but none can prevent blindness if patients cannot reach services, complete referrals, receive treatment, and remain in long-term care. Indonesia's next major ophthalmic innovation must therefore be organisational rather than technological: a resilient, people-centred system that delivers the full continuum of eye care close to where people live. The country no longer needs to prove that it can practise modern ophthalmology; it must demonstrate that modern ophthalmology can become eye care for all. The true measure of progress will not be the sophistication of its leading hospitals, but whether a child with refractive error, an older adult with cataract, or a person with sight-threatening diabetic retinopathy can receive timely, affordable, high-quality care wherever they live.

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