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INDIAMEDTODAY

REIMAGINING INDIAN HEALTHCARE

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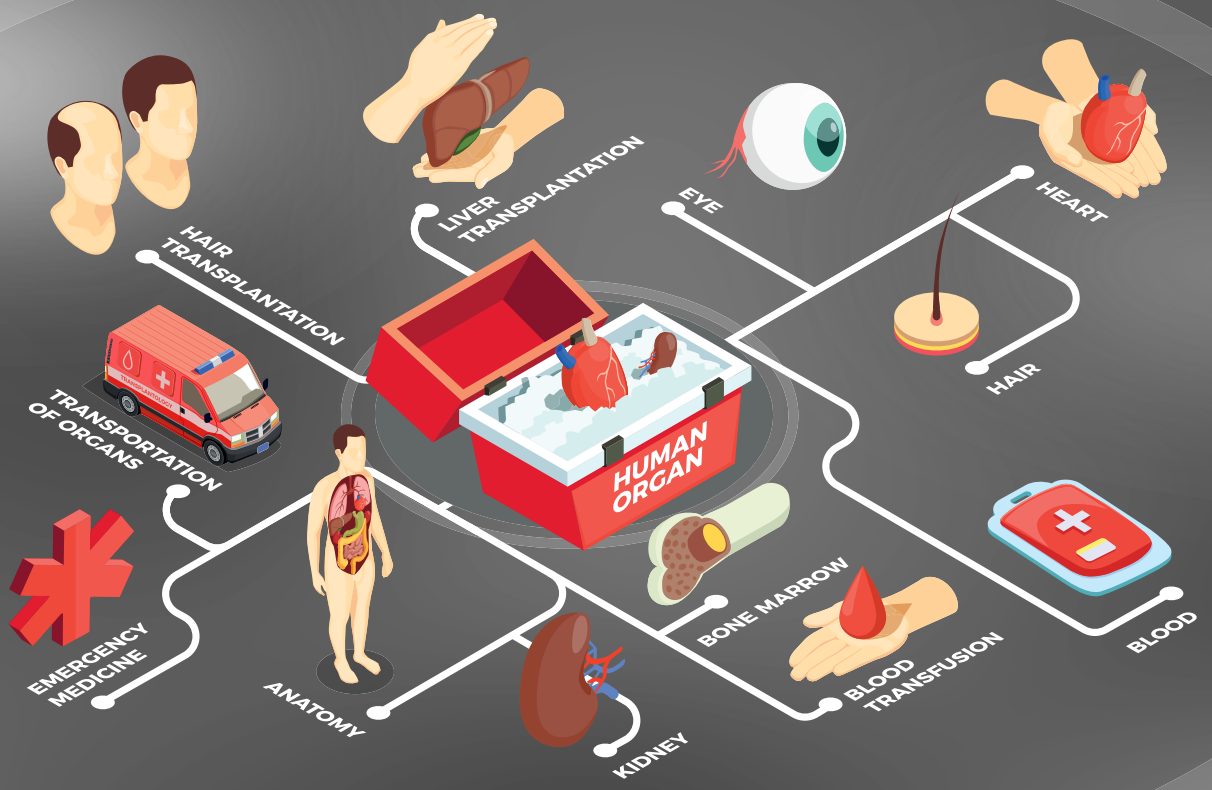
ASSOCIATION OF HEALTHCARE PROVIDERS INDIA

TRANSPLANT SPECIAL

Dr Vasanthi Ramesh
Dr Sudarshan Ballal
Dr Darius Mirza
Dr Mohammed Rela
Dr Sandeep Attawar
Dr Sudhindran
Dr Sonal Asthana

Gift of Life Amid Pandemic



PULSE
Robotic Donor Liver Surgery

APPROACH
Augmenting Efforts: Notto

IMPACT
Crowdfunding for organ transplant

SPECIAL FEATURE
PPP in Action

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Build Better Transplant Ecosystem

This month has been incredibly overwhelming as we scrambled to put our best foot forward; covering a wide array of leaders who spoke about the Union budget. In addition, we experienced first-hand the plight of patients awaiting life-changing surgery – an organ transplant and the agony of their caregivers as they try to give their best and help the patient through the ordeal.

While we often lament the lack of empathy and commercialisation of healthcare, time spent within a transplant ward and with the team shows us how they advance humanism in healthcare delivery. We are privileged to have some of the greatest minds and talent working through immense challenges to provide transplant services to us. We salute these leaders. We also have exemplary professionals who are working to bring about change and improvements in the whole transplant ecosystem to ultimately benefit not only the transplant care givers but also the patients and the population at large. These are innovators, social workers, philanthropists and people in the government sector. It is imperative that we all stand united behind the organizations and the people who are bringing about this change in the transplant community.

Let us help them build a better transplant community and a better ecosystem where each end-stage organ failure person and family has a chance.

We hope you will be inspired by this issue and take away the positives from it. As always, your feedback is welcome. Do write back to editorial@indiamedtoday.com

Editor
M Neelam Kachhap

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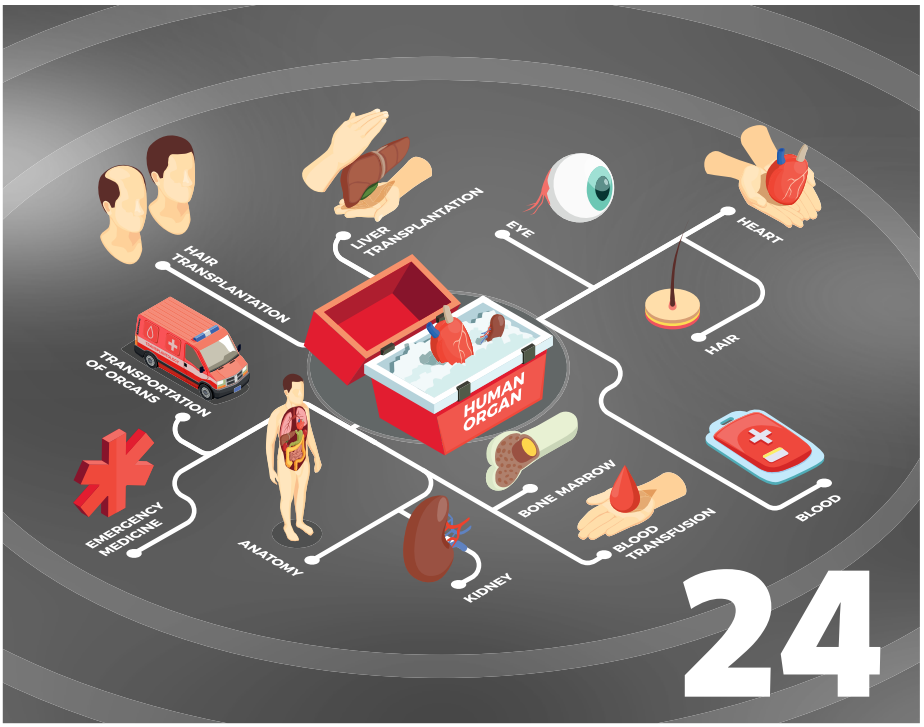

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Gift of Life Amid Pandemic

UPFRONT

Dr Sonal Asthana
Lead Consultant, HPB and Multiorgan Transplant Surgery, Aster Integrated Liver Care (ILC) group, Aster group of Hospitals

Looking Ahead: Transplant Medicine

An Affordable Liver Transplantation Initiative for Children

Transplantation in India has come a long way. From being a transplant backwater and being known as a center of commercial organ trafficking, India now performs the third-highest number of transplants in the world. Indian physicians and healthcare staff, acclaimed the world over, have developed centers-of-excellence that match or exceed post-transplant outcomes anywhere in the world. This month, IndiaMedToday, bring a special edition dedicated to these new achievements in transplant medicine in India.

The magazine, focussed on transplant medicine, comes on the cusp of two anniversaries- it is 50 years since the first successful transplant was performed in India, and 25 years since the the Human Organs Transplantation Act (HOTA, later THOTA) was passed by the Indian Parliament. The new act created a system for lawful organ donation and transplantation and put strict penalties for organ trafficking in place.

Over the past 25 years, we have witnessed rapid advances in almost every facet of organ transplant. Surgical and medical expertise has developed and protocols have been standardised as per international norms. Robust training programmes have been instituted to ensure that young healthcare workers do not need to travel outside the country for high-quality training and exposure to transplant medicine. In addition, anaesthesia and critical care have advanced, allowing us to transplant critically ill and medically challenging patients who perhaps would not have been able to be saved in the previous era.

There has been an increasing awareness of organ donation among the medical fraternity and the public, thanks to positive messaging by medical experts, religious and political leaders, as well as NGOs such as the MOHAN foundation. Standardised training for paramedical workforces and an increasing awareness of brainstem death has led to an increased organ donation rate in India, almost 10-fold in the last eight years.

Having said this, there is still much to do. Our organ donation rate remains among the lowest in the world. Many people, including medical personnel view organ donation with scepticism, so more needs to be done to increase awareness. Several states are yet to start transplant programmes as a result access to transplant varies widely in India. Concerns on equity are abound as organ transplant is overwhelmingly performed in the private sector. In the absence of insurance support, transplant remains the privilege of the rich and those able to pay for the surgery and medical expenses. Data is the key to enhance any service and standardised data collection from a diverse system for organ transplant is an ongoing challenge for state and national bodies. Access to transplant surgery is an economic equity issue, above all else. To fund the high cost of medicines and technology, an innovative approach to funding and charity is required.

The IndiaMedToday special issue on transplant medicine brings together viewpoints from national and international experts on different aspects of transplantation. Dr Vasanthi Ramesh, the Director of the National Organ Tissue and Transplant Organisation (NOTTO) talks about the challenges of running a national programme in a country as diverse and widespread as

India. Professor Mohammed Rela shares what it takes to develop a world class transplant programme in India. Dr Sudarshan Ballal, one of the pioneers of renal transplantation in India, reflects on the evolution of transplantation in the country. Professor Darius Mirza, discusses exciting new developments in organ preservation and reconditioning which can revolutionise how organs are stored and transported. Dr Sandeep Attawar, one of India's leading heart and lung transplant surgeons highlights the particular challenges which the COVID epidemic has put in the way of life saving surgeries like lung transplant. Dr Agragesh Ramani describes an innovative, Made-in-India solution which will allow us to monitor the long term health of transplanted organs thus solving the problem of chronic rejection and allowing organs to survive longer. In addition, Dr Sudhindran, AIMS talks about the penetration of robotics into transplant surgery and how they have accomplished the largest robotic transplant programme in India.

However, transplantation is not all about medical science- it needs a community to accept, donate and pass on the gift of life. Lalitha Raghuram, MOHAN foundation discusses the role of NGOs in promoting organ donation awareness and training. Transplantation in India has benefitted immensely from philanthropy and community funding. Anoj Vishwanathan, co founder, MILAAP discusses how crowdfunding was useful in creating the affordable transplant initiative for children. Another article talks about paediatric transplant and how CSR activity like Pravin Agarwal Foundation (TPAF) can be used to fund care for patients with end-stage organ failure.

This special issue will hopefully highlight the long way we have come as a nation in the development of a national transplant programme and how far we need to go to ensure that no one in need is deprived of lifesaving care.

(L-R) Dr Rajendra A Badwe, HC Agrawal and Swati Pandey

Takeda launches mobile application on genetic diseases

Takeda India launched the 'XPERT EASE' application. The application is developed for the exclusive use of healthcare professionals to address awareness-related challenges and enable an efficient digital ecosystem for disease updates and dose calculation for improved management of patients with rare lysosomal storage disorders.

Doctors' screening, diagnosis, and treatment of genetic diseases have often been identified as challenges, including advising the dosage of medicines specific to patients' individual needs. The XPERT EASE is designed to keep in mind such challenges while managing lysosomal storage disorders.

Tata Memorial conducts landmark study on mammography

A 20-year landmark study by Tata Memorial Hospital (TMC) in Mumbai has proved that clinical breast examination is a woman-friendly and cost-effective alternative to mammography to check for breast cancer. Dr Rajendra Badwe, Director, TMC, a co-author on the study said, "If implemented as a breast screening method in India, CBE would save 15,000 deaths from breast cancer each year, and 40,000 lives globally in low and middle-income countries (LMICs). All this at a fraction of screening cost, thereby reducing stress on the overburdened healthcare systems."

Inventor of first Varilux progressive lens, Bernard Maitenaz, passes away

Bernard Maitenaz, the inventor of the Varilux progressive lens that improved the lives of millions of presbyopes globally and redefined an entire industry, recently passed away in his home city of Paris, at the age of 94. Maitenaz's pioneering work revolutionised the eyecare industry and transformed people's lives: to date, more than 700 million Varilux lenses have been sold since 1959. His passion for optics, unwavering faith in its future and valuable contributions have made him one of the most iconic figures in the optical industry.

Bernard Maitenaz

India Post, Mumbai Region collaborates with Tata Memorial Centre

India Post, Mumbai Region, in collaboration with the Tata Memorial Centre, Mumbai released a Special Cover on cancer. This initiative was taken on World Cancer Day-2021 is aimed at spreading awareness about the disease and help people to imply the preventive measures of cancer in their lives. The special cover was launched by Director of Tata Memorial Centre - Dr Rajendra A, Badwe, Chief Postmaster General, Maharashtra & Goa Circle – HC Agrawal and Postmaster General, India Post, Mumbai Region – Swati Pandey.

IISER Bhopal Innovators develop 'Crowd and Mask' Monitoring System

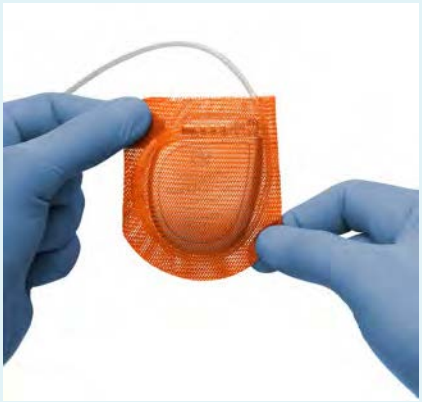
Indian Institutes of Science Education and Research (IISER) Bhopal Innovators have developed a low cost 'Crowd and Mask' Monitoring System, to prevent the spread of COVID-19.

Wearing masks is among the primary precautions adopted to prevent COVID-19 from spread along with social distancing. With the institute commencing the process of bringing students back to campus in phases, this AI-powered system will help to maintain a minimum of three feet of social distancing.

In an initiative to tackle the spread of COVID-19, Dr PB Sujit, Associate Professor, Department of Electrical Engineering and Computer Science, along with Dr Mitradip Bhattacharjee and Dr Santanu Talukdar, Assistant Professors, Department of Electrical Engineering and Computer Science, and Dr Venkateshwar Rao, Assistant Professor, Department of Chemical Engineering, IISER Bhopal, and BSMS Student Kasi Viswanath developed this AI-enabled device that can replicate manual policing to ensure the COVID-19 prevention norms are being followed.

Medtronic launches TYRX Absorbable Antibacterial Envelope

Medtronic announced the launch of



Medtronic

the TYRX Absorbable Antibacterial Envelope (TYRX Envelope) – a single-use, antibacterial envelope designed to stabilise a cardiac implantable electronic device (CIED) or implanted neurostimulator while releasing antimicrobial agents over a minimum of seven days. Constructed from a multifilament, knitted absorbable mesh, the TYRX Envelope holds the CIED device and is fully absorbed by the body approximately nine weeks after implantation. It can be used with any implantable defibrillator, pacemaker, or neurostimulator.

Ericsson ties up with Smile Foundation

Ericsson India Global Services (Ericsson) has joined hands with Smile Foundation to support government initiatives to collect covid test samples for testing at designated government labs in Chennai and Pune. The effort will speed up covid testing in these cities.

A total of 40 Ericsson skill development centres in Chennai, Bengaluru, Delhi, Pune, and Kolkata have been set up to train youth from slums.

Metropolis Healthcare awards scholarship to 70 medical students

Metropolis Healthcare awarded a scholarship to 70 medical students for the 2nd edition of its annual Medical Talent Outreach Programme, MedEngage. The recipients of the scholarship were awarded a total of Rs 50 lakhs in recognition of their academic scores, publications, extra-curricular activities and presentations.

To nurture and nourish medical talent in India, this year's edition of the scholarship summit was held virtually. Over 2000 registrations and 1500 applications from several governments and private medical colleges from India were received for the scholarships. Out of these, the jury shortlisted 70 students whose applications were considered unique and innovative. Amongst the winners, 40 students are from government colleges while 30 are from private colleges.

Centre extends PLI scheme for pharma sector

Extending the Production-Linked Incentive (PLI) scheme to more sectors, the Union Cabinet has approved Rs 15,000 crores for incentives to domestic manufacturing of pharmaceuticals in India.

The PLI scheme is an effort to make the industry globally competitive and geared towards the production of high-value drugs, leveraging its position as a country that already exports low cost-pharma to more than 200 nations.

Allocations worth Rs 11,000 crores have been earmarked for Group A, Rs 2,250 crores for Group B and Rs 1,750 crores for the relatively small players in Group C.

Bharat Biotech International to receive Genome Valley Excellence Award

BioAsia has announced that the Genome Valley Excellence Award for the year 2021 will be bestowed upon Bharat Biotech International for its breakthrough, pioneering research, development and commercialisation of vaccines including COVAXIN (COVID-19 Vaccine), rabies vaccine, rotavirus vaccine, Japanese Encephalitis vaccine, polio vaccine and typhoid conjugate vaccines, among others that have helped save billions of lives globally.

Bharat Biotech was selected by the International Advisory Board of BioAsia comprising Ajit Shetty, Corporate Vice President Global Operations, Johnson & Johnson USA (retd.) and Chairman Emeritus, Janssen Pharmaceutica, Belgium, Makarand Jawadekar, Former Director, Pfizer, USA, Robert Naismith, Former Chairman, JUJAMA, USA, among others for its vision and commitment to developing the first indigenous vaccine for COVID-19 and leading the global fight against the pandemic.

AYUSH Ministry, WHO SEARO ink agreement

The Ministry of AYUSH, Government of India and the World Health Organization South East Regional Office (WHO SEARO) signed a Letter of Exchange (LoE) for the secondment/deputation of an AYUSH expert to WHO's regional traditional medicine programme in New Delhi amidst a signing ceremony organised at WHO-SEARO, New Delhi.

Vaidya Rajesh Kotecha, Secretary, Ministry of AYUSH, Government of India and Dr Poonam Khetrapal Singh, Regional Director of WHO South-East Asia Region signed the Agreement.

The initiative has been taken to support the WHO SEAR implementing the regional traditional medicine action plan, with particular emphasis on the safe and effective use of traditional medicine service including Ayurveda and other Indian traditional systems of medicine and its appropriate integration into national health care systems. Efforts will also be made to strengthen the capacities of SEAR countries in the area of traditional medicine.

The partnership will also be joint efforts of Ministry of AYUSH and WHO in helping countries in the South-East Asia Region to develop policies and to implement action plans to strengthen the role of traditional medicine.

Oasis Fertility launches WeCanConceive initiative

Oasis Fertility has launched WeCanConceive, a public awareness initiative on infertility support ecosystem. The platform will provide information about infertility awareness and support for couples having difficulties with

infertility, challenges with conception. The ecosystem will help such individuals to successfully traverse through their fertility journey. The health awareness ecosystem brings together a global compendium of caregivers, renowned fertility experts, media partners, health influencers and social enterprises.

The objectives of the initiative would be to inform and inspire couples, improve awareness on sexual and productive health, and imbue a sense of empowerment. This will be done by offering safe, affordable, and high quality assistive reproductive technologies, while creating an environment of positivity and hope for improving infertility outcomes.

Global Hospitals, Mumbai Parel opens mucormycosis clinic

Global Hospitals, Parel has formed a Multidisciplinary Team (MDT) consisting of ENT, infectious diseases specialist, critical care, physician, and endocrinologist, who would jointly treat mucormycosis patients. The hospital has launched Mumbai's first mucormycosis clinic, to offer comprehensive and planned care for the patients.Mucorales is the largest and best-studied order of zygomycete fungi, which are sometimes called pin

moulds. This rare fungal infection destroys bone, invades blood vessels. It spreads aggressively from the nose to palate to the orbits and the brain.

Narayana Health City

Amitabh Jaipuria

Ziqitza Healthcare appoints Amitabh Jaipuria as MD and CEO

Ziqitza Healthcare has appointed Amitabh Jaipuria, as the new MD and CEO of Ziqitza Healthcare. Jaipuria joins Ziqitza Healthcare at an unprecedented time when the entire healthcare sector has come into sharp focus due to COVID-19. He looks forward to leveraging his vast and wide-ranging experience to drive the growth of the emergency healthcare sector in the country and to take Ziqitza Healthcare to new heights.

Narayana Health City launches single emergency response number

Narayana Health City has launched a 24/7 Emergency Network Service. The new service will offer patients emergency care right from the time the distress call lands at the Narayana Health Command Centre. It will provide patients with round the clock access to emergency services including free of cost ambulance service to any hospital of the patient's choice by dialling a single number-97384 97384. The event also witnessed Narayana Health City organising an ambulance rally to create awareness about the need for emergency care.

IIT Mandi researchers develop LakshmanRekha for COVID patients

Researchers at the Indian Institute of Technology Mandi have developed LakshmanRekha, an artificial intelligence – biometric-driven Home Quarantine Management Application (HQMA) for COVID patients. The developed application uses a combination of biometric verification, geofencing, and artificial intelligence, to continuously monitor and accurately detect the identity of a home quarantined person. In addition to the quarantine management, this application can also serve as an unbreachable mobile phone platform for normal (non-COVID) mobile users, situations like under curfew, or any national emergency, for identifying the violators or lawbreakers.

The results of the research work that was funded by the Department of Science and Technology, have recently been published in the IEEE Consumer Electronics Magazine. The paper has been authored by the lead scientist on this research Dr Aditya Nigam, Assistant Professor, School of Computing & Electrical Engineering, IIT Mandi, and Co-investigators on the study were Dr Arnav Bhavsar, Associate Professors, School of Computing & Electrical Engineering, along with research scholars, Daksh Thapar and Piyush Goyal of IIT Mandi, with Dr Gaurav Jaiswal from IIT Delhi and Dr Kamlesh Tiwari and Rohit Bhardwaj of BITS Pilani, Rajasthan.

Fujifilm launches branding campaign

Fujifilm recently unveiled its globally proclaimed 'NEVER STOP' series in India. The new film titled, *Never Stop Innovating for a Healthier World* highlights how life-

changing technologies can enable people to move beyond their health challenges to pursue all that inspires them.

The campaign articulates the thought on 'preventive healthcare with a mantra of innovating for a healthier world.' While serious diseases may seem to limit an individual's capabilities and begin to define them, innovative new medical technologies from Fujifilm India can help empower people with the high-functioning imaging solutions and knowledge they need to lead a longer life.

Wolters Kluwer India appoints Harish Ramachandran as Country Head, India

Wolters Kluwer has appointed Harish Ramachandran as Country Head – India and SAARC, for the Clinical Effectiveness division. Before his appointment at Wolters Kluwer, Ramachandran was heading Connected Care at Philips, Africa, in the capacity of Business, Marketing and Sales Lead. He has extensively worked in the medical equipment space and has held various senior leadership roles at Philips India and also has experience of working with GE Healthcare in the past.

Harish Ramachandran

With more than two decades of experience in leadership roles in the healthcare industry including medical equipment, medical devices, and the pharma sector, Ramachandran's appointment will be instrumental in understanding the interdisciplinary dynamics and strategies going forward for Wolters Kluwer.

Baxter Healthcare in India recognised as Great Place to Work

Baxter Healthcare in India has been certified as a Great Place to Work by the Great Place to Work Institute. The certification programme stands for the organisation's commitment to creating an employee-centric workplace culture. The survey included independent, anonymous feedback from employees on the organisation's credibility, fairness, mutual respect, camaraderie and pride. 2600 employees across Baxter Healthcare in India's arms – R&D, manufacturing, commercial, Centre of Excellence and IT participated in the survey and 83 per cent of employees said Baxter Healthcare in India is a Great Place to Work.

Biocon Biologics signs agreement with Clinton Health Access Initiative

Biocon Biologics, a subsidiary of Biocon, has signed an agreement with the Clinton Health Access Initiative (CHAI) to expand access to lifesaving cancer biosimilars in over 30 countries in Africa and Asia as a part of the Cancer Access Partnership (CAP). The partnership is a significant step in delivering advanced cancer therapies to patients who need them the most and ensuring equitable access to high-quality biosimilars in low- and middle-income countries (LMICs).

Raj Gore joins HCG as CEO

HealthCare Global Enterprises (HCG) has announced the joining of Raj Gore as CEO from February 1, 2021. Gore has a 17-year track record in the healthcare business management spanning North America, Asia, and Africa. He has led business transformation and financial turnaround mandates, including post-acquisition integration for acquired healthcare companies in India, Mauritius, and Vietnam. Gore has built high-performance teams and successfully implemented organisation-wide transformation initiatives that have improved employee engagement and patient satisfaction in cross-cultural environments.

Raj Gore

Sasakawa Leprosy Initiative, MoH&FW and WHO India launch flipchart for ASHAs

The WHO Goodwill Ambassador for leprosy elimination, Yohei Sasakawa (Recipient Gandhi Peace Prize 2018), Sasakawa Leprosy (Hansen's Disease) Initiative, National Leprosy Eradication Programme (NLEP) of the Ministry of Health and Family Welfare of India (MoH&FW), and WHO India jointly launched a pictorial flipchart on leprosy for Accredited Social Health Activists (ASHAs).

Produced jointly by Sasakawa Leprosy (Hansen's Disease) Initiative, NLEP and WHO India, the flipchart printed in Hindi, Gujarati, Oriya, and Bengali languages is being delivered to 300,000 ASHAs in six leprosy-endemic states: Bihar, Chhattisgarh, Gujarat, Jharkhand, Odisha, and West Bengal. In conjunction with this launch, WHO India will be releasing

Yohei Sasakawa

short online animation films in regional languages for ASHAs to learn how to use this flipchart effectively. This training package will strengthen ASHA's skills in facilitating early case detection and treatment which is key for further reducing disease burden.

Ocugen in agreement with Bharat Biotech

Ocugen, a biopharmaceutical company focussed on discovering, developing, and commercialising gene therapies to cure blindness diseases and developing a vaccine to fight COVID-19, and Bharat Biotech, a global leader in vaccine innovation, have entered into a definitive agreement to codevelop, supply, and commercialise Bharat Biotech's COVAXIN, an advanced stage whole-virion inactivated COVID-19 vaccine candidate, for the US market. Under the terms of the agreement, Ocugen will have US rights to the vaccine candidate and will be responsible for clinical development, regulatory approval (including EUA) and commercialisation for the US market. Bharat Biotech will supplyinitial doses to be used in the US upon Ocugen's receipt of a EUA.

Also, Bharat Biotech will support the technology transfer for manufacturing in the US. In consideration for the exclusive license to the US market, Ocugen will share the profits from the sale of COVAXIN in the US market with Bharat Biotech, with Ocugen retaining 45 per cent of the profits.

Sameer Garg joins Meril Lifesciences

Sameer Garg has joined Meril Lifesciences to drive its robotic orthopaedic business. Garg joins Meril with more than 25 years of business and leadership experience, including 18 years at J&J (DePuy) where he began his career.

Sameer Garg

Most recently, Garg served as the Head-West Zone at Maxx Orthopaedics, where he led the business strategy and initiative of driving and developing PM-JAY business. Garg also served as the National Head, Da Vinci Robotic System (Vattikuti Technologies) until Intuitive established a direct sales office in India.

In his current assignment, Garg will be responsible for the operational execution and growth of Meril's Curexo business. Last year, Meril Lifesciences signed a sales agreement with Curexo. The company plans to sell at least 53 CUVIS-joint surgical robots by the end of 2025, it said.

Katja Borghaus to become new head of Human Resources at LANXESS

Katja Borghaus will take over as head of LANXESS' Human Resources group function by July 1, 2021, at the latest. The 51-year-old will join the speciality chemicals company from Aramark Holding Deutschland. There, as a member of the Executive Board, she has been responsible for Human Resources, Occupational Safety, Hygiene and Quality since 2011. In 2016, she additionally assumed responsibility for human resources in the Continental Europe region.

Katja Borghaus

Bengaluru scientist develops virus attenuation device Shycocan

A one-of-its-kind virus attenuation device developed by Bengaluru scientist and inventor Dr Rajah Vijay Kumar is helping curb the spread of coronavirus in indoor spaces.

Manufactured by Bengaluru-based Shycocan Corporation, the cylindrical device is called Shycocan, short for Scalene Hypercharge Corona Canon. It has found to be effective in securing indoor spaces from the spread of not only the Coronavirus family which cause diseases like pneumonia, ARDS, SARS, MERS, COVID-19 and other coronavirus induced diseases, but also the influenza family of viruses which trigger annual seasonal flu and serious epidemics such as swine flu and bird flu. Shycocan also works on all current and future variants and mutants of these viruses, protecting people's health and saving millions of hours of lost productivity.

Shycocan

Siemens Healthineers introduces Corindus in India

Siemens Healthineers has launched Corindus CorPath GRX, the only FDA cleared and CE certified robotic system, for coronary and peripheral vascular interventions in India. With state-of-the-art technology, the company has opened a new field for the advanced therapies business, tapping into adjacent growth markets with great potential for the future.

Robotic systems for minimally invasive procedures help doctors to precisely control guide catheters, guide wires, balloon or stent implants via integrated imaging. The physician does not have to stand at the angiography table as usual but can control the procedure with a separate controlling module and is therefore protected from radiation. Recent studies have shown that the CorPath GRX robot system facilitates up to 20 per cent reduction in radiation dose to patients.

Private hospitals can charge up to Rs 250 per dose for COVID-19 vaccine: MoH&FW

Private hospitals can charge up to Rs 250 per dose of COVID-19 vaccine, the Union Health Ministry said as India prepares to vaccinate people aged above 60 years and those over 45 with comorbidities from March 1. The ministry also specified 20 comorbidities among people aged between 45 and 59 years who will get the vaccine – heart failure with hospital admission in the past year, moderate or severe valvular heart disease, coronary artery disease, CT/ MRI-documented stroke, diabetes of over 10 years or with complications, hypertension, end-stage kidney disease on haemodialysis, diagnosis of any solid cancer on or after 2000 or currently on any cancer therapy. The COVID-19 vaccine will be given free of cost at government hospitals, while people will need to pay for it at private facilities. To ramp up the vaccination capacity manifold, a significantly large number of private facilities are being involved, the ministry said.

SpiceHealth Signs MoU with Uttarakhand Government

SpiceHealth has signed a Memorandum of Understanding (MoU) with the Government of Uttarakhand to conduct Real-Time Polymerase Chain Reaction (RT-PCR) and Rapid Antigen tests for pilgrims visiting the State for the Kumbh Mela festival. SpiceHealth's mobile lab, accredited by National Accreditation Board for Testing and Calibration Laboratories

(NABL) and the Indian Council of Medical Research (ICMR), has been set-up in Haridwar. In addition to the mobile lab, SpiceHealth has also set up testing facilities at five locations on the state border where pilgrims visiting Uttarakhand for Kumbh will undergo rapid antigen tests. The testing facilities were functional from February 26, 2021.

Aditya Birla Health Insurance introduces plan with up to 100 per cent return on premium

Aditya Birla Health Insurance Company Ltd (ABHICL), the health insurance subsidiary of Aditya Birla Capital, announced an industry-first initiative of up to 100 per cent health insurance premium returns and other significant product offering upgrades. The newly designed version of its flagship product 'Activ Health' will inspire customers to lead a healthy lifestyle. The Activ Health policy is a feature-rich product that provides comprehensive health protection with extensive wellness benefits. Aditya Birla Health Insurance offers up to 100 per cent premium returns, i.e. HealthReturns, rewards and up to 100 per cent reload of the sum insured through its enhanced version of 'Activ Health' policy. The consumer is rewarded through a cash-equivalent which can be used for either health-related expenses like buying medicines, paying for diagnostic tests, daycare treatment, out-patient expenses (OPD), and alternative treatments (which are traditionally excluded), or most importantly can be used towards the payment of future premium.

Indian Healthcare Budget 2021

How the industry received Finance Minister's new budget announcements

By Team IMT

The budget is reassuring

It's a great step ahead, and far-reaching budget announcement, providing Rs 35,000 crores for COVID vaccination in 2021-22. The Finance Minister's commitment to provide more funds to contain the coronavirus pandemic spread in the country and provide an effective, smooth path for the vaccination scheme will help contain, and lead our nation towards accomplishing a COVID-19 disease-free Bharat.

Dr Krishna Ella,
CMD,
Bharat Biotech

The layout plan of a Rs 64,180 crore spending plan for healthcare over the next six years to be spent on primary, secondary and tertiary healthcare, in addition to the National Health Mission is also a welcome move, which will strengthen public health services as 17,000 rural and 11,000 urban health and wellness centres and integrated public health labs to be set up in each district. The government's focus, on three areas – preventive health, curative health and well-being, is also very reassuring. With this landmark budget, the Government of India has signalled its intention to make health a cornerstone of the future success of our country. The allocation to vaccines signals a shift to preventive healthcare, a validation of the fact that vaccines are the most cost-effective healthcare interventions.

Suchitra Ella
Joint MD,
Bharat Biotech

The new health infra schemes with a significantly higher outlay of ₹ 35,000 crore for Bharat's mega COVID19 vaccination drive is a huge fiscal medicine to contain the pandemic, reduce disease burden for the population, and the economy. A record total outlay of ₹ 2,23,846 crore for health and wellbeing aimed to boost the health and well-being of the nation, is also a well-thought announcement in this budget, with a focus on preventive, and curative health. It's encouraging to note the creation of nine Bio Safety Lab-III (BSL-3) in this Budget, that will boost research and scientific discoveries. With this landmark budget, the Government of India has signalled its intention to make health a cornerstone of the future success of our country. The allocation to vaccines signals a shift to preventive healthcare, a validation of the fact that vaccines are the most cost-effective healthcare interventions.

Budget seems realistic, constructive

Dr Alok Roy
Chair, FICCI, Health Services Committee and Chairman
Medica Group of Hospitals

India Inc and especially the healthcare industry which has been battling the demon of COVID-19 and its aftermath should consider this year's budget a blessing. Quite rightly, the budget has focussed on health and well-being, infrastructural reforms, development of human capital and minimum government and maximum governance. The very fact that the government has put health as the first pillar shows that finally it is being considered as the prerequisite to ensure the economic well-being of the country. Budget 21-22 seems realistic, constructive, and the finance minister showed her commitment to the healthcare sector, which needed a boost urgently.

Focus on healthcare infrastructure in budget is a positive step

Sudarshan Jain
Secretary General,
Indian Pharmaceutical Alliance

The FY22 Budget is in line to support the recovery of the Indian economy while keeping the overall policy stability and fiscal discipline in perspective. The COVID-19 pandemic is an unprecedented time and has brought importance to healthcare in India. The focus on healthcare infrastructure in the FY22 Budget is a positive step towards growth with a 137 per cent increase in allocation to the sector at ₹ 2,23,846 crore. The allocation of ₹ 64k crore (over six years) on the PM Atmanirbhar Swasth Bharat Yojna will help boost the healthcare infrastructure across primary, secondary and tertiary care and the vaccination programme is well-funded with over ₹ 35,000 it will help the country address the pandemic. All these initiatives are pointers to increased investment in healthcare infrastructure and will strengthen the sector going forward.

There are some concerns on budgetary allocations

Population Foundation of India (PFI) welcomes the Union Government's commitment to increase investments and focus on health in the Union Budget

Poonam Muttreja
Executive Director,
Population Foundation of India

2021-22. Signalling the importance of health and well-being by terming it as the first of the six pillars of the budget 2021 has lifted the spirits of all of us who are deeply concerned by the impact of the COVID-19 pandemic on the lives of our people.

It is encouraging that the budget adopts a holistic approach to health, focusing on both preventive and curative measures.

The budget allocation for the Department of Health and Family Welfare is ₹ 71,269 crores, an increase of 9.6 per cent over the budget allocation (₹ 65,012 crores) on Financial Year 2020-21. This is, however, lower than the revised estimates for FY 2020-21 (Rs. 78,866 crores.)

The budget is a great boost for the healthcare sector

The budget is a great boost for the healthcare sector receiving double the allocation. The 137 per cent increase will aid the sector and also help in creating more jobs especially taking into account the effect of the pandemic. However, most of these funds are allocated towards the COVID-19 vaccine drive and water and sanitation. While we have to tackle the pandemic, I have time and again emphasised on the importance of innovation and R&D in the medical sciences, which has not

Dr KM Cherian
CEO & Chairman,
Frontier Lifeline Hospital

happened. There also needs to be a PPP (public-private partnerships) in the health sector to ensure the progress of the industry along with transparent governance. It is the need of the hour and the government must introduce policy initiatives for the same in future.

Budget 2021 comes with a few caveats

Budget 2021 meets most expectations of the healthcare industry following the covid crisis. The increase in the total budget outlay for the healthcare sector is a welcome move and addresses the long-pending demand for an interventional focus on healthcare spending.

The proposed 137 per cent YoY increase for 'health and well being' at ₹ 2,23,846 crores comes at a time of need. The launch of the PM Aatmanirbhar Swasth Bharat Yojna with an outlay of ₹ 64,180 crores over six years along with the National Health Mission demonstrates that building the healthcare capacity of the country is a key priority for the government.

The interventions of the Aatmanirbhar Swasth Yojna that focus on developing capacities of primary, secondary, and tertiary care with 17,788 rural and 11,024 urban health and wellness care centres strengthen existing national institutions and create more. By bolstering the National Centre for Disease Control (NDNC) and establishing

integrated public health laboratories at the district level, the government showcases the focus on strengthening diagnostics networks and preventive healthcare.

The government has specifically allocated ₹ 35,000 crores for COVID-19 vaccination. This will help in sizable procurement along with investment in cold chain management, syringes, and other requirements. The rollout of pneumococcal vaccines to prevent 50,000 deaths annually is a great step.

Increased Health Research spending to ₹ 2,663 crores (for 2021-22) and the allocation of ₹ 50,000 crores for the National Research Foundation (NRF)

Ishiqa Multani
President,
Sagar Group of Hospitals

over the next five years portends well for Indian innovation and R&D. Mission Poshan 2.0 is a heartening initiative along with the Rs 60,030 crore expenditure for the Department of Drinking water and Sanitation that brings added focus to providing clean and safe drinking water to the entire population.

However, Budget 2021 comes with a few caveats. The 137 per cent increase in healthcare is arrived at by combining the budgets for three departments under 'health and well-being' for the 2021 budget. The budget under the Health Ministry is at a total of ₹ 73,931 crores (including Health Research), an increase of only 10 per cent Y-o-Y in pandemic conditions. Out of this, ₹ 35,000 crores form the corpus of COVID-19 vaccinations specifically. Additionally, the budget for nutrition has been shrunk from ₹ 3,700 crores to ₹ 2,700 crores—a 27 per cent cut—so, the actual impact of Mission Poshan 2.0 will have to be seen in the future. The Aatmanirbhar Swasth Yojna expenditure is also spread over a period of six years—the actual spending details for 2021-22 is awaited—so, the spending in the next five years is critical.

While the budget does leave some expectations unanswered, it also must meet the wide-arching needs of the entire nation's healthcare. Overall, Budget 2021 has been widely welcomed by the healthcare industry, and with good reason.

The allocation to health in this budget has been increased substantially

Dr Ramakanta Panda
Managing Director and
Vice Chairman,
Asian Heart Institute, Mumbai

There is a major emphasis on infrastructure. They have announced a total spend of around 2 trillion on healthcare and mega national highway projects which is always a boost for the economy. The allocation to health in this budget has been increased substantially. The areas of focus will be preventive and curative healthcare as well as wellbeing. There is a 137 per cent increase in the allocation from the previous budget. Also ₹ 35,000 crore has been budgeted for the COVID-19 vaccination expenditure in the financial year 2021-22.

The overall spending should have been much more

Dr BS Ajaikumar
Executive Chairman,
HealthCare Global Enterprises (HCG)

India is in dire need of Universal Healthcare Coverage (UHC), which was not well articulated in the finance minister's budget today. It is good to see that we are spending ₹ 35,000 crore (over $4.79 billion) on the COVID-19 vaccine. The proposed budget of ₹ 64,180 crore invested over six years to healthcare ($8.79 billion) is not substantial in my purview. The overall spending should have been much more because we started from a very low base post COVID. The government spending only one and a half per cent of the GDP so far on healthcare is insufficient. While it is good to focus on preventive healthcare and wellness clinics, the government's intention on cooperating with the private sector is still unclear. A cess similar to education cess could have been created in healthcare to bring uniformity through UHC. Overall, I am glad to see some spends directed towards healthcare, but it is not substantial, especially considering that we are battling the effects of COVID-19.

Overall a forward-looking budget

Healthy India is core to India's economic growth reflects in the 137 per cent increase in outlay for health at ₹ 2,23,846 crore in budget 2021. The

Vishal Bali
Executive Chairman,
Asia Healthcare Holding

focus on healthcare with Atmanirbhar Swasth Bharat Yojana with an outlay of ₹ 64,180 crore over six years shows that healthcare capacity building is now a key priority for the government. The ₹ 35000 crore earmarked for the COVID-19 vaccination drive will create a safety net for the country. The overall capital expenditure increase of 26 per cent should drive infrastructure acceleration much-needed GDP growth driver. The Insurance sector which is an important pillar for any country should see exponential growth with an enhancement of the FDI limit to 74 per cent from 49 per cent. Overall a forward-looking budget to drive the 11 per cent GDP growth for India in FY22 as pegged in the Economic survey 2020.

The Budget will help to accelerate medical devices manufacturing

The Indian Medical Devices Industry has responded positively to Union Budget 2021. Sometimes a crisis helps to come out with bolder decisions. Major fillip to healthcare through PM Atmanirbhar Swastha Bharat Yojna, PLI Scheme, Health Infra allocation, focus on new and emerging diseases and health labs will surely address major gaps.

Finally, we may have something to help accelerate medical devices manufacturing as a Make in India enabler so that Indian National Healthcare security concerns are addressed – the inadequacy of which is being exposed in the crisis to address the coronavirus epidemic preparedness. We look

Rajiv Nath
Forum Coordinator,
Association of Indian Medical Device Industry (AiMeD)

forward to reading the fine print.

Rest we will be able to comment on after going through the fine prints on custom duty on medical devices and withdrawal of many related exemptions that were being roadblocks to Make in India as it was simply being cheaper and more convenient to import than manufacture.

We had been hoping that this will be a Make in India push budget for an Atmanirbhar Bharat and the finance minister has highlighted the need to support the manufacturing sector to be part of the global supply chain and the need for it to grow on double-digit sustained basis.

The Indian medical devices industry is disappointed not to notice any changes in custom duty as done for other sectors and was hopeful that the fine print of the Union Budget would have possibly acted upon our recommendations on a Predictable Tariff Policy for a Make in India push for phased manufacturing plan for components and finished medical devices and allocations for testing infrastructure as well as for Med Tech Parks and Cluster developments.

No major developments around digital healthcare

The finance minister announced an allocation of ₹ 64,180 crore over the next six years for the healthcare sector in the 2021 Union Budget. The budget allocated is in addition to the National

Vikram Thaploo
CEO,
Apollo TeleHealth

Health Mission which is already in effect. One of the key initiatives proposed in this year's budget is the addition of 17,000 rural and 11,000 urban health and wellness centres which is a supportive move for better patient care and will also pave way for more public-private partnerships. Also, the government has proposed to set up integrated public health labs in each district with 3,382 block public health units across 11 states. Another welcoming move is the outlay of ₹ 1.41 crore for the Swach Bharat 2.0 mission which will help improve sanitisation and transform the lives of millions. Considering the government's effort to curb the pandemic of COVID-19, it has also planned to set aside ₹ 35,000 crore for the COVID-19 vaccine in FY22. Though it must be admitted that the government has red-shifted its focus on healthcare in this budget, considering the rapid integration of digital technology into healthcare, no major developments around digital healthcare or telemedicine was announced.

The budget has provided much-expected increase in public expenditure

Budget 2021 has provided a much-expected increase in public expenditure on healthcare. The finance minister has announced an outlay of ₹ 64180 crores over six years though, on Atma Nirbhar Swasthya Bharat scheme in addition to the National Health Mission budget.

Charu Sehgal
Partner and Leader,
Lifesciences and Healthcare,
Deloitte India

There appears to be an integrated approach whereby both the short term and immediate needs, as well as the longer-term measures, have been proposed. While the provision of Rs 35000 crores for COVID-19 vaccine and focus on disease control and surveillance will help cope with the immediate needs brought forth by the pandemic, the setting up of the National Institutes for Virology and Integrated Health Labs, an updated health information portal will all prepare us for future such eventualities.

The pandemic had brought to the fore the stark shortage in infrastructure and medical and paramedical medical resources. The budget announced setting up and up-gradation of primary, secondary and tertiary health units across districts and blocks, as well as a focus on allied healthcare professionals and that, is a welcome step.

The budget has also looked at healthcare holistically and focussed on other determinants of health such as nutrition, water and sanitation and air quality. Prevention and wellness have thus been a key focus. The total outlay on healthcare and wellness has been ₹ 2.24 lakh crores including the above mentioned allied departments. This has been increased from ₹ 91,000 crores last year.

What seems to be missing was the support and boost that was expected to encourage private investment in healthcare infrastructure as well in the manufacture of medical devices.

There was also no mention of specific support and incentives for R&D and innovation for the Pharma and Medical technology.

It was the private sector that rose to the challenge during the last year whether it was on innovation or manufacture of drugs, devices and vaccines or testing and treatment and it was expected that it will be provided with a boost.

The infrastructural push will certainly create many more skilled jobs

Sanjiv Navangul
MD & CEO,
Bharat Serums and Vaccines

The union budget has given a substantial increase to bolster the healthcare sector in India. ₹ 35000 crore for the COVID-19 vaccine and the commitment to the pneumococcal vaccine to be rolled out nationwide to avert child deaths is a massive boost. A well-spent allocation of ₹ 64,000 crore under the new Atmanirbhar Swasthya Bharat Yojana scheme will show significant results thus labelling #healthyindia as an encouraging effort. And, the infrastructural push will certainly create many more skilled jobs revitalising the overall ecosystem.

We were looking forward to the change in duty structure

The Union budget seems to be a mixed bag. There has been an increase of 137 per cent in the overall health

Jatin Mahajan
MD,
J Mitra & Company and Joint Coordinator – IVD (AiMED)

budget, and this is a very good sign – it demonstrates the government's high priority towards the healthcare segment. The government has announced the PM Aatmanirbhar Swastha Bharat Yojana which will have an outlay of ₹ 64,180 crore over the next six years, and this will be in addition to the National Health Mission. ₹ 35,000 crore has been allocated for the covid vaccination drive.

The government plans to set up Integrated Public Health Labs which will be a boost to early detection of the ailments and diseases. National Centre for Disease Control will be further strengthened; Emergency Health centres will be established and the government is readying the National Digital Health Blueprint.

On the manufacturing end, the PLI schemes will be further enhanced and this is likely to benefit the healthcare manufacturing segment as well.

There is an effort to boost the startup and MSME segment, and this will also positively impact the healthcare segment. Collateral free loans, a fund for funds to be set up, and the restructuring of the MSME definition will all boost the manufacturing segment and this will have a positive impact on the healthcare segment

But what has been missing from the details are the focus on Make-in-India and the medical devices segment. We were looking forward to the change in duty structure in favour of home-grown companies, but this doesn't seem to have been addressed. Also expected was a concerted focus on creating the

right ecosystem and environment – Medical Devices manufacturing hubs, that provide the right mix of common infrastructure, facilities, and subsidies for technological upgradation to increase sustainability and economies of scale. But this on the first view, doesn't seem to be a priority.

Budget allocation augurs well for the nation

A well-rounded holistic budget that embraces all sectors through various measures to boost economic activity. Against the backdrop of the pandemic and an economy facing an unprecedented contraction, the finance minister has met the challenge face-on with a budget that has a long term vision laid out in a strategic road map. The emphasis on an 'Aatmanirbhar Bharat' with an increase in capital expenditure will boost investment in infrastructure

Nikhil Chopra
CEO & Whole Time Director,
JB Chemicals & Pharmaceuticals

and fuel economic growth.

The significant increase in allocation for health and well-being augurs well for the nation and can be a driving force and a strong foundation for accelerating essential drugs and health-related consciousness to the last mile of Indians. The allocation of funds for COVID-19 vaccination will fast track the inoculation drive and it is worth lauding the government's commitment to providing further funds if deemed necessary.

The budget addresses the gaps in rural and urban healthcare that the pandemic exposed with the 'PM Atmanirbhar Swasth Bharat Yojana' in addition to the National Health Mission. Along with the emphasis on nutrition, clean water, and clean environment, this will bolster health infrastructure and reach across India. The pharma industry is ready to contribute towards fortifying the health of the nation that is the cornerstone of development.

The budget is a positive step in the right direction

This is a very good and bold budget. It has provided substantial allocation for healthcare, which is a very positive step in the right direction for healthcare services in India. The Budget would help address the gap in the healthcare infrastructure as well as in the delivery of healthcare services in both urban and rural areas. Setting up of 28,000 wellness centres across the country, establishing integrated public healthcare labs in 11 states, setting up critical care hospital blocks, earmarking funds for COVID vaccine, strengthening integrated health information portal in all states, regional research platforms and four new National Institute of Virology will help the healthcare industry combat emerging viral infections effectively. The overall thrust of the budget is on strengthening the preventive and curative aspects of healthcare, which is critical in advancing the health of our people.

Dr Prem Kumar Nair
Medical Director,
Amrita Hospitals, Kochi

Significant focus also has been brought to scaling up infrastructure

The finance minister has accorded special attention to the healthcare sector, increasing the overall outlay to health and wellbeing to nearly ₹ 2.25 lakh crore, an increase of over 135 per cent over last year. The enhanced allocation, along with the plan to look at healthcare holistically – including nutrition, sanitation, clean drinking water, and pollution control, certainly augurs well for the country. The allocation of ₹ 35,000 crores towards covid vaccination also is a very welcome step.

Dilip Jose
MD & CEO,
Manipal Hospitals

Significant focus also has been brought to scaling up infrastructure, like critical care capabilities as well as primary and secondary care facilities through the PM Atmanirbhar Swasth Bharat programme. It is also heartening that the finance minister promised higher allocations as required, as institutions absorb the funds committed at the first instance. All in all, a great beginning has been made on the journey to take our healthcare system to world-class standards.

A much-needed step in the right direction

Budget 2021 does recognise the immediate needs for the COVID-19 pandemic and vaccine requirements

Dr Minnie Bodhanwala
CEO,
Wadia Hospitals, Mumbai

for the nation. The focus on spending on COVID measures and the vaccines will bring much-needed stability to the public healthcare setup. The increase in budget outlay for health and welfare by 137 per cent as compared to the previous year will boost the public health and pharmaceuticals sector.

The PM's Aatmanirbhar Swasth Bharat Yojana to develop capacities of health care systems, develop institutions for detection and cure of new and emerging disease is the first step to boost rural health and keep the country ready for emergency handling of pandemic situations. The government will need to continue to invest in the development of human resources and infrastructure in the years to come.

The decision to include the pneumococcal vaccine is also a welcome decision, along with the announcement of Mission Poshan to improve nutritional outcomes for children.

With Budget 2021, the government has taken a much-needed step to be moving in a direction of strengthening healthcare and promoting preventive healthcare. A robust monitoring and implementation plan in place will he see the initiatives achieve great success.

Budget will yield a positive impact

We see this budget as a positive step in the right direction for the healthcare sector. The allocation for Aatmanirbhar Health Yojana with an outlay of ₹ 64,180 crore over six years in addition

Dr Somesh Mittal
MD & CEO,
Vikram Hospital Bengaluru

to the National Health Mission, is a welcome move. The government's focus on setting up health emergency centres, urban health and wellness centres and integrating public health labs will go a long way towards ensuring better healthcare and treatment options. I am also happy that the Government of India has announced ₹ 35,000 crore for COVID-19 vaccine which will help lakhs of poor and middle-class citizens. I am positive that all the measures taken in this budget to make healthcare available to all, will yield a positive impact on the economy. Lastly, let's not forget the Mission Poshan 2.0 launch that will tackle the malnutrition problems in India especially with the underprivileged and migrant population. Overall, health and nutrition have received the focus it deserves in the budget.

India needs a long-term policy to build a healthcare ecosystem

The proposed healthcare budget is a big move to boost the country's healthcare infrastructure. The pandemic has brought the healthcare system to the centre stage, the allocation of ₹ 2,23,846 crore, which is 137 per cent higher than the previous budget is a major move. Additionally, the announcement of PM AtmaNirbhar Swasth Bharat Yojana with an outlay of ₹ 64,180 crores to develop the capacities of primary, secondary, and tertiary care health systems to build better capacity to combat future

Varun Sheth
CEO & Co-founder,
Ketto.org

pandemic is a welcome step.

However, it was surprising to see the government's significant schemes such as the Ayushman Bharat and Pradhan Mantri Jan Arogya Yojana (PMJAY) remained severely underfunded. The recent economic survey has emphasized a hike in public spending on healthcare services to reduce out of pocket expenditure (OOPE) from the current level of 65 per cent to 35 per cent. India has one of the highest levels of OOPE in the world, contributing to high medical expenditure which drives millions of families into the depths of poverty every year. In recent years, medical crowdfunding has played an instrumental part of such families, enabling them to afford quality medical care for their loved ones. It is encouraging to see that the government is prioritising preventive care and well-being, however, India needs a long-term policy to build a healthcare ecosystem that enables quality and affordable healthcare to all."

Indian Out-of-pocket Expense can be reduced

Using India's deep experience in digital health, skilled manpower availability, clinical trials, manufacturing prowess and proven ability to deliver affordable excellence in healthcare, India can emerge as a global centre of excellence for holistic healthcare weaving the preventive, promotive, curative and

Siddhartha Bhattacharya
Secretary General,
NATHEALTH

rehabilitative spectrums. This can position healthcare as a top employment generating sector while bringing in valuable investments to fund the journey towards universal healthcare, reducing out of pocket investments.

Holistic approach to healthcare

The government's holistic approach to healthcare will help in creating awareness of preventive healthcare. Post-pandemic learning, the move to establish more number of critical care blocks in hospitals and strengthening of primary, secondary and tertiary care is a much need move by the government. The launch of Mission Poshan 2.0 is a commendable move to prevent over 50,000 child deaths annually. Coupled with initiatives like clean water, clean air and clean environment, it will act as a binding force to achieve a universal health coverage. Detection of new and emerging diseases like COVID have been given the right impetus and will encourage all-round development and preparedness towards a progressive and safe future.

Harish Manian
CEO,
MGM Healthcare

Will help to build a robust community surveillance

Preetha Reddy
President NATHEALTH and
Executive Vice Chairperson,
Apollo Hospitals

This will strengthen preventive health and ensure frontline allied health worker skill-building while increasing robust community surveillance of emerging infectious diseases. This announcement reinforces the commitment Government made earlier under the Ayushman Bharat programme to strengthen public health and community health through health and wellness centres.

Much needed shot in the sector's arm

The finance minister has presented a very progressive budget. With a substantial increase in healthcare outlay, the government has given a much needed shot in the sector's arm. With a substantial increase in healthcare outlay and key emphasis on public-private partnerships, the entire value-chain in the healthcare sector will gain new momentum and will see major

A Ganesan
Group Vice Chairman,
Neuberg Diagnostics

collaborations amongst stakeholders. The announcements of centrally funded – Aatmanirbhar Health Yojana will strengthen our primary, secondary and tertiary healthcare, and setting up 15 health emergency centres with a focus on curative and preventive health and wellbeing will scale up the delivery of affordable healthcare services.

Overall it is a good budget

Mahendra Patel
MD,
Lincoln Pharmaceuticals

The budget is in line to help recovery of Indian economy post covid while keeping taxation neutral, policy stability and fiscal discipline in perspective. Higher allocation to the MSME industry and 137 per cent rise in allocation to the health sector will further boost the health infrastructure in the country. Overall it is a good budget with higher allocation to infrastructure, agriculture which are the need of the hour.

Augmenting Efforts: Notto

Role of NOTTO and its impact on organ donation and transplantation in India

By Team IMT

National Organ and Tissue Transplant Organization (NOTTO) is a National organization under Directorate General of Health Services, Ministry of Health and Family Welfare. It is the apex body for coordination and networking for procurement and distribution of Organs and Tissues and registry of Organs and Tissues Donation and Transplantation in India

There is a wide gap between patients who need transplants and the organs that are available in India. An estimated around 1.8 lakh persons suffer from renal failure every year, however, the number of renal transplants done is around 6000 only. An estimated two lakh patients die of liver failure or liver cancer annually in India, but only about 10-15 per cent of these can be saved with a timely liver transplant. In fact, about 25000-30,000 liver transplants are needed annually in India but only about 1500 are being performed. Similarly, about 50000 people suffer from heart failures annually but only about 10 to 15 heart transplants are performed every year in India. In case of cornea, about 25000 transplants are done every year against a requirement of one lakh.

The 2011 Amendment of THOA 1994 provided the basis for the establishment of NOTTO, which has been crucial in regulating organ donation and transplantation in India with the setting up of the NOTTR in 2015. NOTTO has been actively involved in enhancing organ transplant to save lives in India. Here Dr Vasanthi Ramesh, Director, NOTTO talks about the challenges of running a national level organ donation network and the role of Notto in the success of transplant programmes in India

Dr Vasanthi Ramesh, Director, NOTTO

State of organ donation and transplant in India

In the last 25 years the awareness regarding organ donation has come a long way. Now, families respond very well to the counselling in brain death cases and the living donor programmes are also seeing a larger acceptance in the community. In 2020, there were around 400 brain stem dead donors, 5800 living organ transplants and 900 deceased organ transplants. The annual figures for transplant based on organs are encouraging. There were about kidney ~ 5000, liver ~ 1500, heart ~ 80, lungs ~ 60, pancreas ~ 20 and six for small bowel. Around

Transplant coordinator training programme

1500 transplants were done in the southern region, around 950 in the western region. Delhi-NCR had about 1850 transplants, northern region had around 890, eastern region had around 400 and north-eastern region had 12 transplantations.

However, the transplant numbers have reduced in the last year due to the COVID-19 pandemic. Initially, as per the COVID-19 training guidance, no elective transplants were allowed. Later, it was changed and allowed as social restrictions were lifted. The transplantation numbers had gone down by 46.19 per cent since the previous year, but off late transplantation numbers are picking up again and is regaining momentum.

The role of Notto

Let me take you back to the WHO Madrid Report 2004. The international advisory highlighted the need for a national transplantation agency for effective integrated development of donation and transplantation. Its parallel in India was the 2011 Amendment of the Transplantation of Human Organs Act 1994 to set NOTTO up with its first director in 2014, and also with a national donor and recipient registry to achieve transparent allocation. A challenging task for NOTTO was to collect real-time data of donors, recipients, and transplants in the National Organ and Tissue Transplant Registry (NOTTR) from all transplant and retrieval centers. However, NOTTO succeeded in collecting data offline from all 29 states and seven union territories and submitted to World Health Organization–Global Observatory on Donation and Transplantation in 2019. I'm happy to note that there was a greater than two-fold increase of deceased organ donors from 340 in 2013 (pre-NOTTO) to 875 in 2018 (post-NOTTO). The deceased organ donation rate went up from 0.27 to 0.65, and the total number of transplants went up from 4990 to 10,340 in the same period. All the outcome measures doubled or tripled, establishing the role of NOTTO. Albeit having differences, NOTTO is analogous to the National Transplant Organization of Spain and United Network of Organ Sharing of the United States.

Notto and tissue transplant

The Transplantation of Human Organs (Amendment) Act 2011 included the component of tissue donation and registration of tissue banks. Subsequently, a national level tissue bank to fulfill the demands of tissue transplantation was instituted. Its activities included procurement, storage and distribution of biomaterials. The centre takes care of the following Tissue allografts

- Bone and bone products e.g. deep frozen bone allograft, freeze-dried bone allograft, dowel allograft, AAA Bone, Duramater, facialata, fresh frozen human amniotic membrane, high temperature treated board cadaveric joints like knees, hips and shoulders, cadaveric cranium bone graft, loose bone fragment, different types of bovine allograft, used in orthodontics
- Skin graft
- Cornea
- Heart valves and vessels

The call centre in NOTTO informs people about cornea donation and about facilities for tissue retrieval and networks. Also, the call centres carries out calls and helps in facilitating the tissues removal from the institution closest to the donor's residence.

Leadership

Well it has been challenging and rewarding experience at the same time. So far we have streamlined networking organisations of NOTTO, ROTTO and SOTTO registry. In addition, we ran a drive to ensure that all the hospitals register as NTORC; and tissue banks, transplant centers are registered with the national registry at NOTTO. All states and institutions are requested at periodic intervals to ensure uploading of data such as registration of patients on the waiting list, donors and transplants are done. Transplant professionals are constantly requested to upload the follow up of the donors and recipients; however there is resistance to this activity. Nevertheless, our effort is ongoing. To achieve this, to enable compliance with the THOTA Act and rules, NOTTO is leaving no stone unturned. NOTTO as an organisation and its employees have received awards felicitating their contribution in the field of organ donation and transplantation in India. Notably, the present Director of NOTTO- Dr. Vasanthi Ramesh was honoured as Unsung Hero Awardee in 2020 from The Transplantation Society (TTS), which again was a big achievement on the forefront of transplantation activity in terms of international recognition.

Current programmes

Some of the programmes initiated in the last couple of years are:-

- Training of intensivist/anaesthesist/ neurologist/neurosurgeon was conducted by NOTTO during CAST 2019, with international and national faculty. Doctors from across the country were trained in this course.
- Retrieval workshop for surgeons were also conducted where surgeons were trained for retrieval of kidney, heart, lung and liver.
- Propose to upgrade the NOTTO webportal and national registry to bring it on par with registries of developed countries.

Deceased Organ Donation programme at CISF Headquarters, New Delhi

New Arenas to Explore

It would be wonderful if NOTTO could be transformed into a transplant university or Indian Institute for Transplant Research on the lines of ICMR and be established as an institute of national importance having been created as a mandate of THOTA 1994 similar to AIIMS, PGIMER and JIPMER. Similar autonomy could go a long way in establishing this institution.

Looking Ahead

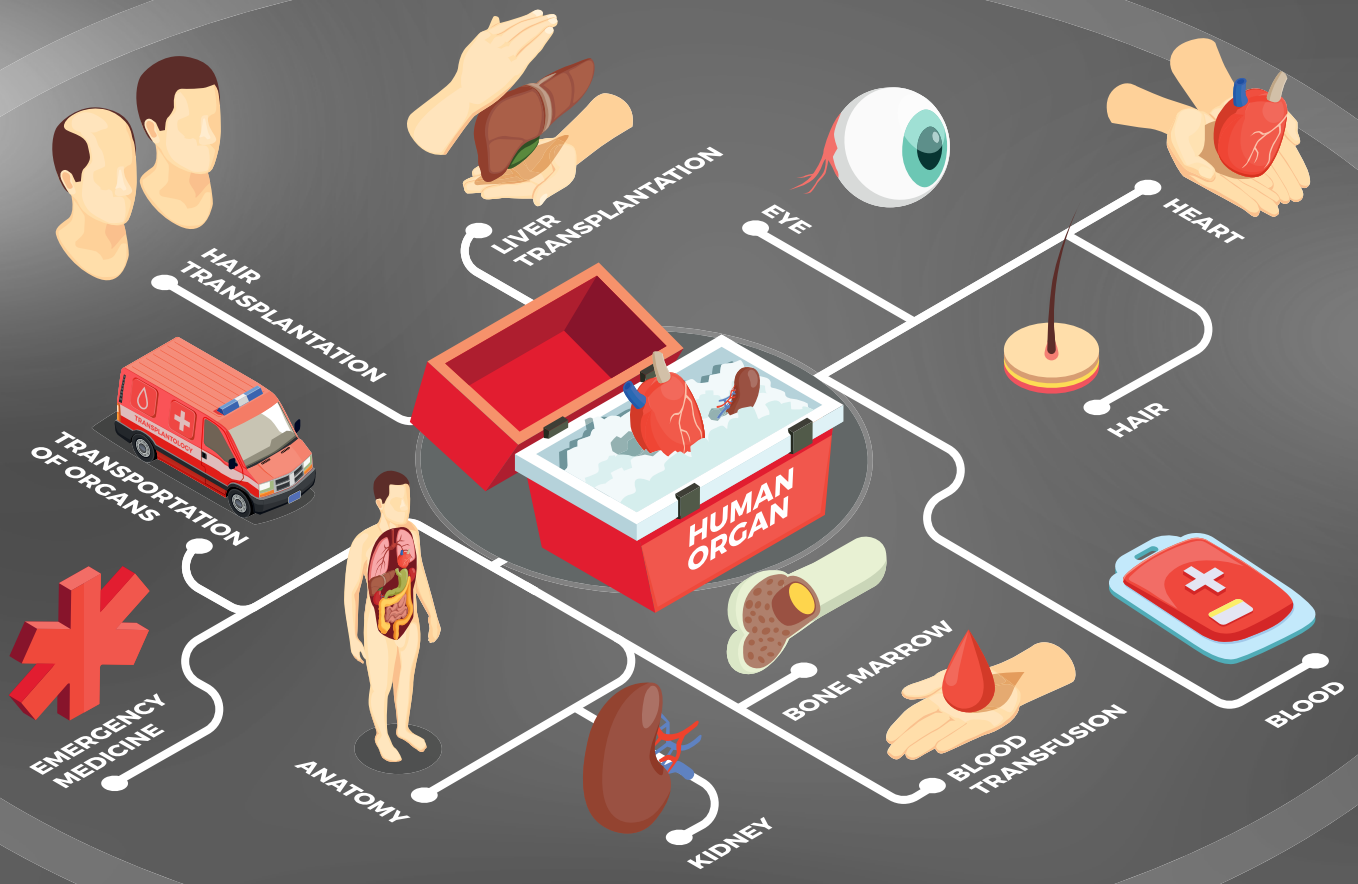
The future lies in the training of intensivists to function as leaders of transplant coordination so that no brainstem death patient goes undetected. The required request as per the act is to be fully implemented and the organs thus harvested from the consented donors are fully utilised for the welfare of mankind. It is also proposed to have more training programmes for surgeons to enable the availability of adequate manpower for performing transplants, training of pathologists, neurologist, microbiologists to upgrade the investigational modalities which are mandatory for transplant procedures and last but not least – the training of transplant coordinators (TCs) who form the backbone of the activity at the initiating level.

What does NOTTO do

- Lay down policy guidelines and protocols for various functions.
- Network with similar regional and state-level organisations.
- All registry data from states and regions would be compiled and published.
- Creating awareness, promotion of deceased organ donation and transplantation activities.
- Co-ordination from procurement of organs and tissues to transplantation when organ is allocated outside region.
- Dissemination of information to all concerned organisations, hospitals and individuals.
- Monitoring of transplantation activities in the regions and states and maintaining data-bank in this regard.
- To assist the states in data management, organ transplant surveillance and organ transplant and organ donor registry.
- Consultancy support on the legal and non-legal aspects of donation and transplantation
- Coordinate and organise trainings for various cadre of workers

COVERSTORY

Gift of Life Amid Pandemic



How organ donation and transplant beat COVID-19 pandemic, but yet to reach levels of significance

Sanjiv Das

A CRPF jawan giving a new lease of life to three, a brain dead child saves 11 lives by donating organs are some of the inspiring stories, which we have recently come across in various news channel. Green corridors being set up for ambulances to zoom past through busy traffic so that an organ from a brain dead person reach the hospital within the least stipulated time are all possible due to government's initiatives, awareness among the general public and the urge to help others by relatives of the deceased. However, something is amiss.

Though the general public is much more aware due to various campaigns on organ donation and transplantation, India still lags far behind when compared to other western countries. Challenges associated with superstitious beliefs, rackets involving the selling of organs,etc., are some of the hurdles which the government and NGOs need to work upon to make the process easier and help thousands who are on the waiting list.

Reluctant to Lend

Though India performed the second largest number of transplants in the world in 2019 after the US, the country lags behind Spain, the US and the UK in national donation numbers. So, what is the current scenario of organ donation in the country?

Says, Anika Parashar, Chairperson Parashar Foundation, ORGAN (Organ Receiving & Giving Awareness Network), "India's current deceased organ donation rate is 0.52 per million population (pmp). This means that not even one person in every 10 lakh people eventually donates their organs after death, which is extremely low in comparison to a country like Spain that has 46 pmp. In 2019, there were only 715 deceased donors across India."

According to National Health Portal, around five lakh people die annually in India due to lack of an organ donor but with less than one per million people opting to donate, the organ donation rate in the country is one of the lowest in the world. States like Telangana, Tamil Nadu, Kerala, Maharashtra and Rajasthan have been leading in organ transplants where NGOs have played a huge role in bringing awareness on organ donation.

Says Dr Vasanthi Ramesh, Director, National Organ and Tissue Transplant Organisation (NOTTO), Ministry of Health & Family Welfare, "In 2019, 715 people donated organs and Maharashtra had the maximum number of deceased donors while, Tamil Nadu performed the maximum number of deceased donor transplants by better organ utilisation from each donor." These numbers tell the story of grit and determination of a number of unsung heroes who make organ donation possible. These selfless warriors are celebrated every year during the Organ Donation Day. At the 11th National Organ Donation Day, Dr Harsh Vardhan, Union Minister of Health and Family Welfare talked about the exemplary performance by states and healthcare professionals in the country. He also said that they should be encouraged at every step so that the curve keeps following an upward trend.

The COVID pandemic brought this essential service to a screeching halt. Dr Vardhan, recently said that the COVID-19 pandemic has had a hugely negative impact on the deceased donor programme in India.

Govt's policy on organ donation

The Government of India has enacted the Transplantation of Human Organs Act, 1994 which has been amended in 2011 after the Parliament has passed the Transplantation of Human Organs (Amendment) Act, 2011. The purpose of the Act was to streamline regulation and removal, storage and transplantation of human organs and tissues for therapeutic purpose and for prevention of commercial dealing in human organs and tissues. Further, the Ministry of Health and Family Welfare, Government of India has notified Transplantation of Human Organs and Tissues Rules, 2014.

"Healthcare professionals in the country should be encouraged at every step so that the transplant curve keeps following an upward trend"

Dr Harsh Vardhan,
Union Minister of Health and Family Welfare

The aforesaid Act and Rules provide for the policy regarding organ donation.

In India, health is a state subject, the states are required to adopt the Act before it may become applicable for the people. The Original Act, i.e. the Transplantation of Human Organs Act, 1994 is applicable in all states and Union Territories (UTs) except the states of Andhra Pradesh and Telangana which have their own act on this subject. After notification by the Government of India, the Transplantation of Human Organs (Amendment) Act, 2011 has come into force on January 10, 2014, in the states of Goa, Himachal Pradesh, West Bengal, and all UTs. Subsequently, the states which have adopted the Amendment Act to date are Rajasthan, Sikkim, Jharkhand, Kerala, Odisha, Punjab, Maharashtra, Assam, Manipur, Bihar, Chhattisgarh, Gujarat and Uttar Pradesh. Other states have not yet adopted the Amendment Act.

This led to the establishment of the National Human Organs and Tissues Removal and Storage Network and National Registry for Transplant. The Act also simplified donation and transplant procedures by establishing a legal definition of brain death, relative organ donation and non-relative (swap) organ donations. In time, state and region level organ and tissue transplant organisations were also set-up.

Lingering Challenges

The process of organ transplantation is not an easy task. There are a number of challenges both medical and non-medical. For example, a cadaveric organ donor transplant can be done from 'brain stem dead' persons but before the heart stops beating. So time is the key factor for these transplants. Before going in for organ transplantation, certain important measures need to be followed. Factors like finding the right donor, matching the blood group, counselling the patients for post-surgery complications etc.

Apollo Dialysis Clinics, Bangalore, which performs nearly 60 to 70 transplants per year has a protocol to ease the challenges. Says Dr Prashant C Dheerendra, Consultant Nephrologist, Apollo Dialysis Clinics,"Factors like age, gender, health parameters and financial constraints should be looked into before going in for transplantation. In every case, there is always a small percentage of risk involved post-surgery on how the recipient will adapt to the transplant, and whether there might be side effects or any organ disruption during or after the surgery."

There are many myths and misconceptions in India regarding organ donation and transplantation that deter people from pledging their organs. Religious sentiments and superstitious beliefs have added to these woes. While, there continues to be some malicious practices of illegal organ trade, a number of rumours and unsupported claims regarding organ donation are a big challenge for the transplant community.

Recently, rumours surfaced in Goa regarding reports that organs are being removed from the deceased kept in the mortuary. The State Organ Tissue and Transplant Organisation in Panaji had to reach out to people with ad campaigns to expel these rumours.

Parashar says, "People are scared to donate because of lack of knowledge. Many believe that if someone donates an organ, they have to pay for the organ besides the body getting mutilated."
A number of awareness drives are conducted to fight such beliefs and rumours but they aree not enough.

"COVID free pathway had to be created in the hospitals and the entire transplant team had to take adequate precautions"

Dr Vasanthi Ramesh, Director, NOTTO

So, what is the way out?

Counselling the donor's family before and after the transplant is extremely essential, it may be the case of a cadaveric donor (brain dead donor) or a relative live donor. There is already a sense of grief and loss prevailing in the air therefore being sensitive to their circumstances is paramount.

Adds Dr Dheerendra, "Over and above, there are sentiments and religious perceptions which may overrule their decision while the counsellor and team of doctors can only guide, but not insist anything on anyone. It is a completely personal choice made out of one's own conscious decision."

There are cases of illegal organ transplants where the poor are conned into selling their organs. Reports surfaced a few years back in Delhi where government apathy led to a major kidney selling racket. Bureaucratic challenges also keep many away from coming ahead and donating organs for the needy. Out of desperation, many family members end up conniving with officials which lead to organ selling rackets.

The COVID saga

The COVID-19 pandemic has thrown a host of challenges for people urgently looking for transplantation. People in dire need of transplantation had to wait for a long time due to lockdown and many needy patients died in want for organs. The government's strict protocol during the lockdown resulted in an even longer waiting list which took a toll on the patient's health. Says Dr Dheerendra, "A lot of patients cannot afford such a long wait due to several financial and health-related problems. Considering all the aspects, they have started performing the transplant surgeries once again for those who willingly gave informed consent. Though many new protocols had to be instilled to minimise the risk of COVID-19 transmission NOTTO has published guidelines for the same. Fortunately, almost all of the surgical repairs have been successful."

NGOs that usually receive funds from philanthropists had a tough time managing the budgets during the

"India's current deceased organ donation rate is 0.52 per million population"

Anika Parashar,
Chairperson Parashar Foundation, ORGAN

COVID lockdown as there were hardly any donations coming in. Initially, all transplant activities were stopped, but eventually, it restarted, which led to donations." After a lull of three to four months during the lockdown period, things again started picking up. Parashar says, "For those waiting for living donations (they already have a donor in the family for kidney or liver), the time taken extended due to COVID and there was the added threat of contracting COVID during the transplant. Now both deceased activity and living donations have restarted."

Dr Ramesh opines that the donor and receiver had to be COVID-19 negative. "A COVID free pathway had to be created in the hospitals and the entire transplant team had to take adequate precautions. The recipient who was to be put on immune-suppressants was considered particularly at risk and therefore needed to be protected during the covid pandemic. The lockdown prevented the movement of people which made it difficult for recipients to reach the hospital in time. Also due to the fear of COVID, recipients were unwilling to undergo transplants," she said.

Need of the Hour

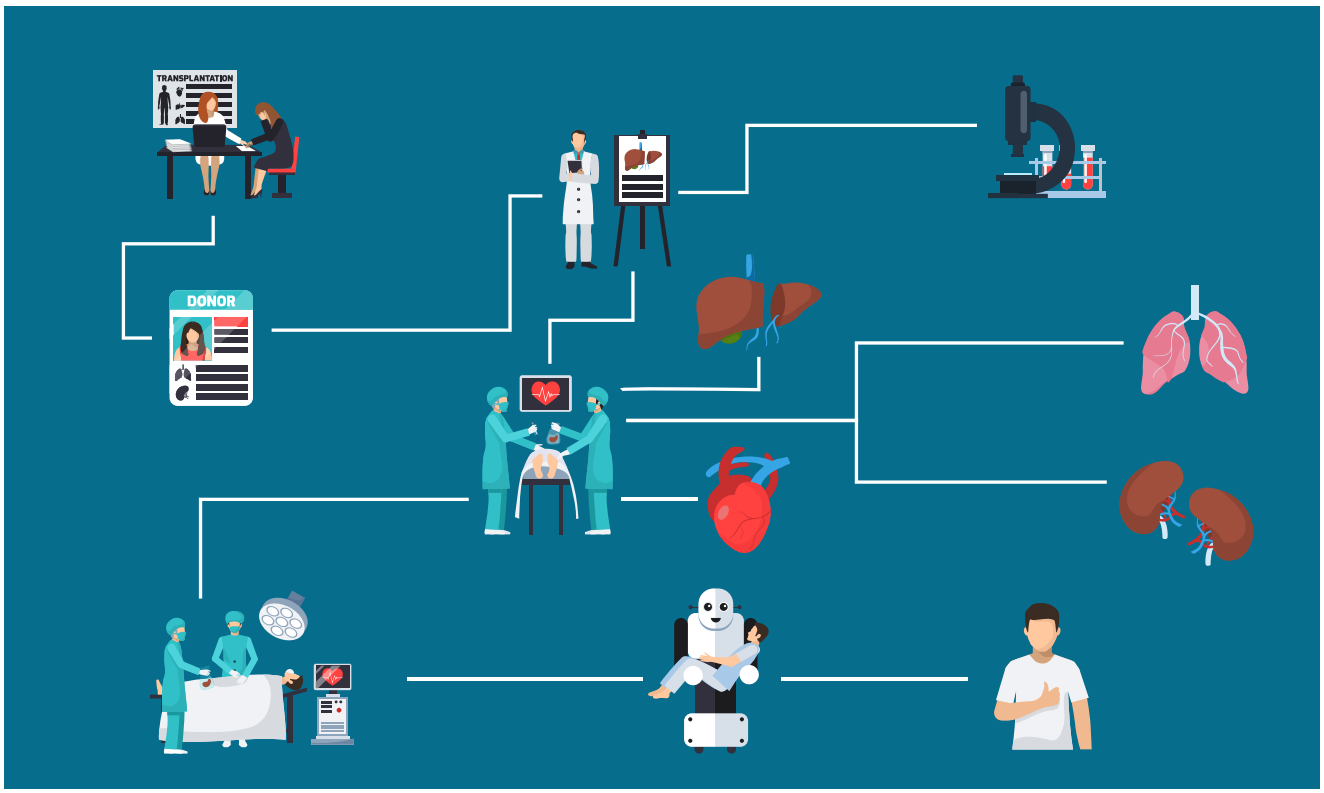
The aggressive campaign is the need of the hour to promote organ donation. Social media, television ads can play a crucial role in this endeavour. Film stars, sportsmen can play a huge role as they can act as role models in this initiative.

Recently, IndiaMed Today carried news on Edelweiss Tokio Life Insurance unveiling a unique educational programme on organ donation and a plan to build a corpus for underprivileged organ recipients. According to the company, the insurer will continue its partnership with MOHAN Foundation, an NGO actively working for the cause. The organisation has roped in actor and social activist Rahul Bose to harness his social influence in spreading awareness for this cause.

Says Parashar, "We would recommend a mass awareness campaign led bybthe government to bring organ donation into the public domain and make something routine. Also, government hospitals

" There are sentiments and religious perceptions which may overrule their decision (organ donation) while the counsellor and team of doctors can only guide, but not insist"

Dr Prashant C Dheerendra,
Consultant Nephrologist, Apollo Dialysis Clinics



need to start doing transplants so that they are affordable for all. Schemes for funding for transplant and medication need to be taken out by Central and state governments."

NOTTO has adopted a 360-degree media approach to spread awareness on organ donation in the form of national events such as Indian Organ Donation Day, walkathon: run for saving lives, poster making competition, TV, Radio, Print, Outdoor, Social media, advocacy events and other modes of communication.

Dr Dheerendra says, "Organ donation is a very sensitive topic to be discussed in the open. As we all know, it is an individual choice made out of one's own conscious decision, therefore, more than anyone else, the donor needs to be convinced in terms of donating the organ to the recipient. People need to understand that there can be no greater gift than this. While, huge awareness can be created through the help of multiple seminars, talks and celebrities endorsements; understanding the deeper cause of this donation can help one propagate the issue more."

The future

It is important to understand that the existing educational institutions and the various religious heads have the greatest influence on the minds of a person. People need to understand that a small step can bring a dynamic change in our entire world. Starting educating children in schools about the good effects of organ donation, besides massive ad campaigns, can help change the perception and attitude. Each person can surely contribute in a small but significant way by signing up to become an organ donor.

Build Through Wisdom

Dr Mohamed Rela, Chairman & Managing Director, Dr. Rela Institute & Medical Centre, Chennai talks about setting up a world class centre for liver transplant

By M Neelam Kachhap

Not many of you would remember the injuries of Late Pramod Mahajan, the then BJP general secretary had just after he was shot. It was 2006, and Mahajan was battling for his life at Hinduja Hospital in Mumbai. An expert was called from King's College Hospital, London to see if liver transplant was a possibility. At the time, there were very few liver transplant surgeons around the world, and Dr Mohamed Rela was one of them. Sadly, Mahajan died due to a cardiac arrest 13 days after he was shot. But it did bring liver transplant into the spotlight and the need for a dedicated programme in India.

Dr Mohamed Rela
Chairman & Managing Director, Dr. Rela Institute & Medical Centre, Chennai

Having seen the suffering of people with liver disease, Dr Rela left London to set-up a centre of excellence in liver transplant in India at Chennai, where he worked for the next 10 years. Later he worked on his pet-project with a vision of instituting a world-class liver care facility in India. Thus the Rela Institute and Medical Center was established and started service in 2018. Here he talks about his journey and what it takes to run the most advanced liver care centre in the world.

Early Life

Dr Rela comes from a business family based in the beautiful village of Tamil Nadu, Kiliyanur. He was born to SA. Shamsudin and Hasma Beevi in 1959. He remembers a happy childhood with two brothers and five sisters.

Even as a kid, Dr Rela, wanted to be a surgeon whereas his classmates preferred careers in aviation, education or fine arts. He studied at The Besant Theosophical School, Chennai and passed with flying colours in 1974. Later, he joined The Stanley Medical College and secured MBBS from the University of Madras, 1982. He spent the next five to six years specialising in Hepatobiliary disease and moved to London, where he joined the King's College Hospital in 1991. Here he got to enhance his skills in surgery and moved on to transplant medicine. It was during this time that he performed a liver transplant on a five-day-old girl with rare disorder called neo-natal haemochromatosis earning him an entry into the Guinness Book of Records. Today, the girl is 20-years old and is living a full life.

Dr Rela adressing students on graduation day

Return to India

When Dr Rela moved to India, the field of transplant medicine was in its nascent stage. "After working in the UK for over 20 years I moved to India in 2009 to help set up a liver transplant programme in my hometown, Chennai, a major city in South India. Until then liver transplant activity was primarily restricted to two centres in northern India," Dr Rela shares. He set-up the liver transplant programme at Global Hospital, Chennai in November 2009 with a focus on both DDLT and LDLT. Cadaver organ donation rates were just beginning to improve in southern India at that time. During his time at Global Hospitals Dr Rela worked to established liver transplant programmes within the Global Hospital group in Hyderabad (2009) and Mumbai (2014).

"Over the last six years, we have completed over 1500 liver transplants in Chennai alone, with over 270 of these being DDLT, and the programme has now become the largest single site liver transplant programme in southern India. The programme has also focussed on paediatric liver transplantation and innovative techniques in transplantation of small children and children with metabolic liver disease. Paediatric liver transplantation now constitutes over 30 per cent of our transplant volume and we currently perform over 50-60 paediatric liver transplants per year, making it one of the largest paediatric programmes in the world," he shares.

Training Programme

With the liver transplant programme in place Dr Rela focussed on training and education. He has trained and mentored surgeons who have gone on to setup successful liver transplant programmes in India and neighbouring countries. The Chennai programme also developed India's first university recognised post-doctoral fellowship programme for liver transplantation and liver surgery in 2012 and since then has been attracting Indian and international fellowship trainees. The fellowship programme has been expanded to include liver anaesthesia, critical care and paediatric hepatology.

"My team in Chennai is also involved in training and mentoring DDLT programmes in other hospitals within the state. We are currently supporting the DDLT programme in Government Stanley Hospital, where liver transplants are performed free of cost. There is also a plan to start a new liver transplant programme in government general hospital, Chennai in the near future," Dr Rela shares.

The Next Step

"With a focus on a strong, dedicated and ethical concept of healthcare, I have now ventured into setting up a new healthcare facility named after me, Dr. Rela Institute and Medical Centre (RIMC)," shares Dr Rela. The new centre is a quaternary care hospital dedicated to fostering and responding to the needs of a diverse set of patients. The hospital is committed to being an international healthcare system with the state-of-the-art infrastructure facilities. The institute is designed to provide high-level care in all specialities with a special focus on care of critically ill and multi-organ transplantation. This hospital houses one of the world's largest dedicated liver intensive care units. In addition to the quality quaternary care in all specialities, the hospital is committed to providing day-to-day 'primary and secondary care' to the local population with international standards. In a short span of 24 months, since its inception, over 450 liver transplantations have been performed. A plethora of firsts has been achieved, including successfully performing a liver transplantation on the youngest child in India of one month of age.

Key to Successful Centre

Talking about his experience and learning of setting-up successful transplant centre Dr Rela says that a number of factors impact success. Primarily a good surgeon leader, a modern facility and trained team along with time and perseverance lead to the success of any centre.

Leader with extensive transplant experience: First thing needed is to have leadership with extensive

experience. A junior surgeon who has recently completed his training hoping to set up a successful transplant unit may not be successful. He has to mature as a leader before he can set up a world class service.

Setup or the facility for a transplant programme: In our country, it is possible in the public/govt. sector like in the central institutes where major investments are possible. Unfortunately, this has not been widely adopted across the country. The private sector on the other hand has the potential to do so in India. When choosing a private-sector enterprise, it is imperative that the surgeon has some idea of its financial stability. The organisation itself should not be struggling with the finances and depend on the first instance of this budding transplant programme. This stability will allow for the setting up of long-term goals rather than short-term gains.

Well trained team: The third important aspect is to attract good staff who are either trained or are easily trainable in the various aspects of transplantation. In the beginning, it is always a bonus to have well trained professional to support the programme. This again comes back to opportunity and leadership which will attract these new staff to think and believe in this new programme to grow, learn and excel in the field.

Research: The clinical and research potentials come later, but are also key cogs in the wheel of a successful transplant unit. Again, with good leadership and results, the programme is bound to grow in size and stature. However, it is important to start as a small well-knit unit, and grow from there on.

Time and perseverance: Programmes can take up to five years to mature, and time should not be a metric to judge progress. It is also noteworthy that the financial affordability has tremendously improved in India, and the cost of LT is much lower than the west with equal if not better results and outcomes at the hands of our teams. These factors lay a fertile ground for any new transplant program to bloom.

28 years of experience

Performed over **4500** liver transplants

Authored over **554** peer-reviewed publications

One of the **20** Most Innovative Paediatric Surgeons

Conducts annual Master Class in Liver Disease boasts over **1000** delegates

Honors, Medals and Awards

- Panchanna Chaterjee Oration and Gold Medal – Association of Surgeons of India. December, 1996.
- Senior Lecturer: King's College, University of London, 2000
- Recognised Teacher status and PhD Supervisor: University of London, 2001.
- Professor of Liver Surgery and Transplantation: King's College, University of London, 2005
- Scroll of Honour and Medal: Jawaharlal Institute of Post graduate Medical Education and Research (JIPMER), Pondicherry, 2009
- Dr Madhanagopal Oration and Medal: Madras Medical College, 2010
- DSc (Doctorate of Science) Honoris Causa from 3 Universities

PPP in Action

An Affordable Liver Transplantation Initiative for Children

Dr Sonal Asthana
Lead Consultant, HPB and Multiorgan transplant Surgery, Aster Integrated Liver Care (ILC) group, Aster group of Hospitals

Rising healthcare costs often negate the impressive gains India has made in poverty alleviation. Approximately, 63 million people are pushed back into poverty every year because of catastrophic out-of-pocket healthcare costs. Effective mechanisms to fund costly treatment like transplantation are not available to the majority of the Indian population.

Children with organ failure represent a particularly unique and vulnerable group. While over 2,500 children in India are in need of a liver transplantation every year, less than a 150 get access to one. An estimated 2000 children die of liver failure in India every year, and almost all these deaths are preventable with appropriate surgery. Besides, 90 per cent of these children fail to receive transplantation primarily due to lack of financial resources or delayed detection.

Tough Challenge

Children are a rewarding group to treat. Diseases causing end-organ failure in childhood are often genetic or environmental, and transplant can be curative. Most parents voluntarily come forward as organ donors should children require a transplant. The skills and facilities for performing complex surgery exist in the private and the public sector. Economic factors are often the only reason why transplants are not performed for children.

Hospitals are often reluctant to undertake these surgeries because of lack of insurance coverage for unexpected cost escalations (due to surgical or medical complications), and a lack of guaranteed long-term support for medicines and laboratory tests which these children need.

Winning Strategy

Utilising funding combining crowdfunding supported by corporate social responsibility for healthcare has the potential to be a game-changer in healthcare delivery as well as outreach. Selected private/ corporate partners can provide knowledge and skills transfer as well as a potential source of funding for a catastrophic expense.

2000

Number of children dying of liver failure in India every year

Pravin Agarwal
Founder of The Pravin Agarwal Foundation and Chairman, Sterlite Power Transmission

We have created a funding mechanism for an affordable liver transplant for children over the past three years using a combination of CSR funding and crowdfunding. This involved key stakeholders to ensure pricing control and equitable distribution of funding burden to avoid burdening the family with unsustainable expenses. The Internet has lowered search and communication costs allowing funders to easily gather information, monitor their investment, and engage with the social platform coordinating funding, regardless of their geographic location. The average donation per patient for our children was Rs 2500 (approx. 35 USD).

Key Funding Partners

The Pravin Agarwal Foundation (TPAF) and Help the poor foundation have supported more than 300 transplants across more than 20 partner hospitals in India. Our unit at Aster hospitals has performed 101 transplants for children using a supported funding mechanism.

"The cost of a liver transplant surgery is very expensive and the reason why many who are in need cannot afford one. At TPAF, through our fundraising campaigns we are trying to bridge that economic gap. If a disease can be taken care of through transplant, funds shouldn't be a reason to lose an innocent life. As an organisation, we also try to be an ecosystem enabler by partnering with super-speciality hospitals facilitate surgeries at a fixed rate. We also extend post-transplant support through our support groups. In the year 2020, we supported our 200th paediatric transplant since our inception. We hope to touch many more lives in the coming years," says Pravin Agarwal, Founder, The Pravin Agarwal Foundation and Chairman, Sterlite Power Transmission.

This novel approach to healthcare funding and delivery may help supplement the government's efforts to expand healthcare coverage under the PMJAY by providing additional funding for advanced and relatively expensive healthcare interventions and help us to truly provide equitable and affordable healthcare for all.

Growth of Heart, Lung Transplant

Dr Sandeep Attawar, Program Director and Chair, Institute of Heart & Lung Transplantation, KIMS Hospitals, talks about the the journey of in heart and lung transplant in India

By Team IMT

A 32-year-old man from Chandigarh suffering from sarcoidosis leading to fibrosis of the lungs, a 51-year-old lady heart transplant recipient from Andhra Pradesh, a 59-year-old man from Delhi, suffering from severe lung fibrosis due to covid infection and a 34-year-old marketing professional from Haryana who recently underwent a double lung transplant has something common between them. All of them received new lease of life thanks to Dr Sandeep Attawar, Program Director and Chair, Institute of Heart & Lung Transplantation, KIMS Heart & Lung Transplant Institute, KIMS Hospitals and his team of doctors based out of Secunderabad.

52-year-old Dr Attawar has been practising for the past 24 years and has done close to 12,000 heart surgeries. He has conducted around 250 transplant surgeries – which includes lung, heart and artificial heart transplant. Says Dr Attawar, "Indians are more prone to a high incidence of tuberculosis and end-stage lung disease. Though the US has a lot of heart failure and lung diseases, the country has a concrete database when it comes to the incidence of heart and lung failure when compared to India."

According to Dr Attawar, the environment plays a huge role in lung diseases. Citing the example of pigeon poop, he says that it is one of the main cause of interstitial lung disease, which is known as hypersensitivity pneumonitis. Apart from this, silicosis and asbestosis are more prevalent in third-world countries.

Indians at a high risk

Every year, around two lakh Indians require heart transplants as compared to 50000 Americans. A majority of the Indians suffer heart disease at an early age and are more prone to diseases like diabetes. Lifestyle changes leading to hypercholesterolemia, tobacco consumption, industrial pollutants, stress due to socio-economic inequality are some of the leading causes of heart diseases. "A limited number of opportunities lead to younger individuals suffering from heart disease at a much earlier age which culminates into massive cardiac attack due to poor heart function," says Dr Attawar.

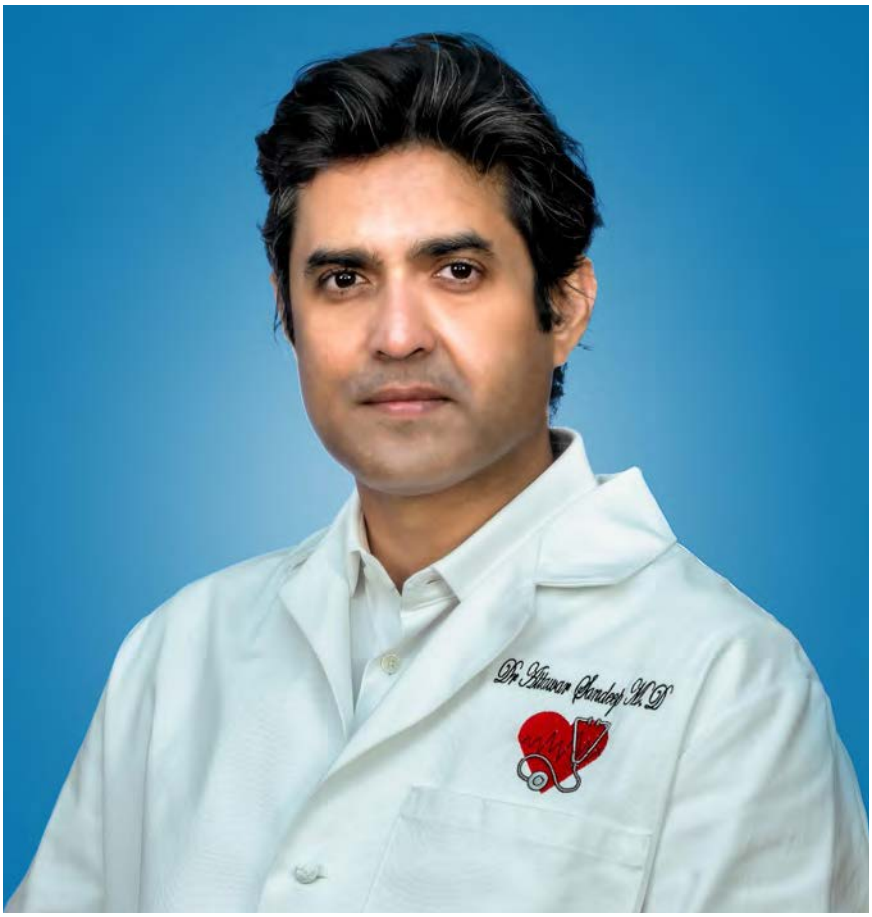
Rheumatic heart disease can also lead to heart failure if not treated on time and the patients would need a heart transplant. In certain cases, children suffering from congenital heart disease go undiagnosed and on becoming adults, a heart transplant is their only option. Collateral cardiac and lung disease can progressively lead to end-stage heart and lung disease and then a transplant is the only option.

Besides, these transplants are costly. The economics of heart and lung transplant is such that unfortunately a very small sub-segment or strata of this entire disease burden population can even afford a transplant. Health insurance penetration in India is minimal and many patients have to pay from their own pockets while going in for a heart transplant or a lung transplant. Things have changed for good and many are aware of the ill-effects of heart disease and the need for a transplant.

Says Dr Attawar, "The good thing is that we are now noticing an upsurge in awareness which is making people understand that this is a better option for a better quality of life. We are having greater success as people suffering from end-stage heart or lung disease are coming forward and more receptive towards the option of a transplant."

The history behind heart and lung transplantation in India

The fourth heart transplant in the world



Dr Sandeep Attawar
Program Director and Chair,
Institute of Heart & Lung Transplantation, KIMS Hospitals

was attempted in India way back in 1968 at KEM Hospital by Late Dr PK Sen and his colleagues. However, the attempt was an unsuccessful one and post that there was a significant lull. In August 1994, the first successful heart transplant was conducted at the All India Institute of Medical Science (AIIMS), Delhi, by Dr P Venugopal. This was followed by Dr KM Cherian at the Madras Medical Mission conducting a series of heart transplant. Thus the southern states instituted transplant programmes in both private and public hospitals, even though the first cases were done in Delhi and Mumbai. While, North India lagged in transplantation, the southern states were at the forefront with a lot of NGOs and government organisations coming forward and moving in the direction of voluntary organ donation after brain death. “Chennai picked up the pace and continued to do a smattering of cases over the next few years and gradually started picking up also on organ donation where other states laggard.”

Sometime, during late 2007-08, the southern states of India witnessed a sudden spurt in transplant activity and it can be attributed to the 'Hithendra Effect'. It is the heartwarming case of a 15-year-old boy named Hithendra, who lost his life in a motorbike accident. Hithendra's parents chose to donate his organs, which brought the focus back on organ donation and sparked off a movement for organ donation, called the 'Hithendra Effect'. Post this Chennai and most of TamilNadu continue to be the leader in organ donations for probably a decade till other states are started

picking up and even overshadowing Tamilnadu as far as organ donation rates were concerned.

In the early part of the last decade, a couple of centres in Chennai took a keen interest in heart and lung transplantation and between 2016-17 and 2018-19, it became a larger movement where no less than 150 to 200 transplants were conducted annually.

Also, states like Telangana and Karnataka did some fabulous job while Kerala did some exceptional work for a few years but later got embroiled in controversies. The southern states of India account for 92 - 95 per cent of all the organ donations and the main reason is that the government in those states came forward to sponsor heart and lung transplant. But it had its own set of challenges as the government regulations were tight and only very few patients can avail the benefits. But it was a blessing for many below the poverty line or lower-middle-income group. This also led to many heart surgeons going in for transplantations as a viable option with end-stage heart disease especially with heart failure. Pune, Mumbai, Nagpur in Maharashtra followed suit and have now good transplant programmes.

Says Dr Attawar, “I started transplants in 2012 at Global Hospitals Chennai, right at that moment when organ donation was beginning to happen and I spent a year there. Initially, I was reluctant as the programme was at a nascent stage despite having several donors and recipients. The amount of strength and back up required to make an impact was less. Later, I moved to Gurgaon. In 2017, I went back to Chennai and started with a team of 30 professionals for end-stage heart and lung disease. We conducted around 65 transplants in 2017 and the number increased by 15 per cent in the next year. Between 2019 till the end of 2020, we completed 224 heart and double lung transplants in Chennai. We started two satellite centres one in Bengaluru and the other in Mumbai. So we had three centres by the end of 2020 and a dozen and half cases were looked into before the pandemic set in."

The COVID-19 effect

The transplant activity completely ceased between March - July 2020. During the interim period of six months, when everything came to a standstill, there were probably close to 55 recipients on the waitlist who were desperately waiting for an organ transplant. Probably less than a quarter of them survived the pandemic and most of them died during this waiting period.

Surprisingly, the neighbouring state of Telangana was going ahead with organ transplantations despite the pandemic. This was because donations were happening during the pandemic and the government didn't clamp down on the initiative. It was at this time, Dr Attawar decided to move to Hyderabad and set up services at Krishna Institute of Medical Science Hospital also known as KIMS. The department for transplant was set up in early June and the services started from the middle of August onwards.

Says Dr Attawar, "By August 15, 2020 we conducted a double lung transplant. We realised that there was a reasonable number of recipients waiting for transplants. Post-covid lockdown, we witnessed a huge influx of patients having lung infection."

According to him, some of the patients were in extremely bad shape, having multiple and viral infections. Sadly less than a quarter of them even reached a stage where the lungs were completely unrecoverable and a double lung transplant was the only option. Some of these patients spent between 25-54 days at Extracorporeal membrane oxygenation (ECMO) treatment.

Subsequently, the numbers of donors increased in Hyderabad and the centre witnessed 15- 18 donations a month. "It may be noted that the biggest centre in North America is North Western, where seven covid double lung transplants were undertaken whereas we conducted 10 transplants till the end of last week, though some of the patients are still on life support and waiting for a suitable organ donor," says Dr Attawar.

Under normal circumstances, an individual after a double lung transplant can start a normal life within five days of transplantation. In the case of heart transplants, patients can walk within

four to five days after the transplant. It is sad to see that individuals affected by covid who are in the ICU for more than three months have to wait long for a transplant and are taking a long time to recover Dr Attawar said.

Team effort

Transplant is a team effort. Dr Attawar says, "We live in a world of limited opportunities and huge challenges, so achieving something as solid organ transplant successfully and in keeping these patients alive is another key thing. I always felt that a good team approach can make a lot of difference for transplant patients."

He goes on to add, "We have a team of transplant coordinators who are clinical coders and ICU nurses, having experience with patients who have recently undergone heart surgeries. The ability to understand the challenges which patients face not only in the ICU but also in the long term as they rehabilitate and go back to normal life is something like an achievement."

For a group of 270 post-transplant recipients, KIMS has five to six coordinators who take care of 50 patients in a group and do the follow-up every week. Using WhatsApp and social media extensively, the process of coordination has become easier.

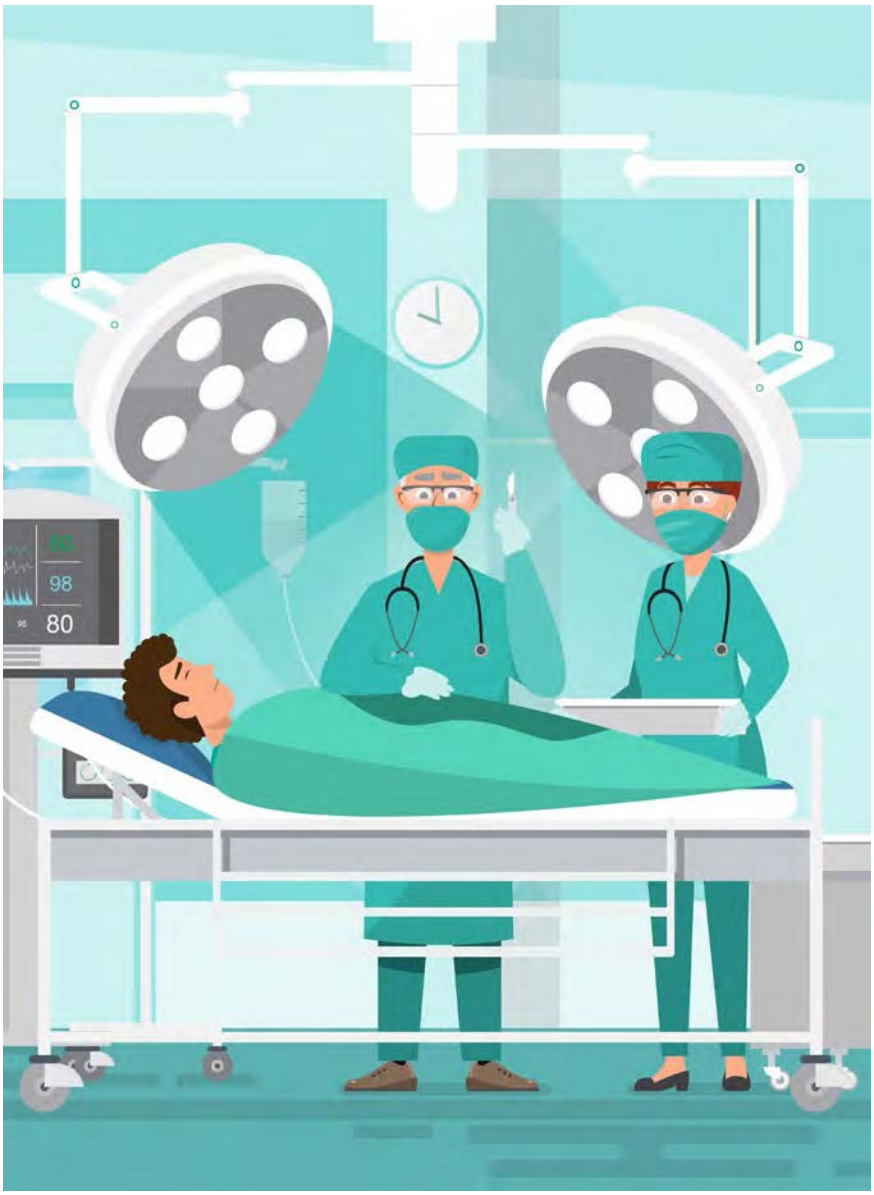
According to Dr Attawar, in case of any eventuality, someone from the group immediately takes up the issue and solves it. It is free of charge service and the response time is between four to six hours. If any recipient goes back to their hometown, the doctors liaise with the local physician and solve the issue fast. According to Dr Attawar, this initiative helps to monitor immunosuppression. Most of the patients require drug testing very frequently. These and other tests and follow-ups are done by the coordinator and doctor's advice is readily available due to the use of social media.

Tracking the medical records

According to Dr Attawar, paperless service will be a game-changer for transplant patients. Says Dr Attawar, "All the records will be available on the hospital management system on the electronic medical record. We will be able to provide paperless transplant service for hearts and lungs. Everything from admission to discharge will be taken care of flawlessly with the help of paperless service."

Going forward, there are plans to take things to the next level and KIMS has tied up with a Pune-based software company, which is into medical software and helping to develop a registry. All the patient's case history and details are fed into the registry which will be handed over to the National Organ & Tissue Transplant Organisation (NOTTO). According to Dr Attawar, KIMS will electronically hand over day-to-day outcomes and long-term survival data to NOTTO.

The doctor hopes that this initiative will inspire other hospitals conducting transplants to bring in a drastic change in organ transplantation. All these initiatives will help to provide continuity of care and ensure that patients receive the best.



Current Challenges of Renal Transplant in India

Dr H Sudarshan Ballal, Chairman, MHEPL, talks about the current situation of renal transplantation in the country and how the COVID-19 pandemic had an impact and the way forward

A majority of the renal transplants in India are live related (90 per cent live and 10 per cent cadaver or deceased donor) Though the number of cadaver donations is increasing they are far less than the demand at present. This leads to patients waiting on the cadaver list for more than four to five years to receive a deceased donor kidney if there are no related donor available. Some even may not survive waiting for the kidney (cadaver). In India, the average number of transplants done is 6000 to 7000 per year.

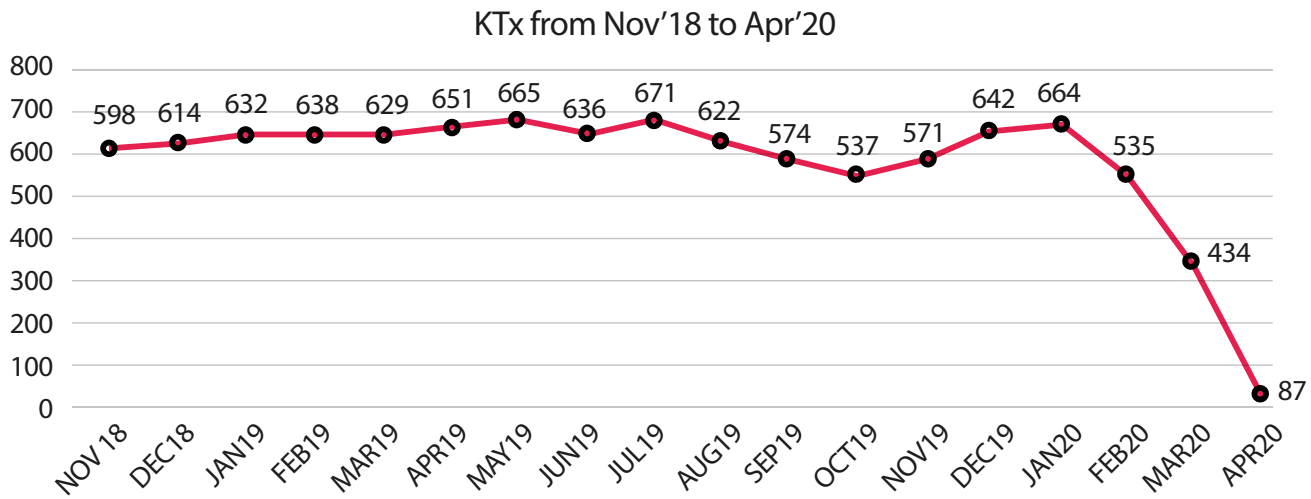
For many reasons the southern states have always been the leaders in cadaver transplant and also have had a more robust healthcare system. The northern, eastern and central states have had a less robust healthcare system and lesser number of transplant centres and have not developed strong cadaver transplant programmes, hence the regional disparity. However, Delhi and NCR have a strong live transplant programme and the cadaver programme is slowly picking up.

> Tamil Nadu, Telangana, Kerala and recently Gujarat are the leading states for deceased kidney donations. In many states in the north, including the capital New Delhi, cadaver donations are very few.

Approximate Kidney Transplants in India post lockdown (from 21st Mar 2020-30th April 2020)

KTx in major indian territories		
	Average KTx/me (Before Mar 20)	No of KTx post-COVID 19/ Lockdown
DELHI-NCR	140	24
PUNJAB	40	0
UP	22	0
RAJASTHAN	18	0
WEST BENGAL	70	1
AP + TELANGANA	35	3
TAMIL NADU	80	0
KARNATAKA	45	0
KERALA	35	8
MAHARASHTRA	90	1
GUJARAT	55	0
MADHYA PRADESH	15	0
		37

Kidney transplants in India over the period of last 18 months



During the lockdown, both live and deceased kidney transplants had come to a complete standstill world over including India. Though slowly live renal transplants were restarted, cadaver transplants are yet to pick up, though a few have happened during the last two to three months, but much lesser than pre-covid times. In pre-covid era from January to March, the monthly transplant all over India was more than 600. During the lockdown, transplants were almost nil, later came to an average of 100 to 200 per month from August 2020 onwards.

Finding a suitable donor within the family is becoming more difficult as the number of nuclear families is increasing. Family donors have become far and few leading to the patients waiting for cadaver donations which may take many years. To sustain till then with weekly thrice dialysis is a very expensive proposition and will drain the patient and the family financially, emotionally and may also lead to job loss and other problems. Especially in India, most of the patients do not have any insurance and have to bear the expenses out of the pocket of a transplant which may cost an average of Rs 5-6 lakhs. This leads to a significant amount of hardship for the family and we have to work out a universal health coverage system for our citizens akin to the NHS of the UK or Medicare of the US.

There is an increasing number of patients undergoing SWAP transplants, ABO-incompatible transplants, steroid-free kidney transplants, second /third transplantation(kidney), dual organ transplants like liver-kidney, pancreas-kidney etc. Many surgical advances also have taken place like laparoscopic donor nephrectomy, robotic kidney transplantations etc

Most of the centres have good results. Centres with higher volume have always better results.

More number of cadaver donations (similar to what is seen in Spain) is the need of the hour in our country. There are centres doing kidney transplantation including tier-II cities which is a welcome move for the patients. There is a need to educate the general public on the need for organ donation constantly.

Dr H Sudarshan Ballal
Chairman, MHEPL

Crowdfunding for organ transplant

From confusion to clarity

Anoj Viswanathan
President and Co-Founder, Milaap

Twenty-five-year-old Sindhu had been diagnosed with drug-induced liver damage and the only remedy was to get a liver transplant. The surgery would have cost the family over Rs 40 lakh. "My family was struggling to put together funds for my sister's treatment, till help came from all quarters from total strangers," says Sindhu's sister Priyanka. 3000+ strangers contributed to Sindhu's campaigns and a whooping Rs 36 lakh was raised in three days. Thanks to them, today Sindhu and her sister Priyanka who donated 60% of her liver, risking her life, are now doing well.

Hubail Abrar, a one-year-old from Ernakulam, hardly had 48 hours for the transplant. A fundraiser on crowdfunding platform raised 14 lakhs overnight and the doctors could go ahead with the treatment at the right time. Even amid the Covid crisis, crowdfunding platforms have witnessed an unprecedented wave of generosity from people.

Stalin, father of seven-year-old Betina said, "For me, 19 lakhs in three days was a huge sum to afford. I tried borrowing from family and friends but did not managed to collect even half the sum. I even reached out to my friends and colleagues but wasn't able to gather the required sum." He further added, "I am thankful to the hospital management and doctors who recommended me to start a fundraiser on a crowdfunding platform. I was able to raise funds within a few minutes and it took us barely a couple of days to raise Rs 17 lakhs for my daughter's treatment. My daughter has undergone the liver transplant operation and is doing very well. I am grateful to all donors who helped me save the life of my child."

Medical emergencies can knock at your door anytime and sometimes even savings of a lifetime is not enough. Such uncertainties can befall anyone and without help in sight, lives can be lost or families can be ruined. The emergence of crowdfunding as a platform to raise funds for emergency or tertiary healthcare has come as a ray of hope to many such families crushed under the burden of hospital bills. In most cases, crowdfunding is not the only source of funding and is often the last resort after exhausting all other avenues.

Despite transplants costs in India being the lowest in the world, it is still well beyond the reach of Indian middle-class families. Among transplants of critical organs such as kidney, liver and heart, a liver transplant is the most expensive, with costs ranging between Rs.15-30 lakh. The government's national health mission programme, Ayushman Bharat, which aims at providing Rs 5 lakh medical insurance to 10 crore Indians, covers chemotherapy and radiation costs for cancer patients but does not cover organ transplant. The Tamil Nadu government provides funds for liver and bone marrow transplants, but there is no chance for it to reach everyone, as there are eligibility norms. Most families do not have insurance coverage and those who do may find their covers insufficient to take care of the entire cost of the transplant and beyond.

Milaap was started 10 years ago, and

Hubail Amrar before the transplant

Hubail Amrar with his twin brother - After the transplant

had raised Rs 400 crores towards the medical needs of people. Till date, more than Rs 80.2 crore has been raised for liver-related ailments through this platform. Most users are from middle and lower-middle class families, who do not fit into any schemes. People use the platform when they run out of options such as insurance cover and savings. With more than 20 lakh donors in and outside India, thirty per cent of them have contributed more than once.

Sometime in 2015, Dr Sonal Asthana, liver transplant surgeon at Aster Hospital, Bengaluru, and his team possibly became the first doctors in India to set up a campaign on a crowdfunding platform for a transplant. Since 2013, Dr Asthana has been working with private foundations and CSR teams of corporate hospitals to fund liver transplants. Milaap has a network of 2000 + partners including 300+ hospitals in 35 cities. Many doctors recommend crowdfunding platforms over NGO to raise funds for the treatment, especially for paediatric liver transplants.

"For a patient living with liver disease, the financial burden could be tremendous. The cost of a liver transplant plus a lifelong commitment to immuno-suppressant is out of the reach of a common man. Our collaboration with Milaap has made liver transplants affordable for many," said Dr Mohamed Rela, a senior liver transplant surgeon.

In the recent year, there's been a surge in fundraisers for children needing urgent liver transplants. Paediatric liver ailments account for the largest share of medical fundraisers. Milaap has supported 12,000 medical fundraisers for children (0-18 years) to date, which have altogether raised more than Rs 155 crore for this cause. Of these, nearly 1,500 fundraisers have been for children with liver-related ailments, that have raised nearly Rs 35 crore. This crowdfunding platform has directly or indirectly aided over 50 per cent of paediatric liver transplants performed in the country till date.

Reasons, why campaigns run for children, tend to be more successful are aplenty. One, children not only evoke unparalleled feelings of sympathy and generosity, but the sense of gratification of saving a child, who has his/her entire life ahead of him, is immense. The second is the high success rates that paediatric transplants enjoy. I believe that crowdfunding opens up an alternate financing option for such medical emergencies, and liver transplants, in particular, are a kind of treatment with higher success rates, particularly among children. Urgency is one of the key psychological triggers that cause people to donate, needs like these are more likely to receive support online.

Crowdfunding is an option for patients and their surgeons who work with cutting-edge technologies and want to provide better quality-of-life to their patients.

Robotic Donor Liver Surgery

Challenges and learnings from the largest liver transplant center

Dr S Sudhindran
Chief Transplant Surgeon,
Department of Gastrointestinal Surgery and Solid Organ Transplantation,
Amrita Institute of Medical Sciences, Kochi

Liver transplantation is the only treatment option for patients suffering with acute or chronic liver failure. If you look at patients with kidney failure, an alternate option of dialysis is available but there is no substitute to maintain a failing liver for lengthy periods. They need a new liver.

A liver transplant is not a simple procedure, but it is a lifesaving intervention. In the last couple of years, survival rates after liver transplant have improved remarkably. Currently, over 80-90 per cent of people survive liver transplantation and enjoys a good quality-of-life. The survival rate is comparable with international standards.

There are two primary options for liver donation. The first one is from a deceased donor where liver donation is from a patient who has undergone brain death. This form of donation is less common as we in India are already dealing with the lack of donated organs. The other form of donation is living donor transplant where the donation of part of the liver is from another person, mostly family or relative. This form of donation is popular because of the fact that the donor's body needs only about a third of the liver's volume for its daily function and the liver's unique ability to regenerate. After transplantation, the partial livers of both the donor and recipient will grow and remodel to form complete organs, usually within three months.

Risks with donor surgery

Liver donor surgery is the most challenging surgery one can do because you are operating on a healthy individual with no morbidity and you want to make sure that no harm comes to the donor.

However, as in all surgeries, there are risks involved with the donor surgery too. These risk may be bleeding, infection, bile leakage from the cut surface of the liver and possible death. So we as surgeons need to minimise these risks. In addition, the probability of these risks occurring is more when the right lobe of the liver (comprising up to 60 per cent of total liver volume) is used for donation. When the recipient is a small adult, the left lobe of the liver from the donor might suffice and in such cases the complication rates are extremely low. For transplantation into children, even a smaller portion of the liver is required from the donor, diminishing the complication even further, although not totally eliminating them.

We did a study to look at these risk factors. The occurrence of morbidity and mortality after living donor liver transplantation is much talked about but potentially life-threatening near miss events (during which a donor's life may be in danger but after which there are no long-term sequelae) are rarely reported. Our study revealed that most complications are of low-grade severity but 4.1 per cent of patients had severe or life-threatening events. That's why we look for better options so that we can improve the experience for the live liver donors.

Robotic liver transplant

Robotic liver transplant in India is done for the live donor. In the recent past, minimally invasive surgery has gained

popularity for donor liver surgery. The resection of anterior liver segments and left lateral secterectomies through laproscopic approach is well established. The advantages of this method are less estimated blood loss, postoperative pain, morbidity and shorter hospital stay. And yet this technique has its limitations.

When the robotic surgery arena developed we looked at converting from key hole to robotic surgery. In fact, pure robotic donor right hepatectomy (liver surgery) is performed only by a handful of centres around the world. We are doing robotic right donor hepatectomies at our centre for the last two years. In June, 2018 we did our first successful case. In India, there are about two-three centres that are doing robotic hepatectomy. Dr Rela's Institute is one of them and they do a large number of paediatric cases. Another centre that is doing good work in this field is the Medanta Hospital.

At our centre we have done more than 850 liver transplants. Of the total of 850 transplants, 780 were from live donors and 70 were from deceased donors. In fact we were the first and largest liver transplant programme in Kerala and maybe India. We have been running a regular live donor programme since 2007 and we performed our first liver transplant in June 27, 2004. Currently, in a year, the team performs 103 liver transplants. We have the largest robotic donor hepatectomy experience in India and maybe in the world with a total of 150 successful cases.

In our experience, with an experienced team pure robotic right donor hepatectomy is safe and feasible for a select group of patients. This operative video demonstrating surgical technique as follows–Right lobe mobilisation, Defining Right hepatic vein and IVC, Hilar dissection, Marking the demarcation line, Parenchymal transection using robotic instruments, assistant port is used for minimal usage of CUSA/ suction, robotic suture closure of bile duct opening, Hemolocks and stapplers for final vascular transection, delivering graft through pfannensteil incision.

Establishing robotic surgery program

The basic requirement to start a successful robotic liver surgery programme is a dedicated team along with equipment and surgical expertise. You need a patient and supportive management because the equipment is a big investment. The initial cases are subsidised and require a lot of support from the team, from anaesthetist, nursing staff and assistants. We have a team of about 13 senior consultants, four to five nurses and technicians and we have managed to develop a world class liver transplant programme.

Challenges and learnings

Robotic surgery is very different from open surgery techniques, because in open technique we rely a lot on our senses, like depth perception and feel of the tissue, whereabouts and location and moving the organs is easier in open surgery. Seeing things in real and observing things on a screen is completely different, even if it's a 3D rendertion. Robotic surgery has its limitations related to these and even a little bit of bleeding is difficult to manage though the robotic arms. Besides, there is always a tendency to convert from robotic to open if complications arise.

One other challenge is that robotic surgery takes a longer time. The open surgeries take about six hours

to complete but robotic surgery may take anywhere from 10-12 hours. The learning curve is steep, we are still establishing and changing protocols. One thing that is challenging is when we take the liver out of the donor, due to lack of blood and oxygen it starts to decay. We can slow this process by flushing the organ with a special liquid and cooling it before it goes to the bench. This step is extremely important and time taken to do this should be minimal. In open surgery, we hardly take two-five minutes to process and put it in ice, but in robotic surgery, it takes about 15-20 minutes. So we need to hurry slowly. In addition, when you change instruments in open surgery or laparoscopic surgery it is easier, but in robotics, there is a longer process. You cannot just put down one clamp; you need to unlock, decamp, check, so instrument exchange takes time.

Additionally, the liver bleeds easily so we need to do a lot of very precise fine stitching, this requires a lot of experience as both donor and recipient blood vessels need to be preserved. Here robotics comes in handy as robotics provides good dexterity and magnification for this precise stitching. However, this requires a lot of training and the amalgamation of these techniques; open, laparoscopic and robotics would be the best thing for the patient but very difficult to achieve for the surgeon.

In terms of instrument improvement, the present robotic system, the DaVinci system, developed in America was not developed for liver transplant surgery. Its main use was for urology and gynaecology procedures. The device needs a lot of upgrades and has to develop more for liver surgery. We hope this will happen soon as other companies come into the market.

One of the important steps in liver transplant is liver resection or parenchymal transection or measuring and division of the liver for resection. Currently, the main device used for parenchymal transection is Cavitron Ultrasonic Surgical Aspirator (CUSA). There is no instrument for this in robotics so an operating surgeon has to be there to do it. In fact, the robotic equivalent of CUSA is eagerly awaited, as it will help improve the division of the liver and the liver transplant donor surgery in future.

In future

The main disadvantage of robotic liver surgery is its cost.In our experience, robotic liver resections cost on an average 2.5 lakhs extra than open surgery which itself costs about 18-20 lakh. We hope that with the development of newer techniques and more competition in the market cost rationalisation will happen.

I hope that in the near future, robotic liver surgeries will become safer and feasible. Of course, this will depend on how the technology evolves. My wish list would be for better miniaturisation, development of better instruments, easy and faster docking and de docking, enhanced navigation use of AI, cost effectiveness to make this more affordable.

Progressive Perfusion Tech

How game-changing perfusion techniques are expanding the donated organ pool

Dr Darius Mirza
Professor of Hepatobiliary & Transplant Surgery,
QE Hospital & Birmingham Children's Hospital, UK

Organ transplant has been one of the modern marvels of medicine. Replenishing a deceased organ with a donated healthy organ has fulfilled the great promise of modern medicine. Today, about 1.5 million solid organ transplants are performed every year globally. Besides, strategic investment in developing newer technologies have amplified the transplant provider's effort to serve the patient community better by innovative organ preservation technologies and improved organ survival.

The Foundation

Solid-organ transplantation came of age in the 1950s and 1960s once clinicians understood the steps needed to prevent rejection. As the field developed, surgical aspects of organ selection, removal, preservation and implantation were understood. One of the keys to better transplanted survival was organ preservation. This requires slowing down the metabolism and this has conventionally been done by cooling to reduce the impact of lack circulation once the transplant organ has been retrieved. The conventional method of preservation is termed static cold storage (SCS), with the organs preserved at a temperature between 0 - 4 degrees centigrade, and the metabolism slowed by a factor of 10-12 fold. However, new techniques have now been introduced that do not require cold temperatures.

Challenges Galore

There are a number of challenges with organ preservation and transport. The ultimate goal of transplant is to have a functional organ but the transport and preservation often are difficult because of injury to the donated organ.

SCS is less costly and efficient but results in additional organ injury due to ischaemia, toxin build-up or lack of nutrients. Dynamic perfusion can be done at body temperature or cold (0-4 deg C) or at temperatures somewhere in between, but requires machines to pump oxygenated fluid or human blood or a blood substitute to the organ. This new thought has changed the face of transplant medicine. Earlier, organs that were non-optimal were discarded but now using new technology these organs can be saved and transplanted. Studies have shown that the new perfusion techniques have lesser a degree of organ injury during preservation, allowing better function in these organs once implanted into a patient.

Importance of Novel Perfusion Tech

Transplant medicine has been plagued by one major limitation; the actual organ availability. There is a huge need for donated organs, but out of the donated organs, there are few that are not used and are rejected. This gap between available organs and actually used organs is a major concern for transplant surgeons around the globe. One way out is to preserve these vulnerable organs in a way that these can be used. One of the areas of interest in transplant medicine is to develop new strategies for the preservation of marginal grafts

Photo Courtesy: Ex-Vivo Organ Support System - University of Alberta

that are prone to injury when treated with standard techniques, such as static cold storage (SCS). In fact, a number of innovative preservation methods in kidney, liver and lung transplant are currently under investigation in animal models, pre-clinical and clinical trials, comparing different strategies, ranging from hypothermic (4–10°C) to subnormothermic (20–25°C) – including controlled oxygenated rewarming – and normothermic (35–37°C) conditions. New techniques of organ perfusion and preservation are a vital developing area of organ donation and transplantation.

OrganOx Metra device

In 2013, Professor Constantin Coussios and Professor Peter Friend, who were with Oxford University's Department of Engineering Science and Nuffield Department of Surgical Sciences and Director of the Oxford Transplant Centre respectively succeeded in keeping a human livers outside the body, alive and functioning on an innovative machine which was later, successfully transplant them into a patient. Prof Coussio, Friend and colleagues had been researching the technology since 1994.

This device was the first completely automated liver perfusion device of its kind. It kept the organ perfused with oxygenated red blood cells at normal body temperature, just like inside the body, and could be observed making bile, which made it an extraordinary feat of engineering.

This device was further developed by a company called OrganOx and the device is called Metra. Till 2020, the device had been used for about 800 liver transplants. Including 220 livers that formed the Consortium for Organ Preservation in Europe (COPE) randomised controlled trial published in Nature in April 2018.

Recently, the VITTAL trial (Transplantation of discarded livers following viability testing with normothermic machine perfusion) was published in *Nature Communications* in June, 2020. It reported on the perfusion of 31 livers which were previously determined to be unsuitable for transplantation by all liver transplant centres in the UK. Dr Mirza, Consultant Transplant Surgeon at University Hospitals Birmingham NHS Foundation Trust and Honorary Professor at the University of Birmingham, was the VITTAL project lead. This challenging study was designed to assess the function of discarded livers in real-life situation. The major challenge in this pioneering clinical trial was to assure patients safety while pushing the envelope of sub-optimal liver utilisation. The study reported that 22 of the 31 livers (71 per cent) met criteria and were transplanted. Early outcomes were excellent with 100 per cent 90-day graft and patient survival (primary endpoint of the study). One-year patient survival was also 100 per cent.

Organ Care System

In 2014, St Vincent's Hospital Heart Lung Transplant Unit in Darlinghurst, New South Wales, Australia used a novel portable machine to house and

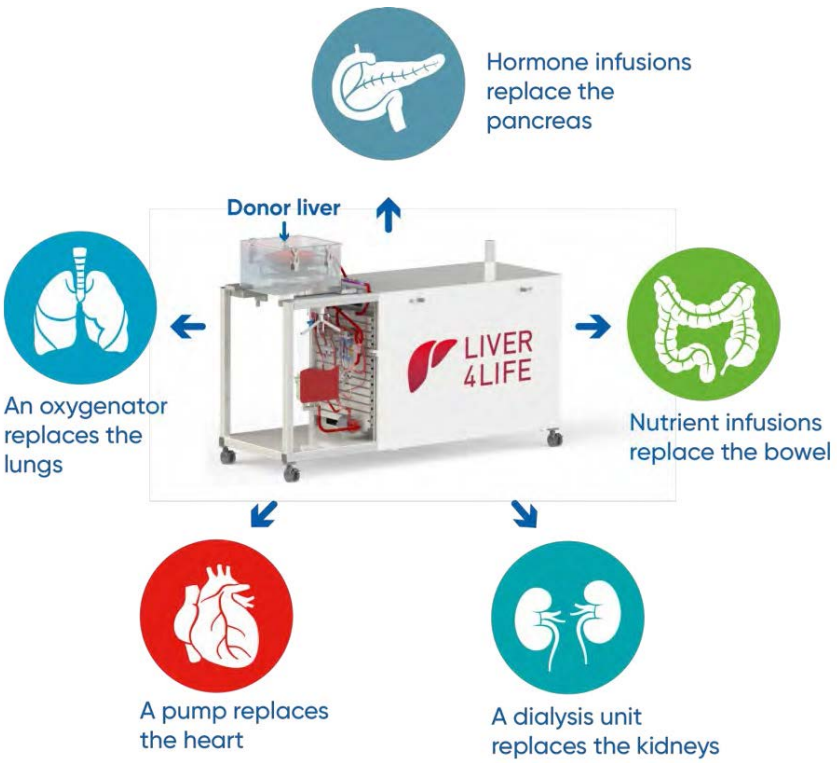


Photo Courtesy: Liver4Life - University Hospital Zurich

transport donor organs, during heart transplant. The Organ Care System (OCS) developed by Massachusetts based TransMedics is the only device available for ex vivo perfusion of human donor hearts in a warm beating state.

Currently, the OCS Heart, OCS Lung, and OCS Liver systems are CE Marked and are in use at leading transplant centres in Europe, Australia and Canada. To-date there has been more than 950 successful human transplants using the OCS System world-wide.

In April 2018, OCS Lung INSPIRE Trial was published in the peer-reviewed journal *The Lancet Respiratory Medicine*. The INSPIRE Trial was the first and largest controlled clinical organ preservation trial ever done in lung transplantation and was conducted at 21 leading international academic transplant centres. The primary objective of the INSPIRE Trial was to compare the safety and effectiveness of the OCS Lung System to the current cold storage standard of care for the preservation of standard criteria donor lungs. The trial results demonstrated assurance of the safety and effectiveness of the OCS Lung System in standard criteria double lung transplantation. "This publication is an important milestone for the field of lung transplantation. For the first time, we have published prospective clinical evidence that there is a new modality to reduce the most severe and common clinical complication after lung transplantation – PGD3," said Dr. Gregor Warnecke, Vice Chairman of Cardiothoracic and Transplant Surgery Department in Hannover Medical School, Germany, and the Principal Investigator of the INSPIRE Trial.

EVOSS System

In early 2020, a team of researchers at the University of Alberta, Canada announced the development of the Ex-Vivo Organ Support System (EVOSS). Developed by the University of Alberta surgeons Darren Freed, and Jayan Nagendran, the platform uses negative-pressure ventilation to replicate the way our chest cavity expands and contracts with each breath. By mimicking the natural process of breathing, it ventilates donated lungs in an ex-vivo organ perfusion device, which constantly supplies the lungs with blood and oxygen and keeps them warm, similar to the conditions inside the body, the university said. Currently, organs are stored on ice while being transported, which often results in organ damage. The only thing physicians can do to minimise the risk of damage is to reduce the time between when the organ is harvested and when it is transplanted.

Lungs can be kept from six to eight hours on the ice, but up to 48 hours on the EVOSS device. This additional time also allows for organs to be assessed and repaired, which increases the number of viable organs available.

Freed and Nagendran have founded Tevosol, University of Alberta spinoff company to commercialize their product. The ex vivo research trial was published in *Nature Communications* in November, 2020. The study with 12 transplants demonstrate the safety and feasibility of NPV-ESLP.

Liver4Life project

The Wyss Zurich institute, along with highly specialised technical expertise and biomedical experts from the University Hospital Zurich (USZ), ETH Zurich and the University of Zurich (UZH) are working on a new organ perfusion technology called Liver4Life project.

The Wyss Zurich project (Liver4Life)

Photo Courtesy: OrganOx metra - OrganOx Limited

started in 2015 and aimed to develop a novel therapeutic strategy for liver regeneration consisting of: i) surgical resection of a small healthy piece of the liver from the patient; ii) growth of this piece outside of the body in a perfusion machine until a sufficient size is reached; iii) retransplantation of the regenerated liver to the original patient while removing the remaining diseased part.

Current perfusion systems are not able to keep a liver alive outside of the body for a sufficient time to allow growth and regeneration to occur. The challenging aim of the project was to extend the viability of liver tissue outside of the body for a few days and allow its growth. They developed a perfusion machine that provides necessary nutrients and oxygen supply, and is equipped to monitor growth, as well as assess the functional capacity of the liver.

Until now, livers could be stored safely outside the body for only a few hours. With the novel perfusion technology, livers - and even injured livers - can now be kept alive outside of the body for an entire week. This breakthrough may increase the number of available organs for transplantation saving many lives of patients with severe liver diseases or cancer.

The pilot study published on January 13, 2021 in *Nature Biotechnology* shows that six of ten perfused poor-quality human livers, declined for transplantation by all centres in Europe, recovered to full function within one week of perfusion on the machine. The next step will be to use these organs for transplantation. The proposed technology opens a large avenue for many applications offering a new life for many patients with end-stage liver disease or cancer.

Looking Ahead

This is a new field as far as clinical application is concerned and most of the recent progress has been translational – moving this technology into the realm of everyday transplantation in selected situations. The effort should be to make this common for all transplants. This can happen be making machines cheaper and more portable, use of perfusion fluids that can carry oxygen at higher temperatures, ability to improve function by repairing some of the damage these organs acquire during the process of death of the donor. These are the key areas of improvements in perfusion technology and should be looked at in future.

Awareness is need of the hour

Non-profit charitable trust MOHAN Foundation has been fighting for the cause of organ donation in the country for more than the last two decades. Lalitha Raghuram in a tete-a-tete with IndiaMed Today, talks about the foundation's journey and how it has helped to create social awareness about organ donation in India.

Team IMT

Lalitha Raghuram

Organ donation has become legal since the time when The Transplantation Of Human Organs And Tissues Act, was passed in 1994. "People can donate organs within the family after one is deceased and when one is brain dead. Though organ donation has become legal and it has been more than 25 years since the act was passed, the awareness about the same is still at a nascent stage. If you look at the South and the West of the country, states like Telangana, Andhra Pradesh, Kerala, Tamil Nadu, have more organ donations than the rest of the country. Originally Tamil Nadu did well followed by Maharashtra and Gujarat," , says Lalitha Raghuram from MOHAN Foundation.

A brain dead person donating organs can give a new lease of life to nine people where lungs, kidneys, heart, pancreas, intestine, tissue-like eyes, heart valve can also be donated. Says Raghuram,

Says Raghuram "Don't burn or bury the body, donate organs and give life to as many people as possible." With little awareness, the organ donation rate in our country is 08 per million of the population.

Chennai headquartered Mohan Foundation was founded in 1997. Apart from Chennai, Hyderabad,

Mumbai, Bengaluru, Delhi, Chandigarh, Jaipur, Nagpur, MOHAN Foundation has information centres in Thiruvananthapuram, Goa and Manipur in the North East. The organisation receives funding from philanthropists, corporates and individuals. The foundation doesn't charge anything for the organs that are donated and receive anything from the recipients.

Raghuram mentions, "We started with kidney transplantations and now we doing lung, heart, liver transplants as well. Things are happening routinely and the success rate is pretty good. Though things have changed for the better with modern transplant medicines and doctors being trained abroad who are conducting transplants back in the country, the only challenge is to procure donor organs. A lot of patients are on the waiting list in need of organs."

According to the government registry in Telangana, Tamil Nadu, Rajasthan, Kerala, Maharashtra, the list of people waiting for organ transplantation is huge. MOHAN Foundation is actively promoting deceased organ donation and the tag line says, "No Indians should die for want of organs."

Building an awareness campaign is the need of the hour. The foundation works in the hospitals and with the help of doctors, NGOs like MOHAN Foundation are notified who then approach the patient party to counsel them. The challenge, in this case, is that doctors need to be more aware of declaring a brain dead person on time so that a family can be counselled and the organs can be retrieved on time.

Raghuram adds, "We do a lot of ICU workshops for intensive care doctors, the documentation and the legalities. Currently, we are conducting a lot of sensitisation workshops across the country."

She further says, "Around 90 per cent transplant happens through living donation where the near and dear ones can donate the organs. If there is no family member then people start looking out for suitable donors. In the case of unrelated donation, every state has an authorisation committee. The committee has to give approval that any other person can donate without any fees. In desperation, sometimes in connivance with the authorisation committee, people end up doing illegal activities fall prey to rackets." According to Raghuram, the only long-term solution is to stop illegal activities/ crimes is to promote deceased organ donation.

The COVID-19 pandemic had taken a toll on organ donation across the country. Almost for three-four months, the entire transplantation procedure came to a standstill. With the entire focus on the deadly virus, the central government issued a notification to stop all organ donations. National Organ & Tissue Transplant Organisation (NOTTO) came up with guidelines on how to go ahead with organ donations during the COVID pandemic, which tests can be done on the donor etc. All these led to a dip in organ donations as nobody wanted to take any risk. From September onwards, things started at a slow pace.

MOHAN Foundation conducts four or five activities to create an awareness campaign. National public education programme, a lot of face to face meeting, public education at schools and are some of the initiatives undertaken.

Says Raghuram, "With the help of the online platform, our mission is to reach millions. Musicians, folk artists, Twitter and YouTube medium are some of the mediums which help the NGO reach out to the masses.

Era of Personalised Transplant Treatment

Acrannolife Genomics DNA test can make life simpler for the patient as well as the doctor

IMT Team

It's shocking to think that pain can be an enabler. Sometimes, the pain we feel while moving through the journey of life brings us together and can lead to wonderful things. In case of Avinash Ramani and Agragesh R, pain of seeing their loved ones suffer led to a patient-centric and technology-driven solution that is enhancing the quality-of-life of patients in India. We spoke to Agragesh to understand their journey better and to know more about their genetic and molecular diagnostic start-up, Acrannolife Genomics.

How did you get into genetic and molecular diagnostics?

The start-up was fundamentally founded by Avinash, my Co-Founder & Chief Scientific Officer back in 2016. The idea for the company came to him while he was a PhD scholar. He identified a significant gap in transplant diagnostics and immunology space to serve the patients and the nation. At the time, I was still in B-School and Avinash was working on this research during our formative years.

Our motivation to work on transplant immunology was fuelled by our personal experience with oncology and solid organ transplants in our family. We have a unique understanding of various pain a patient and their family go through. The ultimate mission of Acrannolife is to make sure we democratise this space and enable the best possible care and technologies for everyone.

We do not consider ourselves as a molecular diagnostics lab, but rather a biotech start-up building technologies and solutions for India and the world. Thus, building a self-reliant (Atma Nirbhar) India and providing a service for the nation.

What were the challenges in solid organ transplants and how do you help overcome these challenges?

We are looking at a key area in transplant medicine – graft rejection. We have been working on the post-transplant monitoring of graft rejection since our inception.

Currently, the gold-standard for post-transplant monitoring of graft rejection is through the conventional tissue-biopsy. This is painful, requires hospitalisation and has its own baggage of significant risks to the patients including bleeding and organ-rejection itself. Another challenge faced by the transplant teams is that the regular basic biochemical tests do not provide the real time information. The biomarkers that are sought out are slow responsive biomarkers and their quantity start showing-up (detectable value) only after a significant part of a new graft has already been damaged.

Hence, we started to work on a novel technology to identify graft outcome by just a simple blood test that can tell the transplant team much before any scan or a biochemical test how the graft is working.

PIs tell us about your genetic tests for organ donors and recipients.

Our flagship service is a molecular assay, a blood test of sorts, which measures the DNA of the donor organ and allows us to analyse the graft condition from day one.

This innovative, patent applied Trunome molecular assay identifies the graft-rejection in a transplanted organ, quite early-on without the need of a biopsy. Trunome is based on monitoring levels of DNA derived from the donor organ,

Avinash Ramani and Agragesh R
Co-Founder, Acrannolife Genomics

circulating in the bloodstream of the transplant recipient, along with other markers in the DNA.

We have also built a large database of certain genotypes to enable a few more innovations in this space for identifying sensitised patients much quicker.

In addition, we also provide all types of basic pharmacogenomics tests such as for Tacrolimus or Warfarin for better, personalised medical management of transplant patients.

How can genetic testing help optimise immunosuppressant for transplant recipients?

Mmunosuppressants are a big part of any recipient's life. Most of their concerns are regarding how many medicines to take and how much. We looked at this paradigm and tried to find a better solution to the problem.

Everyone has a different body make-up and varying lifestyle habits and all of these factors play a key role in

a person's response to a life-saving post-transplant immunosuppressant regime. Pharmacogenomics gives us the understanding of how the patient would metabolise or respond to a particular drug. We can now tell if the patient is a fast, slow or a normal metaboliser or a positive, neutral or a negative responder for a particular drug regime.

Excess dosage of this very life-saving immunosuppressant regime, if prescribed to a slow drug metabolizer will create toxicity in their body. While an insufficient dosage regime to a rapid metaboliser will cause the immunological rejection of the transplanted graft. Hence, an optimal balance of immunosuppressant dosages needs to be maintained in the management of transplant graft survival.

Another area of concern is that the long-term immunosuppressant regime can lead to drug resistance or non-responsiveness. Certain pharmacogenomics tests for drug resistance on long-term transplant recipients will thus help in the regulation of the immunosuppressant regime along with our proprietary Trunome molecular assay for monitoring graft rejection and other regular biochemical tests.

How do genetic tests compare with other available tests in assessing graft journey and risk management?

The available test like biopsy and blood test for biomarker levels have been around for quite some time. Both these approach have their limitations.

The Trunome test is a simple blood test with quick turn-around-time. The test analyses various molecular markers from the DNA and gives a heads-up on the onset of transplant graft-rejection much earlier than existing tests. Another plus point is the cost factor. While available tests cost anywhere between Rs 30-15 thousand Trunome is much affordable. Our test is much cheaper, better, faster and most importantly safer option for the patients and the doctors to look for signs of graft injury or rejection.

PIs tell us about genetic testing and its benefit in early ischemic injury and DGF.

There are many molecular markers that are known to highlight the acute graft injury as well as the Delayed Graft Function(DGF).

Our Trunome molecular assay can help in diagnosing acute Ischemic injury. Also, the density and the quality of the DNA in the recipient can help in quick, rapid diagnosis of ischemic graft injury. This molecular assay also pick-up certain key immunological markers that can identify acute cellular rejection within 24hours.

In addition, there are a number of molecular variants or single nucleotide polymorphisms (SNP) that play important role in our body functions including our response to drugs. Some of these SNPs are known to play a significant role in DGF. So it came naturally to us to test for these SNPs. Some of our molecular assays that identify these pathogenic SNPs can help in the diagnosis of delayed graft-function as well.

Let's talk about non-adherence to treatment in transplant recipients. How can your tests help?

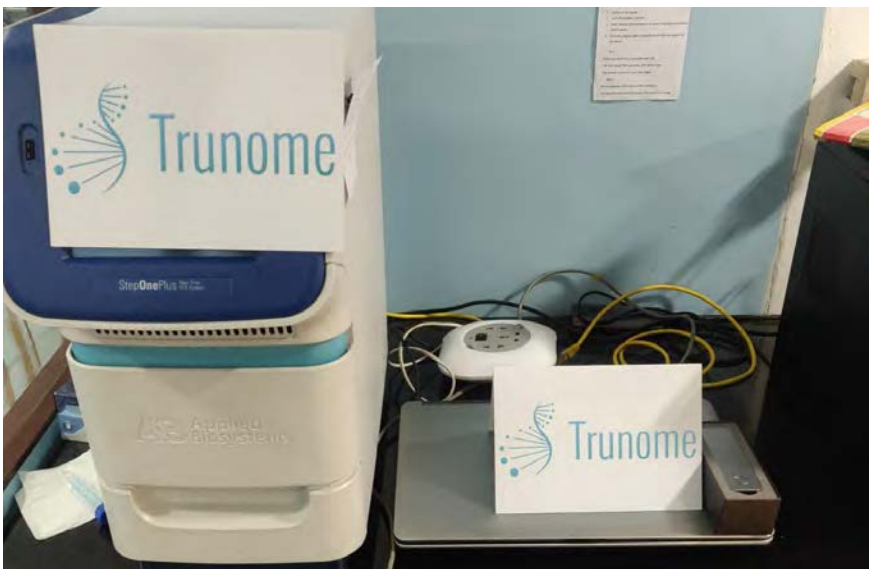
Non-adherence to the life-saving immunosuppressant therapy, in post-transplant patients, is quite dangerous and can prove fatal to the patients. You need to understand that these patients have to take medicines life-long, which is very daunting and in many cases patients get discouraged either by lack of funds or due to psychological burden. When they refuse these medicines their health deteriorates and they suffer more.

Non-adherence to the post-transplant immunosuppressant medication is a problem that requires multiple interventions, including early diagnosis, proper medical management, as well as psychological counselling of patients and their immediate family members and care givers. Patients' and their family needs to be sensitised and educated. Organ transplant surgery alone does not completely cure their problems and that the strict-adherence to life-saving medicines as well as lifestyle changes that are to be followed post-transplant, including regular, periodic medical monitoring is key for healthy living and long-term graft survival.

Our Trunome test can predict any changes in the donor DNA in the recipient blood, which can help identify signs of rejection early on. The test can also predict changes in some key immunological markers. Periodic monitoring with our Trunome test can help identify patient's non-adherence to medications and can lead to timely intervention like a doctor's consult or counselling.

What do you see in the future for this technology?

We envision a better quality-of-life for all transplant patients. A simple blood test that can be done at home by patients to test for rejection and much more that will make life simpler.



Preventing strokes in women

Factors causing strokes in women and ways to prevent it

Dr NK Venkataramana,
Founder Chairman and Chief Neurosurgeon,
Brains Neuro Spine Hospital, Bangalore

A stroke (brain attack) can be defined as a catastrophic event resulting in a sudden loss of vision, memory, sensation, speech and movement of hands or legs. It is the leading cause of disability and the fourth common cause of death.

A stroke occurs when the brain suffers either loss or reduced supply of blood. It may be caused by a blocked artery (ischemic stroke) or a leaking or burst blood vessel (haemorrhagic stroke). Some people may experience a temporary disruption of blood flow through their brain (transient ischemic attack). The most common ischemic strokes include thrombotic stroke, which occurs when a blood clot (thrombus) forms in one of the arteries that supply blood to your brain. A clot often may be caused by fatty deposits (plaque) that build up in arteries and cause reduced blood flow (atherosclerosis) or other artery conditions. An embolic stroke occurs when a blood clot or other debris forms away from the brain commonly in the carotid arteries or heart and is swept through the bloodstream to lodge in narrower brain arteries. This type of blood clot is called an embolus. A haemorrhagic stroke occurs when a blood vessel in your brain leaks or ruptures.

A stroke is equally common in women. Pre-menopausal women have a little lesser risk than women in the post-menopausal age who are rather at a slightly higher risk. It has also been found that women with other risk factors such as diabetes, hypertension, dyslipidemia and obesity stand at an increased risk for stroke. Other additional risk factors include the use of oral contraceptives, hormonal therapy, abortion, smoking and alcoholism and women who are already suffering from migraines are at a slightly higher risk.

Women are particularly prone to venous stroke such as cortical venous thrombosis, especially after the postpartum period. The traditional belief of restricting consumption of water following delivery in rural areas increases the chances of venous thrombosis due to dehydration and a higher concentration of blood. Apart from ischemic stroke, brain haemorrhage (haemorrhagic stroke) can occur in women due to uncontrolled blood pressure particularly in the latter part of pregnancy.

A brain haemorrhage can also occur due to the aneurysm, arteriovenous malformation (AVM's) at any time. Other medical conditions such as atrial fibrillation, vasculitis, polycystic kidney disease and other vascular and autoimmune syndromes can also lead to stroke.

Meticulous medical examination, identification of risk factors and keeping them under control will help to a greater extent in preventing stroke. Lifestyle modification to prevent the precipitating factor particularly in those having an underlying medical condition is mandatory. Venous thrombosis can be prevented by proper hydration and judicious use of hormones.

Detection of early symptoms such as transient ischemic attacks presenting as sudden blindness, sudden numbness or weakness of the body and difficulty in speaking and imbalance should be taken as warning signs. These symptoms should be investigated at the initial stage to prevent a major stroke.

During pregnancy, women should ensure that they go for regular check-ups and also putting a check on other risk-factors will help in the long run. Women in the post-menopause age group need to undergo periodical medical check-ups and proper control of the underlying medical conditions and lifestyle modifications can help prevent a stroke.

In an unfortunate event of a stroke, it should be suspected early, evaluated and treated urgently within the first three hours to minimise the risk and reduce the disability. On the other hand, those with a history of stroke or with a family history of stroke should be under constant medical surveillance to prevent a second stroke.

Indian Health Budget 2021-22

Bahubali size or innovative accounting

Dr Ranga Reddy Burri
President,
Infection Control Academy of India
Honorary Professor,
University of Hyderabad

On February 1, 2021, when the Finance Minister announced a new budget and all news channels and pundits were screaming about an unprecedented outlay for healthcare of Rs 2,23 lakh crore, I was elated and felt relieved that our government had finally departed from the previous tradition of sub 1 per cent of GDP allocation for a vital segment like healthcare.

Alas, the jubilation didn't live long. Having kept my calm when I double-checked – healthcare budget 2021-22, I found the innovative accountancy done by the team finance under the captaincy of Nirmala Sitaraman, Minister of Finance and Corporate Affairs.

Good things first

Launch of yet another healthcare scheme–the Pradhan Mantri Atma Nirbhar Swasth Bharat Yojana–with Rs 64,180-crore outlay spread over the next six years was welcome. The scheme is to yet be launched to develop capacities in the healthcare system for over six years. It will address the much-needed capacity development to address one of the three major issues plaguing public health, which is understaffed and under-skilled human resources. However, it is unclear from the budget document how much of this money would make its way into any health spending this year. Hope clarity will emerge soon.

A special allocation of Rs 35,000 crores promised for COVID-19 vaccines. This is substantial and reflects the government's commitment to deal with the ongoing pandemic. The vaccine is one major tool to control the pandemic such as never before allocation of this size is justified.

Innovative accounting and real allocations

The government proclaims an unprecedented increase of 137 per cent in outlay for healthcare in budget FY'22, pegged at Rs 2,23 lakh crore, which seems more optics than reality.

Historically, the allocation for healthcare is referred to as allocation to the health ministry alone, the government this time has presented the healthcare

budget more innovatively. In an attempt to show 'Bahubali' size allocation, the finance minister combined many existing heads in some way related to healthcare even if not managed by the health ministry. It is evident, no new budget-heads of money have been created for healthcare, only existing ones have been added up, which gives this inflated figure of Rs 2,23 lakh crore.

The increased allocations have been arrived at by adding the budget heads like one-time allocation for COVID vaccination, health ministry, AYUSH ministry, department of drinking water and sanitation and allocations by the finance committee for health, water and sanitation.

That leaves the real allocation for 2021-22, the Ministry of Health and Family Welfare got only 73,931 crore which is 10.16 per cent more than the budget estimate for 2020-21, but 10.84 per cent less than the revised estimate for the FY'21.

This kind of innovative accounting doesn't bode well for improving the ailing public health with multi-dimensional issues like infrastructure deficiency, inadequate staffing, high out of pocket expenditure etc. If we had to get out of chronic issues like poor availability of health services, less than satisfactory outcomes and move towards universal preventive healthcare, we need transparency first!

Such allocations with just about a 10 per cent real increase are not aligned with the seriousness of the global public health challenges. We need to recognise how a healthcare crisis can get transformed into an economic and social crisis.

We wish the government spending on health which remained frozen at around 1 per cent of GDP for close to 15 years and continuing will be streamlined sometime soon. We earnestly request the finance minister, the real allocation be increased to at least 2-3 per cent of GDP over the next three years and make a good beginning this year itself with modifications to the budget presented on February 1, 2021.

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