Post COVID-19: Modernizing India's Healthcare Infrastructure

Introduction

Today, there's an acknowledgement that populations live healthier with improved wealth, which doesn't arrive at free of cost. It shows that progress is workable, but its interpretation of access to health and healthcare services is unequal. It symbolised the Primary Health Care movement and yet failed to meet the hopes of the related population. The nature and character of the health problem are changing, although knowledge, attitudes, and behaviour about health are only partially changing. Transversion and transmission of infectious, acute, and non-communicable diseases demand integrated and comprehensive disease management beyond the symptoms, primarily based on causes and disorder know-how.

Human resources are vital for the effective implementation of healthcare services offered equitably to achieve sustainable development goals. The availability of healthcare personnel with the needed competency for managing healthcare crises could be a challenge and can't be over accentuated. In public health crises like COVID-19, numbers alone won't essentially cause the well-liked changes in health status and outcome. The is because: we tend to, as human beings, never learn a lesson from the past. Since World War II, the world has encountered a spread of endemics, although humans might succeed and succumb to several. Mankind proudly says he's developed advanced medical tools and improved drug missionaries to face challenges that occur from time to time. However, the failure is uncertain in (medical) science and its unpredictable result orientation because it never had preventive and promotive thoughts instead of centred on care and treatment. For example, in 2003, SARS jerked the world; after a decade, in 2013, Ebola jolted, and 2020 was no time for COVID-19 to stir humanity.

The repetitive influx of endemics proved inefficiency and ineffectiveness within the healthcare system, demanding 3-Cs-concern, competencies, and commitment alongside 5-As – accessible, available, affordable, approachable, and accountable. COVID-19 found that globalisation forged negative navigation in terms of accrued economic and doubled the disease burden. There is little or no governance in informatics in conjunction with the evolving business competition with no or fewer ethics counterfeit COVID-19 pandemic. Several strategies were fabricated to arrest the invisible-coronavirus, but they paid a heavy toll, in terms of morbidity and mortality, without any benefits. Additionally, 50% of the productive population recorded job loss; 32% of the population tumbled to the poverty line; 42% begged for health poverty level, and more than 300 million people had acute food shortages. Each micro and macroeconomy scrambled into a recession. A scary sketch of humanity and its livelihoods. This demands' design thinking in the health system and disease management.

The Coronavirus shamed humanity since we were perplexed and stranded as personal protection equipment (PPE) and the standalone infrastructure required is unavailable. India isn't an exception to the present. India's dependency on PPE, medical instruments, diagnostic kits, and clinical know-how has led to the population being anxious, bothered, concerned, and distressed-ABCD. At the same time, Indians are put under strict lockdown alongside social distancing protocols, as India needs to import over 80% of its pharmacy/drugs raw materials, although it is the third-largest drug manufacturer in the world. Nonetheless, it's understood that Indians should not panic but get to steer away from the ill-equipped infrastructure.

Meanwhile, the Indian public-private partnership (PPP) has been challenged and hit. The government ordered several health services to suspend more space for COVID-19 patients to enhance their capacity, acquire other hospital beds with existing accoutrements, and establish private hospitals without isolated premises[1]. This shows the infrastructural limitations that need attention to deal with uncertainty. Interaction with private hospitals associations mirrored that there's not an organic link between public-private establishments for training, sharing of knowledge and experience.

Managed care through integrated medicine also failed to display its competency, although integrative medicine has the competence to contribute to prophylaxis and protection of vulnerable organs involved in viral entry. Several COVID-19 strategies focused on healthcare personnel and their associated front-liners to save lives and alter the population's lifestyles. The stigmatised COVID-19 brutally distanced the frontline workers and socially distanced the sufferers' delay in reporting, with increased morbidity and mortality. 'Nations without borders' revealed the gaps in COVID-19 management while didn't examine WWWW-where we went wrong? It could

be attributed to many factors: systemic issues, inequity, inadequate competencies, low healthcare financing, misinformation, and inadequate competencies in delivering services.

However, first, there's a loss of opportunities, as the health system hasn't geared up to rapid changes in health, alterations in the quality of life, variation in lifestyle, and insulated globalisation. Second, unfair economic opportunities, social inequalities, and a notable lag in improving health measures. Third, the primary healthcare movement and its guiding principles have failed to provide a people-centric approach and guide expectations, both of which are critical to healthcare governance. It aimed the health discourse of Alma Ata to provide evidence, justification, and responses to health needs and address social challenges. This paper primarily addresses post-COVID-19, how the Indian health system is required to be so that it can avert any emerging threats? The present status of competency and skills in the health system raises many queries. Will the health system have the potentiality to create the capability of those health-functionaries? Is that the existing resources and infrastructures appropriate? Is there a preparedness embedded within the healthcare system to develop the requisite skills in providing services effectively?

Fostering Healthcare System Functioning

The World Health Organization (WHO) defines the healthcare system as measures for sustaining people's health and communities, including health promotion, prevention, protection, care, and treatment. WHO also advocates strengthening the information system, linking organisational structures, managing infrastructure, and human

Fig-1: Nurturing Health Care Components for Development

resource capacity to deliver healthcare services and improve health outcomes[2]. Candidly, the health outcomes in India have improved over the last 75 years, but there are still many constraints, contractions, and challenges, most of which to responsiveness and responsibility. Some point out that medical technologies and scientific advancements have substantially contained many diseases. Nonetheless, a considerable population still cannot access, avail, and afford these services because of physical, social, and economic opportunities among weaker and vulnerable people in society. The absence of a comprehensive healthcare operational framework, adapted modern technologies and tools to improve responsiveness and reinforcing spatial mapping measures for the provision, financing, regulation, and management of healthcare resources and infrastructure are unmistakable.

Candidly nurturing a healthcare system offers considerable economic payoff. Enhanced public health boosts productivity while also ensuring a high quality of life and a long life span. There is a demand for health investment to alleviate poverty, while the economic benefits for those in need outweigh those of the affluent since the poor have higher disease burdens. As a result, modernising the healthcare system with openness (adequate resources and infrastructure) empowers citizens to fall back from the vicious cycle of low capital, lower revenue, and poor health. The improved responsiveness of the healthcare system centred around prevention, promotion, protection, and prescription (care and treatment) substantially frees up the financial resources used for other developmental agendas and social services (Fig-1). Strategies toward eradicating poverty, income disparity, underemployment and unemployment, and gender inequality are undoubtedly contributory factors that unmistakably improve health outcomes. Strong leadership and stewardship are required to secure essential investments in health to increase health system performance, coordinate stakeholders, forge partnerships, develop protective health measures, and enhance human resource cohesion.

Population, Health and Resources: Facts and Facets

The interrelatedness between resources and the population is a tricky subject. The interconnecting of these two sets of phenomena comes from a diverse universe of discourse. Putting them into one platform is not like comparing apples and oranges, both fruits, but more like comparing donkeys (resources & infrastructure) and viruses (corona). The resources & infrastructure themselves include a vast and varied number of things having little in common. In addition, "health and healthcare" themselves are peculiar subjects. However, they are not used to dealing with resources and infrastructure. Health and healthcare are thus often viewed as a purely scientific phenomenon to be observed and understood but a matter of political and economic significance. As things stand, India, the second populous country in the world, is seriously concerned about resources and infrastructure and about expanding healthcare services to achieve rapid, sustainable, and more inclusive growth[3].

Excessive population increase is assumed to be caused by high fertility, putting pressure on finite resources and infrastructure. Resources and infrastructure, where inaccessible, have been given incredible attention. Despite a significant paradigm shift at the beginning of the 1990s, growth rates rose sharply when the economic policy unravelled. This mirrored a substantial improvement in India's population's health. For instance, the infant mortality rate per 1,000 live births declined from 64 in 2000[4] to 30.9 in 2019[5] and is comparable with Eastern and Southeast Asian countries. The maternal mortality ratio was 122 per 100,000 population in 2015-17[6] down from 210 in 2010, but far above the regional mean[7]. Through the availability of health infrastructure and health outcomes, existing scarce public health services become negligible.

Despite significant progress made over the last ten years, health spending was valued at 2611.01USD of GDP in 2017, up from 834.2USD in 2006[8]. Poverty reduction remains a severe challenge to policymakers in India. Poor health and inadequate healthcare spending are important causes of the country's poverty. India is in the awkward position of a developing country on the threshold of tiger-hood. This is mirrored in its primary health issues that embody diseases of poverty (e.g. tuberculosis, malaria, diarrhoea, and other infectious diseases) and diseases of affluence (e.g. diabetes, cardiovascular diseases).[9] The existing healthcare package is inadequate, with no preventive or basic curative care for catastrophic (lifestyle and non-communicable) diseases. As a result, holistic healthcare systems are becoming increasingly important, especially for preventing and managing chronic and non-communicable illnesses connected to a sedentary lifestyle.

Knowing the potential of the AYUSH system of medicine, the Indian government established it as an essential component of the NHM[10], ensuring that lifestyle and non-communicable diseases enjoy sustainable, affordable, and progressive health benefits and that it strives to influence the provision of reasonable, quality health care[11]. Though 70% of India's population does not have health insurance, the country also has two million beds short of the worldwide benchmark. The 'Aarogya Bharat 2015' report demanded an increase of 2.5% to 3% of GDP in government health spending and apportioned a larger share of public expenditure for prevention, including mass screening and primary care measures[12]. The revitalising of the Local Heath Tradition (LHT) is still in its early stages. Still, it attempts to construct a square measure concerning health promotion, prevention, and curative ways that have widespread acceptability and prevalence among households of different economic strata. LHT is vital in supporting and enhancing the AYUSH system. Therefore, LHT revitalisation is another strategy for the NHM to be evaluated.

Limited public resources have pushed the government, notably for life and non-communicable illness care, to rely increasingly on direct household finance[13]. High out-of-pocket expenditure has impeded the ability of poor households to get medical attention. Many families had to deal with catastrophic healthcare costs. Such costs are a significant cause of poverty. In addition, related disabilities hurt household income and assets. Therefore, faced with a noticeable decrease in resources, the Ministry of Health and Family Welfare has the problem of addressing multitudinous concerns. Yet, the challenges related to health-devolution, public sector programs don't prioritise people's needs-that are affected by diseases of poverty and diseases of affluence. Catastrophic health expenses-and thus, the recent budget crisis is expected to result in a slower pace of improvement in health status, threatening the country's chances of meeting the health-related Sustainable Development Goals.

Diseases Burden: Causes and Lags

Estimations of disease burden based on sound epidemiological research serve as the foundation for public policy. What would public policy initiatives need to be prioritised based on this evidence? Well-researched longitudinal data can allow judicious targeting and facilitate deciding what needs to accomplish where, for whom, and when. Conversely, the absence of empirical data of reasonable quality would affect program design and, therefore, results. India has ample evidence of these effects, often because of the mismatch between the burden of illness and its causal factors. Thus, the adopted intervention and priorities in the allocation of resources. Besides the necessity to avert disease to enhance the quality of life, neglect would have adverse consequences on the well-being of affected families–social, psychological, and economical. Identification of the diseases based on four criteria: first, India is one of the 23 selected countries is contributing about 80% of the total mortality burden attributable to catastrophic diseases and 50% of the total burden of disease caused by

non-communicable diseases worldwide. Seven out of the ten leading causes are devastating diseases, accounting for 57.8% mortalities [14] (Fig-2). Second, the likelihood of the burden of specific health conditions falling on the poor; third, diseases (like NCDs) that are heavily concentrated on young and working adults or the poor, as with cerebrovascular disease, cancer, renal diseases, hypertension, diabetes, and chronic

Fig-2 Catastrophic Diseases Trends, India 2010-18

obstructive pulmonary disease, which have a ruinous impact as these diseases are costly to treat, mainly due to lack of health financing mechanisms; and fourth, the likelihood that a health issue may cause many people to become financially disadvantaged and fall below the poverty line.


Fig-3 Health Spending by BRICS Nations
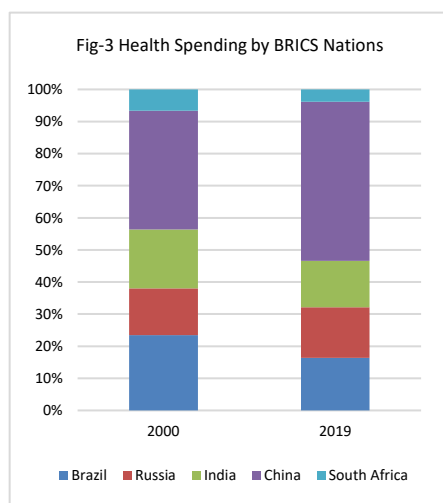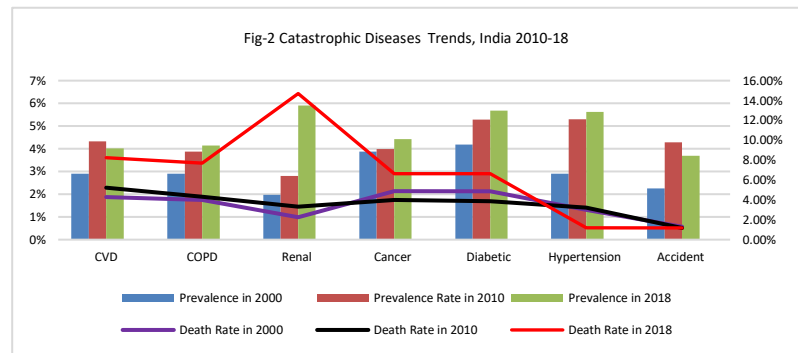
India accounts for 21% of the global burden of the disease[15]. India is home to the greatest burden of maternal, newborn, and child deaths[16]. The infant mortality rate dropped from 83 per 1000 live births in 1990 to 30.9 in 2019, whereas the maternal mortality ratio decreased from 570 per 100,000 live births in 1990 to 212 in 2007–9 and then to 122 in 2015-17. But they remain high in comparison with other BRICS countries (Fig-3). While there has been impressive progress in tackling transmissible diseases such as polio elimination, rapid changes in lifestyles have led to the emergence of non-communicable diseases, which represent two-thirds of total morbidity and around 53% of total deaths (from 40.4% in 1990 to 59% in 2019), though life expectancy at birth has increased to 67.4 years for males and 70.2 for females[17]. Gender issues are of great concern. In the 2011 Census, the worrying proportions of selective abortion were more apparent; in the 0–6-year age group, females to males had a steep decrease from 0.945 in 1991 to 0.924 in 2020[18]. India has a gender equality index of 0.501, well below that of China (0.163), Sri Lanka (0.380), or Nepal (0.476). [19]

The World Bank claims India loses almost 6% of its GDP annually due to premature maternal death and preventable maternal morbidity. Total health expenditure is 4.2% of GDP (Fig-3). Of this, current public spending on maternal health is barely 1.28% of GDP. Over 72% are out-of-pocket expenditures incurred at the point of service. Per capita, health spending in the country rose from $21 in 2000 to $44 in 2019 (government spending rose from $6 to $13). India, however, remains one of the five countries with rock-bottom levels of public health spending. Out-of-pocket payments have grown, with 2.2% of the population becoming impoverished each year because of catastrophic illness-related expenses. Hospitalisation for major illnesses, particularly for individuals living below the poverty line, can be a significant cause of indebtedness. The needy consume less in developing countries, and the swanky use more. In other words, public health spending disproportionately benefits the wealthy (over the poor), which is understood as inverse care.

Public health programs – like reproductive health and tuberculosis - lack adequate financing mechanisms despite the programs' several edges on the poor and have more considerable positive externalities for society. In addition, susceptible regulatory obligations deplete affordable or cost-effective mechanisms, particularly drugs and medical devices[20]. As a result, drug prices are higher because economies of scale or standardisation can't gain impact, and quality control concerns arise. Indian health programs and the Universal Health Insurance Program remain weak overall and uneven across states. Only 20% of the poor are insured nationwide. However, counting the enrolled poor is difficult as poverty statistics don't exist at municipal levels, and local government entities cannot accurately map the poor[21]. This unequivocally established that impoverished people with worse health are much less entitled to public subsidies and are more likely to spend a much higher proportion of their income on health care. The poor bear a disproportionately and doubly burdened when they encounter health problems like infectious and cardiovascular diseases, first, by losing their economic productivity, and second, by spending a tremendous amount out of their pocket on treatment, adversely affecting their household economies[22]. It's been found that it's precisely the poor people who have to contend with inferior quality and

inaccessible health services and other factors that tighten the constraints a poor household faces even more. Increased public finance doesn't correspond to a growing dominance of poverty and ill-health in the Indian health care market (Fig-4). Because of weak health resources and infrastructure, inconsistent or deficient approach to good health, the healthcare system's capacity to function is likewise at risk, and well-informed resources and infrastructure development are sparse.

Fig-4 Health Transition - India (1955-2017)
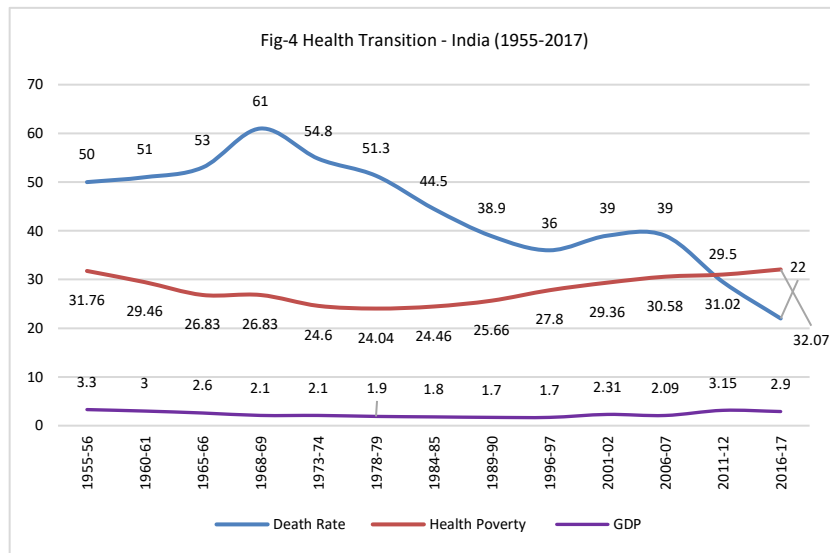
The Indian healthcare system is unanswered when it involves establishing an equity fund for demand-side subsidies[23] or social health insurance[24] to mitigate poverty and provide financial support for ill-health or the catastrophic health expenses of the weak and vulnerable populations[25]. An apparent disparity concerning the distribution of resources for public health is the main reason for this ambiguity. Inequality reveals increasing public expenditure disparity between the poor and the rich and a significant absorption of public subsidies by the richest within a state[26]. The disproportionate intake of public subsidies reflects a failure to prioritise public health institutions. As a result, the government has incurred substantial healthcare costs (during and after Covid-19). Still, it has hampered household out-of-pocket expenditures[27] (72%), while the public sector's share of total health expenditures (of 37%: 17% from central and 20% from state governments) has declined, the national health insurance program coverage remains low (30% in 2014). It allocated most public resources to curative healthcare, with only 13% directed toward preventive health programs[28].

Therefore, there is a need to expedite progress toward achieving Sustainable Development Goals (issues with child health, under-nutrition, and gender equity problems). The high burden of disease, albeit substantial progress, has been achieved with some disorders and changes in the epidemiological profile, with the emergence of non-communicable diseases like cardiovascular and cerebrovascular diseases, metabolic diseases, cancer, and mental illnesses as first-order problems, whereas tuberculosis is acquired. There is considerable concern about the disconnect between gaps, challenges, and expectations. Therefore, stronger collective and management actions need to reflect the values of reforming delivery systems and eradicating health poverty resulting from catastrophic health expenditures.

The responsibility for delivering health services rests with the government, which protects the interests of the people. Not that the government should reform the health system. However, the legitimacy of state intervention hasn't solely been supported by social and political concerns, conjointly wide to command public expectations. Due to this, integrative medicine plays a redistributive role in preventing catastrophic diseases and man-made disasters like COVID-19 and protecting the public from health poverty. There are other key economic actors whose intentions are additionally aligned to supply a viable health market: an upscale modern health economy can't sustain itself while not sharing and pooling resources. About 74.01% of manufacturing units supported Ayurvedic products, 14.12% for homoeopathy, 7.22% for Unani, and 4.65% for Siddha medicine. The AYUSH sector is expected to be worth Rs. 20000 crore[29]. Unfortunately, the Indian AYUSH system is today dominated by the 'traders' mafia's vision rather than a vision inspired by value-added knowledge goods. This entails major transformation and re-investment in constructing integrative medicine–the AYUSH image. This transformation, called positive (effective) stewardship, has increasingly centred on mediation to address current and future complex health challenges while addressing greater efficiency and equity on the ground.

The reduced engagement of the government in the healthcare sector exposes an increasing number of households at risk of catastrophic healthcare expenditures. As a result, many rural and urban households cannot meet the costs and have effectively excluded from healthcare, particularly those with cancer, cerebrovascular diseases, hypertension, diabetes, renal problems, and chronic obstructive pulmonary diseases. Several efforts are to invert the trend–pooling and pre-payment schemes bolstered at the end of the 2000s and the beginning of the 2020s, respectively, by introducing basic health insurance schemes and Ayushman Bharat. These schemes aim for broad coverage with a relatively modest depth of benefits and are tailored to the needs of the native population. Financial resources under these schemes are paid through various insurance mechanisms or pooled at the level of the local health administration, significantly strengthening risk-sharing capacity. It's worth noting that 'political poverty'–better off with political backing-is quicker to take advantage of these schemes than a household with varying low incomes. The AYUSH, however, raised hopes and advanced in expanding access to a rural and underserved population and played a role in reversing the deleterious tendencies of the past that assigned government organisations a substitute and intermediary role. The growing consensus of state intervention to provide more equitable access to vital health care [30].

The interested groups–healthcare professionals, pharmaceutical industries, patients, and commercial interests-are banding together to spice up their negotiating position and defend their interests. A plurality of stakeholders should participate in effective social health mediation for the strategic reorientation of primary health care reforms[31]. As India 'politically modernises', the people value governance and participation. And that has increased the importance of people-centeredness and participation in deciding on many developmental policies, especially health-connected ones. The health system should specialise in many stakeholders' expectations and resolve inevitable confrontations like prevention and protection, care and treatment, healthcare access and expenditure, and promotion and negotiation. Integrative medicine ought to harness innovations and share lessons on what works.

Healthcare Delivery System: Responses and Changed Challenges

We describe health resources and infrastructure as the system resources, competencies, and infrastructure that enable the overall performance of essential health services in rural and urban areas. The Indian Constitution stipulates that health is a state responsibility and provides the resources and infrastructure required to implement various health schemes and programs. The Constitution's preamble emphasises the need to furnish fair access and sustenance to all sectors of the population, particularly the underserved and underprivileged, emphasising improving nutrition, the quality of life, and public health. India, therefore, recognises health as a fundamental human right. It protects and promotes its citizens' rights to health and raises their health consciousness. The Indian Constitution guarantees health protection, prevention, promotion, and prescription at the doorstep of its citizens. However, it is still a distant dream.

In contrast, healthcare services are still being hampered by high costs, physical and social barriers, especially for about 34.7% of the poor population. In the past eight decades, it has implemented reforms in the healthcare system in the country: promoted a primary health care concept in 1946[32]; induction of the integrated cadre of multi-purpose workers in 1974[33]; in 1977, GoI launched a rural health scheme with principles focusing on "placing people's health in people's hands" [34]; the adoption of PHC movement in 1978[35]; in 1983, the GoI launched Health Sector Reform Agenda under the National Health Plan[36] the devolution of health services to States; and integrated health approach under NHM in 2007 began[37]; the enactment of the National Health Protection Scheme transforming PHC centres into Health Wellness Centres in 2018 at the secondary and tertiary levels as a significant policy framework and strategy to improve the way it delivered healthcare, financed and regulated[38].

India has a dual health system: the public sector financed by state or central government through a tax-based system and provides healthcare services at free of cost; and the private sector (includes NGOs, NPOs, and Private organisations) that focussed on a market-oriented approach to user or service fees concept. With the expansion of the health mission, Ayushman Bharat Yojna emerges as a potential source of public health financing for about 500 million beneficiaries who are vulnerable and in the category of below the poverty line. The Indian healthcare system relies heavily on community health resources and infrastructure to expand health services. Health resources and infrastructure used to be in disarray in 1950 is nevertheless in disarray in 2021.

The Sub-centres, PHC, CHC support routine basic health services and do not support any essentials for emergency preparedness, which are disproportionately affected by health infrastructure gaps. The availability of health infrastructure is exceedingly scarce in rural settings, which is a long-neglected chronic condition, while human resources seem to have better placed in urban zones. There are enormous shortfalls at every level of health infrastructure. Unfortunately, there is evidence that the present healthcare system and services are incapable of meeting new challenges owing to a lack of resources and infrastructure.

Since its independence, India has paid less attention to the essential role of health resources and infrastructure. The pandemic, notably COVID-19, has heightened public consciousness, raising awareness, funded health resources and infrastructure, and values of community services beyond knowledge. Pandemics like COVID-19 raise concerns about our ability to respond to health hazards such as infectious diseases, occupational hazards, chronic diseases, environmental threats, and lifestyle diseases despite our awareness of the importance of powerful resources and infrastructure. Almost all are preventable, but the impact on health is still miles away. However, these diseases and health threats brought the Centre, State, and local governments together to identify infrastructure weaknesses and develop resources appropriate for implementation. The vigour and effectiveness of these organisations remain critical determinants of the nation's health, and emerging threats require prevention strategies. Most of the instituted healthcare interventions are premised on a vertical implementation approach that disregards existing ones. It resulted in the ineffective use of resources and time. For example, Asthma, TB, Pneumonia, Bronchitis and COVID-19 programs have been vertically developed. We can place these under one program as an 'integrated respiratory care program' that can improve resource efficiency and effectiveness.

In light of COVID-19, the treatment infrastructure capacity at the sub-centre level to CHC needs to be reviewed to meet the impending multiplied demand with particular attention to communities with high-risk behaviours. Given that states differ in terms of resources and infrastructure, these disparities must be passably controlled. Rural health resources and infrastructure, in particular, have long been neglected and now have little potential to face COVID-19 challenges. Therefore, the continuous efforts to enhance access to a range of respiratory health problems, infectious illnesses, and non-communicable diseases must be essential to improving health and local demand, using the resources and infrastructure available for First Referral Units to expand the capacity to offer a wide variety of healthcare services, intensify disease surveillance/monitoring, and promote healthy activities. These efforts must be focused, and limited resources shifted to pursuing disease prevention and control of the emerging burden of diseases.

Simply imparting primary health services such as reproductive and child health services, facilitating minor ailments, or assisting women with institutional deliveries have modest gains in health and not probably lead to attaining SDGs. The health problem has reportedly accelerated non-communicable diseases, catastrophic health issues, and degenerating diseases while adding corona infection as contagious. In principle, private healthcare setups and organisations such as dispensaries, clinics, and pharmacies appear to play a meaningful role and concern themselves with the healthcare system to expand the potential avenues for healthcare providers that no longer have adequate resources. There is a need to promote public-private partnerships in addressing various healthcare services and providing training to and monitoring infectious diseases like COVID-19. As a result, systematic expansion of health resources and infrastructure availability necessitates financial and political support at the state and municipal levels. However, such dedication is unlikely to enhance healthcare services and scale up health services to tackle the contemporary pandemic and catastrophic diseases. Additionally, it involves modernising health resources and infrastructure while providing adequate financial and human resources to meet them in a realistic way.

India has the worst records in the world compared with the population for the number of beds. India has only five beds per 10,000 people, according to its Human Development Report 2020[39]. In India, 18,99,228 hospital beds are available as of April 2020, while they recorded 7,13,986 hospital beds in the public sector, whereas the number of hospital beds in the private sector is 1,185,242 available[40] (Fig-5a).

Fig-5a Number of Beds

Fig-5b Number of ICU Beds
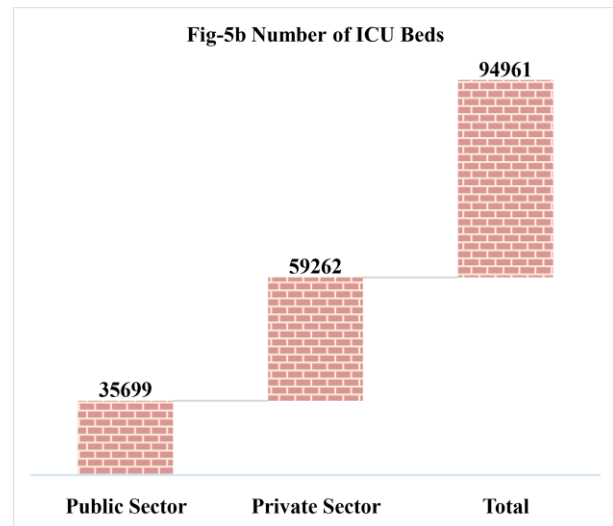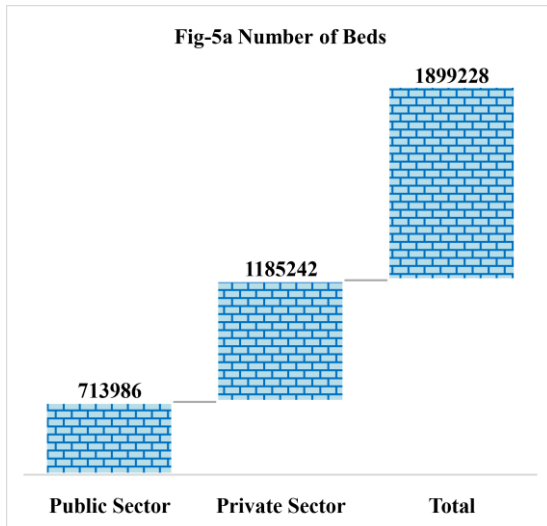
Out of the total number of beds available, it earmarked about 94961 numbers of ICU beds. While it is slightly higher among the private sector-59262 ICU beds than public sector hospitals, they reported 35699 ICU beds[41] (Fig-5b). For instance, rural India has 3.2 government hospital beds per 10000 population, but urban India has 11.9 beds per 10000 population[42]. Many major states in rural areas have much fewer beds than the national average (Fig-6). Uttar Pradesh has 2.5 beds per 10,000 inhabitants in rural areas, whereas Rajasthan and Jharkhand have 2.4 and 2.3. The state has more COVID-19 cases in Maharashtra, with two beds per 10000 population, while Bihar is at 0.6.

Fig-6 Key States Lacking Rural Hospital Access (Beds per 10000 population)
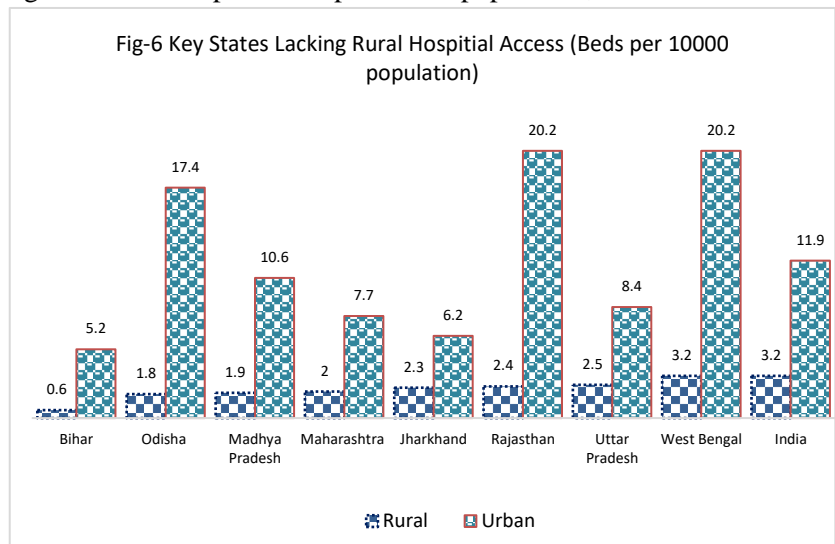
The competency of the health system is to respond effectively and adequately to the emerging challenges and people's health demands. Despite advances in medical technology, more remarkable socioeconomic development, and more access to medical services, the populace remains significantly underserved. The COVID-19 poses a slew of problems and constraints that require overhauling. This calls for innovation efforts and going out of the box thinking towards resource scarcity, specifically in the chronically neglected rural areas.

Forging Partnerships: Ceasing Obligation and Flouts

The Indian healthcare system is constantly under reform, adapting to fundamental changes resulting from the devolution of health services and the expansion of health services through multiple protection mechanisms. The healthcare system is developed to create an environment conducive to political change and adapts to the local social fabric. This enforces conscious efforts from diverse stakeholders to entail integral healthcare initiatives to achieve desired health outcomes. Harnessing and forging an enhanced partnership provides the essential synergy for attaining health goals. Sustaining partnerships and fostering harmony is an intricate process, which is possible. As noted above, health in India is a personal and private affair. People become vulnerable because of their inability to manipulate the resultant effects of an illness or disease. To tackle this issue, partnerships in health should ensure people are dealt with and treated concerning human rights.

However, the involvement of private health care institutions in India, which has been extensively experienced and yet poorly documented, is increasingly accessible and cost-effectual, even when the context of accountability is problematic. But suppose a country such as India does not have an adequate public funding mechanism and lacks resources to serve its population. In that case, a potential contribution may be provided by fostering public-private partnerships (PPP). About 32.5% of the rural population receives healthcare services from the public sector, compared to their urban counterparts, 26.2% (Fig-7). However, almost two-thirds (62.2%) of the rural population have access to private sector healthcare services compared to nearly three-fourths (71.6%) of urban counterparts[43]. But the government has comprehensive authority and responsibility for the creation, maintenance, and oversight of health resources and infrastructure regardless of Centre, State, and local, or otherwise.

Fig-7 Treatment by types of healthcare service providers (in Percent)
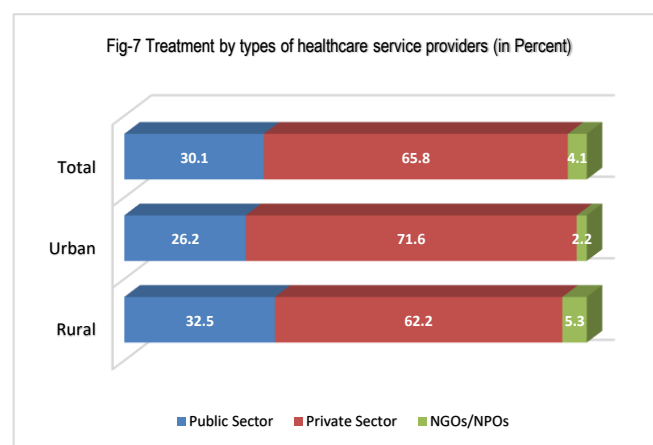
Though NGOs/NPOs are regarded worldwide for their social movements, the responses at the grassroots level to various health threats and environmental issues are confined primarily to receipt of government funds–many of them founded on a bottom-up, so-called autonomous movement. NGOs/NPOs can organise and mobilise communities and act as change agents, especially in areas where the public system is not or is insufficient and are quiet or reluctant to adopt a sustainable model or self-sufficient approach to assisting the community in resolving diverse health crises. However, following COVID-19, we observed that strengthening PPP would be dramatically different in social and economic terms and would also recognise the criticalities and circumstances of success. Although 'no one method fits all', it must elevate its governance paradigm in providing healthcare services. Why? In India, private healthcare establishments mainly provide tertiary care requiring know-how, high-tech equipment, and imported medical technology facilities. This segmentation exists because of much less competition, client-centred, demands to surpass, corporate entrepreneurship, and high-profit orientation.

On the other hand, population growth, demographic shifts, multiplied disposable income, and enhanced quality of life are all accounted for. Private players risk neglecting even essential services to the most extensive section of the population. Because of this, there is mistrust between private enterprises and public setups. Given the level of public health, healthcare, infrastructure, and service provision have ripple effects far beyond its borders. More than ever, the COVID-19 pandemic has taught us that 'we are interconnected'.

The challenge is making private healthcare setups to provide primary and secondary care with a preventive and promotive approach. We must address the demands of post-COVID-19 for accessibility, availability, and affordability of healthcare loops while focusing on quality. Although private organisations are keen on entering the social health infrastructure with innovative measures, pricing, technological usage, and advocacy mechanisms need to be regulated and controlled. Therefore, the healthcare system ceases if all, especially the underserved or vulnerable population, offer health services. To benefit most of the population, the PPP must concentrate its efforts on integrating public and private setup capabilities, skills, and competencies into the COVID-19 pandemic. This would result in exclusive roles and responsibilities, whereas privatisation of healthcare services attempts to improve service delivery efficiency. However, private organisations should be active partners in developing scientific monitoring, surveillance, and quality assurance capabilities. PPP must be interdependent and promote collaboration with community stakeholders while developing preventive strategies based on community capacity assessments. PPP requires buy-in and creates a sense of belonging whilst adapting a grounded approach to communication and continuous interpersonal processes to an effective system. Given this, we must carry out hospital reforms to address the disparity between public and private facilities and social health resources to enhance patients' responsiveness.

Public-Private partnerships can take place in various ways, from negotiations on uninterrupted service delivery to sharing scientific technology, setting up a robust and scalable infrastructure, monitoring, and epidemiological surveillance. PPP would also equally benefit from developing health sciences and technology know-how and sharing knowledge generated to reach their compatriots.

**Surveillance and Monitoring: Schematisation and Valuation**

India has emerged in the ICT, BPO, pharmaceuticals, and telecommunication sectors as a global player. Still, it faces severe constraints and challenges with rural health infrastructure, which is a long-pending one. Low public spending led to a direct effect on health resources and infrastructure that subsequently impacted health. As of March 2019, about 157541 SCs operate in rural areas. Of the SCs, the operating figures for government buildings improved by 43.8 per cent in 2005 to 75.3 per cent in 2019. There are 24855 PHCs in rural areas at the national level. The PHC ratio operating in government facilities grew considerably from 69% in 2005 to 94.5% in 2019.

In contrast to the effect of monitoring and surveillance, there is a shortfall of 7.6% of allopathic physicians in PHCs[44]. Centres in rented premises are less well-equipped, less well-furnished, and less conducive to working. The author, who carried out a facility survey, observed these centres are inadequate in water supply, lack proper toilet facilities, and have insufficient transport facilities[45].

The factor that leads to inadequate monitoring is that India is one of many countries. The average population in a district is about two million—the size of a small African country. There are rural areas and urban zones, tribal belts, within the state and even within the same district. India's public health measures vary from one region to another since the patterns of infection spread, illness, disease, and health threats from local conditions are highly geographically variable. A detailed analysis of large-scale epidemiological granular data is required. Making available epidemiological data is one of the country's biggest challenges. The lack of information sharing with the scientific and academic communities about detailed tests and clinical facts resulted in an inadequate response to health demands.

The failure to obtain and disclose epidemiological data systematically contributed to the inability to manipulate health threats appropriately. Consequently, this has decreased research and academia from using new testing platforms and has reduced the potential for a sequential surveillance exercise. The immense gaps in health regulatory caused by the lack of expertise, infrastructure for specialised services and laboratory facilities in rural areas, and weak regulatory systems and processes are the major contributing factors to this situation. The second wave of COVID-19 is an exemplary case. Suppose the plans were in the vicinity of each at the level of monitoring and surveillance. In that scenario, the ensuing pandemic could have been prevented with changes in intervention. Therefore, funding is needed to expand the epidemiological network of enterprises that collect large-scale surveillance data on various health risks locally and rapidly put the data into the public domain. It should be integrated with the epidemiological facts needed for implementation to draw attention to the institution's organisational potential in terms of research and surveillance. Thus, the possibility to monitor the health of a community with particular attention to the most vulnerable data, case reports, and laboratory evaluations. In addition, sustaining enhanced surveillance and modelling is necessary to estimate the various threats to health, risk factors, and prevalence and determine if these changes are significant enough to reduce the epidemic. Experts might argue that these models have improved weaknesses, produced a range of estimates on epidemic monitoring and intervention, and prevented fatality rates. However, the estimates are reliable and accurate in their population and biological and conductual parameters. The surveillance records are to be triangulated with qualitative research and other knowledge, attitude, and practice indicators that could be produced over time to measure change.

The NABL certified about 1039 of the country's almost 1.1 lakh medical labs, with test results accounting for over 70% of medical decisions (Fig-8). The vast majority of them are in metros and Tier-1 cities. Because of limited economic opportunities, many do no longer wish to set up a laboratory in depressed rural areas. However, 3500-4000 tests are supplied via these laboratories/diagnostic facilities, regardless of accreditation. Therefore, robust regulatory procedures are needed to prevent the market in healthcare from relying on inequality or an unequal allocation of diverse health requirements. Lab and diagnostic tests account for 41% of outpatient healthcare spending, whereas they account for 10% of inpatient healthcare spending[46]. Health insurance plans do not

Fig-8 Number of Labs with NABL Accreditation
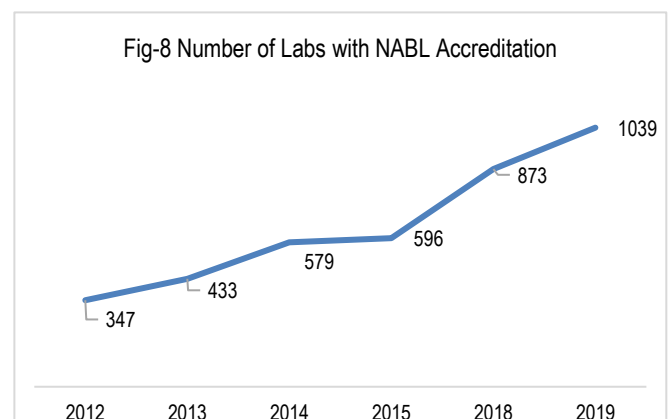
cover laboratories' expenses. This shows the healthcare system's lack of preparedness and inadequacy. Poverty and its accompanying diseases abound in India, as does a poor state of health and a shaky healthcare system. Because of a lack of information, consumers cannot assess the quality of services they buy. In such a situation, the government should use regulation to promote accessible healthcare products and services and affordability or equity. In addition, the government must fulfil the requirements of laboratory or diagnostic centres to impose quality standards. Without this, health regulation will probably not be effective and would improve the performance of health systems.

Given imperfections within the healthcare markets and its regulatory challenges, any health threat or pandemic has been another disease that the health system can handle. However, the current system is unprepared to respond to the increasing workload, inadequate surveillance, and epidemiological focus on monitoring the health risks. Post COVID-19, India must gear its diagnostics facilities and cold chain infrastructure to deliver at the door, especially in rural areas. This calls for a rapid, effective, wide-ranging distribution system requiring local authorities to manipulate the logistics system. At the same time, the State & Centre government provides adequate hospital care, long-term health recovery procedures, and the potential involvement of private agencies for accurate diagnosis. The village-wide mass campaign presents vast challenges to rural health infrastructure, particularly human resources and capacity. Because of this "new normal" situation, the Indian health system focused on freight and carriage, storage and transportation, cold chain maintaining and supporting logistics, sensitisation meetings and social mobilisation, personnel training, surveillance activities, and PPE. The laboratory skills are crucial for determining viral loads, sample storage and supplies, and waste and vaccine management focus. For example, a polio campaign requiring 2-3 staff at each polio booth could accomplish the entire task. After COVID-19 - a 'new normal', large-scale vaccination campaigns would require an additional workforce for implementation. Therefore, the development of critical health infrastructure is a prerequisite to achieving social objectives, equity, efficiency, and productivity.

Diagnostic/laboratory outcomes must be integrated into electronic reporting, along with medical procedures. Hospitals should adopt comprehensive reporting to uniform health information systems. They place financial constraints on small hospitals (and specific geographical areas) and local health departments by adopting specific health information technologies. Funding for such changes enhances health resources and infrastructure and reduces the potential barrier to health computing. In addition, the internet facilities need to be strengthened to receive, send and exchange reports and health data in the required configuration. This would enhance the relationship between hospitals, laboratories, and local health departments. It would undoubtedly improve preparedness and strengthen the health resources and service infrastructure.

Health resources and infrastructure disparities in India have not even diminished between rural and urban areas, even though over time, the difference between health outcomes appears to have reduced. This makes the puzzle a unique set. Therefore, healthcare needs to be promoted in a more equitable way across rural and urban areas. Rapid distribution of laboratory and diagnostic measures to a large population requires significant community resources and infrastructure. To dispense last miles requires strategic and operational planning to perform the task within the specified time limit.

The limited number of trained personnel compounds the inherent complexities. Indian health systems require high-quality diagnostic/laboratory resources to create a critical laboratory training infrastructure. This training infrastructure provides a range of education and training for frontline health workers and the resources needed for improved readiness, facilitates the transfer of information, and develops model practices. The Indian healthcare system should capitalise on existing indigenous skills and improve them through proactive strategies. Such an approach would hasten implementation, enable local ownership, and ensure sustainability so that the critical human and institutional resources needed to respond efficiently would enhance the quality. In order to improve the quality, the importance of program monitoring and evaluation of projects is critical for interventions. The failings of neglected monitoring and assessment have been apparent in the programs and projects where these components have not been adequately implemented. They, therefore, needed monitoring of activities output and their quality and coverage to achieve long-and short-term effects at the intervention/implementation level. In health, the short-term results typically evaluate behaviour changes while long-term service provision is sustained.

One of the shared governance issues among the health regulatory agencies is the lack of quasi-judicial powers to ensure timely and robust law enforcement. Regulatory functions have been restricted to limited funding and debilitated resources in logistics and personnel, leading to a focus on licensing and accreditation, inspection, standards development, assessment, monitoring, and imposing fees. They do not interlink diagnostic/lab results at the national or state level with health records. The agencies cannot concentrate on governance without doing technical and operational research to serve as the basis for standards development. In addition, there are not enough training facilities, testing laboratories, and a trained workforce with the required expertise to test and monitor the conformity of regulated products. In Post COVID-19, it is imperative to set a policy that decentralises the regulatory agencies with fiscal and judicial autonomy, focusing on governance while also establishing a quality assurance system at the local level, which is the need of the hour.

Similarly, it is necessary to explore safety nets to protect the public from high prices and inferior quality and their associated effects. The Generic Drugs Act has failed to remove the cloud of doubt over local pharmaceutical companies' presumed low quality because of intense lobbying, marketing strategies, and advertising by multinational pharmaceutical companies that targeted physicians and pharmacists. Despite the enormous price differential, consumers prefer the brand over generic products and services. Global issues concerning health products and services, including technical obstacles to trade and the dumping of substandard products from other countries, have raised alarms about the necessary harmonisation of systems expected to put local resources to more optimal use.

## Health Informatics Infrastructure: Reorganising Shambling

Information, communication, and technology are vital to public health services as tools for sharing information, training and education, counselling, and awareness throughout jurisdictions, providing practical advice and protocols, promoting health education, facilitating disease surveillance, and providing effective monitoring. In India, even though the government mandates the collection of identifiable health data, there are many varieties of surveillance forms, varied physician reporting, multiple variants of laboratory records, and unverified health information systems available at several healthcare institutions and hospitals. It raises several concerns, including patients' rights and privacy. Health informatics has been weak. Parts of the existing infrastructure and data structures are inconsistent, outdated, and non-existent. There is no health informatics system available and maintained by the State or central government. In terms of management systems and processes, it is well-known for being bureaucratic and inefficient. The specific personal health information is preserved at all private health facilities and institutions of public health and is not collected for diagnostic or monitoring purposes in particular. Candidly, government records are not intended to supply details on the community's health or keep standards.

The evolution of a health information infrastructure (HII) is integral to today's health system efforts. Health informatics is still a distant concept/dream in India and is now not unified into a single database structure. The devolution in the health sector creates opportunities for shifting from the centralised and more complex policy and decision making at the state and central government level to a more focused and community-responsive action at the local level. Surveillance, epidemiologic research, diagnostics and screening for diseases, assessing the disease prevalence or risky behaviours of a specific population are vital things to do with health informatics infrastructure. Despite significant work on evaluating the program and redesigning the strategies, this has proved useful. Many health programs under this structure of unified HII advocate focusing operations on regions of critical need and guiding the monitoring of incidence, trends, and patterns. It is expected to promote lifestyle changes in society, behaviour, and the environment. HII lacks a shared responsibility between the individual and the healthcare system. While the infrastructure for health information alone cannot guarantee individual health, it can undeniably contribute. The Indian healthcare system has unfortunately grown in a fragmented and uncoordinated manner since independence. As a result, the demand for a 'national electronic disease surveillance system' parallels the healthcare system and service research. Therefore, the national health system should reorganise healthcare delivery by providing unprecedented access to high-quality and timely surveillance data.

Training and Skill Orientation: Overcoming Quantity

Since the outbreak in Wuhan and misinformation's regarding human-to-human transmission led the world to remain in sleeper-cell. This colossal cost morbidity and human loss suggest an increase in healthcare and disease burden. Although Coronavirus unfolds to over 180 countries affected with a 125-million population, no serious efforts are made to develop a comprehensive training policy. Due to a low priority on human resource development and a misunderstanding of COVID-19 as flu-like, there are no training plans to combat the rising endemic-COVID-19. In India, various ad hoc skill-development programmes have been launched in the previous decade, although healthcare and its accompanying human resource development have failed to produce the promised results. For instance, aside from COVID-19, healthcare services are suspended abruptly as healthcare professionals struggle to care for and supply the appropriate treatment for patients with co-morbidities (78%). This further put hospitals that are suspended their services are finding their inexistence or survival in the chaos.

Globally, both developed and emerging economies are reviewing how vital issues such as 4e-equity, equality, efficiency, and effectiveness serve delivery. A country like India, which tries with only limited resources and capacity to deliver essential healthcare services. It is clear because one-third of the health-functionaries have had no training in the last five years. 24.4% of physicians and 23.4% of nurses are in secondary/tertiary setups or are part of the surveillance team. 66.7% of health workers who allegedly did not take part in any training are the First-Contact-Point at the village/ward level (Fig-9).

Fig-9 Status of Training and Skill Orientations (in percent)
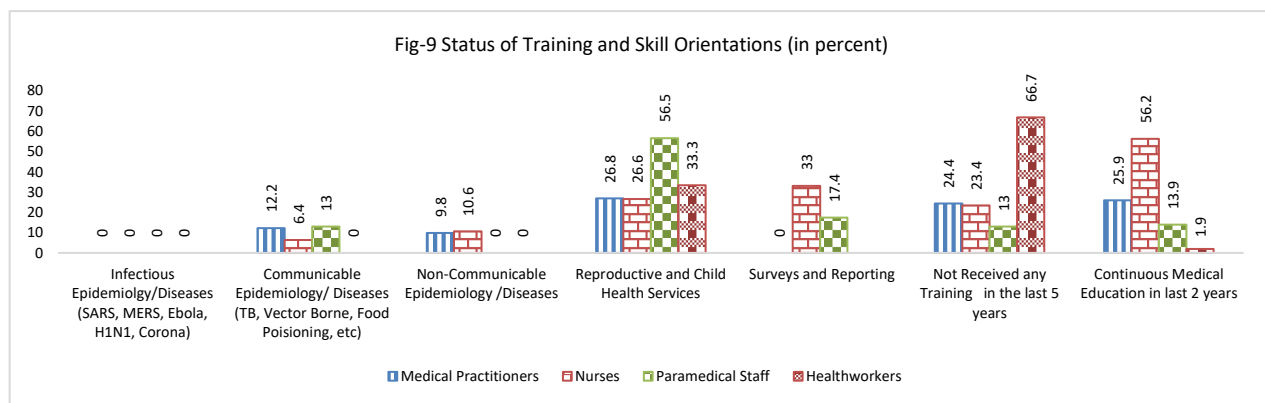
It reflects the very low priority of training. Training is not recognised as a spice-up intervention while it is seen in isolation and instruction. None of the health officials has been trained in infectious diseases such as SARS, MERS, Ebola, or H1N1-Swine flu in the past five years. Those epidemics are deemed regional and cannot be infiltrated into the continent of India. Though 31.6% of health functionaries have undergone communicable disease-related training (Fig-9), this validates the extent of preparedness for any epidemic. Inability to anticipate health issues and inept trainers, along with a lack of technical guidance, resulted in no or poor quality orientation, diminishing training credibility. India is excused because of earlier initiatives to lock down and trace the people-with-coronavirus to quarantine. Otherwise, there would be a 'corona tsunami' that Americans, Europeans, and Iranians face as a reality. Excerpts from the interviews suggest they viewed training as a constraint to achieving program objectives rather than facilitating it. Top management never senses the need for training and is not implemented. Thus, the personal and programmatic aims conflict.

Over the last two decades, quantities have been emphasised, and human resource standards have become backward. This quantitative approach could increase staff availability, but productivity and performance have remained poor. There is thus a need to rethink training and reposition it. It was prime time that training was developed as an instrument for the development of skills. This can be embarked on an online/distance learning system. It is possible.

Public Health Capital and the Social Health: Reorienting the Diaspora

The importance of health resources and infrastructure cannot be overestimated because "healthcare" is an essential requirement for the growth and development of societies. Because of the low priority of local, state, and central governmental authorities, health resources and infrastructure are seriously and systematically underfunded. Insufficient human capital accumulation is a restriction on productivity and economic growth.

The state remains in the realm of health resources and infrastructure, despite contrary views expressed by experts. The lack of planning and budgetary aspects needed to develop and strengthen existing resources and infrastructure to ensure their strength has unfortunately not been implemented. With the collapse of the health system worldwide in COVID-19, the pressures for adopting market-friendly health policies in India, and infrastructure, in particular, are increasing both within and across the country. This provision has two significant constraints: first, private players assume profit-oriented investment; second, considering the infrastructure services are public goods non-rival, raising elaborate pricing issues. These two must be overcome, given that India lacks development funds, leading to heavy dependence on external investment. As it is known, competitive pricing would not produce the efficiency that requires optimum allocations in society. However, this has been overlooked in India since independence, resulting in inadequate regulations on service delivery, much less in research and development, various obsolescence rates in private health capital products and services, and fewer health impacts. Public health funding is rarely mentioned as a plausible factor since the resources and infrastructure for combining health outcomes are insufficient. For example, lack of trained personnel to operate the latest medical devices, a shortage of ICU facilities, especially in the FRU and District Hospitals, lack of space to install medical devices, complacent health authorities. The urban-rural/spatial skew is also simply a reflection of the regional system imbalances. No government has allocated resources and infrastructure services based on population rather than personal health services, which need attention. This is because public health capital is critical in promoting, preventing, protecting, and treating health.
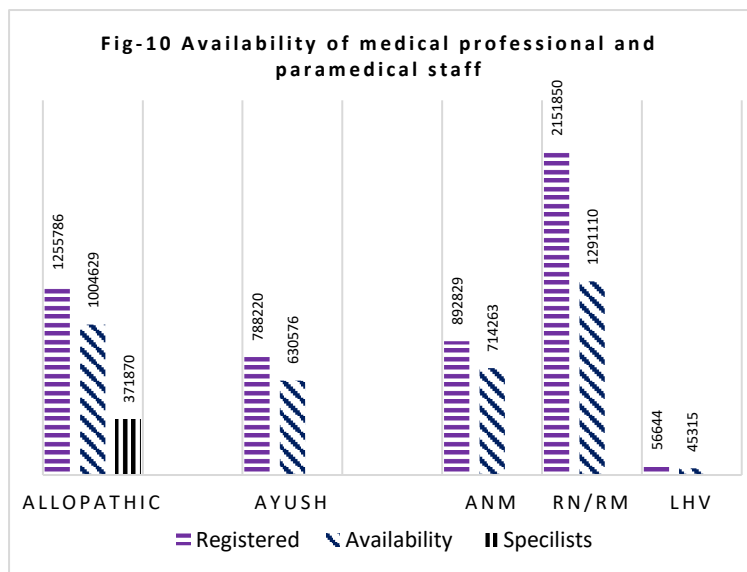
History says that colonialism never ended, and its fundamental principle of extractive inequality continues today. The way wealthy hedge supplies, while poor people are neglected. Much of the world has been impacted by the painful sluggish production and distribution of vaccines such as COVID-19. Rich countries have stockpiled their vaccine supplies, whereas people from less privileged countries die in record numbers. Elites are well-protected and differently at serious risk in many countries. It is also said that a medical missionary tradition was established in the process when cash-rich nations, induced or called for by their corporate interests, managed social, cultural, and ecological disorder. The power centre, accountability, and decision-making are valued and rewarded far more than the communities in the arms of a few colonial capitals and backyard professional knowledge. However, biomedical disease thoughts prioritise developmental solutions, and unfair trade relations are still being adopted.

Among the world's 25 largest emerging markets, India ranks last for hospital beds per 1000 population, 5th from last for medical practitioners, and 4th from last for nurses and midwives. India's per capita income is still mediocre compared with other large countries-Pakistan, Bangladesh. India's government spends around 30% of GDP, while its social spending accounts for 9%. It does little to modernise the country's fundamental health structure, which is based on colonial rule. India's healthcare system was supposed to be revamped along the lines of the Bhore Committee. Still, its comprehensive blueprint for hospitals and clinics throughout the country has yet to be realised. Instead, we are recording today underfunded hospitals and health centres featuring operating rooms without surgeons, x-ray machines without radiologists, and beds without nursing staff. India's desires to spend more on health have little to say about how badly resources and infrastructure are currently positioned. This inacquisite and uncoordinated healthcare system would fail in a pandemic, such as COVID-19, which is not surprising. Given these faltered lines and poor regulation, life insurance undertakings also rejected the assured return on the policy as agreed; were cautious and tightened underwriting standards of high-value policies following COVID-19; and pulled back through reinsurance undertakings in India, citing low rates. People who hoped for insurance to return continue to fight hopelessly and hollowly for extermination.

India, therefore, needs to commit much faster and more resources to health and infrastructure financing to protect its citizens. It takes an hour to expand the necessary infrastructure and make swift decisions on research, path, delivery of services, decentralising purchases, and resource allocations.

Organisational Capacity and Capacity Raising: Striving towards Productivity

Human resources are crucial to healthcare management and delivery. Human resources are essential for improving and achieving the desired results. They are inadequate and distributed unevenly between rural and urban areas. While rural India accounted for 67% of the total population in 2019, around 37% of all health workers are rural (Fig-10). This proportion is slightly lower for health associates and assistants, and pharmacists. According to the estimates from MCI and AYUSH, the doctor-population ratio for allopathic practitioners is 1:1343, while for AYUSH, it is 1:825. In addition, 371,870 allopathic physicians have registered their specialisation and give a doctor-population ratio of 1:3629; a nurse-patient ratio of 1:658 is severe functional destruction of the healthcare system[47] (Fig-11). In addition, the lack of career development weakens the general performance capability, which in the healthcare system plays a significant role. Building capacity to combat infectious diseases, chronic illness, natural disasters, and high-risk behaviours, as well as manufactured disasters like COVID-19, has been undermined. Most of the medical professionals and paramedical staff reside in metros, cities, and urban zones. However, their availability in sub-centres and PHCs continues to be critical because no ANM or doctors remain in these facilities. After all, they have no essential services and are without incentives to work in rural areas. In rural areas, basic curative services, emergency medical care, and referral services are thus deprived.

Fig-10 Availability of medical professional and paramedical staff
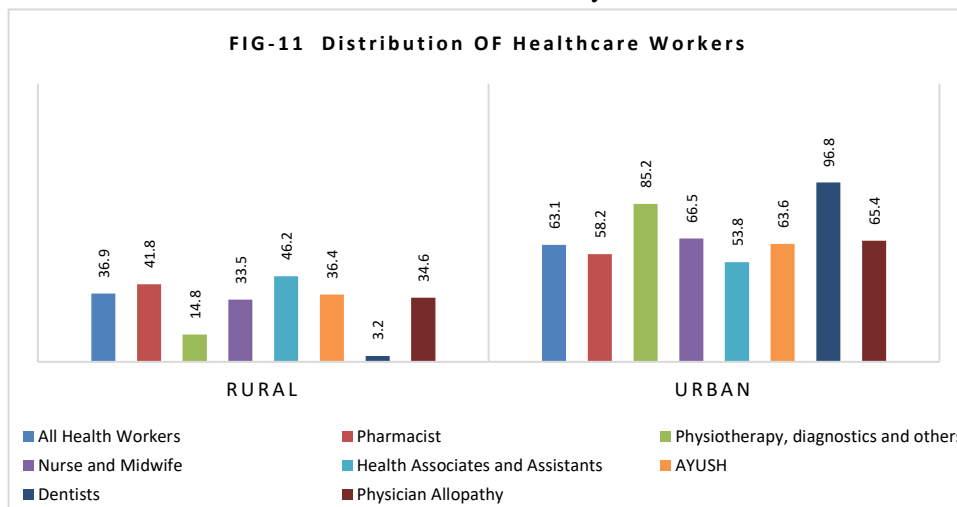
India has become major outsourcing healthcare professionals to many countries because of socioeconomic and political situations that have helped little skilled ones. There is no focus on competency mapping, and workforce evaluation has been conducted or limited by methodological challenges. Besides these, insufficient human resource development capacity to improve skills, weak management structures; flawed strategic planning; and insufficient knowledge-building programs. In addition, the availability of data sources, developing methods, and conducting competency mapping and workforce assessment are still pending, which is the need of the hour.

FIG-11 Distribution OF Healthcare Workers

The lack of a unified, holistic plan and a multi-sectoral approach embracing all healthcare professionals to address human resources demands and needs poses obstacles to human resource management and development. Adequate data and skill mix requirements, career development, performance management, training and development, skill mapping, and human resources planning would all need to be addressed to justify standards for healthcare facilities.

The Indian system is not geared towards tackling public health threats and averting early warning systems to protect communities against pandemics and emergencies. The system trends too late arrival once health threats and emergencies hit the street. This means strengthening the organisational potential to link community stakeholders, cooperate with public-private hospitals and build the learning capacity. It requires creating knowledge management systems to serve frontline healthcare workers through the extended availability of ICT, making best practices available for learning and updating community stakeholders.

Integrating public health programs and hospital services has remained feeble. The lack of an integrated framework and mechanisms has primarily contributed to this condition. This led to misunderstanding the perceived devolved health services while often causing conflicts between government and private setups. While efforts have been made to integrate a dual hospital system with direct subsidies (insurance schemes), the consequences remain weak due to inadequate hospital networking and patient referral systems, high reliance on national and local government direct subsidies, and the uncoordinated implementation of the hospital public health program. This has led to minimal involvement of the private sector in implementing public health programs, but the resources and capacities are not yet fully harnessed. The leadership and governance functions of health systems are necessary through overhauling to overcome inefficiency, inadequacy, and ineffectiveness.

In terms of performance evaluation and improvement in performance over time, public health systems do not adapt to performance standards compared to private organisations. As a result, government organisations cannot engage with local stakeholders to deal with regional health threats and emergencies. However, various health programs have developed PPP initiatives to enhance the health status by focusing on SOPs, leadership development, advocacy, and health information systems. Engaging diverse stakeholders in problem-solving dialogue to address issues related to health system transformation. In the short run, a spatial mapping exercise is necessary to address identified deficits and improve capacity building for use at the local and state levels to improve efficiency and effectiveness. In the long run, a 'health promotion, prevention, and treatment system' needs to be developed to shape service delivery and what it does. This is now more vital than ever since the public has become aware of the strength and weaknesses of the health system. An increasingly diverse population necessitates an expanding range of culturally and socially relevant approaches to illness management and health promotion. The healthcare system needed to work with the local community through grounding programs to ensure ongoing support and relevance.

In the long run, healthcare services should include chronic disease prevention, environmental and occupational health, mental health, and other population-based healthcare services, i.e., move beyond infectious diseases and MCH. This means that the health system is identified as a priority, including transmissible diseases, reproductive and child health issues. Still, there have been few other services, such as chronic treatment for diseases, behavioural disorders, environmental protection, primary care, and health promotion—partnerships with the local community and organised healthcare to ensure that healthcare services are provided to individuals and populations. The COVID-19 pandemic has undeniably highlighted the significant structural health inequalities in India and its states. The most inclined and weakest part has suffered the most; the loss distribution has not been equal. It could also result in fragmentation and inequality of service quality and distribution because the delivery enhances local control, stability, and elasticity of the various health systems and programs to meet people's needs. As both local and state independence is inherent in health, each of the 33 states is unique in its political history, civil service regulations, budget, appropriation processes and restrictions, authorisation statutes, and much more. This variation inevitably leads to a vast difference in the provision, performance, and results of health care services.

Where are we today? Despite recent health and healthcare achievements, there are significant infrastructure gaps, and they continue to weaken. Therefore, it is necessary to develop comprehensive strategies to deal on the one hand with the need to pay for compensation, career paths, continuing medical training. On the other hand, established local healthcare standards and performance criteria, skills icing, and efficiency improvement.

Health Education and Communication: Translating into Action

Health education plays a crucial role in providing well-investigated communication strategies with strong involvement of key stakeholders, clearly identified measurable indicators, and an innovative approach to sustainable behaviour change. Currently, most efforts in health education in India do not include essential elements of formative research, participatory process, quality, consistency in messages, cues to action, and result orientation, monitoring, and evaluation. The aim of communication should be to influence individual behaviour

by providing timely and accurate information and knowledge, motivation through persuasive communication, and self-efficiency. Early therapy, testing, and counselling should all be used to make use of the knowledge. In other words, transmission means that health knowledge can be translated to the public and applied successfully.

During the last five decades, several communications efforts have been dispersed on an ad hoc basis. The materials/substances developed and distributed are arbitrary and poorly reviewed, if at all. Anecdotal evidence and a small degree of qualitative research appear to be all that is available. Therefore, good policy thinking and action in the communication arena must be strengthened. To move from general to targeted messages linked to specific, desired actions would have a far more significant impact.

Inadequate skill-based formal healthcare education, training, and professional certification hamper individuals' career pursuit in the healthcare management profile. Instead of preparing aspirants for their jobs through professional education, it has left them to learn on the job. About 60% of the workforce in the epidemiology or the surveillance department lacks formal training. Ravichandran has consistently shown a gap between know-how and what is necessary for effective practise by examining the skills of health workers[48]. The workforce has the lowest level without a performance assessment system. The supervisory authorities acknowledged that essential service skills related to the workforce are lacking in training.

Continued health education with improved skill standards, career development, and enhanced awareness of healthcare offsets lead to growth in the health department. In the 21st century, this showed that health workers had scant compensation, poor education, and less emphasis on trade.

Health systems must constantly strive, with broader community stakeholders and the public, to communicate efficiently what's health and what it does, how health systems work, and how they focus on services. Currently, war-footed approaches are adapted during and after COVID-19, and attention is drawn based on the health crisis level and magnitude, although engagement and effort are often limited. Therefore, sustainable investment in health education and the communication system is essential to the success of health care and its provision of services and effective communication strategies.

Health Financing: Tailoring the System

Written 75 years ago, the central, state and local authorities have the fundamental duty to transform healthcare. Unfortunately, government financial accounts for 29.2% of health sector funds, while a majority of 70% of expenditures are attributable either to out-of-pocket or to private financing.

Over 43 years after Alma Atta called for more significant equity for health, the global healthcare system continues to rely on inequitable health financing mechanisms, i.e., out-of-pocket expenditure by the patients at the point of service. It is observed that the quality of services and technology additionally increases patients' costs. Healthcare spending is growing at 19.9% per annum in India, but out-of-pocket payments are growing, one of the principal health inequities and inequality sources.

Fig-12 Percentage of GDP Spent on Health By Indian States - 1990-2019

The increase in health spending between 1995 and 2005, averaging 12.1% annually to 18.1% in 2006-2016, in comparison with the average annual population growth rate[49] decreased by 1.87% at current prices, shows that the population is growing much faster than the rate of increase in total expenditure on health at current prices. Sadly, the growth in Indian healthcare expenditure is low, with 33.31% of the contribution being provided through private and employees' compensation and highly vulnerable to social-political economic contexts. But, for
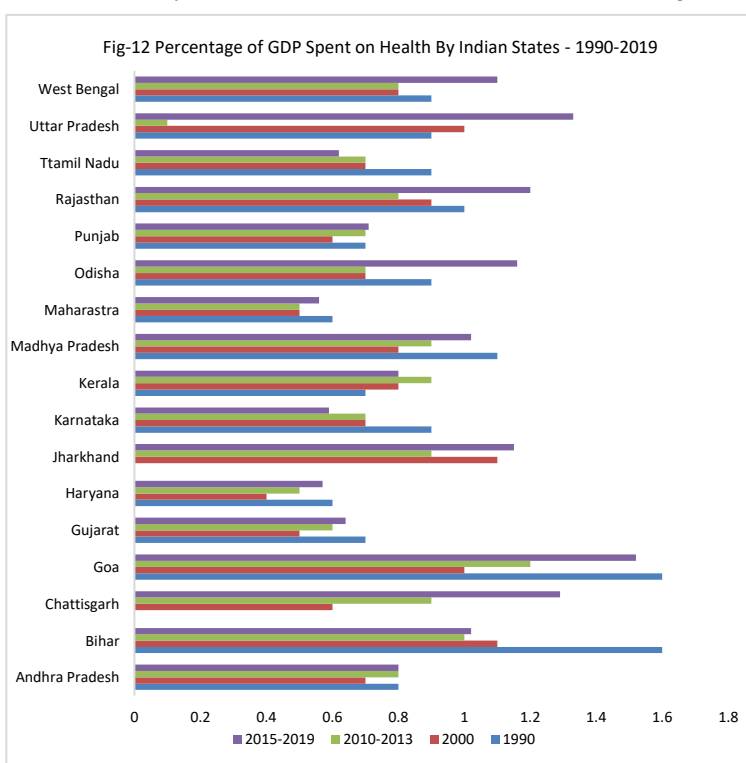
both national and local governments, health spending per capita in absolute numbers more than doubled in 2016-17, while actual health spending stagnated[50].

In many Indian states, the health system is usually underfunded (Fig-12). The states that spend less than $10 per person on healthcare have more NCD incidences than states that spend more than $50. This gap is wider in BIMARU states-Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh-that are plagued by infectious disease outbreaks. Individuals in these states have a health-adjusted life expectancy of 64.8 years.

In contrast, the difference between high and low health expenditure shows fewer variations in gains in life expectancy than what and for whom resources were used. In this respect, increased costs imply that a much smaller health system in a sluggish system is transformed and adapted. There is little or no room for healthcare and stagnation. Coherence in the financing of foundational capacity is as important as the level of investment. Likewise, state health sources vary with time and often more than central funding due to balanced budget demands. Financing of health resources and infrastructure related to health and health is currently absent.

In 2005, the proportions of social insurance and private sources in overall health spending grew to 28.8% and 41.25%, respectively. The share of government spending on health fell to 17.1% (Table-1). The share of other health expenditure sources remained at 1.2%. In 2009, 45.9% of the total health costs came from households' out-of-pocket expenses. The financial burden of healthcare for households is higher for the poor. Still, it had decreased from 80.3% in 2005 to 73.8% in 2015—the high cost of hospital and personal healthcare, which does not offer preventive and promotional health services. The government's stake in 2016 was only 25.4% compared to 18.2% in 2005. (Table-1).

It shows that India does not spend enough on healthcare services. In 2005-06, 28,8% to 41,3% in 2016-17 accounted for social health insurance, while other sources, such as private health insurance, community-based health financing, and employers' benefits, accounted for 2,71% in 2005 3,69% in 2016. This depicts the family as the least effective and inefficient health insurance institution, as measured by direct out-of-pocket cost. Family income and size limit the resources

Table-1: Source of Funds – India (1995-2021)				
	per cent			Rate of Change
	1995 -2005	2006 -2016	2017 -2021	
GOVERNMENT SOURCES				
National	12.1	18.1	24.0	17.1
Local	6.1	7.3	5.7	0.8
SOCIAL INSURANCE				
ESIC	2.13	8.28	10.3	25.7
SHI	28.8	41.25	35.7	38.2
PRIVATE SOURCES				
Out-of-Pocket	80.3	74.6	74.8	-12.9
Private Insurance	2.71	3.69	**3.2**	**7.31**
HMOs	4.6	4.7	3.5	6.4
CBHI	11	15	10.7	2.5
ALL SOURCES	**18.4**	**21.5**	**21.4**	**19.95**

that can be shared. Family members often share or are exposed to similar health risks, and the family has limited risk-pooling capacity. The rise in personal health care expenditure reflects the influence of private and political interests over resource allocation decisions.

The participation of private organisations in the government-funded Ayusman Bharat Scheme indicates it covers health services at USD7,000 per family per year. The current capital is about $10 per person; however, there is a $10 yearly spending deficit. The gap must be bridged by creating healthy living conditions to live happily and safely against health threats. Promoting health insurance enhances access to the maximum public healthcare for the publicly-funded network. And standards need to be set to provide sustainable health and related resources and infrastructure funding. The scheme also challenges fabricating/inflating bills, whereas private corporate hospitals are unwilling to join because of low subsidies. This calls for a robust transaction monitoring information infrastructure and strong regulatory mechanisms. Therefore, outreach health care services are expected to be addressed by delivering health services employing health resources and infrastructure.

The recent COVID-19 pandemic has brought India's economic system to a knee-jerk level. It is only because of shortcomings in health resources and infrastructure that the economy is in jeopardy. The Indian sub-continent is prone to natural disasters, while India is confronted with man-made disasters like terrorism, Naxalism. Outbreaks of COVID-19 diseases do not recognise political boundaries or the cost of poor health outcomes prevented via promotion and protection. Meanwhile, spending on biomedical research, operations, policy research, and monitoring has not changed in absolute terms despite expanding the health care sector.

Moreover, studies in public health programs show that fragmented local health networks and problems with the administration of centrally managed programs may have made funds less effective. The ongoing financing of

health resources and the competence of federal, state and municipal governments to secure public health through health finance are necessary. Therefore, health financing should promote health equity, while healthcare resources and infrastructure should be prioritised—developing resources and infrastructure to decrease the existing gap.

Procurement and Supply Chain: Building Resilience

The COVID-19 crisis has highlighted several hidden weaknesses in healthcare systems and demonstrated the extensive, often unknown, dependencies supporting the operation of these systems. These systems work at maximum capacity with no build-in redundancy in many instances. The pandemic has revealed a broadly restricted resiliency, a severe disruption of the system. As we all know, supply chain and procurement systems are some of the worst affected by the ongoing COVID-19 crisis. The rise of resilience does not take place in a vacuum. Instead, it is part of an intentional decision to better the system of interests of an organism. Equitably, it is part of an intentional decision to better the system of interests of an organism. Resilience decisions must be integrated into the decision-making framework of the organisation, enabling it to optimise the value of the system. Value is a complex construct in health systems that requires complete elicitation across the various actors in the supply chain that can have distinct goals and priorities. These aims could include maximising profit and resilience; other issues, such as delivering local needs and political concerns, and aversion to low stock or readily available resources, could also need to be taken into account. The Indian health systems are not resilient in their construction. In addition, supply chain design and improvements to health systems may not necessarily boost the system's resilience. Silo-specific and project-specific improvements may not enhance resilience and may lead to the contrary by increasing overall complexity or focusing merely on piecewise cost reduction.

Therefore, the Indian health system should enhance resilience capacity and deploy resilient designs for health procurement and supply chain systems contributing to outbreak response-COVID-19 or not. At the same time, a collection of metrics can inform the resilience capabilities such as redundancy, robustness, reliability, and time to restoration, which may include time to respond to perturbation, increased demand post-COVID-19, and time to restore if a failure occurs. Resilience capacity must map and characterise the configuration of the major sub-systems, components, and relevant stakeholders and their contribution to the target of the procurement and supply chain system. The resilience system should have design adaptation to enhanced resilience, capacity-building activities, surveillance, evaluation mechanisms for resilience, and communication and dissemination.

Knowledge Management: Permeating Complexities

Knowledge management refers to an environment that encourages healthcare professionals to learn, share and use knowledge to achieve goals collectively. In other word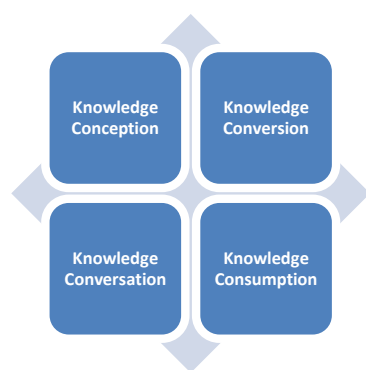s, fashioning a culture of learning and sharing process maximises efficiency and encourages innovation to create a competitive environment, comparative advantage, and achieve desired objectives. This requires strong HIIs to ensure that information is reliable and available timely at the national, state, local, and regional levels. India is mainly unable to account for knowledge management. As noted above, research activities are fragmented, duplicated, and unsynchronised, resulting in the underutilisation of information and results. Second, integrating information collected through routine information systems, population surveys, and special studies by various government and private agencies is essential for decision-making in knowledge management. Third, there is a need for standardisation to eliminate ineffectiveness by developing a compendium of health indicators for knowledge design, conversion, conversation, and consumption through multiple epidemiology units, surveillance systems, and programmatic data (Fig-13). Fourth, enhancing knowledge management addresses the challenges that emerge from time to time that require powerful feedback mechanisms, requiring increased capacity and improved competency for evidence-based decision-making at all levels of governance. India is incapable of accounting for knowledge management. The local level, in particular, should foster a competitive atmosphere and benchmark, which may lead to beneficial changes in health outcomes and overall community development. Increasing performance is a critical factor.

Fig-13: Components of Knowledge Management

Governance in Health: Decisive Architect

Better governance necessitates effective information management solutions that enhance performance. Good governance guarantees reliability and autonomy while dealing with opportunistic conduct, irresponsibility, and the sheer inefficiencies of public transactions. Imbibing good governance would result in accountability, transparency and ensure positive conduct and rule-following. Governance needs a thorough understanding of the programming strategy to attain health goals and objectives. The healthcare system collects numerous data but seldom uses many. An effective health knowledge management system must be selected to minimise inefficiencies and waste of limited resources. Strengthening HII would create a public health support constituency, increase capacity, and affect the vertical behaviour of health systems. Local government engagement, such as Panchayats, is essential for community development, behavioural change, and decision-making.

Investment in human resources is crucial to improving performance, which calls for the quantity and quality of health professionals needed to implement the programs, projects, and schemes. However, the lack of governance, the lack of a proper blend of competent and motivated personnel, the poor work environment, and the poor career development opportunities resulted in the retention of poorly qualified employees. Governance, therefore, needs to rationalise and enhance the existing networking mechanisms and referral systems, build dual systems (access to the private sector), share resources, build capacity, restructure and transform systems, institutionalise professional development, and distribute and retain health personnel in our areas of service and maintenance.

Improving governance is indispensable, and health communication can play a significant role in highlighting the challenges, as can the reinforcement of the PPP response. It enhances fiscal autonomy at the local level while integrating financial management tools to improve accountability and performance auditing. The supply management system needs to be created and upgraded with logistics and material management systems and then linked to the financial management system. It strengthens the monitoring and evaluation process of financial, procurement, and logistic management and improves medium-term budgeting to reduce the gaps in programmatic activities. Establish a control system to ensure efficient allocation and optimal usage while eliminating corruption, imposing sanctions and penalties, increasing accountability, and maintaining fiscal discipline. It requires an effective information system that would, from local government-Panchayat to central and state, focus on monitoring and evaluation, research, and knowledge management systems to support rational performance assessment and reinforce evidence-based health policy development and decision-making processes.

Conclusion: modernising into 'new normal'

The above arguments underline the fundamental ideologies required to modernise the health care system to deliver services and improve health outcomes. This embraces the value of health, managing resources and infrastructure, specifying information for effective communication, strengthening human capital, providing quality care services, adapting advanced medical technologies, enhancing disease surveillance and monitoring activities, knowledge management, governance, and consideration of the local social fabric. The goal of the healthcare system is to improve public health while eliminating disparities, prejudice, and inequity. The demanding healthcare system achieves average health outcomes and accomplishes the minor possible inequalities, but equality is the goal of the healthcare system in terms of responsiveness. As a result, the post-COVID-19 system requires modernisation and a 'new normal' scenario requiring appropriate resources and facilities to achieve the country's health objectives. The concerted efforts of the central, state, and local governments, private organisations, NGOs/NPOs, and community stakeholders play a vital role in providing and strengthening the national health program initiatives to help the nation overcome deadly but preventable and infectious diseases by providing technical, financial and operational support.

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