In the 1970s, endothelial cell density was the only parameter that mattered for measuring the health of a cornea following a surgical intervention. I was then a cornea fellow at the eye department in Park Ridge Hospital, Rochester, NY. In our patients, the corneal reaction to cataract surgery with similar preoperative cell density differed. While some of them developed edema, others didn’t, and nobody was looking beyond cell density for answers. In 1976, I was introduced to a specular microscope for the first time—one of only four in the world—at the hospital. No one had used it before, and I was given the microscope as my research project. Weeks of tinkering and fiddling with that finicky instrument for my studies on corneal endothelium gave me an insight that would change the course of my life. The specular microscope, after much coaxing, helped me establish the importance of cell morphology and polymegathism and its role in preserving corneal transparency.

The world disagreed—at least initially. My paper on endothelial cell morphology was rejected many times until it was finally accepted in a lower-impact journal. However, the data was solid. It was not easy to dismiss the evidence that a new tool was available that linked endothelial cell morphology to its functional reserve. In four years, with the Association for Research in Vision and Ophthalmology (ARVO) annual meeting—including an entire session on polymegathism—I knew my insight had now become mainstream.

This has been a recurring feature all through my career. I was never a topper, never considered a brilliant student. I had an average scholastic record, and I made it to my preferred colleges and training programs very often on waiting lists. Many top institutes rejected my applications. I had to bring perseverance, focus, patience, and a careful attention to detail to ensure success in all my endeavors. Needless to say, these values permeate the founding and growth of the organization that I helped create: the LV Prasad Eye Institute (LVPEI). The inspiring examples of many visionary institutions and individuals also provided much-needed stimulus.

The Beginning

The World Health Organization (WHO) released the “World Report on Vision” in 2020. The report “seeks to stimulate action in countries to address challenges to eye care by proposing Integrated people-centered eye care (IPEC). IPEC aims to provide a continuum of health interventions that address the full spectrum of eye conditions, coordinated across the different levels and sites of care within and beyond the health sector, and according to people’s needs and throughout their life course.”

I am struck by how much the pyramidal model of eye care delivery developed and implemented by LVPEI is a manifestation of this aspiration. The inspiration and influences behind this model are presented in this report.

In late 1981, my wife Pratibha—whose support was pivotal to the LVPEI story—and I gave ourselves five years to come back to India. Our dream was to create a high-quality, academic eye center, an institute along the lines of the many famous ones in the US. We knew from the beginning that the center would be open to all, irrespective of their ability to pay. By the first decade, with the support of many kind and generous friends, the LVPEI took shape. As our team grew, so did our understanding of the need for eye care. We began with a focus on fellowships and training, research, and a world-class clinical center. However, it quickly became clear that the need was far greater. Understanding the magnitude of blindness and visual impairment, their main causes, and the many barriers to accessibility opened up conversations between LVPEI and its partners from around the world.

One of the first steps that redefined LVPEI’s focus and the nature of care it offered was our advancement into rural public health, or as we call it, community eye health. Many of our patients came from rural areas. While care was provided free of cost, very few could travel long distances to seek treatment. They say that India lives in many centuries, all at the same time. I had grown up in a tiny village in the India of the 1950s, and I knew what life was like in rural India. It made sense to take eye care closer to India’s villages. Encouraged by the Indian heads of Sight Savers International (SSI) and Christoffel-Blindenmission (CBM), INGOs working in India, LVPEI launched its rural eye care program with the first secondary center in Mudhole (a village in one of the most impoverished districts in Telangana). LVPEI’s landmark population-based survey, the Andhra Pradesh Eye Disease Study or APEDS (1996–2000) provided the empirical evidence to deepen our plans for rural and tribal areas that lacked permanent facilities for eye care. The concept of primary care “vision centers” emerged from this data, leading to LVPEI’s pyramid of eye care delivery.

While the world associated LVPEI with the eye health pyramid, we had also developed an integrated management system with ten functional arms that covered all aspects of eye care services. These arms were closely interlinked to their operations and management so that the Institute continued to function as a single, healthy unit. To my eye, the ten arms of LVPEI look like the corneal endothelium! Only when they are all closely inter-digitated can LVPEI have a clear path to success. These are:

1. Patient care: The very base of LVPEI’s existence. It includes basic screening in rural communities to the most complex surgeries to everyone in need—irrespective of their ability to pay—through a coordinated pyramidal model of eye care service delivery.
2. Vision Rehabilitation: It empowers and supports people with irreversible vision loss to lead independent and happy lives.
3. Education: It provides high-quality and need-based training of all cadres of eye care personnel; local empowerment, and career advancement through training and education.
4. Rural and Community Eye Health: It provides eye care closer to the community in remote and underserved regions in India and in other developing countries.
5. Eye Banking: It develops a state-of-the-art eye banking system to combat corneal vision loss.
6. Research: This relates to translational research to enhance our understanding of disease pathologies, early detection...
methods, and treatments for superior outcomes. It includes public health research to understand the burden of vision loss and operations research to improve management systems.

vii. Technology Innovation: It includes technological innovations to improve efficiency and bring down the cost of care; to improve access through teleophthalmology; data integration using electronic medical records; and tools for screening and early detection of eye diseases.

viii. Product Development: This includes developing products that are useful for clinical care but are not available in the market.

ix. Capacity Building: This is to enable other eye health organizations to become better for a wider impact.

x. Advocacy, Policy, and Planning: This is to influence policymakers and the government for better allocation of resources, program planning, and to place eye care higher on the priority list of healthcare programs.

The model of eye care delivery, the evidence of APEDS, our clinical practice, robust education programs and research, and expertise that LVPEI attracted over the decades helped place us on the global map. LVPEI played a pivotal role in creating and strengthening VISION 2020: The Right to Sight (V2020) global initiative in 1999. This initiative, jointly launched by the World Health Organization (WHO) and the International Agency for the Prevention of Blindness (IAPB), helped define public health eye care delivery around the world. LVPEI was the secretariat for IAPB for a decade and our eye health pyramid was a key model internationally. We also contributed to global efforts to prioritize eye care within the global health frameworks and to put it on the global health agenda. LVPEI also led the effort to form state- and national-level V2020 programs. The institute has been a WHO collaborating center for more than 20 years.

The success of the LVPEI model in addressing vision loss and its positive impact on changing the lives of millions of people won us the prestigious "Sanford and Susan Greenberg Outstanding Achievement Prize" through "End Blindness 2020" and several other accolades at the individual and institutional level.

**LVPEI is Unique**

There are certain unique features that underlines LVPEI’s success. These features give us credibility and recognition from our patrons, patients, and peers. I want to highlight a few of them:

a. Equitable eye care service delivery model: At least 50% of care is provided free to those who cannot afford it, and nobody is denied care however complex and expensive the treatment. All receive the same high-quality care and are treated with the same dignity and respect (clinical facilities are the same, ancillary facilities like waiting areas differ).

b. Comprehensive Eye Care: LVPEI provides comprehensive eye care that encompasses prevention of blindness, promotion of eye health, treatment of every eye care ailment, and rehabilitation of irreversible blindness and low vision. There is special emphasis on vulnerable groups.

- LVPEI is one the first eye institutes to provide comprehensive vision enhancement and rehabilitation services for the irreversibly blind or vision impaired integrated into the patient care services in India.
- It is one of the few institutes with an exclusive facility for children’s eye care, including a dedicated facility for comprehensive management of eye cancer (retinoblastoma) in children, and a retinopathy of prematurity (RoP) program.
- At the opposite end of the demographic spectrum, the Silver Sight Initiative provides home-based eye care to the elderly to ensure continuity of care.
- The The Liberia Eye Center in Monrovia, Liberia in West Africa, provides high-quality care in the region and also a residency program in ophthalmology to support African ophthalmologists.
c. Eye banking: Initiated right around the inception of the institute, the LVPEI eye bank network is now the largest in Asia and one of the largest eye banks in the world.

d. Human resource development for eye care: Education and need-based training of all cadres and levels of eye care personnel was focused on developing a team approach. Some of LVPEI’s popular examples include the Ophthalmic Nursing Assistant (ONA) and the Vision Technicians (VT) programs that provide career opportunities for youth from disadvantaged backgrounds. Improving career prospects for every employee in their chosen area of work and recognizing young talent and nurturing it to success have been the cornerstone for LVPEI’s success. This, indeed, has yielded us rich dividends over the years. Inculcating elements of discipline such as punctuality, regularity, grooming, frugality, cleanliness, and respecting every individual are essential components of induction for every team member. Additionally, we remodel ophthalmologists into professionals that emphasizes the three Fs: hands (safe surgeons), head (evidence-based practice), and heart (compassion for the underprivileged).

e. Research: Relevant and translational research combined with technology and innovation is core to LVPEI’s purpose. Our research focus covers the gamut of eye care, from basic science to clinical, epidemiological, and operations research. The enabling environment created in the institute has led to a new breed of LVPEI “clinician-scientists” who excel in advanced clinical care coupled with expertise in basic sciences that has helped in creating a vibrant research program.

f. Commitment to quality: Our commitment to quality is evident in all aspects of work at LVPEI and at every level. This extends to non-clinical aspects like cleanliness of our facilities or the extensive documentation of our processes.

g. Combining art and science: LVPEI is among the few eye care institutions that host science and art. Spacious art galleries, esthetically pleasing infrastructure, and well-designed gardens are the signature features of all LVPEI campuses. All aspects of our facilities including ambience, patient flow, and lighting are managed to create a place that does not feel like a conventional hospital.

h. Public health/Rural eyecare: LVPEI has made a name for itself by venturing into difficult geographies and reaching out to marginalized populations. Our first two secondary centers were established in two of the most backward districts in the country 25 years ago. To date, these two are the only eye care services in these regions and have become role models for sustainable eye care to the world. Similar facilities at the primary and secondary level have been created in other districts in the three states where LVPEI has a presence: Andhra Pradesh, Odisha, and Telangana [Fig. 2]. They take eye care closer, to the doorstep of people far removed from urban infrastructure.

The LVPEI pyramid of eye health insists on permanent infrastructure to ensure continuity of care and commitment to the local communities. Our centers are also sites of trust and faith in our health system for people accustomed to indifferent health personnel and apathetic health delivery. Today, our primary eye care centers are supplemented with state-of-art teleophthalmology technologies, bringing high-quality care even closer to people in our towns and villages. This development proved invaluable in providing last-mile care during the coronavirus disease 2019 (COVID-19) pandemic.

While LVPEI’s unique features keep us going, the following are a few non-negotiable elements that make us who we are:

a. Values: LVPEI is founded on the core values of “patient first”, excellence, equity, integrity, and togetherness in all its functions and behaviour. We provide equitable care to all patients with the same high-quality care. Equity encompasses all stakeholders, including trainees, staff, and our vendors. We aim for excellence in every aspect of LVPEI’s work—right from patient care to cutting-edge research. We are mindful of the trust and faith that enables us, and so we strive to be efficient in all our endeavors.

b. Commitment to quality: LVPEI is synonymous with high quality services at all levels of care, delivered with compassion by well-trained professionals. Be it simple vision screening by the community eye health workers to the most complex surgical care at the advanced tertiary care facility, high-quality care is delivered with diligence and with a sense of responsibility. Every interaction with the world outside is framed by this commitment.

c. Fiscal discipline: LVPEI is a not-for-profit organization. We have always run a tight ship to ensure that we can serve as many non-paying patients as possible. Although the goal of LVPEI is to provide at least 50% of its services to those who cannot pay, in certain locations this proportion is even greater. Yet, the LVPEI model is financially sustainable. Even during the COVID-19 pandemic, LVPEI stood strong without any debt or overdraft. The institute ensured that no employee was affected by the pandemic with job protection and full wages.

A Future to Share

The LVPEI eye care delivery model has been striving to integrate and provide comprehensive care to achieve universal eye health over the decades. This focus has ensured that our services explore a broad set of modalities for our patients across age groups. Our insistence on permanent centers of eye care has placed us in a position to build bridges with other health services. This allows chronic conditions like diabetes and hypertension to be covered by relevant specialists and to enable strong referral networks to other health systems. LVPEI has been at the cutting-edge of imaging technologies and tele-health, creating portable devices and applications that address issues of access. This has put us in a unique position to showcase how we can practice and deliver true IPEC today.

LVPEI continues to offer our experiences to those within the sector, as we believe a strengthened eye health sector can ensure its relevance in an integrated health system and prove to be the first port-of-call for many new health-seeking individuals. Based on our decades of experience, we envisage two strategic pillars for the future:

a) Institutes of Excellence that will emerge as global resource centers in specific areas of eye health. These institutes will cover the gamut from clinical care to education, research and innovation, and advocacy and policy. They will partner with organizations around the world to share their expertise and build robust eye health systems.

b) Primary Eye Care for 150 million population that will become a model of high-quality primary care in the three states we are involved in. While the network extends to over 260 locations in the states of Telangana, Andhra Pradesh, Odisha, and Karnataka, we intend...
to partner with the government, other NGOs, and the private sector. This approach will be a model for other health systems that are currently focusing excessively on quaternary care. As India’s demographic patterns shift, the need for primary care will only increase. LVPEI’s experience will be invaluable in the future.

We went through a seamless leadership transition about a year ago. In the immediate future, their focus will be on leveraging the best of technology to serve the most vulnerable groups of population.

Gratitude

LVPEI’s story begins and ends with our patients. We are grateful to the millions of patients who come from around the world seeking our services. The institute is based on a solid foundation of community participation and engagement. LVPEI’s philanthropic champions cut across all sections of society: from individuals in small villages to international corporations. Every major international eye care NGO has supported LVPEI over the years. While the collaborations with WHO and governments have helped in advocacy and global policy, partnerships with major universities in the USA and the rest of the world brought rigor in research, education, patient care, and technological innovation.

We take great pride in our alumni and celebrate their flourishing across the world. We are grateful that they chose to be a part of our journey. Our staff and teams are critical to our success. Across the years, these individuals, with support from their families, have stepped beyond the call of duty to help achieve our goals. I am indebted to them for their dedication and unflinching support to our collective vision. The mentorship of Prof. L. P. Agarwal and my teachers at Dr. Rajendra Prasad Centre, Drs. Jules Baum and James Aquavella, laid a strong foundation for my professional journey. All this would not have been possible without the unreserved support of my wife and children at every stage, and my parents for giving me a value-based foundation.

For someone whose childhood was spent in a small rural village, the opportunity to grow professionally and to be able to contribute to better eye health in the world has been a great privilege.

I leave you with a few lines from J. K. Rowling’s Harvard graduation lecture of 2008. I think it applies to each one of us striving to take eye care to those in greatest need and make a difference to their lives. After all, learning is a lifelong endeavor and all of us are students.

“Your intelligence, your capacity for hard work, the education you have earned and received, give you unique status, and unique responsibilities. That is your privilege, and your burden. If you choose to identify not only with the powerful, but with the powerless; if you retain the ability to imagine yourself into the lives of those who do not have your advantages, then it will not only be your proud families who celebrate your existence, but thousands and millions of people whose reality you have helped change.” – J. K. Rowling.

Acknowledgements

Sreedevi Penmetcha, Srinivas Marmamula, and Tejah Balantrapu helped in a big way in the preparation of this manuscript.

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Figure 2: The LV Prasad Eye Institute service delivery network
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Dr. Gullapalli Nageswara Rao

Dr. Gullapalli Nageswara Rao established the L V Prasad Eye Institute (LVPEI) in Hyderabad, India in 1987 and is LVPEI’s Founder Chair. He is the alumnus of Guntur Medical College; AIIMS; Tufts University and University of Rochester, USA.

He has over 300 publications, membership on editorial boards of several international journals of ophthalmology, visiting professorships, honorary doctorates and fellowships from national and international academic institutions. As the Editor of the Indian Journal of Ophthalmology, Dr. Rao was responsible for its transformation into a well-edited and punctual high-quality professional medical journal.

He is a member of the “Academia Ophthalmologica Internationale (AOI)” and served as its President. He held leadership positions on the boards of many organisations, including the International Council of Ophthalmology. He was Secretary–General and later Chair of the Board and CEO of the International Agency for Prevention of Blindness. He is a member of the Jury of Annual Vision Science Award of the Champalimau Foundation, Portugal.

He was inducted into the “Ophthalmology Hall of Fame” at the American Society of Cataract and Refractive Surgery (ASCRS). The All India Ophthalmological Society created the “Gullapalli N. Rao – AIOS Endowment Lecture” in his honour, in 2020. He also received The Sanford and Susan Greenberg Outstanding Achievement Prize as part of the “End Blindness 2020” initiative.