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the business of Bio & Health Sciences

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22nd ANNIVERSARY

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For queries, please contact: Dr. Prachi Kaushik, Senior Manager, BIRAC Email: pkaushik.birac@nic.in

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Acknowledgement/ Feedback

We, at the Centre for Predictive Human Model Systems in the Atal Incubation Centre (AIC)-Centre for Cellular and Molecular Biology, advocate for organ-on-chip, organoid, 3D bioprinting, systems biology technologies in India. We believe our efforts are aiding the Indian ecosystem to slowly move away from animals to more human-relevant models in biology. We would love to collaborate with BioSpectrum for larger articles on similar topics.

- Dr Kasturi Mahadik, Hyderabad

Thank you BioSpectrum for processing the article 'How biotech sector can capital on AI' at such a fast pace, in the February edition.

- Dr Rajneesh Gaur, Delhi

Terumo India team would like to thank you for having them featured in your story in the Feb edition of the magazine. Thank you for all your support and coordination for making this interaction insightful.

- Anusha Saxena, Delhi

Thank you for covering the second edition of REDRESS – 2023 to discuss various aspects of rare genetic diseases research to accelerate diagnostics and therapeutics.

- Dr Pankaj Gupta, Bengaluru

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MM Activ Sci-Tech Communications
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Publisher & Managing Editor:
Ravindra Boratkar
CEO
Manasee Kurlekar
manasee.kurlekar@mmactiv.com
Editorial:
Chief Editor: Dr Milind Kokje
milind.kokje@mmactiv.com
Advisor - Content: Vijay Thombre
Editor:
Narayan Kulkarni
narayan.kulkarni@mmactiv.com
Executive Editor:
Dr Manbeena Chawla
manbeena.chawla@mmactiv.com
Assistant Editor: Nitesh Pillai
nitesh.pillai@mmactiv.com
Content Team:
Singapore: Hithaishi C. Bhaskar
hithaishi.cb@mmactiv.com
General Manager (Strategy and Marketing)
Ankit Kankar
ankit.kankar@mmactiv.com
Social Media Communications:
Poonam Bhosale
poonam.bhosale@mmactiv.com
Operations and HR: Asmita Thakar
asmita.thakar@mmactiv.com
Production & Design:
MM Activ Sci-Tech Communications
Anil Walunj
Subscription:
Asmita Thakar
asmita.thakar@mmactiv.com
Circulation and Media Enquiry:
Sudam Walekar
sudam.walekar@mmactiv.com

South Region
Vrushti Kothari
Business Development Executive
"NITON", No. 11/3,
Block "C", Second Floor,
Palace Road, Bangalore,
Karnataka- 560052
Mobile: +91-7798935660
vrushti.kothari@mmactiv.com

Mumbai
Mandar More
Regional Business Manager
1st Floor, CIDCO Convention Center, Sector 30A, Vashi, Navi Mumbai, Maharashtra-400703.
Mobile: +91-9870009281
mandar.more@mmactiv.com

Nagpur
Manisha Boratkar
402, Govind Apartments, Shankar Nagar Square,
Nagpur - 440 010. Tel. +91-712-2555 249

New Delhi
Dr Manbeena Chawla
Executive Editor
103-104, Rohit House 3,
Tolstoy Marg, Connaught Place,
New Delhi - 110 001
Mobile: +91-8861043732
manbeena.chawla@mmactiv.com

Pune
Apoorva Mahajan
Marketing and Communication Specialist
Ashirwad, 36/A/2,
S.No. 270, Pallod Farms,
Baner Road, Pune-411045
Mobile: +91-7724025888
apoorva.mahajan@mmactiv.com

INTERNATIONAL

Singapore
MM Activ Singapore Pte. Ltd.
Saradha Mani
General Manager
#08-08, High Street Centre,
1 North Bridge Road,
Singapore - 179094
Tel: +65-63369142
Fax:+65-63369145
saradha.mani@mmactiv.com

Asia Pacific and South East Asia-
Ankit Kankar
General Manager (Strategy & Marketing)
#08-08, High Street Centre,
1 North Bridge Road,
Singapore - 179094
Mobile: +65 90150305
ankit.kankar@mmactiv.com

North America and Europe
BioSpectrum Bureau
MM Activ
Sci-Tech Communications
Mobile: +65 90150305
E-mail: digital@mmactiv.com

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Letter from Publisher

Ravindra Boratkar
Publisher &
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MD, MM Activ Sci-Tech
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Dear Readers,

Activities in R&D, innovation and manufacturing areas of the life sciences industries are increasing in the post-pandemic era. Both, the number of greenfield and brownfield projects have surged with growing demand for locally produced pharma and medical products.

In the cover story, our content team has captured the changing facets of the life sciences industry related to real estate. The country's growing demand for facilities like biotech/med-tech parks, research hubs and collaborative multidisciplinary ecosystems under one roof is fuelling demand for real estate.

This month we celebrate International Women's Day on March 8. Like each year we are celebrating it in our content. Our team has touched upon the value of gender diversity in STEM fields—science, technology, engineering and mathematics— as it is becoming increasingly apparent. Significant gender disparities still exist, though, especially when it comes to leadership roles in industries like biotechnology and healthcare. The majority of women working in India's healthcare sector occupy frontline, low-paying jobs. In India, women make up 29 per cent of doctors, 80 per cent of nurses (including midwives), and almost 100 per cent of ASHAs, or accredited social health activists. Despite this, women continue to earn 34 per cent less than males and account for only 18 per cent of leadership roles in the healthcare industry. The journey toward gender parity in STEM careers in India could be challenging, but the momentum for change is growing.

Two tuberculosis (TB)-related deaths occur every three minutes in India, making it a nation with the highest TB-related mortality rate. According to the World Health Organization (WHO), the nation had an astounding 28 lakh cases in 2022, making up 27 per cent of all cases worldwide. The government launched the TB Free India campaign with the ambitious objective of eliminating tuberculosis by 2025—a deadline that was five years ahead of the UN's Sustainable Development Goals (SDGs).

India's fight against TB has made significant strides, earning recognition from WHO. With less than two years left to achieve its 2025 TB elimination target, the country must embrace new strategies. One insightful article on how the government is working on its efforts to eliminate TB by 2025 takes a closer look at this crucial initiative.

Besides, we are covering an expert article on Artificial Intelligence (AI), which is currently catalysing a paradigm shift in the healthcare industry, fundamentally reshaping how medical services are delivered across the globe.

I am sure you will find this edition a great read.

Thanks & Regards,

Ravindra Boratkar,
Publisher & Managing Editor

COVER 23

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What's Shaking Up India's Life Sciences Real Estate Sector?

India, in the last few decades, has witnessed the IT and manufacturing sectors invest heavily in real estate and infrastructure. However, in the post-pandemic era, we see life sciences companies require space to innovate, for R&D, and manufacture at scale. The demand for life sciences-related real estate has significantly increased. Both greenfield and brownfield projects have surged, as the pandemic fuelled the demand for locally manufactured pharma and medical products. This story attempts to encapsulate the changing facets of the life sciences real estate market in India, where the country is remarkably progressing in innovation and R&D, which in turn are fuelling the demand for specialised facilities, biotech/MedTech parks, research hubs with modern amenities and collaborative multidisciplinary ecosystems under one roof.

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Top Video

Infosys Prize 2023 winner in Life Sciences, Prof Arun Kumar Shukla, IIT-Kanpur talks about G-protein coupled receptor (GPCR) biology and drug discovery.

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Winner of the Tata Transformation Prize 2023, Prof Anurag S Rathore at Indian Institute of Technology – Delhi shares his thoughts on the concept of next-generation biomanufacturing.

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Regulars

Underwhelming At Best

As announced earlier by Finance Minister Nirmala Sitharaman, being a vote on account budget for the election year, no big announcement was expected when she presented the budget for 2024-25. Still, some of the exceptions include stress on encouraging research and innovation. The FM announced setting up of Rs 1 lakh crore corpus to promote research and innovation in sunrise domains by lending innovators long-term financing or refinancing with extended tenures and low or no interest rates.

Earlier, the government made research labs of various government research institutes available in different areas to the private sector on a time-sharing basis. This aided in government labs' tie-ups with the private sector in pharma. In addition, some companies are receiving funds under the R&D-linked incentives scheme.

Nobody would deny the need for growing gross expenditure on R&D (GERD) which is lingering around just 0.8 per cent of the GDP. While Israel is spending over 4.5 per cent on research events the world average is 1.8 per cent and developed countries spend around 3 per cent. The use of corpus may help push the low percentage expenditure on R&D to a higher level.

While the research community and industry have welcomed the finance minister's announcement in general, some apprehensions have been expressed in certain quarters. Some scientists feel that instead of making the funds available to the private sector for research, they should be made to universities and research institutions since research in the private sector is mostly profit driven. However, the finance minister has just made an announcement of setting up of the corpus. Its modalities and how much of it will go to research in the public or private sector has not yet been announced. The government can consider the opinion of scientists while finalising the rules, etc.

The second apprehension is about non availability of adequate funds for the existing institutes when the new setting of corpus has been announced. The National Research Foundation (NRF) was set up by a statute eight months back to centralise science research funding replacing the current various government funding agencies. As per 2021-22 budget, Rs 50,000 crore were to be set aside in five years. Of the Rs 50,000 crore set aside by NRF over five years (2023-28), some Rs 36,000 crore (72 per cent) was expected to come from the private sector. Thus, the government is envisaging spending only around Rs 14,000 crore over five years, i.e., around 2,800 crore per year.

But what it received is just Rs 260 crore in the 2023-24 budget in revised estimates. The latest budget speech is silent on the allocation. It is also not clear from the speech if the corpus of Rs 1 lakh crore will be given to NRF to lend it for the research projects. The number of universities, IITs, IIMs, IIITs and AIIMSs have increased in the country in the last few years. The FM revealed new numbers in her budget speech, but scientists feel that the budget for them has not kept up with the growing number of institutes. In some cases, hardly 3 per cent of the approved funds had been actually allocated. While the concept of a new corpus is good and a welcome idea, the allocations for already established institutions need to be done to start their function properly.

While setting up the corpus is a positive step, spending a huge amount on R&D, the desired result or outcome is not seen and at one point the whole effort has to be given up. It is always easier for the private sector to do this while utilising their funds. But in a society like ours where funds are needed for several programmes for the poor and needy, public funds are scrutinised with a magnifying glass and hence failures are looked upon suspiciously. How the government balances the risk allowance and risk aversion, will truly be a test and also guide several such efforts in the future for promoting R&D. BS

Dr Milind Kokje
Chief Editor
milind.kokje@mmactiv.com

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Goa renews MoU with Novo Nordisk for foot care in diabetes patients

Government of Goa has announced renewal of Memorandum of Understanding (MoU) to continue the ongoing 'Changing Diabetes Barometer' (CDB) programme with Novo Nordisk Education Foundation (NNEF), a non-profit organisation set up by Novo Nordisk India. The CDB programme was launched over a decade ago by the state government to create awareness and support around diabetes care and capacity building in the state. As part of the revised MoU, the state's first-ever foot care clinic

for people living with diabetes will also be developed in addition to continued diabetes awareness, screening and medical education and training programmes for healthcare professionals and caregivers. The state government and NNEF will continue the ongoing public-private collaboration to develop robust community diabetes centres along with Goa Medical College, district hospitals and sub-district hospitals. Emphasising on the importance of educating more people and making them aware of the concerns and complications associated with diabetes, 15 diabetes educators will be available for home visits and expert counselling on diet, exercise and general wellbeing for the people living with diabetes across Goa.

Centre launches Young Scientists Induction Training Programme

The Capacity Building Commission (CBC) in collaboration with the Office of the Principal Scientific Adviser (Office of PSA) to the Government of India has launched the Young Scientists Induction Training Programme at the Indian Institute of Management Visakhapatnam (IIM-V). This is a first-of-its-kind training programme that envisages honing the capacities of young scientists and science administrators in managing S&T programmes, projects, products, and people; promoting cross-fertilisation of ideas among participants; providing practical exposure to new-age research and technology concepts and enhancing functional, behavioural and domain skills. It is a hybrid training module designed and curated by IIM-V with a mix of online and on-campus activities delving into aspects such as strategy and policy skills, system skills, soft skills, and societal relevance skills. The first cohort for this programme was attended by over 55 young scientists from different labs and centres of the Department of Science and Technology, Department of Biotechnology (DBT), Council for Scientific and Industrial Research (CSIR), Department of Atomic Energy (DAE), Indian Council of Medical Research (ICMR) and Defence Research and Development Organisation (DRDO).

Ayush Ministry injects Rs 100 Cr to build yoga & naturopathy institute in Assam for NCD management

Ayush Ministry has announced the development of Central Research Institute of Yoga & Naturopathy (CRIYN) along with a 100 bedded Yoga & Naturopathy hospital at Dihing Khamtighat in Dibrugarh, Assam. The institution will be developed over a land parcel of nearly 15 acres at an investment of Rs 100 crore, with an aim at bringing a scientifically valid and useful synergy between traditional knowledge of yoga and naturopathy and modern tools of technology. It will establish benchmark standards in education, preventive healthcare and research in the field of yoga and naturopathy. This state-of-the-art institute will focus on fundamental aspects, scientific validation of traditional systems of medicine and practices through evidence-based research, apart from functioning as an international collaboration centre for global promotion and research in yoga and naturopathy. The institute will also serve as incubation centres in startups in the field of yoga and wellness sector.

Dr Mandaviya inaugurates headquarters of National Dental Commission

In a significant step towards dental healthcare, the Union Minister of Health and Family Welfare Dr Mansukh Mandaviya inaugurated the new headquarters of the National Dental Commission (NDC) in Delhi, and laid the foundation stones for three Nursing Colleges in Andhra Pradesh and one in Jammu and Kashmir virtually. Additionally, Dr Mandaviya presided over the signing of Memorandum of Understanding (MoU) between the Dental Council of India and Quality Council of India for the assessment and rating of undergraduate dental colleges and launched the National Dental Register under the National Health Digital Mission. Through the Dental Commission Act, the government has made an effort to make dental education more practical, affordable and bring transparency in the entire system, simultaneously providing patients with affordable and good treatment.

Centre strengthens public health infrastructure in Maharashtra and Gujarat

Prof. S P Singh Baghel and Dr Bharati Pravin Pawar, Union Ministers of State for Health and Family Welfare virtually launched the Kilkari programme, a Mobile Health (m-health) initiative for beneficiaries in local content in Gujarat and Maharashtra. Mobile Academy, a free audio training course designed to expand and refresh the knowledge of Accredited Social Health Activists (ASHAs) and improve their communication skills via their mobile phones was also launched. The 'Kilkari' programme aims to offer weekly services, timely accessible, accurate and pertinent 72 audio messages through Interactive Voice Response System (IVRS) about reproductive maternal, neonatal and child healthcare to the targeted beneficiaries. It is centrally hosted by the Ministry of Health and Family Welfare (MoHFW) for all the States/UTs and no further investment in the technology, telephony infrastructure or operational costs is required to be borne by States/UTs. The programme is integrated with the centralised Reproductive Child Health (RCH) portal of MoHFW and is the single source of information for this mHealth service.

Odisha approves Biotechnology Policy 2024 to enhance state ecosystem

The government of Odisha has approved the Biotechnology Policy 2024 to create a flourishing ecosystem for the biotech industry. This will further promote higher education, research & infrastructure development in the sector and strengthen the supportive ecosystem for innovation, incubation, investment, income & impact to build enterprises. Association of Biotechnology Led Enterprises (ABLE) has provided valuable inputs in formulating an industry friendly and futuristic policy document. The policy provides support for development of biotech parks promoted by state agencies or private sectors. Biotech units shall be provided capital investment subsidy on actual investment in plant and machinery. Soft loan assistance will be provided to large & mega biotech units operating in the state for setting up production units in key biotech areas using high end technologies. Eligible biotech startups will be provided with financial assistance for showcasing their products or technologies in national or international events. The government will also constitute an Odisha Biotech Vision Group (OBVG) to act as a think tank and advisory body on diverse policy related issues.

Bajaj Finserv strengthens healthcare portfolio by acquiring Vidal Health Care for Rs 325 Cr

Bajaj Finserv Health, a wholly owned subsidiary of Bajaj Finserv, one of India's leading and diversified financial services companies, has announced the acquisition of 100 per cent stake in Bengaluru-based Vidal Healthcare Services (VHC). The acquisition of VHC significantly expands Bajaj Finserv's capabilities in the healthcare space, empowering it to service consumer needs for hospitalisation, one of the largest healthcare spends categories. The acquisition now enables Bajaj Finserv Health to offer OPD, wellness, as well as hospitalisation benefits to customers, thereby providing continuum of care. It also helps Bajaj Finserv Health play a pivotal role in various healthcare initiatives of the government and the insurance regulator. The acquisition is made at an Enterprise Value of Rs 325 crore and is expected to close in the fourth quarter of FY 2023-24. Upon completion of the acquisition, VHC and its subsidiaries shall become wholly owned subsidiaries of Bajaj Finserv Health.

Natco Pharma invests around $2M in Cellogen Therapeutics

Cellogen Therapeutics, a Delhi-based biotech startup promoted by Dr Gaurav Kharya, Director, Centre for Bone Marrow Transplant & Cellular Therapy, Indraprastha Apollo Hospital, Delhi has raised around $2 million from Hyderabad-based Natco Pharma. Cellogen is primarily involved in two R&D programmes involving cell and gene therapy solutions. Chimeric Antigen Receptor T (CAR-T) cell therapy programme is at an advanced stage for Cellogen Therapeutics where the T cells of the patients are genetically engineered to identify and kill the cancer cells. Cellogen Therapeutics has developed bi-specific CARs and also added another costimulatory domain to increase the efficacy and persistence of the CAR in the human body as compared to currently available CAR constructs that are mono-specific with one co-stimulatory domain. Both these innovations are aimed at reducing the risk of relapse post CAR-T cell therapy which remains a major challenge with existing CAR constructs. Current available products in the market cost around $500,000 – 700,000 which Cellogen aims to bring down to $ 60,000 – 70,000.

RxP expands life sciences real estate portfolio in Mumbai with $150+ M investment

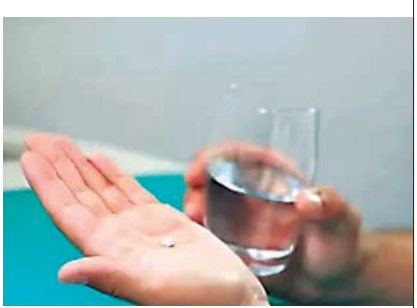
Rx Propellant (RxP), a platform focused on providing innovative real estate solutions, including research and development (R&D) laboratories and associated facilities for the life sciences and associated sectors in India, has announce an initial investment of $75 million in phase 1 of the Navi Mumbai Research (NMR) District, as part of its continued regional expansion strategy across India. The NMR District represents the first exclusive life sciences development in Mumbai and is spread across 16 acres of land with a total development of 1.5 million square feet. It was formally launched in November of last year with the first phase of 400,000 square feet set to be ready for occupancy by late 2025. To be developed in multiple phases, this project will attract a total investment of over $150 million by RxP. With a planning aim of being the largest exclusive life sciences campus in Mumbai, the project will provide a purpose-built base for housing a broad spectrum of life sciences startups, scale-up businesses and well-established enterprises, as RxP look to build on its best-in-class track record and create a truly dynamic ecosystem for the geography.

Entod Pharmaceuticals unveils cutting-edge R&D centre in Navi Mumbai

Entod Pharmaceuticals recently inaugurated its state-of-the-art Research & Development (R&D) Centre in Navi Mumbai. The Department of Scientific and Industrial Research (DSIR) approved research laboratory is equipped with the latest molecular and formulation research tools, microbiology testing facilities, sterile batch production capacity, and high-end Quality Assurance/Quality Control analytical equipment. The new R&D Centre underscores Entod's commitment to pioneering pharmaceutical innovation, contributing to India's aspirations to become a value-driven innovation hub in the specialty pharmaceutical space. The facility will focus on developing next-generation molecules using generative artificial intelligence (AI) platforms, particularly in the ophthalmic, ENT, paediatrics and skincare segments. Some of these groundbreaking molecules are expected to be indigenous to India, marking a significant stride towards global pharmaceutical leadership.

Zydus brings once-a-day pill for advanced prostate cancer patients to India

Ahmedabad-based Zydus Lifesciences has launched Relugolix under the brand name, Rexigo. This is the first and only oral once-a-day therapy for testosterone suppression in patients with advanced prostate cancer in India. Though Relugolix has been available in developed countries for the last four years, patients in India did not have access to it. With this launch, Zydus brings access to a critical therapy and also makes it affordable at a cost of Rs 6995 per month which is 50 per cent less than the currently available injectable options. The drug will be manufactured at the group's manufacturing premises. This marks a big leap forward in the management of prostate cancer as patients and doctors will have a new option which can offer convenience, safety and rapid action. Prostate cancer is one of the leading cancers in men and more than 43000 cases were reported in India in 2022 as per the National Cancer Registry Programme of India. Prostate cancer growth is majorly driven by the male hormone, testosterone, a member of 'Androgens'. One of the key strategies of prostate cancer management is 'Androgen Deprivation Therapy (ADT)' with a goal of suppressing testosterone levels.



Glenmark partners with Pfizer to launch abrocitinib for atopic dermatitis treatment in India

American pharmaceutical giant Pfizer and Mumbai-based Glenmark Pharmaceuticals have joined hands to launch abrocitinib, a first of its kind oral advanced systemic treatment for moderate-to-severe atopic dermatitis (AD), in India. Developed by Pfizer, abrocitinib has received marketing authorisation from the Central Drugs Standard Control Organisation (CDSCO) in India and is approved by the US Food and Drug Administration (FDA), European Medicines Agency (EMA), and other regulatory agencies. When launched in India, it will be co-marketed under the brand names JABRYUS and CIBINQO by Glenmark and Pfizer respectively. Abrocitinib (CIBINQO) is available in over 35 markets globally, including the US, Japan, and China. Atopic dermatitis is a chronic skin disease characterised by inflammation of the skin and skin barrier defects. The persistent itching associated with moderate-to-severe AD disrupts daily life, impacting social interactions, work productivity, and overall well-being. Abrocitinib, a Janus kinase 1 (JAK1) inhibitor, provides rapid itch relief, sustained disease control, and a vastly improved quality of life for patients.

Krka, Laurus Labs to establish joint venture in Hyderabad

Krka and Laurus Labs have reached an agreement to establish a joint venture in Hyderabad. Krka will hold a 51 per cent stake in the new company and Laurus 49 per cent. The share capital is up to 50 million euros. The joint venture will enable Krka to produce finished products for new markets, including the Indian one. Krka and Laurus have been cooperating under contract for several years, and their business complements each other. After discussing ways to strengthen cooperation and synergy by pooling knowledge and resources, they agreed to set up a joint venture - Krka Pharma. The parties have agreed on the gradual development of the new company. The company will prepare a plan for entering the Indian market and other markets outside the European Union, where Krka and Laurus with their finished products are not yet present. The co-founders have agreed to pay up the share capital gradually, in line with the financing needs. The development of business activities in the new company will also be gradual.

Roche inaugurates new campus for Digital Centre of Excellence in Pune

Swiss firm Roche has announced the inauguration of its Digital Centre of Excellence in Pune, marking a significant milestone in its history in India. This strategic presence in Pune reflects Roche's commitment to becoming a centre for digital talent and thought leadership. Over the past three years, Roche has undertaken a transformative journey in Pune, earning recognition as a respected voice in the industry. This trajectory has positioned the new Digital Centre of Excellence in Pune as an excellent opportunity to harness the power of technology and digital transformation. The new campus has been designed as an employee-centred experience and ecosystem zone, incorporating valuable learnings gained from post-pandemic workplace design. The 200,000-square-foot campus can accommodate nearly 1,300 professionals dedicated to developing cutting-edge solutions that harness the power of the latest technologies, such as data and analytics, cloud computing, artificial intelligence and machine learning.

Siemens Healthineers, IISc launch lab for AI in precision medicine to revolutionise neurology research in Bengaluru

Siemens Healthineers and the Indian Institute of Science (IISc) inaugurated the Siemens Healthineers-Computational Data Sciences (CDS) Collaborative Laboratory for artificial intelligence (AI) in Precision Medicine at IISc Bengaluru. Peter Schardt, Chief Technology Officer of Siemens Healthineers, inaugurated this state-of-the-art laboratory. The CDS collaborative laboratory will develop open-source AI-based tools to precisely automate the segmentation of pathological findings in neuroimaging data, with a focus on accurately diagnosing neurological diseases and analysing their clinical impact at a population level. The laboratory has been established with the support of Siemens Healthineers Corporate Social Responsibility initiative, which also includes six M Tech fellowships for women, aiming to enhance female representation in artificial intelligence. Dr Vaanathi Sundaresan of IISc's Department of CDS will lead the programme. The focus of this collaborative laboratory will be to work closely with neurologists, radiologists and Siemens Healthineers and integrate the developed computational models into their regular clinical workflows.

Algorithmic Biologics makes genomics affordable, eliminating 60-90% of library preparation costs

Bengaluru-based deeptech startup Algorithmic Biologics (AlgoBio), leveraging advanced algorithms and artificial intelligence (AI) to revolutionise molecular testing efficiency and scale, unveiled the Tapestry platform for next-generation sequencing (NGS) at Genomics India Conference 2024, held in Greater Noida, February 1-3, 2024. Aligned with the company's vision of enabling accurate and affordable large-scale molecular testing, Tapestry empowers genomics labs to cut sequencing costs significantly by eliminating 60 to 90 per cent of library preparation costs that is 33 to 50 per cent of the total sequencing costs. Founded by Dr Manoj Gopalkrishnan, a multi-disciplinary technologist and professor at IIT Bombay, AlgoBio also announced securing $2.5 million in pre-series A funding led by Bharat innovation Fund (BIF) ventures with participation from existing investor Axilor Ventures. Proceeds of the fundraise will be used to support the product pipeline, building the sales organisation and furthering their international expansion.

Qure.ai and Project Data Sphere partner to focus on advancing cancer research using AI

In a pivotal stride towards advancing cancer care, Mumbai-based startup Qure.ai, a leader in artificial intelligence (AI) solutions for medical imaging, and Project Data Sphere, a nonprofit initiative of the US-based CEO Roundtable on Cancer, have announced their partnership to augment tumour assessments using AI-enabled solutions for clinical trials and cancer care. The collaboration aims to increase efficiency and consistency in evaluating the effectiveness of cancer treatments, ultimately improving the quality of care for patients. The focus of this collaboration is autoRECIST, a product of Project Data Sphere's Images and Algorithms programme. The programme, initiated in consultation with the US Food and Drug Administration (FDA), includes stakeholders and experts from across the pharmaceutical industry and academia. In collaboration with Qure.ai, autoRECIST will address the critical need for automating and standardising tumour response assessments in medical imaging to enhance cancer treatment and research. Rooted in current imaging guidelines, this AI clinical tool will aid radiologists in the detection, selection, measuring and tracking of lesions using defined criteria.

World's first leg health test utilising neural network technology

Varco Leg Care, a New Delhi-based startup, has unveiled the world's first Artificial Intelligence (AI)-powered leg health test. This groundbreaking technology harnesses the power of AI, machine learning, and neural algorithms and provides users with personalisation in addressing conditions like spider veins, diabetic foot, restless leg syndrome and more. Users start by answering ten carefully designed questions about lifestyle factors, health history, symptoms, and areas of concern. They then upload high-resolution images of their legs from multiple angles, which VarcoLeg Care's advanced neural network synthesises to compute the user's comprehensive leg health score, a single yet nuanced metric encapsulating their overall leg health standing. The test further provides targeted product recommendations from Varco Leg Care products. These ultra-personalised recommendations include optimal products, solutions, dosages, durations, and applications to integrate into the user's daily health regimen.

AIC T-Hub selects 20 startups to drive healthcare innovation in India

Hyderabad-based T-Hub, a startup incubator, has announced the launch of the new cohort of the AIC T-Hub Healthcare programme, aimed at fostering technological advancements and innovations within the healthcare sector across India. The programme will host 20 startups carefully selected for their groundbreaking solutions in the healthcare ecosystem. The selected startups in the upcoming cohort will be addressing critical challenges

in digital health, wearables, and hospital systems. The programme's structure involves a 12-week intensive curriculum with mentorship from healthcare thought leaders, doctors, and industry experts. The selected startups include Exsegen Genomics, Pratibha Healthkon, RudrastraApptech, Medstown, Dognosis, MolVerse, MicroHeal Wellness, Medicoinnovex Technologies, Aspire Health and Medicare, Swarupa Narsimha Healthcare (OPC), Cliniv Health Tech, SC Health care logistics, Incra Soft, LIV Emergency Healthcare, Terrablue, Medaid, Aarogya ID, Neordent Healthcare Solutions.

StartupTN unveils Blue Economy and Healthcare & Life Sciences Forums

StartupTN, the State Nodal Agency for Startup and Innovation, functioning under the Micro, Small and Medium Enterprises Department, Government of Tamil Nadu, is taking strides to make Tamil Nadu the preferred global startup destination. As part of the sectoral initiatives, StartupTN launched the Blue Economy Forum and the Healthcare & Life Sciences Forum at an event held recently in Chennai. The Blue Economy Forum and the Healthcare & Life Sciences Forum are strategic platforms to bring together sectoral startups, innovators, corporates, experts, industry bodies, aspirants, incubators, mentors, investors, government departments and other stakeholders for focused collaborations to make Tamil Nadu a leader in this space. StartupTN would facilitate them, extend all possible avenues to support them and also keep track of their progress. StartupTN has also inked Memorandums of Understanding (MoUs) with Trivitron Group of Companies, and Sathyabama Institute of Science & Technology and Indian Angel Network to enable Corporate - Startup connects for mentoring, product validation, testing, startup, and incubation support.

Molbio Diagnostics launches EDGE scale up programme for healthcare innovation

Molbio Diagnostics, Goa-based player in point-of-care (POC) diagnostics, has launched 'EDGE'- an innovative scaleup partnership programme dedicated to accelerating game-changing healthcare technologies. As a part of EDGE, Molbio Diagnostics will select high-potential medtech startups and small and medium enterprises (SMEs) with groundbreaking solutions in rapid POC for high sensitivity immunodiagnostics and early cancer detection. The main objective of this programme is to help startups overcome critical hurdles in product development, translation and scaling up with the assistance of Molbio's expertise, guidance and support. Participants will be able to leverage Molbio's extensive network and expertise to bring their innovation to a worldwide audience. Over 12 weeks, selected participants will receive intensive mentorship, resources and expertise from Molbio's team of seasoned professionals. This culminates in the opportunity to forge co-development, manufacturing, or global sales partnerships with Molbio.

WHO enables greater patient access to multiple essential diagnostics

The World Health Organisation (WHO) and the Medicines Patent Pool (MPP) have announced a license agreement with SD Biosensor (SDB), a global in-vitro diagnostic company, to provide sublicensees with the right, know-how and material to manufacture SDB's rapid diagnostic testing (RDT) technology. The transparent, non-exclusive license agreement, negotiated under the auspices of the COVID-19 Technology Access Pool (C-TAP), represents an important milestone in the evolution of the C-TAP initiative as it enables the manufacture of diagnostics for COVID-19 as well as other diseases such as HIV, malaria and syphilis. The technology offered through the license is ideal for low and middle-income countries as it is easy to use, with no equipment requirements and has high sensitivity. Furthermore, a number of the company's RDTs are Prequalified and Emergency Use Listed by WHO.

WHO calls for renewed global efforts to eliminate neglected tropical diseases

The World Health Organisation (WHO) is calling on everybody, including leaders and communities, to unite and act to address and eliminate the inequalities that drive neglected tropical diseases (NTDs) and to make bold, sustainable investments to free the estimated 1.62 billion people, in the world's most vulnerable communities, from a vicious cycle of disease and poverty. NTDs continue to disproportionately affect the poorest members of the global community, primarily in areas where water safety, sanitation and access to healthcare are inadequate. In 2023, remarkable progress was made in the global fight against NTDs, bringing closer to the goal of controlling, eliminating and eradicating these diseases worldwide. In a landmark achievement for global health, 50 countries have now eliminated at least one NTD, bringing the halfway point towards the ambitious target set in the WHO NTD 2021-2030 road map. Also in 2023, Bangladesh became the first country in the world to be validated for the elimination of visceral leishmaniasis, thanks to a wide collaborative effort.

WHO introduces the Health Technology Access Pool

The World Health Organisation (WHO) has announced the Health Technology Access Pool (HTAP) as the successor to the COVID-19 Technology Access Pool (C-TAP). C-TAP was launched in May 2020 by WHO, the Government of Costa Rica and other partners to facilitate equitable and affordable access to COVID-19 health products for people in all countries. The platform provided a much-needed forum for technology partners to voluntarily share intellectual property, knowledge, and data in order to accelerate technological

innovation and expand access to COVID-19 tools. HTAP will promote access to health products that respond to public health priorities including pandemic preparedness and with relevance during and outside health emergencies. This approach will amplify the public health value of HTAP investments as well as the attractiveness of licensed technologies to recipient manufacturers by realising greater market opportunities and financial sustainability. The announcement on the licensing of a rapid diagnostic test platform technology serves as an example of such an approach. Later in the first quarter of 2024, WHO will publish further details on how HTAP will operate and the technologies it will target. The official launch of HTAP is planned for the second quarter of 2024.

CEPI, PAHO boost preparedness against diseases with epidemic, pandemic potential

Norway-based Coalition for Epidemic Preparedness Innovations (CEPI) and the Pan American Health Organization (PAHO) have signed a Memorandum of Understanding to strengthen collaboration between the two organisations as they strive to enhance regional epidemic and pandemic preparedness, and to support infectious disease prevention and response alongside greater equity in access to vaccines and other health technologies in the Americas. The partnership will enable the two organisations to share technical expertise, knowledge and experience and to strengthen support to Member States and partners in the Region in areas related to vaccine research and development as well as in the rapid deployment of vaccines against emerging infectious diseases. Additionally, the organisations seek to further enhance disease surveillance, vaccine manufacturing and research and clinical trial capacity in Latin America and the Caribbean. This will support equitable and timely access to vaccines and health technologies as part of epidemic and pandemic prevention, preparedness and response.

Africa CDC hosts Vaccine Manufacturing Supply Chain Forum

The Africa Centres for Disease Control and Prevention (Africa CDC) and the Coalition for Epidemic Preparedness Innovations (CEPI) recently hosted the African Vaccine Manufacturing Supply Chain Forum, in Nairobi, Kenya, to discuss about the sustainable supply of input materials to support vaccine manufacturing as the continent witnesses a surge in vaccine manufacturing. Vaccine demand in Africa is expected to rise from approximately 1.4 billion doses to over 2.1 billion doses by 2040. Africa CDC identified a range of roadblocks for urgent interventions to support local vaccine manufacturers in establishing strong and resilient supply chains to enable the African vaccine manufacturing industry to develop, produce, and supply around 60 per cent of the total vaccine doses required by 2040.

Form IV (See Rule 8)

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Names and addresses of individuals who own the newspaper and partners or shareholders holding More than one per cent of the total capital.

Name	:	Mr. Ravindra Vidyadhar Boratkar
Address :		402, Siddhivinayak Apartment, Khare Town, Dharam Peth, Nagpur-440010.
Name	:	Mr. Jagdish Balkrishna Patankar
Address :		B-55, Mahavir Park Society, Pune - Satara Road, Pune-411037.
Name	:	Mr. Vijay Padmakar Thombre
Address :		1, Sagar Apartment, 6 Mahaganesh Society Paud Road, Kothrud, Pune-411038.
Office Address	:	Ashirwad, 36/A/2, S.No. 270, Pallod Farms, Near Bank of Baroda, Baner Road, Pune-411045.

I Ravindra Boratkar hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-

Date: 1st March 2024

Signature of Publisher

Maldives, Sri Lanka achieve Hepatitis B control

Maldives and Sri Lanka have achieved hepatitis B control, the World Health Organisation (WHO) announced after an expert panel verified that the two countries have had consistently high coverage of hepatitis B vaccine doses in infants and a low prevalence of the deadly disease, corroborated through serological surveys conducted recently in both countries. The Expert Panel for Verification of Hepatitis B Control in WHO South-East Asia Region reviewed childhood immunisation data from Maldives and Sri Lanka that showed consistent over 90 per cent coverage with Hepatitis B vaccine doses provided during infancy for the past many years. The experts also reviewed the findings of national surveys conducted among children in 2022-23, in these countries. The two countries join Bangladesh, Bhutan, Nepal and Thailand, who achieved the same feat in 2019. Preventing Hepatitis B infection in infancy substantially reduces chronic infections and cases of liver cancer and cirrhosis in adulthood. Hepatitis control continues to be an important public health initiative in the South-East Asia Region of WHO that comprises of 11 countries and is home to a quarter of the world's population.

Sindh introduces comprehensive mental health policy

To address the growing mental health challenges, the Sindh government in Pakistan has launched the first-ever Sindh Mental Health Policy. The policy outlines a comprehensive plan to establish a sustainable and effective system to improve mental health services across the province. The policy has been developed in collaboration with multiple local and international stakeholders, including the Pakistan Institute of Living and Learning (PILL), University of Manchester, King's College London, Sindh Mental Health Authority, WHO, prison department, Pakistan Psychiatric Society, and Pakistan Psychological Association. The policy document is aligned with the cultural, geographical, religious, and historical context of the province and provides a framework to advance good mental health services for the people of Sindh. It recommends various measures, including the translation and dissemination of the Sindh Mental Health Act in local languages, notification of its rules and procedures, and separate allocation of budget for mental health programmes. The policy also calls for incorporating education and training in mental health in medical education curriculum and making mental health literacy a mandatory part of continuing professional education.

Power and Participation Research Centre launches Bangladesh Universal Health Coverage Forum

Power and Participation Research Centre (PPRC), an Independent Policy Centre in Bangladesh has launched Bangladesh Universal Health Coverage (UHC) Forum, a non-government think tank, to ensure advocacy targeting the United Nations-sponsored Sustainable Development Goals (SDG) by 2030 and Universal Health Coverage by 2032. The forum will focus on five strategic priorities- road to the UHC and the SDG 2030 like epidemiological transition and the rising non-communicable disease burden; urban demographic transition and the system gap of Urban Primary Healthcare; the economic challenges of high and rising out of pocket burden; climate-induced health shocks and the challenge of System Preparedness and Resilience; and community engagement for improved public health. In addition to the strategic priorities, there are three priority tasks which include physical progress analysis in achieving the target of the UHC; taking politically conscious strategies and views exchanges with policy makers; and creating social movements in spreading health literacy, especially in rural areas and schools.

Innovation, Youth and Women Empowerment Turn Focal Point

Focused on boosting women's empowerment and highlighting the government's all-encompassing comprehensive strategies to propel India towards becoming a developed nation by 2047, 'Viksit Bharat' and 'Nari Shakti' schemes took centre stage as the Interim Budget was announced by the Union Finance Minister Nirmala Sitharaman on February 1, 2024. Let's take a closer look at the key takeaways from the Interim Budget announcement.

While presenting the Interim Budget 2024-25 in Parliament, Nirmala Sitharaman said that the opportunities for India at the global level are expanding and the country is coming up with solutions through innovation and entrepreneurship of its people. Stressing that research and innovation will catalyse India's growth, generate employment and lead to development, the government proposes to create a corpus of Rs 1 lakh crore to boost private investment in sunrise technologies. An agency will run it professionally and identify innovation-related activities in the private domain. The corpus will be established with a 50-year interest-free loan. It will provide long-term financing or refinancing with long tenors and low or nil interest rates.

With a sharp focus and providing momentum to Nari Shakti, the minister proposed vaccination to prevent cervical cancer and the amalgamation of various schemes for maternal and child care. The vaccination programme will be for girls in the age group of 9 to 14 years. The government will encourage this vaccination among the eligible categories. To further the Digital India initiative of the government, Nirmala Sitharaman proposed a newly designed U-WIN platform to be rolled out expeditiously throughout the country. This platform will be used for managing immunisation and furthering the efforts under Mission Indradhanush.

With a focus on Yuva Shakti, Nirmala Sitharaman proposed setting up more medical colleges. The new medical colleges will be set up by utilising the existing hospital infrastructure under various departments. A committee will be set up for this purpose to examine the issues and make relevant recommendations. This initiative will not only create opportunities for youth to become doctors but also improve healthcare services for the people. The minister also proposed that ASHA workers, Anganwadi workers and helpers be covered under the Ayushman Bharat Scheme.

Prime Minister Lal Bahadur Shastri gave the "Jai Jawan Jai Kisan" slogan and Prime Minister Atal Bihari Vajpayee made that "Jai Jawan Jai Kisan Jai Vigyan". "Prime Minister Modi has furthered that to "Jai Jawan Jai Kisan Jai Vigyan and Jai Anusandhan", as innovation is the foundation of development," the minister said.

Lauding the budget, Prime Minister Narendra Modi said, "It is an inclusive and innovative Budget that carries the confidence of continuity and that will empower all four pillars of 'Viksit Bharat' — youth, the poor, women, and farmers".

Viksit Bharat 2047

The corpus fund allocation announcement as an integral part of this year's Interim Budget has been complimented and lauded by ministers, pharma & biotechnology sectors for its 'far-sighted vision' to combine the power of youth and technology for achieving the goal of 'Viksit Bharat 2047'.

Announcement of a mega-innovation fund – the corpus fund of Rs 1 lakh crore during the Interim Budget, the government intends to provide impetus to the mobilisation of Science and Technology (S&T) and to boost private investments in sunrise industries for achieving the goal of 'Viksit Bharat'.

Dr Jitendra Singh, Union S&T Minister, said, "The corpus fund announced in the Interim Budget will help promote Innovation and Startups, coupled with a new scheme for Deep Tech Startups in Defence and an exclusive Biomanufacturing scheme to supplement Bio-Startups and bio-economy". He further emphasised that Biotechnology will be the key driver as we aim to achieve a $5 trillion economy and meet the Sankalp of Viksit Bharat during Amrit Kaal.

The 'Jay Anusadhan' scheme's Anusandhan National Research Foundation (ANFR) Act, 2023, was allocated funds of Rs 2000 crore as part of

the corpus fund. Experts across healthcare and life sciences maintained that it will help to create a wholesome ecosystem for startups in India.

Regarding the allocation of corpus fund to boost the ANRF as the biggest announcement of this budget, Union Minister for Education and Skill Development & Entrepreneurship, Dharmendra Pradhan, said "This budget was a 'brilliant, forward-looking, people-centric and growth-stimulating Viksit Bharat Budget'. The Budget gives further momentum to women-led development, fulfilling aspirations and furthering ease-of-living for all, green growth and employment generation."

The industry experts expressed that the Budget showcases the government's commitment to technological transformation, as well as its focus on boosting research and innovations. The Rs 1 lakh crore corpus with its 50-year interest-free loans is being hailed as a game-changer by many. In line with fostering innovation and extending tax benefits to startups in the sunrise technologies domain, several leaders of the pharma sector seem to be congruent on this Budget being one with a visionary initiative', referring to the sustained funding for empowering startups to transcend boundaries and contribute to the progress of the 'Atmanirbhar Bharat' vision. They also look forward to more strategies on the trajectory of AI-related research and technological innovation to set the stage for India at a globally competitive level in the upcoming full budget.

Highlighting the Budget's boost to various industries, experts cite the Budget announcements as a 'welcome move towards transparency, accountability, and a people-centric approach to nurture an economic growth environment for home companies'. It champions the focus on sustainable production and bio-manufacturing and is being lauded by pharma giants for its emphasis on ease of doing business and local manufacturing is welcome.

While the proposed amendments offer encouragement, the startup community eagerly awaits policies on increased ease in ESOP taxation, a simplified tax regime and a reduction in Minimum Alternate Tax (MAT).

The Budget also rolled out allocations for other advancements in healthcare, including schemes like Saksham Anganwadi and Poshan 2.0 to improve nutrition delivery, expanding health coverage under the Ayushman Bharat scheme to include ASHA and Anganwadi workers, and upgrading existing hospital infrastructure to increase medical colleges.

The Interim Budget comprised an amalgamation of various schemes for maternal

"It is an inclusive and innovative Budget that carries the confidence of continuity and that will empower all four pillars of 'Viksit Bharat' — youth, the poor, women, and farmers".

- Narendra Modi,
Prime Minister of India

"The corpus fund announced in the Interim Budget will help promote Innovation and Startups, coupled with a new scheme for Deep Tech Startups in Defence and an exclusive Biomanufacturing scheme to supplement Bio-Startups and bio-economy".

- Dr Jitendra Singh,
Union Science and Technology (S&T) Minister

"This budget was a 'brilliant, forward-looking, people-centric and growth-stimulating Viksit Bharat Budget'. The Budget gives further momentum to women-led development, fulfilling aspirations and furthering ease-of-living for all, green growth and employment generation."

- Dharmendra Pradhan,
Union Minister for Education and Skill Development & Entrepreneurship

"The opportunities for India at the global level are expanding and the country is coming up with solutions through innovation and entrepreneurship of its people. Stressing that research and innovation will catalyse India's growth, generate employment and lead to development, the government proposes to create a corpus of Rs 1 lakh crore to boost private investment in sunrise technologies."

- Nirmala Sitharaman,
Union Finance Minister

Highlights of the Interim Union Budget 2024-25

Momentum for Nari Shakti

- 30 crore Mudra Yojana loans given to women entrepreneurs.
- Female enrolment in higher education went up by 28 per cent.
- In STEM courses, girls and women constitute 43 per cent of enrolment, one of the highest in the world.

Ayushman Bharat

- Healthcare coverage under the Ayushman Bharat scheme is to be extended to all ASHA workers, Anganwadi Workers and Helpers.

Research and Innovation for catalysing growth, employment and development

- A corpus of Rs 1 lakh crore is to be established with a 50-year interest-free loan to provide long-term financing or refinancing with long tenors and low or nil interest rates.
- A new scheme is to be launched for strengthening deep-tech technologies for defence purposes and expediting 'atmanirbharta'.

and child care, an approach that was collectively embraced positively by the country's doctors, 'signifying a concerted effort to strengthen India's healthcare system by prioritising preventive care and expanding access, showcasing the government's proactive approach'.

The Ayushman Bharat Digital Mission (ABDM) aims to develop the backbone necessary to support the integrated digital health infrastructure of the country. It will bridge the existing gap among different stakeholders of the healthcare ecosystem through digital highways. With a proven and well-established system, Ayushman Bharat can further strengthen its primary healthcare framework, ensuring early detection and management of diseases at the community level.

The World Health Organisation (WHO) also applauded the extension of healthcare coverage to ASHA workers, Anganwadi workers, and helpers who are at the forefront of health and care delivery at the grassroots level under the Ayushman Bharat Scheme. Anganwadi and ASHA workers expressed the help they will get due to the Budget's announcement for the expansion of the Ayushman Bharat Health cover, offering financial assistance for each worker/helper and their families per year for secondary and tertiary hospitalisation healthcare.

Upgrading Infrastructure

The Budget also proposed upgrading existing hospital infrastructure to increase medical colleges. Experts welcomed the announcement as it addresses the shortage of healthcare professionals and strengthens medical education to an extent, and also heralded it as a transformative phase for all industries, including health tech.

However, certain key aspects of the healthcare-focused Budget were deemed 'incomplete' and demonstratively requiring additional amendments, especially in areas of adopting effective universal healthcare, upgrading qualities of subsidised treatments and GST rationalisation and increased investments in the healthcare sector, as well as an increase in health expenditure as a percentage of GDP, with the government will increase public healthcare spending to 2.5 per cent of GDP in the next Budget after the elections, to universal health coverage. These steps will help in improving overall national health indicators in future. Additionally, there were no major announcements for the clinical trials or the pharmaceuticals sector.

Further commenting on their expectations from the government's next full Budget to bridge certain gaps, doctors and pharma companies expressed that to effectively manage the primary healthcare needs and address the shortage at the speciality level, it's essential to consider strategies beyond just increasing the number of medical colleges. The considerable shortage of surgeons, physicians, gynaecologists, and paediatricians in rural community health centres and concentrated foci of specialist doctors in urban settings due to better infrastructure, resources, and professional growth prospects are imbalances that the government should address by investing more funding in strategies like incentivising rural service, offering financial incentives, enhanced telemedicine services, focused training programmes, public-private partnerships.

Several experts from the healthcare and pharma industry highlighted that this Budget will help in infrastructure development and make quality healthcare a little more accessible for our public, applauding the proactive emphasis on preventive measures and the extension of health coverage to frontline workers as a genuine commitment to community well-being. This holistic approach is further exemplified by the comprehensive maternal and child healthcare programmes.

All in all, the interim Budget FY 2024-25 for healthcare seems like a holistic, inclusive and forward-looking one. BS

Shivani Thakar
shivani.thakar@biospectrumindia.com

Conceptualised by Ankit Kankar

What's Shaking Up India's Life Sciences Real Estate Sector?

India, in the last few decades, has witnessed the IT and manufacturing sectors invest heavily in real estate and infrastructure. However, in the post-pandemic era, we see life sciences companies require space to innovate, for R&D, and manufacture at scale. The demand for life sciences-related real estate has significantly increased. Both greenfield and brownfield projects have surged, as the pandemic fuelled the demand for locally manufactured pharma and medical products. This story attempts to encapsulate the changing facets of the life sciences real estate market in India, where the country is remarkably progressing in innovation and R&D, which in turn are fuelling the demand for specialised facilities, biotech/MedTech parks, research hubs with modern amenities and collaborative multidisciplinary ecosystems under one roof.

In 2021, a California-based life sciences real estate development company acquired Hotel Buckminster. This acquisition was done to redevelop the closed hotel into a life science lab space. Again in May 2021, a facility that housed the Berkeley Art Museum and Pacific Film Archive was transformed into a new life sciences lab on the campus of the University of California, Berkeley.

During the same year in India, a Canadian Pension Fund along with a Singapore-based wealth and asset management firm jointly invested $100 million (Rs 7.5 billion) in life sciences R&D facilities in Genome Valley, Hyderabad. This investment, according to reports, proved to be a stepping stone for more equity investments in this segment. On February 6, 2024, life sciences real estate developer, Rx Propellant announced an initial investment of $75 million in phase 1 of the Navi Mumbai Research (NMR) District, as part of its continued regional expansion strategy across India.

In all the four developments mentioned above, it is clear that post-pandemic, the demand for life sciences-related real estate has significantly increased. Both greenfield and brownfield projects have surged, as the pandemic fuelled the demand for locally manufactured pharma and medical products.

India, in the last few decades, has witnessed the IT and manufacturing sectors invest heavily in real estate and infrastructure. But in the post-pandemic era, we see life sciences companies require space to innovate, for R&D, and manufacture at scale.

The Indian biotechnology industry is valued at over **$92 billion** and is expected to reach **$300 billion by 2030.** This significant growth will undoubtedly translate to increased demand for specialised real estate solutions.

Fast-evolving life sciences market

India is one of the fastest-growing life sciences markets in the world and the sector is poised to see multi-fold growth by 2030 led by a fast-increasing population, rising life expectancy, a strong industrial base and inclusive government initiatives. In addition, India's demographic dividend, strong industrial base and policy push are known to be the growth drivers for the life sciences sector in the country.

The increasing government spending on the healthcare sector, cost benefits in terms of affordable manpower & real estate expenses, and the availability of a large talent pool are the catalysts of life sciences growth in India. Schemes like Production Linked Incentive (PLI) have boosted domestic manufacturing which has resulted in the need for more space in industrial and tech parks. Also, global exports of pharmaceutical and biotechnology products and medical devices from the country have forced many companies to invest in capacity building and human resources.

Notably, India ranks second globally in terms of the number of US FDA-certified plants located outside the US, closely followed by China. Strengths of this kind and the constantly evolving sector are furthering the requirement for large-scale manufacturing, MSMEs, wet laboratories, R&D hubs, incubators, and data centres coupled with other IT & ES support.

Over the next decade, it is estimated that the requirement for life sciences R&D real estate in India is likely to grow to somewhere between $16 billion (Rs 1,200 billion) and $34 billion (Rs 2,550 billion) as per conservative and optimistic scenarios.

Push from PEs and VCs

India's life sciences R&D real estate is emerging as a high-potential asset class for institutional investors. Aided by exponential global demand growth, geopolitical environment, policies initiatives, and skilled workforce this sector is rapidly transforming.

Courtesy: Genome Valley, Hyderabad

Savills India estimates that the growth of the life sciences R&D segment in India could generate demand for around **96 million sq ft** of new real estate by 2030, and possibly as much as **151 million sq ft.**

Atul Bhardwaj, Business Head, Lighthouse Canton Real Estate, indicates that both domestic and international investors are demonstrating a strong interest in India's life sciences real estate market. According to Bhardwaj, private equity firms, venture capitalists, and real estate developers are actively investing significant capital in the development of specialised facilities to meet the requirements of life sciences companies. He says, "Biotechnology parks and clusters are emerging as key focal points for life sciences research and manufacturing in India. These specialised hubs offer world-class infrastructure, shared amenities, and a collaborative ecosystem that encourages innovation and cooperation among industry stakeholders, academic institutions, and research organisations."

Citing one other compelling factor of the life sciences real estate market to surge, Bhardwaj, says, "This sector's operational model does not accommodate the concept of working from home, which presents a compelling opportunity for real estate developers. The recent pandemic underscored the resilience of the pharmaceutical sector. While many industries, including office realty, experienced significant disruptions, the pharmaceutical sector's demand for space significantly increased, further cementing its critical role in the global economy."

Arvind Nandan, Managing Director – Research & Consulting, Savills India, says, "Venture Capital funding into the life sciences industry in India stood at $448 million (Rs 34 billion) in 2021 through August, almost 3x of the annual average of the previous years, making it clear that this segment will play a pivotal role in the overall growth of the Indian Real Estate industry."

Adopting the asset light model

We know that globally organisations across all sectors – be it small or big – are undergoing massive digital transformation and smart business strategies that are sustainable and cost-effective are implemented. Owing to that, businesses are constantly seeking new and innovative ways to scale up faster, which has given rise to many alternate models of operations, including the concept of going asset-light.

Asset-light model offers a strategic approach where companies minimise their ownership of physical assets (such as buildings or land). Companies go asset-light by owning fewer capital-intensive assets compared to their operational assets. By doing this, life sciences companies focus on their core competencies (such as research, development, and production) and avoid heavy investments in real estate.

Merck & Co., Inc. (MSD outside the US and Canada) is a prime example of an asset-light pharmaceutical company. Merck collaborates with specialised Contract Development and Manufacturing Organisations (CDMOs) for various stages of drug development and production. By leveraging external partners, they avoid heavy capital expenditure on building and maintaining several of their own manufacturing facilities.

Sharing his view on the asset light model, Rx Propellant's CEO Milind Ravi, says, "While traditionally dominated by 'user-owned' models, an evident but slow shift to 'asset-light' options in India indicates growing demand for agile growth-ready infrastructure. With its increased focus on innovation, India's life sciences market is expected to grow threefold in the next decade, reaching $130 billion by 2030. This in turn is set to generate demand for over 100 million square feet of specialised infrastructure across several existing ecosystems including Mumbai, Bengaluru, Hyderabad, Ahmedabad, Chennai, Vizag, and Pune

"Biotechnology parks and clusters are emerging as key focal points for life sciences research and manufacturing in India. These specialised hubs offer world-class infrastructure, shared amenities, and a collaborative ecosystem that encourages innovation and cooperation among industry stakeholders, academic institutions, and research organisations."

- Atul Bhardwaj,
Business Head, Lighthouse Canton Real Estate

"Venture Capital funding into the life sciences industry in India stood at $448 million (Rs 34 billion) in 2021 through August, almost 3x of the annual average of the previous years, making it clear that this segment will play a pivotal role in the overall growth of the Indian Real Estate industry."

- Arvind Nandan,
Managing Director – Research & Consulting, Savills India

"With its increased focus on innovation, India's life sciences market is expected to grow threefold in the next decade, reaching $130 billion by 2030. This in turn is set to generate demand for over 100 million square feet of specialised infrastructure across several existing ecosystems including Mumbai, Bengaluru, Hyderabad, Ahmedabad, Chennai, Vizag, and Pune among others."

- Milind Ravi,
CEO, Rx Propellant

among others."

Another aspect to asset-light operations is the advantage companies draw from sharing infrastructure elements. Atul Bhardwaj opines that the model of providing comprehensive amenities under one roof offers significant benefits to companies by eliminating the need for capital expenditure on individual pieces of equipment such as chillers and DG sets. This approach, he says, not only reduces the initial capital outlay but also lowers the overall opex for companies, as costs related to maintenance, security, and technical manpower are shared.

"This cost model is particularly advantageous, as it would otherwise be a substantial financial burden for a company to bear alone for its standalone unit. Real estate developers who offer high-quality infrastructure can further reduce a company's upfront expenses by providing essential utilities like nitrogen generators and vacuum systems. A multi-tenanted building thus emerges as a mutually beneficial arrangement for both developers and tenant companies," says Bhardwaj.

Sustainable infrastructure

In almost every industry, the board members, shareholders advocate the importance of the mandates of Environmental, Social, and Governance (ESG) of business operations. The threat of climate change has prompted many industries to develop environmental strategies to reduce their carbon footprints, with the life sciences industry on the top of the pyramid.

Being climate conscious has brought in new concepts in smart buildings and other digitally supported facilities and infrastructure models. Open floor plans, shared workspaces, and flexible furniture are some of today's trends that are known to foster interaction and knowledge sharing, similar to what's seen in modern IT work spaces. This shift in life sciences too encourages cross-disciplinary research, faster problem-solving, and quicker innovation and most importantly sharing resources.

"Emerging trends in innovation have seen an increase in demand for next-gen spaces with flexible workspaces, integration of wet lab-computation stations, highly sensitive zones for increasingly sophisticated equipment and process flow optimisation. New developments designed to accommodate such variables offer sustainable long-term solutions," Milind Ravi opines from his experience.

Also, leading life sciences companies in India prefer to operate from large-scale clusters that can meet both their office and R&D needs. Startups

and MSMEs are also increasingly opting to locate themselves in prominent clusters with a clear industrial positioning and abundant R&D resources. Genome Valley (Hyderabad) and Electronic City (Bengaluru) are great examples of such collaborative ecosystems.

So, if, today, we were to walk into any of India's life sciences parks, we would be delighted to see those spaces being built on modern modular designs having mobile equipment and reconfigurable layouts, with amazing aesthetics and classy landscaping.

What will also be evident is that the traditional life sciences technicians confining themselves to sterile laboratories would be ancient. Today's workplaces recognise the need for a more holistic environment with sprawling cafeterias, breakout huddles, and interactive/entertainment spaces. Apart from being modern with the changing times, such amenities are considered by the HR department as a way to attract and retain talent.

Leasing: a preferred business model

Savills, in its report titled 'Unlocking Opportunities: Life Sciences and Real Estate in India', indicates that leasing properties to the biotech industry can provide a steady stream of rental income and long-term investment potential for real estate developers.

Since life sciences is a rapidly growing and promising sector with significant investments and advancements, by leasing to them, real estate companies become part of their growth story, giving them the advantage of increased long-term value and brand association.

Leasing also brings about several advantages to realtors. Life sciences companies typically require specific and tailored facilities, leading to lesser turnover compared to other commercial leases. This translates to reduced management costs and higher occupancy rates. Also, life sciences companies often require long-term leases due to the complex nature of their facilities and research projects. This stability translates to predictable and dependable income for the real estate companies.

Speaking from his company's perspective, Milind Ravi, says, "We bring a very inclusive approach to support companies of all scales not just with infrastructure, but a gamut of ecosystem services that play a pivotal role in their overall experience. We lease laboratory spaces on tailored models based on the need, timelines, intended use and life-stage of our tenant partners. Our standard offering constitutes modular spaces in shared or dedicated formats – in both 'warm shell' and 'plug-and-play' models as part of integrated and life science-focussed clusters. Apart

Key Developments in India's Life Sciences Real Estate Market

- In February 2024, Rx Propellant has committed an initial investment of $75 million in phase 1 of the Navi Mumbai Research (NMR) District. The NMR District represents the first exclusive life sciences development in Mumbai and is spread across 16 acres of land with a total development of 1.5 million sq ft. It was formally launched in November 2023 with the first phase of 400,000 sq ft set to be ready for occupancy by late 2025. To be developed in multiple phases, this project will attract a total investment of over $150 million by RxP.
- RMZ Corp, one of the leading developers of commercial and co-working spaces in India, recently forayed into life sciences real estate with its TechZone project in Bengaluru. The project offers a mix of R&D, manufacturing, and warehousing space for life sciences companies.
- Singapore-based asset manager Lighthouse Canton partnered with Ivanhoé Cambridge to invest in life sciences real estate in India. They have committed to developing over 1 million sq ft of laboratory space in Genome Valley, Hyderabad. In partnership with Ivanhoe Cambridge, real estate subsidiary of Canadian pension fund CDPQ, Lighthouse Canton has setup a platform, Neovantage Innovation Parks in Hyderabad that has a portfolio size of 850,000 sq ft operational, 350,000 sq ft under construction.
- Prologis, global logistics giant, forayed the life sciences real estate market in India to develop cold chain facilities for storing and transporting temperature-sensitive life science products.
- Blackstone, private equity giant, has invested in life sciences real estate in India through its platform, Ascendas India. They are developing life sciences parks in Bangalore and Pune.
- In 2020, foundation stone was laid for a Bengaluru Life Sciences Park to come upon a sprawling 52.27 acres with an estimated spend of Rs 5,000 crores. The park is being set up under a public-private partnership with the government of Karnataka and private entity Labzone Corp.

Increasing investments by Actis

Actis, a global investor in sustainable infrastructure, is investing over $700 million (approx. Rs 5,500 crore) in developing life sciences real estate assets in India. The investment will focus on building and expanding assets under Rx Propellant, a platform acquired by Actis that provides real estate solutions (R&D labs and associated facilities) to life sciences and related sectors.

The platform aims to expand its footprint from the current 1 million sq ft to over 6 million sq ft within the next five years. The plans are to grow its presence in existing locations like Mumbai, Hyderabad, and Bangalore, and venture into new cities like Pune and Ahmedabad.

Actis believes India's life sciences sector holds immense potential due to its large talent pool, cost competitiveness, and increasing global R&D activities. Additionally, expiring patents worth $250 billion create an opportunity for India to capture a significant share in the market.

All eyes on Pune

Roche Information Solutions India – the healthcare digital centre of excellence of Swiss biotech giant Roche – in 2023, signed a lease agreement with Brookfield Properties for nearly 2,00,000 sq ft of office space in their workplace project – '45ICON' in Pune. The asset is jointly owned with Raviraj Abhinandan Developers.

In 2023, two biotech majors, Innovassynth and TCG Life Sciences (TCGLS) started operations from Pune's TCG International Biotech Park (TCGIBP) considered to be India's first integrated biotech park and the largest biotechnology facility in Western India.

from this, we also deliver built-to-suit campuses in required specifications of the tenant."

"While our facilities are built for multi-tenancy where each organisation can work independently, we are also working towards developing co-working laboratory spaces with shared equipment and amenities. These are becoming increasingly popular, especially among startups and small research teams," says Milind Ravi.

Growth is certain

A report titled 'Life Sciences Industry & Real Estate Perspective 2024: Putting Asia Pacific under the microscope' by global real estate company JLL sheds light on India's pharma industry's growth trajectory. While the pandemic undeniably spurred investment due to the vaccine race, the report emphasizes that interest was already on the rise owing to the ongoing breakthroughs in areas like immuno-oncology and neonatology. This pre-existing momentum, fuelled by technological advancements, has directly translated into increased commercial real estate leasing within the pharma sector. This may be true to India's life sciences sector too.

JLL stresses on the fact that when companies get funding from venture capitalists, they need lab space in order to deliver as soon as possible. Also, sizeable investments bring with them a plethora of life sciences jobs, which can also spur development of housing, retail and other urban amenities that serve the people who live and work for the expanding companies.

From Bhardwaj's inputs we can infer that India has a robust domestic market, bolstered further by the Government of India's 'Jan Aushadhi' scheme, aimed at providing quality generic medicines at affordable prices to its citizens. As the third-largest exporter of pharmaceuticals by volume and the thirteenth by value, the demand for space is going to grow.

While the pharma industry presents sufficient scope, the medical device industry is not any less. Considered as the sunrise sector, the medical devices industry is estimated to reach $50 billion by 2030. In the last five years, the export of medical devices has been increasing at a rate of 9.37 per cent. India's policy to allow 100 per cent foreign investment under an automatic route in the medical devices sector has helped attract significant investments, which has further pushed the demand for real estate. The Production Linked Incentive (PLI) scheme for the medical device industry in India has also helped augment the domestic manufacturing and in reducing dependence on imports. Hence, manufacturing hubs are being set up in many economic zones of the country.

We can therefore conclude with the evidence that there is immense potential for life sciences real estate development to surge in India. Though the country has limited core life sciences real estate investable stock at present, majority of the growth will come from developing new facilities that entail typical development and leasing risks. The stakeholders, however, forecast an increasing investor appetite for Indian life sciences real estate as the sector gains scale over time. BS

Anusha Ashwin

"Multi-tenanted building could be a win-win for real estate and LS companies"

Biotechnology parks and clusters are emerging as key focal points for life sciences research and manufacturing in India. Building such facilities is no ordinary task. Several factors need to be considered for building such facilities and the models of leasing are changing constantly. Atul Bhardwaj, Business Head, Lighthouse Canton Real Estate, in an interaction with BioSpectrum, demystifies the real estate market developments in the life sciences space. ***Edited excerpts:***

« **Atul Bhardwaj,** Business Head, Lighthouse Canton Real Estate

Could you give a broad overview of the current life sciences real estate scenario in India?

The life sciences real estate market in India is experiencing significant growth and transformation, driven by various internal and external factors. This sector encompasses a wide range of establishments, including manufacturing companies, biotech parks, research, and development (R&D) centres, and specialised laboratories. India's expanding biotechnology, pharmaceutical, and healthcare sectors are the primary drivers behind the increasing demand for life sciences real estate. With a growing emphasis on research and innovation, there is a heightened need for state-of-the-art facilities to support activities such as drug discovery, clinical trials, and manufacturing.

It is evident that a growing demand for state-of-the-art research facilities, cutting-edge laboratories, and advanced manufacturing units have created a wealth of opportunities for real estate developers. What is your take on this?

The pharmaceutical sector is poised for sustained growth, underpinned by its fundamental importance to all forms of life, including humans and plants, highlighting the indispensable nature of this industry. Unlike the technology sector, which faces challenges related to obsolescence, the pharmaceutical industry is characterised by continuous evolution, ensuring a perpetual demand for space.

What are the opportunities you see in developing greenfield life sciences facilities in India and how are life science innovations in the current era transforming the brownfield facilities?

India is home to the world's largest pharmaceutical industry, along with several other major global players, making it a pivotal hub in the international pharma landscape. The presence of almost all the top 50 global pharma companies in India, with many more eyeing the Indian market, underscores the country's significant role. As the third-largest exporter of pharmaceuticals by volume and the thirteenth by value, India has a robust domestic market further bolstered by the Government of India's 'Jan Aushadhi'' scheme, aimed at providing quality generic medicines at affordable prices to its citizens. Additionally, India leads the world in the number of US FDA-approved manufacturing plants outside the United States.

These factors collectively highlight the immense potential for pharma-specific real estate development in India. A capable developer, equipped with adequate funding and talent, can create the specialised spaces required to meet the diverse needs of life sciences companies. The challenge lies in designing facilities that are tailored to the unique processes of pharma and biotech companies, complete with all necessary utilities to minimise initial setup costs.

The rapid advancements in scientific innovation, including the extensive use of AI in pharmaceuticals, the need for high-performance equipment, and the increasing importance of ESG (Environmental, Social, and Governance) criteria, necessitate the transformation of existing facilities. Often, traditional buildings cannot be repurposed to meet these new demands, leading companies to consider greenfield investments.

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For instance, if a brownfield laboratory lacks the structural integrity to support high-performance equipment like an NMR machine, it can significantly disrupt operations.

Moreover, obtaining US FDA and other regulatory approvals require strict adherence to safety standards, including specific requirements for access and exit points. Thus, the location, design, and amenities of a facility are crucial for a company's compliance and operational efficiency. This scenario underscores the importance of thoughtful real estate development in the pharmaceutical sector, where meeting the nuanced needs of the industry can lead to successful outcomes.

What are the potential benefits and challenges of housing multiple disciplines under one roof in a common life sciences facility? How do startups believe in channelising their funds or investments in innovation and R&D rather than on infrastructure or real estate?

In developed markets such as the USA, this asset class commands significant volume, with real estate companies often forming REITs and achieving listings on stock exchanges. There exists a mature ecosystem of life sciences companies where leasing, especially in exclusive clusters, is the preferred option for both established entities and startups, given the manifold advantages.

India is beginning to see a similar trend, where the cost of establishing a lab can exceed Rs 5,000 per square foot, excluding the expenses for high-end portable equipment and skilled manpower. Companies are increasingly recognising the importance of allocating their resources wisely, focusing investments on their core processes rather than on real estate and infrastructure.

Although the journey ahead is long, the rising costs of real estate ownership and the scarce availability of land near pharma-specific clusters are prompting companies to appreciate the value of entrusting their real estate needs to specialists.

What are the different types of leasing models available for laboratory spaces in India?

The rapid expansion of the life sciences sector in India is driving an increased demand for laboratory spaces that can cater to diverse needs, encompassing both research and development (R&D) and manufacturing activities. To address this demand, the real estate market offers a range of leasing models tailored to meet the varied requirements of industry tenants.

For entities with long-term commitments and specific needs, dedicated laboratories present an attractive option. These facilities are customised to meet the unique requirements of a single tenant or organisation, offering greater control over layout, design, and equipment selection. Tenants can optimise the space for their manufacturing or research activities in dedicated labs, ensuring maximum productivity and efficiency.

Built-to-suit leasing represents another alternative, involving the construction of specialised R&D facilities tailored to the tenant's specifications. This approach provides tenants with the highest level of flexibility and control over the space, allowing them to design and furnish the entire building according to their specific needs. However, built-to-suit arrangements may entail longer lease obligations and higher upfront costs.

Additionally, innovation hubs and incubators play a crucial role in supporting early-stage companies and entrepreneurs in the life sciences industry. These facilities facilitate creativity and collaboration by offering access to funding opportunities, mentorship, shared laboratory space, and business support services, fostering innovation and driving growth within the sector. BS

Anusha Ashwin

"There is a growing demand for agile growth-ready life sciences infrastructure"

India life sciences industry is growing at an unprecedented pace and offers immense opportunities for developers to showcase innovative infrastructure products. Rx Propellant is a developer with vast expertise in building and scaling life sciences infrastructure. Milind Ravi, CEO, Rx Propellant, in an exclusive interaction with BioSpectrum, responds to questions that capture various evolving business models in this space. ***Edited excerpts:***

Milind Ravi,
CEO,
Rx Propellant

Could you give a broad overview of the current scenario for the life sciences infrastructure industry in India?

Post-COVID India continues to witness profound transformation in its life sciences infrastructure landscape. Though there is a visible growing demand for space to support the growth aspirations of the life science industry, India does not have recognised platforms that would focus on this particular asset class. Until recently, access to quality stock has been constrained with a handful of locally based developers offering expertise and track record in delivering and managing highly specialised infrastructure. Rx Propellant is unique in this aspect as the only player dedicated to the development of life sciences clusters across multiple cities in India with a portfolio of 6.5 million square feet. We are committed to continually investing in the growth story of the life science industry in India, aiming for a 10 million square feet portfolio by 2030.

A growing demand for state-of-the-art research facilities, cutting-edge laboratories, and advanced manufacturing units has created a wealth of opportunities for infrastructure developers. What is your take on this?

India's life sciences industry is growing at an unprecedented pace and offers immense opportunities for developers to showcase innovative infrastructure products. Entering fast-evolving markets at an early stage offers first-mover advantages, and an opportunity to build strong long-term relationships with the industry. This paves the way to not just develop tailored solutions, but strategically align with the industry to enable faster growth. Developing cutting-edge infrastructure, which can support diverse operations and scale with easy value-chain integration becomes paramount.

Life sciences companies place a premium on the quality and functionality of research facilities and laboratories. Flexible and adaptable facilities that can accommodate future modifications or expansions further enhance the value proposition of the projects.

Social asset developers who can deliver state-of-the-art, purpose-built spaces that comply with regulatory standards and support cutting-edge research and manufacturing processes are well-positioned to capture market share. Increasingly, life sciences companies are prioritising sustainability in their operations, including building design and construction. Incorporating green building practices and sustainable technologies into projects appeals to environmentally conscious tenants. With the right understanding of the market needs and in-house expertise, this multifaceted industry offers multiple avenues to build either generic or specific infrastructure products and services. While this may require substantial upfront investments, they offer a promise for substantial long-term returns.

India's life sciences industry is growing at an unprecedented pace and offers immense opportunities for developers to showcase innovative infrastructure products. Entering fast-evolving markets at an early stage offers first-mover advantages, and an opportunity to build strong long-term relationships with the industry. This paves the way to not just develop tailored solutions, but strategically align with the industry to enable faster growth.

Young companies very often face roadblocks in initial set up and expansion. High costs of construction and fit-outs are attributed to the need for highly specialised and controlled environments with sophisticated instrumentation. Startup companies need to prioritise investments in innovation and R&D to drive growth, differentiation, and competitive advantage in their respective industries. While infrastructure is an important consideration, investing in it entails higher financial risk and may divert resources away from critical R&D efforts. Further, the time required to set up a new facility can range between 18 and 36 months.

What are the opportunities you see in developing greenfield life sciences facilities in India and also how are life science innovations in the current era transforming the brownfield facilities?

Factors such as increasing healthcare expenditure, rising demand for pharmaceuticals, & a focus on research & innovation need rapid growth of supporting infrastructure in India. Greenfield development allows the creation of modern infrastructure integrated with the latest technologies & sustainability features from the outset. India also offers diverse strategic geographical locations suitable for life sciences facilities, including proximity to research institutions, talent pools, & manufacturing hubs. Greenfield projects can leverage these to maximise accessibility & connectivity. With the market growth outlook indicating sizeable demand for infrastructure in the years ahead, it is serviceable only via significant investments in greenfield developments. Key ecosystems such as Mumbai, Bengaluru, Hyderabad, Ahmedabad, & Pune continue to witness a strong influx of life sciences players, with limited space options. Several young ecosystems are also emerging across other Tier-I & II cities including Kochi & Visakhapatnam. Favourable policy conditions & state-led initiatives (biotech/knowledge/technology/other parks) continue to attract life sciences developers.

Though a cumbersome process, to comply with modern norms and to save on time and cost, companies are increasingly investing in upgrading Brownfield facilities to enhance productivity, efficiency, and sustainability. This may include retrofitting existing infrastructure with advanced equipment, automation systems, and digital tools to streamline operations and improve performance. Brownfield facilities are also undergoing environmental upgrades to meet regulatory requirements and reduce their environmental footprint. This includes implementing energy-efficient lighting, HVAC systems, and waste management practices to improve sustainability and minimise resource consumption.

What are the potential benefits & challenges of housing multiple disciplines under one roof in a common life sciences facility?

Collaboration, as we understand it, is a key catalyst to innovation. Housing multiple residents from different sections of the value chain opens a host of opportunities for cross-fertilisation of ideas & knowledge. This can lead to novel approaches, synergies, & breakthroughs in research and innovation. It also allows efficient resource utilisation, thereby providing cost savings and improved productivity. A diverse and collaborative environment also attracts top talent who value interdisciplinary collaboration and the opportunity to work across traditional boundaries, thereby enhancing recruitment and retention efforts for the organisations. However, shared facilities mandate strong spatial and systemic measures for movement segregation, resource allocation and avoiding cross-contamination. This requires rigorous planning, communication, and management to address the associated challenges and realise its full potential.

How do startups believe in channelling their funds or investments in innovation and R&D rather than on infrastructure?

Young companies very often face roadblocks in initial set up and expansion. High costs of construction and fit-outs are attributed to the need for highly specialised and controlled environments with sophisticated instrumentation. Startup companies need to prioritise investments in innovation and R&D to drive growth, differentiation, and competitive advantage in their respective industries. While infrastructure is an important consideration, investing in it entails higher financial risk and may divert resources away from critical R&D efforts. Further, the time required to set up a new facility can range between 18 and 36 months. They can diversify their risk exposure and increase the likelihood of long-term success by adopting a lean and agile approach to resource allocation by focusing on activities that directly contribute to their mission and value proposition. Our engagement models allow companies to considerably reduce the cost and time involved with operational readiness and help them stay focused on their science. Other benefits include resource efficiency, scalability, and speed to market. BS

Anusha Ashwin

Dissecting Gender Disparity

In recent years, there has been a growing recognition of the importance of gender diversity in Science, Technology, Engineering and Mathematics (STEM). However, despite progress, significant gender parities persist, particularly in leadership positions within sectors like healthcare and biotechnology. We shall delve deeper into this unfortunate scenario and explore whether there's light at the end of the tunnel.

Women in the Indian healthcare industry are mainly concentrated in low-paying frontline positions. In India, 29 per cent of medical doctors, 80 per cent of nursing staff (including midwives), and nearly 100 per cent of Accredited Social Health Activists (ASHAs) are women. Despite this, women hold only 18 per cent of healthcare leadership positions and continue to earn 34 per cent less than their male counterparts.

These are the outcomes of the study titled 'An Unbalanced Scale - Exploring the Female Leadership Gap in India's Healthcare Sector' from Dasra, a non-profit organisation. The study revealed that the Indian healthcare sector, one of the country's largest employers, has experienced substantial growth. It takes a closer look at women's representation in healthcare and the leadership opportunities available to them.

Inspiring leaders

"What is concerning is the gap between the proportion of women in healthcare and those who occupy leadership positions. At entry levels, women's representation in sales, marketing, and operations ranges from 40-50 per cent. However, this significantly drops to 15-20 per cent in senior roles," says Shailja Mehta, Director at Dasra.

What is behind this gender gap in leadership positions? Societal norms, cultural expectations and implicit biases against women are some of the main factors that have contributed to the underrepresentation of women in leadership positions. "It is a complex issue. The lack of female role models and mentors perpetuates this gender gap," says Shailja.

Some believe that one of the primary reasons for the skewed gender ratio in STEM is the stereotyping that begins early in life. Societal expectations often push girls towards more traditionally feminine roles, diverting them away from technical and scientific fields. As a result, fewer women choose STEM education and careers. While others argue that the current gap is a reflection of what was happening 20 years ago, when fewer women entered science careers.

"Today's leaders represent those who entered the field 15-20 years back. Now that the number of women entering these fields has significantly increased in recent years, we will see a lot of

"Women are leading more than 30 per cent of the startups incubated at our centre. In many others, they are co-founders or hold significant positions."

- Dr Manisha Premnath
COO, Venture Center

"The biggest challenge that women face is breaking the stereotypes and breaking free from the vicious cycle of work and life. Fortunately, nowadays there are several schemes and funds available to support women."

- Dr Deeksha Bhartiya,
Founder, Genomiki

"As we champion women and girls in science leadership, let us embrace this new era, where their voices, ideas, and leadership propel us toward a brighter, more sustainable future for all."

- Melody Lopez,
Director and Chief of Staff,
Crayon Software Experts India

"A major proportion of startups are led by women. They have the capability to do it. The situation is definitely improving. For more women to take leadership roles, changes are required at the family, community and industry level."

- Dr Raman Gangakhedkar,
Former Director, National AIDS Research Institute (NARI)

"The situation has certainly improved, but school-going girls should have access to reputable colleges and safe residential facilities for pursuing science as a subject for the real change to occur. Besides, they need support in equal measure, from their families and the industry when raising their children."

- Dr Pragya Yadav,
Senior Scientist, National Institute of Virology

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Director, Dasra

"I faced the challenge of balancing child care and career after the birth of my daughter. To tackle this, I established a small child care centre at my office. I believe it's all about the confidence with which you pursue your career."

- Manya Jha,
Founder, Morphedo Technologies

women leaders in the coming years. In fact, a major proportion of startups are led by women. They have the capability to do it," Dr Raman Gangakhedkar, former director, National AIDS Research Institute (NARI) Pune, says, "The situation is definitely improving. For more women to take leadership roles, changes are required at the family, community and industry level."

Dr Pragya Yadav, senior scientist at the National Institute of Virology, Pune, who played an instrumental role in the development of Covaxin, agrees. "The situation has certainly improved, but school-going girls should have access to reputable colleges and safe residential facilities for pursuing science as a subject for the real change to occur. Besides, they need support in equal measure, from their families and the industry when raising their children. If they lose that time, catching up becomes difficult," she says.

"Furthermore, this support should not be seen as an extra favour to women, but rather as their right. Children are the future and the environment they experience while growing up is crucial to their growth and development. It is the duty of both families and society, not just mothers alone, to provide a safe and suitable environment for them," she added.

Manya Jha, a young entrepreneur and founder of Morphedo Technologies, a deep tech startup in aerospace and defence, medical device engineering, IoT and embedded systems, faced the challenge of balancing child care and her career after the birth of her daughter. To tackle this challenge, she established a small child care centre at her office.

"Starting just 20 days after my daughter was born, I brought her to my workplace every day. I made space in my cabin where she could stay with me. Until she was 7 months old, my husband and I took care of her in the shared cabin (during COVID-19 period). At the time of her birth, my startup was also at a crucial stage," she says. "Both my daughter and my company required my personal attention. There were instances when I had to attend important meetings with senior scientists while holding my one-month-old daughter. I believe it's all about the confidence with which you pursue your career."

Today, Manya's company has around 40 employees and the child care centre is now available to all new mothers, offering support in looking after their children while at work.

So, despite the challenges, there has been a noticeable shift in the narrative over the past decade, with the number of women leaders emerging in STEM careers increasing slowly but steadily. And these women are not only excelling in their respective fields but also helping dismantling barriers

"Give equal respect to both the genders"

How to achieve gender parity in the field of STEM? What has been your experience with it?

In STEM, gender parity exists in some cases, at least I have not experienced gender disparity in terms of getting projects/promotions/building career by attending trainings/workshops etc. Hence, I think that the simple and effective way to achieve gender parity is to give equal chances to both men and women workers. It is also important to give equal respect to both the genders.

« **Dr Madhuri Thakar,** former head, Department of Immunology and Serology Division (Scientist G), ICMR-National AIDS Research Institute, Pune

What can be done to ensure women can take up more careers in STEM?

The careers in STEM involve both, professional (careers in industry) and academics (in research). To bring more women in this field, the efforts should be immediate and long term. The immediate efforts should be: availability of flexi timing, permission to work from home whenever required and assurance of proper mentorship in shaping the career. I think that the long-term efforts should be a responsibility of the whole community and the efforts should be mostly social and family oriented. The parents and schools should inculcate the idea of gender equality in all situations; education, family and social responsibilities and expectations from each boy and girl. Also, the availability of right counselling regarding the career choices should be made available to all.

What policies or schemes by the government are presently in place to encourage women to re-join the STEM field after dropping out due to 'family' or 'motherhood' related reasons, as is perhaps commonly seen in our society?

As of I know, the Department of Science and Technology (DST) and the Department of Biotechnology have the schemes for the women scientists to apply for extramural grants in life sciences after their break from the career for any reason. Also, the DST has launched a programme called Vigyan Jyoti to create a platform for girls with merits in high school level to pursue STEM in their higher education and also to provide exposure to rural girls to pursue higher education in science. BS

Shivani Thakar

that hinder the progress of other aspiring women.

Several prominent women leaders are setting an example for others. Dr N Kalaiselvi, Director General of the Council for Scientific and Industrial Research, Dr Priya Abraham, Director of the National Institute of Virology, biotech stalwart Kiran Majumdar-Shaw, and entrepreneurs like Dr Kavita Iyer Rodrigues and Vasanthi Ramachandran represent some of the most sought after leaders in the industry.

"Women are leading more than 30 per cent of the startups incubated at our centre. In many others, they are co-founders or hold significant positions," says Dr Manisha Premnath, COO of Venture Center, an incubation centre in Pune that helps startups grow.

Breaking the glass ceiling

While there is a rise of women leaders in the health and biotech sector, it is important to acknowledge the challenges they continue to face. Stereotypes, biases, and a lack of institutional support still exist. The 'glass ceiling' phenomenon persists, making it difficult for women to reach the highest levels of leadership. A male-centric workplace culture, coupled with a lack of flexibility and understanding regarding work-life balance, discourage women from pursuing or sustaining leadership roles.

"The biggest challenge that women face is breaking these stereotypes and breaking free from the vicious cycle of work and life. They need to step out of their comfort zones, or rather, their safe zones, and then there will be no stopping them. Fortunately, nowadays there are several schemes and funds available to support women," says Dr Deeksha Bhartiya, Founder of Genomiki.

Coming from a very traditional, yet ambitious family, Dr Deeksha got married at a young age and encountered challenges in maintaining a balance between her personal and professional life. However, she didn't allow these challenges to deter her from

BIRAC launches Women Leadership in STEM

In India, the proportion of female graduates at the tertiary level in science, technology, engineering, and mathematics (STEM) is quite high compared to many developed countries such as the US, UK, and Germany. However, only a small fraction of these graduates actually enter the STEM workforce or attain leadership positions. The challenges that impede women's participation in STEM careers and leadership roles are multidimensional, which includes gender stereotypes and biases, socio-cultural factors, work-life balance, limited access to networks and mentors, inadequate opportunities for skill development and advancement etc. Addressing these challenges would require systemic changes along with attitudinal and behavioural changes.

An effective strategy to breaking the glass ceiling and advance gender parity involves providing women with mentorship for transformative leadership and excellence in their respective fields. Prioritising the enhancement of women's leadership capabilities can help level the playing field, equipping them with the necessary tools and resources to compete on equal footing with their male counterparts. This can facilitate the equal representation and involvement of women in decision-making processes, leading to more balanced and diverse leadership teams.

Recognising the barriers that hinder women's participation in STEM careers and leadership positions, Grand Challenges India (GCI)-Biotechnology Industry Research Assistance Council (BIRAC) and WomenLift Health launched a leadership development programme in October last year exclusively for women called Women's Leadership in STEM (WLS). This programme aims to expand the power and influence of talented women in STEM and catalyse a systemic change to achieve gender equality in leadership.

The programme is designed to empower women in STEM institutions to expand their leadership sphere and realise their potential to: Confidently rise as leaders and decision makers; Cultivate the next generation of powerful women STEM leaders; and Foster a strong network of champions and institutional partners.

pursuing her doctoral studies and career. "There were many senior male scientists who advised me to take up a permanent job instead of embarking on my entrepreneurial journey. I was told that women should prioritise stability over adventure. However, I am fortunate to have a very supportive family who always push me to exceed my limits and support me in all my decisions."

Exiting the vicious circle

The foundation for achieving gender parity in STEM careers is laid during the crucial years of education. Schools and educational institutions play an important role in challenging these stereotypes and encouraging girls to explore their interests in science and technology. STEM-focused educational programmes, workshops, and extracurricular activities can help break down gender-based barriers from a young age. Scholarships and mentorship programmes can encourage girls to pursue science education.

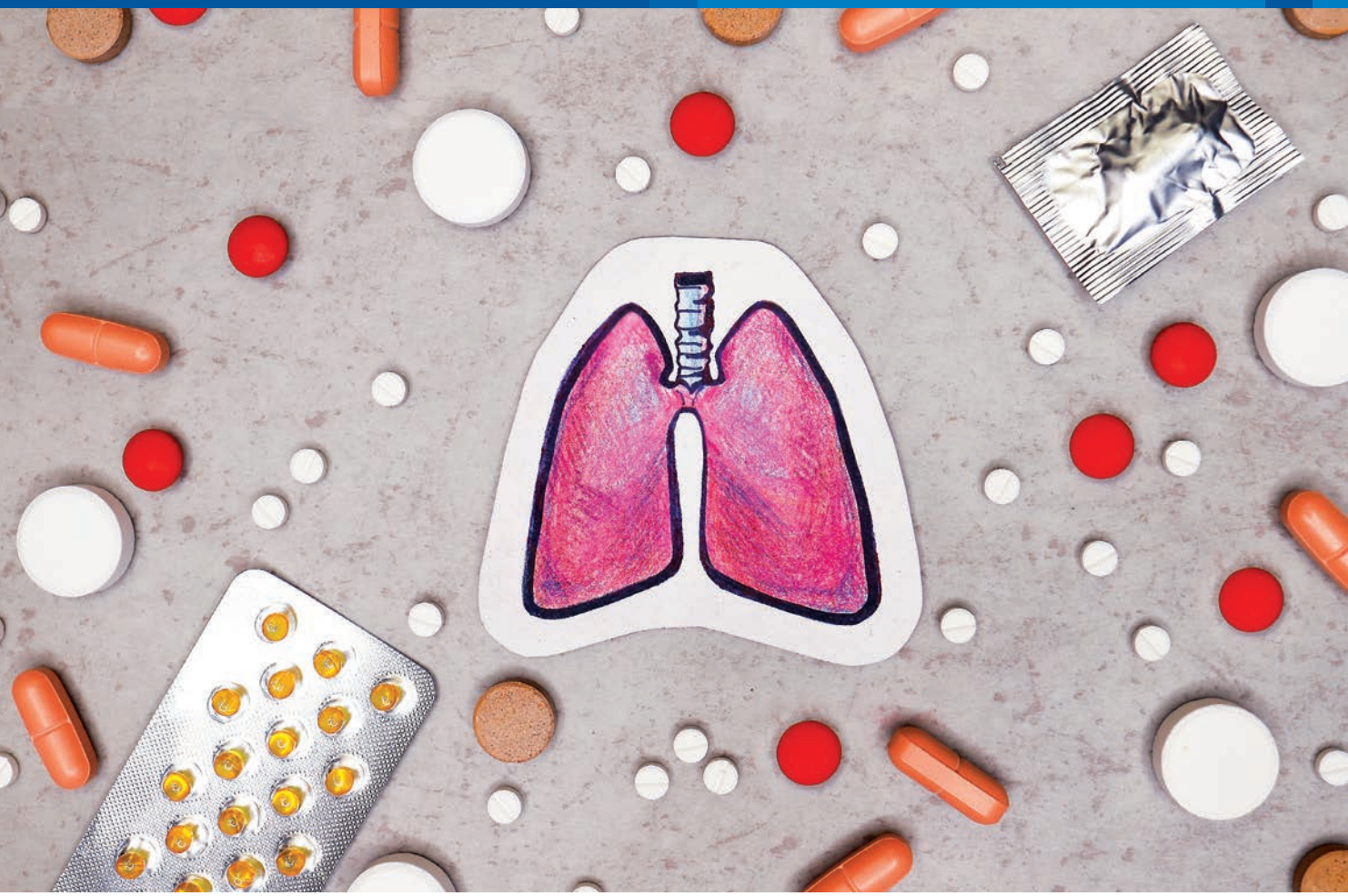
To encourage more women to pursue careers in STEM and foster an inclusive and diverse workforce, it is important to adopt unbiased recruitment practices, create a supportive environment for their progress, and implement flexible work arrangements.

There is a growing emphasis on incorporating diverse perspectives in STEM curricula. Highlighting the contributions of women scientists and engineers in textbooks and classroom discussions can inspire both girls and boys, challenging preconceived notions about gender roles in these fields. There should be more networking events, conferences and platforms that specifically focus on women in STEM to provide valuable opportunities for collaboration and knowledge-sharing. These spaces not only celebrate the achievements of women in the field but also facilitate the exchange of ideas and strategies to overcome common challenges.

Emphasising the pivotal role women play in shaping a sustainable future through scientific leadership, Melody Lopez, Director and Chief of Staff Crayon Software Experts India says "Fostering women's leadership in science is not just about gender equality but also a catalyst for achieving sustainable development goals. The theme reflects a call to action, urging communities, governments, and organisations to provide equal opportunities for women and girls in science, ensuring their voices are heard in decision-making processes." She further says "As we champion women and girls in science leadership, let us embrace this new era, where their voices, ideas, and leadership propel us toward a brighter, more sustainable future for all."

The journey towards gender parity in STEM careers in India could be challenging, but the momentum for change is growing. BS

- Gunjan Sharma



Effectively Eliminating Drug-resistant TB

India's fight against tuberculosis (TB) has made significant strides, earning recognition from the World Health Organization (WHO). With less than two years left to achieve its 2025 TB elimination target, the country must embrace new strategies. Let's look at how far the country has progressed in its elimination programme and what still remains to be done.

India has the highest burden of TB, with two deaths occurring every three minutes from the disease. The country recorded a staggering 28 lakh cases in 2022, accounting for 27 per cent of the global cases, according to WHO.

India initiated the TB Free India campaign with the ambitious goal of eradicating TB by 2025, a milestone set five years earlier than the target outlined by the UN's Sustainable Development Goals. Despite facing setbacks due to COVID-19, the nation doubled down on its efforts, resulting in notable progress. The India TB Report 2023 heralded 2022 as a pivotal year in TB surveillance, noting a significant achievement with a record-high notification of 24.2 lakh TB cases, representing an increase of over 13 per cent compared to 2021.

The latest WHO Global TB Report 2023 acknowledged and praised India's efforts in its fight against TB, particularly highlighting the effectiveness of its case detection strategies. The report emphasised that India's intensified case detection strategies led to the highest-ever notification of cases in 2022,

Key Facts on Global TB

1. In 2022, an estimated 10.6 million people fell ill with tuberculosis (TB) worldwide, including 5.8 million men, 3.5 million women and 1.3 million children. TB is present in all countries and age groups. TB is curable and preventable.
2. A total of 1.3 million people died from TB in 2022 (including 167 000 people with HIV). Worldwide, TB is the second leading infectious killer after COVID-19 (above HIV and AIDS).
3. Multidrug-resistant TB (MDR-TB) remains a public health crisis and a health security threat. Only about 2 in 5 people with drug resistant TB accessed treatment in 2022.
4. Global efforts to combat TB have saved an estimated 75 million lives since the year 2000.
5. $ 13 billion is needed annually for TB prevention, diagnosis, treatment and care to achieve the global target agreed at the 2018 UN high level-meeting on TB.
6. Ending the TB epidemic by 2030 is among the health targets of the United Nations Sustainable Development Goals (SDGs).

Source: WHO

surpassing pre-COVID levels. The government's key initiatives, such as specialised active case finding drives, the scaling up of molecular diagnostics to block levels, decentralisation of screening services through Ayushman Bharat Health and Wellness Centres, and private sector engagement, have significantly reduced the gap in missing cases.

Road to elimination

While the country has made remarkable progress in its fight against TB, the adoption of additional strategies such as shorter treatment regimens, the development of vaccines, and a renewed focus on nutrition could prove to be game-changers in its goal of eliminating TB for good.

The BPaL regimen, composed of Bedaquiline, Pretomanid and Linezolid, presents a promising alternative for a shorter, safer and more tolerable treatment option for drug-resistant tuberculosis (DR-TB). Lasting only 26 weeks, it contrasts sharply with conventional DR-TB treatments, which can span 18 to 21 months and entail the consumption of over 4,000 to 5,000 tablets. Endorsed by the US FDA (United States Food and Drug Administration) in 2019 and the WHO in 2022, the BPaL regimen has been implemented in more than 70 countries, including South Africa, Ukraine, Indonesia, the Philippines and Vietnam.

"The older, conventional regimen for drug-resistant TB included prolonged use of injections with other drugs. This was associated with increased incidence of adverse drug reactions (ADRs), implementation challenges under the programme and inconvenience to the patients. The new TB drug regimen uses the newer oral drugs like Bedaquiline, Delamanid or Pretomanid, or the repurposed drugs such as linezolid, clofazimine, etc. These regimens are injection free and have lesser pill burden leading to more acceptance among the TB patients besides reducing the implementation challenges due to the use of injections. They have the ability to kill the actively multiplying drug-resistant TB bacteria faster and a sustained killing of the bacteria to prevent the recurrence of the TB disease among the patients. These regimens have shown improved treatment success rates under field conditions under the national programme," said Dr Rupak Singla, Head of Department, National Institute of TB & Respiratory Diseases, New Delhi.

Dr Singla further said "To combat the adverse drug reactions of these regimen, specially due to drug linezolid, various regimens using different dosages and durations of linezolid have demonstrated reduced incidence of ADRs maintaining the efficacy of the regimen. Hence, these newer treatment drug regimens could reduce the global burden of drug-resistant TB. However, the requirement of a good quality laboratory network, availability and higher cost of the drugs continue to pose a challenge."

The new regimen is shorter, easier on patients and improves treatment adherence, resulting in better outcomes compared to previous drug regimens.

Talking about the potential implications of the new TB drug regimen on India's TB control efforts, Dr Singla stated, "The cure rate for previous conventional TB regimen for multidrug resistant TB (MDR-TB) was to the tune of around 50 per cent and for Extensively drug-resistant-TB (XDR-TB), less than 30 per cent. The new TB drug regimen has the potential for significant improvement in treatment success rates for MDR-TB as well as XDR-TB."

In India the national data shows that more

than 36,000 drug-resistant TB patients have been initiated on shorter oral Bedaquiline-containing regimen and more than 92,000 patients have been initiated on longer oral regimen till date. Treatment success rates of shorter oral regimen for the cohort April-September 2022 (around 12,000 patients) is 69 per cent and of longer oral regimen for the cohort January-September 2021 (around 15,000 patients) is 71 per cent. The improved success rates of new drug regimens is likely to translate into less number of deaths due to TB, reduced period of infectiousness of TB patients and reduced transmission of TB to others in the community leading to reduced incidence of TB.

Studies at the 2023 Union World Conference on Lung Health affirm WHO-endorsed regimens' effectiveness, surpassing traditional 18- to 24-month treatments. The goal is to urge high-burden DR-TB countries to update guidelines and offer shorter treatments to all patients in need. Only 40 per cent of the 410,000 people with DR-TB in 2022 had access to the shorter regimen, as per a WHO report.

A group of experts in the country have stressed the need for introducing the BPaL regimen in the TB control programme of the country. Blessina Kumar, CEO, Global Coalition of TB Advocates, New Delhi emphasised the potential cost savings associated with its adoption, citing studies estimating a global annual savings of $740 million. With India accounting for a significant portion of global multi-drug, rifampicin-resistant (MDR/RR-TB) treated patients, she suggested that the country could save nearly $250 million per year through the implementation of this regimen. India will likely roll out the new regime soon.

TB Vaccine

Vaccination holds promise as a game-changer for TB elimination. The Indian Council of Medical Research (ICMR) is conducting phase III trials to evaluate the efficacy and safety of two vaccines: VPM1002 and MIP (Mycobacterium indicus pranii). VPM1002 is a live vaccine based on recombinant BCG, modified for better safety and efficacy. MIP or Immuvac, originally developed for leprosy, is a whole-cell TB vaccine candidate. The trial aims to assess the effectiveness of these vaccines in preventing TB disease, among 12,721 individuals exposed to TB at home (referred to as household contacts). Enrollment for the study is complete, with participant follow-up currently ongoing, according to the pipeline report 2022 by the Treatment Action Group.

Bharat Biotech is partnering with the Spanish firm BIOFABRI to develop, manufacture, and distribute a new tuberculosis vaccine across over 70 countries in Southeast Asia and sub-Saharan Africa. The TB vaccine candidate by Bharat Biotech is set to enter phase-III trials soon.

"The cure rate for previous conventional TB regimen for multidrug resistant TB (MDR-TB) was to the tune of around 50 per cent and for Extensively drug-resistant-TB (XDR-TB), less than 30 per cent. The new TB drug regimen has the potential for significant improvement in treatment success rates for MDR-TB as well as XDR-TB."

- Dr Rupak Singla,
Head of Department, National Institute of TB & Respiratory Diseases, New Delhi

"With India accounting for a significant portion of global multi-drug, rifampicin-resistant (MDR/RR-TB) treated patients, the country could save nearly $250 million per year through the implementation of a new TB regimen. India will likely roll out the new regime soon."

- Blessina Kumar,
CEO, Global Coalition of TB Advocates, New Delhi

A Lancet study highlighted the pivotal role of nutrition in TB management. The Reducing Activation of Tuberculosis by Improvement of Nutritional Status (RATIONS) trial demonstrated that providing food baskets to TB patients and their households reduced all forms of TB by nearly 40 per cent and infectious TB by almost 50 per cent. In 2018, the Indian government launched the 'Nikshay Poshan Yojana,' a direct benefit transfer (DBT) scheme to offer nutrition support to TB patients. Since its inception, the scheme has disbursed approximately Rs 2613 crore to over 95 lakh TB patients.

India has indeed made significant strides in addressing TB; however, the battle against the disease is far from over. Despite enhanced detection and surveillance efforts, there's a need to adopt newer strategies to combat TB effectively. Advances in R&D of vaccines, access to newer drug regimens, enhanced focus on nutrition will all help in propelling TB elimination goals. BS

Ayesha Siddiqui

"There is a significant gap in the infrastructure required for AI implementation"

« **Sankara Venkata Krishna Prasad,** Founder, CEO and Managing Director, Cito Healthcare

With the extensive and ubiquitous presence and penetration of Artificial Intelligence (AI), the future seems more dependent on this technology in the life sciences industry. In an interaction with BioSpectrum, Sankara Venkata Krishna Prasad, Founder, CEO and Managing Director of Cito Healthcare, who is also an industry analyst, shared his views on the impact of AI on pharma, biotech and the healthcare industry. ***Edited excerpts;***

Artificial Intelligence (AI) has completely changed the way we see the world today. How do you see AI revolutionising drug discovery in the pharmaceutical industry? Can AI help in discovering new drug molecules that could help treat deadly and chronic diseases like cancers and AIDS?

The future of human life is completely impacted by AI. Particularly its emergence in the healthcare and pharmaceutical industry will have a vital impact on disease control and new drug discoveries. AI is poised to revolutionise drug discovery in several ways. It can drastically reduce the time needed to discover and develop new drugs. AI can be used to help suggest novel combinations for treating fatal diseases and even predict treatment outcomes. Additionally, AI facilitates personalised medicine by tailoring treatments to individual patients, which can ultimately speed up the development of new therapies.

What are the key challenges in implementing AI-driven solutions in healthcare, particularly in the context of regulatory compliance?

I feel, the pharma and healthcare organisations in India are yet to gear up for AI. Many are still in the process of adapting to the advancements in the pharmaceutical industry brought about by digitalisation. Despite this progress, the majority of Micro, Small, and Medium Enterprises (MSMEs) are not adequately prepared to integrate AI into their operations. AI adoption, beyond platforms like Chat GPT, remains in its infancy and requires further exploration and validation. Moreover, there is a pressing need to harmonise regulatory compliances, particularly in manufacturing standards outlined by the International Council for Harmonisation (ICH). This entails the implementation of electronic documentation systems and global alignment on regulatory practices to ensure both qualitative and compliant manufacturing and healthcare delivery systems. Additionally, there is a significant gap in the infrastructure required for AI implementation, including the necessary hardware, software, and skilled professionals, which remains to be addressed.

Can you discuss a specific example where AI has been successfully utilised to discover or develop a new drug?

Although AI is currently making strides in drug discovery, its continual evolution opens up a multitude of possibilities in terms of drug candidates, their structures, and the discovery process. This versatility allows for the pinpointing of targeted molecules tailored to specific therapies or multiple therapeutic discoveries. A recent example highlighting this potential is Insilico Medicine's Pharma.AI, which is revolutionising drug discovery with its suite of AI-powered tools. PandaOmics, for instance, drastically reduces the time required for multi-omics target discovery, from several months to a few clicks. Similarly, Chemistry42 employs machine learning for de novo drug design, generating lead-like molecules within a week. Additionally, InClinico provides an invaluable tool for efficient clinical trial management, identifying potential weaknesses in trial design and predicting success rates. Collectively, these tools are streamlining the traditionally lengthy drug discovery process, accelerating the pursuit of breakthrough medicine.

How do you envision the role of AI evolving in personalised medicine and patient care?

I believe AI could be groundbreaking by using large amounts of data from healthy and sick people. It could help analyse specific therapeutic segments quickly to see how drugs work over time and improve

their formulations. It would also support Phase IV clinical trials, especially in monitoring drug safety (Pharmacovigilance). Overall, AI in personalised medicine and patient care has the potential to improve healthcare, make treatments better, and give patients more control over their health.

What are the ethical considerations that need to be addressed when deploying AI in healthcare settings?

The primary concern lies in protecting patient identity, which can be achieved through AI by masking identities in documentation, albeit in previously challenging areas. The rigidity and security levels of AI coding stand out as effective measures for safeguarding patient identity compared to traditional masking systems. However, the implementation of AI-driven solutions in healthcare, particularly concerning regulatory compliance, presents various challenges and ethical considerations. These include ensuring data privacy and security, adhering to diverse regulations, deciphering complex AI algorithms, managing the time and cost implications, addressing potential biases perpetuated by AI algorithms, integrating solutions into existing systems, navigating complex ethical and legal considerations, determining accountability and liability for decisions made, preserving patient autonomy and consent, and conducting real-time reviews for corrections.

How can AI help address the challenges of drug resistance in infectious diseases?

The emergence of drug resistance in infectious diseases poses a significant healthcare challenge. However, AI offers a promising solution by playing a crucial role in addressing this issue. Through predictive analytics, AI can forecast which drugs may become ineffective against evolving pathogens, allowing for proactive adjustments in treatment strategies. Furthermore, AI aids in the discovery of alternative treatments, the development of more effective medications, and the customisation of treatment plans tailored to individual patients. By providing real-time insights into the changing landscape of drug resistance, AI enables healthcare professionals to adapt swiftly, ultimately enhancing the efficacy of treatments and improving patient outcomes.

How do you see AI impacting the accessibility and affordability of healthcare services globally?

While AI offers significant potential for improving the accessibility and affordability of healthcare services on a global scale, there are challenges to overcome. These include ensuring fair access to AI-driven technologies, addressing concerns regarding data privacy and security, and navigating regulatory and ethical issues. Collaboration among various stakeholders, such as governments, healthcare providers, technology developers, and community organisations, is vital to fully realise the benefits of AI in enhancing healthcare accessibility and affordability worldwide.

What are the key factors hindering the adoption of AI in pharmaceutical research and development?

Pharmaceutical companies face several challenges when it comes to using AI in research and development. Firstly, they require high-quality and comprehensive datasets to effectively train AI models. Secondly, they must adhere to strict regulatory guidelines set by government agencies. Additionally, pharmaceutical companies often possess proprietary data and intellectual property that may not be easily compatible with AI systems. Finally, the significant investment required to implement AI technology presents a barrier to adoption for many companies in the industry.

Can you discuss a case where AI-driven predictive modelling has significantly improved clinical trial outcomes or drug efficacy in the Healthcare system?

It's important to note that using AI in the healthcare system, along with a thorough review of relevant literature from sources like PubMed/Medline, Scopus, and EMBASE, is significant. Integrating AI into healthcare has the potential to greatly improve disease diagnosis, treatment selection, and clinical laboratory testing. AI tools can analyse large sets of data and find patterns, outperforming humans in many healthcare tasks. AI brings higher accuracy, lower costs, and time savings, while also reducing human errors. It can revolutionise personalised medicine, optimise medication dosages, improve population health management, set guidelines, offer virtual health assistants, support mental health care, enhance patient education, and strengthen patient-physician trust.

For example, AI can be used in Therapeutic Drug Monitoring (TDM) by using machine learning algorithms to predict drug-drug interactions. By analysing large sets of patient data, these algorithms can detect potential drug interactions. This helps to decrease the risk of adverse drug reactions, reduce costs, and improve patient outcomes. BS

Amguth Raju
hyderabad@mmactiv.com

Establishing Ethical Frameworks for Equitable Use of AI in Healthcare

« **Ganesh Subramaniam,** VP Engineering, R&D, Murata Vios Ltd

Artificial Intelligence (AI) is currently catalysing a paradigm shift in the healthcare industry, fundamentally reshaping how medical services are delivered across the globe. The convergence of vast datasets and cutting-edge technologies has unlocked new possibilities in the diagnosis and treatment of diseases, leading to more accurate outcomes and significantly enhancing patient experiences. Let's take a comprehensive look at the transformative journey of AI in medicine, delving into its current applications, global trends, and the future outlook.

The global healthcare landscape is witnessing a seismic transformation driven by AI technologies. From therapeutics to diagnostics, hospital operations to clinical decision-making, AI is making significant strides across diverse applications. According to Statista, the value of AI in the global healthcare market was $11 billion in 2021, projected to reach an estimated $188 billion by 2030. This staggering growth, at a compounded annual rate of 37 per cent, underscores the immense potential AI holds in reshaping the future of healthcare.

Transforming Medical Research and Imaging Analysis

The impact of AI is not limited to specific segments; it spans the entire healthcare ecosystem. One critical domain experiencing a revolution is medical research, as AI expedites drug discovery processes. Through machine learning algorithms, researchers can predict the success rate of chemical compounds, significantly reducing the time and resources required for experimentation. This not only accelerates the pace of innovation but also holds the promise of bringing new, effective treatments to patients more rapidly.

In the realm of medical imaging analysis, AI is proving to be a game-changer. It enables the rapid and accurate detection of anomalies in MRI scans, X-rays, and CT scans. Radiologists benefit from quicker identification of potential life-threatening issues, minimising human errors and enhancing diagnostic accuracy. This not only saves crucial time but also improves patient outcomes, particularly in cases where early detection is paramount.

Data-Driven Healthcare

AI is revolutionising the traditional landscape of diagnosis and treatment by providing clinicians with unprecedented data-driven insights. Machine learning algorithms analyse extensive patient data to identify patterns and correlations, facilitating more accurate and timely diagnosis. Personalised treatment plans based on individual patient characteristics are now a reality, enhancing the effectiveness of medical interventions. The ability to tailor treatments to specific patient profiles leads to improved outcomes and a more efficient allocation of healthcare resources.

Real-time assessment of treatment effectiveness by AI tools further contributes to improved clinical outcomes and reduced healthcare costs. Monitoring and adjusting treatment plans based on real-world data ensure that patients receive the most effective interventions tailored to their individual responses. This not only enhances patient care but also contributes to the sustainability of healthcare systems worldwide.

Predictive analysis, powered by AI, enables healthcare providers to forecast potential outcomes based on historical data and real-time health information. Identifying patients at risk of specific conditions allows for early intervention, preventing complications and improving overall healthcare efficiency. Large-scale population data analysis

can also detect trends and outbreaks of infectious diseases before they become widespread, a critical capability showcased during the COVID-19 pandemic. The ability to anticipate and mitigate health crises is a testament to the power of AI in safeguarding public health.

Patient-Centric Approach

The integration of AI into healthcare is not solely about clinical applications; it extends to improving the overall patient experience. Streamlining appointment scheduling, providing remote monitoring solutions, and offering personalised treatment plans based on individual medical records contribute to a more patient-centric approach. AI-driven chatbots responding to routine medical inquiries reduce stress and save time for both patients and healthcare providers, fostering a more efficient and accessible healthcare system.

Despite the promises of AI in healthcare, challenges persist. Blind spots in data access and collection, privacy concerns, data misuse, and regulatory ambiguities are roadblocks to widespread adoption. In India, a rapidly growing player in AI-based healthcare, progress is evident, but there is still a long way to go. The ambitious goals of universal healthcare delivery and affordability through AI remain distant, requiring continued innovation and collaboration.

India, a major player in the global healthcare sector, is rapidly embracing AI. The National Strategy for Artificial Intelligence by NITI Aayog highlights the potential of AI to address challenges such as a shortage of qualified healthcare professionals and non-uniform accessibility to healthcare across the country. According to a report by the World Economic Forum, AI expenditure in India is projected to reach $11.78 billion by 2025, contributing significantly to the country's economy.

Despite challenges, AI's potential to revolutionise healthcare is undeniable. As technology continues to advance, AI's applications in telemedicine, genomics, robotics, and 3D printing will expand. Workforce training and collaboration between medical professionals and AI developers will be crucial for maximising the benefits of AI. The integration of AI with other emerging technologies holds the key to shaping the future of medical care.

As we delve deeper into the integration of AI in healthcare, it's imperative to address the ethical considerations surrounding this revolutionary technology. The responsible use of AI in medical settings demands careful navigation of issues such as patient privacy, data security, and bias in algorithms.

Privacy concerns arise from the vast amounts of

sensitive patient data being processed by AI systems. Ensuring robust data protection measures, stringent encryption, and transparent data usage policies become paramount to build and maintain public trust in AI-driven healthcare solutions.

The potential for bias in AI algorithms poses another ethical challenge. If the datasets used to train AI models are not representative or if biased historical data is fed into the algorithms, it can perpetuate existing inequalities in healthcare. Striking a balance in dataset curation and continuous monitoring of algorithmic outputs is crucial to mitigate bias and ensure equitable healthcare outcomes.

Moreover, the explainability of AI decisions becomes crucial, especially in critical medical scenarios. Ensuring that AI models provide interpretable insights aids healthcare professionals in understanding and trusting AI-generated recommendations, fostering collaboration between humans and machines.

In conclusion, AI is not just a buzzword but a transformative force reshaping the healthcare industry. From diagnosis to treatment, AI is proving its mettle by delivering accurate, personalised, and efficient healthcare solutions. While challenges persist, the trajectory of AI in healthcare is pointing towards a future where technology and human expertise converge to provide optimal patient care. As we stand at the intersection of technology and healthcare, the role of AI in shaping the future of medicine is more promising than ever.

As AI continues to evolve, it is crucial for stakeholders—be they healthcare providers, policymakers, or technology developers—to collaborate in establishing ethical frameworks that ensure the responsible and equitable use of AI in healthcare. The ongoing dialogue around ethical considerations is vital to ensure that AI remains a force for good in healthcare, driving positive change for patients and society at large. BS

IISER Bhopal develops strategy to link proteins with chemical tags for facilitating drug development

Researchers at the Indian Institute of Science Education and Research Bhopal (IISER Bhopal) have developed a technology named 'BHoPAL' for attaching chemical tags to proteins, an important process in the development of drugs. Through this technology, necessary chemical moieties can be linked to specific sites of a protein without harming the protein's efficacy. This process is essential for two main purposes- attaching proteins to fluorescent chemical tags for their visualisation inside cells enabling studies focused on understanding how they perform cellular functions; Linking drugs to antibody proteins for selective drug delivery to diseased cells such as cancerous cells preventing undesirable side-effects of these drugs. Proteins are extremely prone to loss of function when treated with chemical reagents. However, for the first time, IISER Bhopal's novel technique eliminates this problem. This technology is called 'Baylis Hillman orchestrated Protein Aminothiol Labelling' (BHoPAL) which efficiently tags chemicals to proteins without compromising their function.

IIT-G pioneers nanotech advancements in healthcare with new clean room facilities

S. Krishnan, Secretary of the Ministry of Electronics and Information Technology (MeitY), Government of India, recently inaugurated the groundbreaking SWASTHA project and the state-of-the-art ISO 5 and 6 Clean Room Facilities at the Indian Institute of Technology (IIT) Guwahati's Centre for Nanotechnology. Supported by MeitY, the Centre of Excellence on SWASTHA, "Smart Wearable Advanced nanoSensing Technologies in Healthcare ASICs," aims to revolutionise healthcare through advanced nanoelectronic theranostic devices. The project aims to deliver high-quality products and prototypes in micro/nano electronics and nanomaterials, with a focus on healthcare and energy applications. It emphasises innovation, scientific collaboration, and technological progress. The state-of-the-art ISO 5 and 6 Clean Room Facilities are the first of their kind in the North Eastern region of India. They are dedicated to promoting awareness and training in micro/nano electronic fabrication, facilitating industrial research and development, and supporting the Indian Nanoelectronics Users Programme (INUP).

Amrita Hospital Faridabad partners with IIT-H for innovative cancer treatment technology

Amrita Hospital in Faridabad has embarked on a groundbreaking collaboration with the Indian Institute of Technology, Hyderabad (IIT-H), Eranki Labs, and Amrita Centre for Advanced Robotics to develop state-of-the-art technology in radiation therapy for cancer treatment. Dr Bhaskar Viswanathan, Head of the Department of Radiation Oncology at Amrita Hospital, Faridabad, has been awarded a research grant to spearhead the development of an indigenous robotic ultrasound system for tumour motion and radiation hyperthermia. This technology aims to revolutionise cancer treatment by providing non-invasive, precise, and effective therapies. The collaboration aims to leverage robotic ultrasound systems to track tumour movement in real-time, ensuring accurate radiation therapy delivery while minimising damage to surrounding healthy tissue. The project, funded by the Indian Council of Medical Research (ICMR), is expected to be completed in three years.

Ensuring Good Laboratory Practice with Quality Plasticware: A Crucial Component of Scientific Research

In the world of scientific research, meticulous attention to detail is paramount. One often underestimated but critical aspect of laboratory work is the plasticware. Good Laboratory Practice (GLP) demands not only the proper handling and maintenance of equipment but also the thoughtful selection and utilization of plasticware.

Leachables, substances capable of migrating from laboratory consumables into reaction mixtures, pose significant risks to the integrity and accuracy of molecular biology techniques such as PCR, RT-PCR, and DNA sequencing. These techniques rely on precise manipulation of genetic material, and any interference from leachable can compromise results and lead to erroneous conclusions.

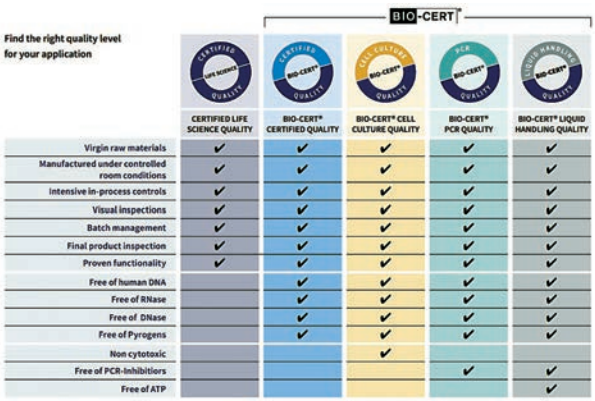
Polypropylene (PP), commonly used in the manufacturing of laboratory consumables such as tubes, plates, and pipette tips, can have various additives including antioxidants, plasticizers, slip agents, biocides (like DiHEMDA), UV stabilizers, monomers, oligomers, and colorants. Even trace amounts of these substances leaching from the plastic surface have the potential to detrimentally affect experimental outcomes.

This article delves into the significance of good laboratory practice with BRAND life Sciences plasticware and the best practices that should be followed.

Selection high-quality plasticware is crucial because using subpar plasticware can introduce undesirable variables into experiments. High-quality plasticware is designed for accuracy and consistency. Sterilize plasticware as needed to prevent contamination by autoclaving, Beta irradiation, UV & ETO treatment, or chemical disinfection methods.

Most plasticware is inert and non-reactive, ensuring that it does not introduce unwanted substances or impurities into experiments, which can compromise results. Consistency in experiments is essential for reproducibility and uniform plasticware ensures that experimental conditions remain constant. Calibrate pipettes regularly to ensure accurate measurements. Always use appropriate tips designed for pipette model. Dispose of plasticware responsibly, adhering to local waste disposal guidelines. Consider using eco-friendly alternatives when possible.

Leachable may contain compounds that inhibit the DNA polymerase enzyme or reverse transcriptase, leading to reduced or failed amplification. Contaminants from leachable can introduce foreign DNA or RNA, causing false-positive results or



Interference with target amplification. Leachable can dilute the template DNA or RNA, reducing the sensitivity of the assay. leachable can affect the quality of sequencing reads by introducing noise or errors in the sequence data. Inaccurate base calling may occur if leachable alter the fluorescent signals used in sequencing. Leachable may interfere with quantification methods, affecting the calculation of DNA concentrations for sequencing libraries.

Researchers must prioritize the use of high-quality plasticware, adhere to strict cleanliness and labelling protocols, and promote environmentally responsible practices.

At BRAND, we utilize virgin Polypropylene and ensure the absence of substances such as Oleamide and diHEMDA. Our process involves the use of meticulously polished molds without the need for releasing agents. Additionally, our production takes place in state-of-the-art cleanrooms conforming to ISO 14644-1 standards ranging from class 5 to 8.

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BRAND Scientific Equipment Pvt. Ltd.
Ph : 91-22-42957790
Email : customersuport@brand.co.in
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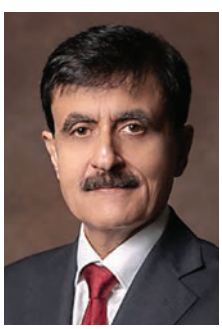
Srinath Venkatesh steps in as MD- India and South Asia at Thermo Fisher Scientific

Srinath Venkatesh has stepped in as the Managing Director (MD), India and South Asia, Thermo Fisher Scientific, as the company embarks into another transformative year of growth and making a meaningful impact with its purpose-driven mission. Venkatesh's proven record of over 30 years has been pivotal in driving sustained growth and success across businesses. Under his visionary leadership, Thermo Fisher will continue its legacy of excellence and steer its operations in India to greater heights. Previously, Venkatesh was serving as the President- Danaher India, and prior to that, business leadership roles including Managing Director- India & South East Asia for Cepheid; Country Leader and Chief Executive Officer for GE in Bangladesh. He started his professional career in 1993, and has held several sales, commercial and business leadership positions across the industrial and capital businesses.

Indian Chemical Society honours Bharat Ratna Prof. C. N. R. Rao as "The Chemist of the Century"

The Indian Chemical Society (ICS), in the midst of its centennial year, celebrated the remarkable achievements of Bharat Ratna Prof. C.N.R. Rao by conferring upon him the prestigious title of "The Chemist of the Century." The felicitation ceremony served as a fitting tribute to Prof. Rao's outstanding career, characterised by ground-breaking research, international acclaim, and impactful leadership roles in the field of chemistry. Prof. C.N.R. Rao, a luminary in the realm of chemistry, has significantly shaped the scientific landscape with his prolific contributions. His illustrious journey, from earning his academic credentials at esteemed institutions to assuming leadership positions in prominent scientific organisations, reflects a lifetime dedicated to advancing the frontiers of knowledge. Prof. Rao's legacy, encapsulated in this prestigious title, stands as an inspiration for future generations of scientists and underscores the profound and lasting influence he has had on the scientific community.

OmniActive Health appoints Amit Chopra as President and CEO



OmniActive Health Technologies, an innovative science and natural health company, has announced the appointment of Amit Chopra as its new President and Chief Executive Officer (CEO). He will be based at the OmniActive Mumbai headquarters. Chopra has served in various leadership positions and brings a wealth of experience in general management, commercial, manufacturing, M&A, and innovation. Most recently, he served as Managing Director for India and South Asia at Thermo Fisher Scientific, where he led the region to become one of the fastest-growing markets globally by building a highly engaged world-class leadership team, transforming customer experience, and successfully integrating multiple Indian and global acquisitions.

Biocair expands operations in India by opening office in Bengaluru

Biocair, a UK-headquartered life science logistics expert, has announced the opening of its office in Bengaluru, the company's fourth office in India. Spread over 2500 square feet, Neha Naik, General Manager Biocair India, inaugurated the new office in the presence of customers and key partners. Biocair has a presence in the country since 2021 with its corporate office in Mumbai, and other locations in New Delhi and Chennai. Biocair has built up a unique, client-centric approach by employing scientists in front-line logistics positions and assembling a team of best-in-class industry experts in quality, cold chain and regulatory compliance. As members of the many regulatory associations such as UK Authorised Economic Operator (AEO) and The International Air Transport Association (IATA), and having certifications such as ISO 9001:2015 and wholesale dealer licence from the Medicines and Healthcare products Regulatory Agency (MHRA), Biocair is extensively qualified to manage time and temperature-sensitive biopharma materials.

FedEx unveils new Life Science Centre in Mumbai

FedEx Express, a subsidiary of FedEx Corp., has unveiled its 'FedEx Life Science Centre' in Mumbai, setting a benchmark in the clinical trial supply chain in India and globally. The new capability will meet and support the clinical trial storage and logistics requirements of healthcare customers both within the India market and those shipping to India from around the world. The facility has ensured compliance with quality and regulatory requirements of the healthcare industry. Key features of the new FedEx Life Science Centre include covering all three temperature-controlled zones- Controlled Ambient (15 to 25 degrees celsius); Refrigerated (2 to 8° degrees celsius); and Frozen at -20 degrees celsius and Deep Frozen at -80 degrees celsius. The new centre also offers 24/7 monitoring and alarms for immediate response and intervention; destruction services for returned Investigational Medicinal Products (IMPs); equipped with document storage and a secure archival facility with fire-safe walls.

Nicoya expands into India with appointment of Medispec as exclusive distributor

Nicoya, a Canadian life sciences tools company specialising in innovative biosensor technology for the academic and biopharmaceutical sectors, is expanding its operation in India by appointing Mumbai-based Medispec as its exclusive distributor. This strategic partnership marks a significant milestone in Nicoya's commitment to providing cutting-edge research solutions to the scientific community around the globe. Nicoya is known for its state-of-the-art Alto and OpenSPR platforms

that are designed to accelerate biomolecular interaction studies and lead screening during drug discovery. With a mission to improve human life by helping scientists succeed, Nicoya is collaborating with Medispec to bring its ground breaking technologies to the Indian market as demand grows. Medispec, a prominent and trusted name in the distribution of life science and medical research instruments, brings a wealth of expertise and a strong reputation for delivering high-quality products and exceptional customer service. Their dedication to supporting scientific advancements aligns seamlessly with Nicoya's vision, making them the ideal partner to represent Nicoya in India.

Takara Bio offers new solutions for oncology research

Takara Bio USA, Inc., a wholly owned subsidiary of Takara Bio Inc., has announced plans to launch two critical solutions for oncology research. These automated single-cell total RNA-seq and DNA-seq library preparation kits will provide high sample and cell throughput, less hands-on time, and the ability to capture more information than other available technologies. The Shasta Total RNA-Seq Kit will detect splicing isoforms, gene fusions, and non-polyadenylated RNAs through full-length transcriptome profiling of up to 100,000 single cells per run. Similarly, the Shasta Whole-Genome Amplification Kit will enable novel insights into tumour heterogeneity through copy number variant (CNV) and single nucleotide variant (SNV) analyses of over 1,500 single cells at once. Several technological limitations have slowed oncology researchers' ability to discover critical biomarkers. Popular single-cell RNA-seq methods, although high-throughput, lack full-length transcript coverage and detect limited mRNA biotypes, leaving out critical information from precious samples. Even current instrument-free high-throughput single-cell RNA-seq workflows take several days to complete and are limited to mRNA-only readout.

Qiagen brings new QIAstat-Dx syndromic tests for rapid and accurate diagnosis of infectious diseases to India

Qiagen has announced the launch of two syndromic testing panels for its QIAstat-Dx instruments in India, including the Gastrointestinal Panel 2 and Meningitis/Encephalitis Panel, which join the Respiratory SARS-CoV-2 Panel that had been authorised for emergency use in 2020 first time. The panels have received regulatory approval from the Central Drugs Standard Control Organization (CDSCO), enabling healthcare providers in India to diagnose patients accurately, faster, and easier. The QIAstat-Dx system is designed for use in laboratories and employs cost-efficient, single-use cartridges with all reagents on board and built-in sample processing. Utilising multiplex real-time PCR, it detects and differentiates between multiple pathogens. QIAstat-Dx additionally provides easy-to-view cycle threshold (Ct) values and amplification curves that can offer additional insights not available with end-point PCR or other techniques.

Thermo Fisher launches next-gen Invitrogen TaqMan Cells-to-CT Express Kit

To help labs pursue more sustainable practices, Thermo Fisher Scientific has launched a next generation Invitrogen TaqMan Cells-to-CT Express Kit, offering simplified, scalable workflows for gene expression analysis that produce less plastic waste. With improved chemistry, the Cells-to-CT Express Kit helps facilitate the preparation of cell lysates for reverse transcription (RT) real-time PCR (qPCR) in just 5 minutes. With the Cells-to-CT Express Kit, researchers can measure relative gene expression while skipping the traditional RNA purification step when performing RT-qPCR. Instead, with only 5 minutes of prep time required, they can go directly from cultured cells to RT-qPCR. This not only promotes a faster workflow overall, with results delivered from an entire plate of cells in 70 minutes, but also reduces the plastic waste generated from the process. With the Cells-to-CT Express Kit, the amount of waste generated is approximately 8.1 grams of plastic.

Beckman Coulter unveils DxC 500 AU chemistry analyser

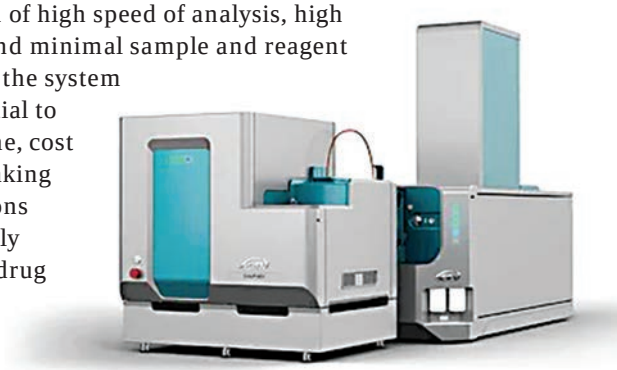
Beckman Coulter Diagnostics has unveiled its new DxC 500 AU Chemistry Analyser, an automated clinical chemistry analyser. It is one of several recent Beckman Coulter solutions designed to address the complete needs of healthcare systems that are looking to complement central hub laboratories by advancing the technology and capabilities of satellite and independent hospital laboratories. The product features advanced automation technology, onboard guided workflows, and standardised reagents for use across healthcare networks. Its menu of more than 120 assays has been independently and objectively verified for high quality Six Sigma performance, supporting confidence in clinical results, reducing QC trouble shooting and lab operational costs. The DxC 500 AU Chemistry Analyser is for in vitro diagnostic use only. It is available throughout North America and the Middle East. Global commercial availability is planned for March 2024.

Agilent partners with Incyte to develop advanced companion diagnostics in haematology & oncology

American firm Agilent Technologies Inc. has announced an agreement with US-based Incyte, an American multinational pharmaceutical company with headquarters in Delaware, and Switzerland, that will bring together Agilent's expertise and proven track record in the development of companion diagnostics (CDx) to support the development and commercialisation of Incyte's hematology and oncology portfolio. The agreement between Agilent and Incyte allows the companies to collaborate on CDx development programmes. This will enable Agilent to continue to expand its companion diagnostics portfolio with novel biomarkers and Incyte to leverage Agilent's expertise in IVD assay development, global regulatory approvals, and commercialisation to support clinical trials as well as the potential registration and commercialisation of CDx in the United States and Europe.

Sciex expands high-throughput screening solutions with Echo MS+ system

Sciex, a US-based firm in life science analytical technologies, has launched the Echo MS+ system. It couples proprietary Acoustic Ejection Mass Spectrometry technology and Open Port Interface (OPI) sampling with the capabilities of either the Sciex ZenoTOF 7600 or Triple Quad 6500+ system to deliver precise qualitative and quantitative results, through an expanded panel of robust high-throughput screening workflows. The system addresses key challenges in high-throughput screening applications for drug discovery without the need for extensive method development. This is achieved through the introduction of new, flexible workflows for small and large molecules that leverage the capabilities of high-resolution mass spectrometry for improved selectivity and sensitivity compared to other analytical tools. Through a combination of high speed of analysis, high data quality and minimal sample and reagent consumption, the system has the potential to reduce the time, cost and risk in making critical decisions during the early phases of the drug development pipeline.



Prioritising Women's Health & Wellbeing

According to a new report from the World Economic Forum and the McKinsey Health Institute launched at Davos in January 2024, women may live longer than men, on average, but they spend 25 per cent more of their lives in debilitating health. The report said improving diagnostics, data on women-specific conditions like ovarian cancer, and directing more investments towards women's health and research is needed. In particular, McKinsey research finds that less than 2 per cent of healthcare research and innovation is invested in female-specific conditions beyond cancer.

This 'women's health gap' equates to 75 million years of life lost due to poor health or early death each year. Closing the gap would benefit 3.9 billion women, giving them an extra seven healthy days a year, or an average of 500 days over a lifetime. Further, it could boost the global economy by $1 trillion by 2040 from fewer early deaths and health conditions, and a greater capacity for women to contribute to the economy and society.

As a result of these findings, the final hours of the World Economic Forum in Davos saw the launch of a new Global Alliance for Women's Health, which has the broad ambition of 're-shaping the future of women's health and the global economy.' The health alliance will pledge new commitments from governments, philanthropies, and pharmaceutical companies, among others, across three pillars i.e. financing, science and innovation, and agenda-setting. So far, partners have pledged $55 million to improve women's health outcomes.

With International Women's Day 2024 being themed around 'Inspiring inclusion', we see governments across the globe putting the much-needed emphasis on women's healthcare. For instance, the UAE has set out wide-ranging plans to bolster healthcare services for women, by approving the 'National Policy for Improving Women's Health' for providing the highest healthcare services quality for women, whether curative, preventive or rehabilitative services. Similarly, the Irish government is paving the way for a longer-term comprehensive Women's Health Strategy.

Women in England are being urged to help shape reproductive health policy, as the government seeks views on periods, contraception, fertility, pregnancy and menopause for health strategy. Likewise, the Biden administration recently announced a White House initiative to improve how the federal government approaches and funds research into the health of women, who make up more than half of the US population but remain understudied and underrepresented in health research.

India, of course, is not far behind in this initiative. The Interim Budget 2024-25 announcement that took place on February 1, 2024, laid focus on encouraging vaccination for girls in the age group of 9 to 14 years for the prevention of cervical cancer.

Besides these government initiatives, multiple efforts are also being made by the industry players to improve women's health. For example, the US Food and Drug Administration (FDA) has approved Zurzuvae as the first and only oral treatment approved for women with postpartum depression, developed by American pharmaceutical company Biogen. The US FDA has also recently approved a birth control pill to be sold without a prescription for the first time in the US, a milestone that could significantly expand access to contraception. The pill's manufacturer, Perrigo Company is based in Dublin.

Further, biotech companies in the UK and Korea are embarking on the world's first prospective study of artificial intelligence (AI)-powered breast cancer detection, to streamline diagnosis, and tackle radiologist shortages. On the other hand, startups in India have developed groundbreaking multi-cancer detection tests specifically designed for high-risk and asymptomatic women.

Quality, affordability, and accessibility, particularly in the context of women's health, are very critical aspects of ensuring well-being. This calls for greater mobilisation across sectors to invest in women's health, keeping in mind the imperatives of equity and integral care. BS

Dr Manbeena Chawla
Executive Editor
manbeena.chawla@mmactiv.com

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poonam.bhosale@mmactiv.com

ankit.kankar@mamctiv.com

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