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Research Paper

Covid -19 Impact on Health Care Industry

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ABSTRACT
Over 7.5 million people have been infected by COVID-19 globally. In India, the number of cases has risen exponentially from 470 in March to over 4 lakhs, within a span of three months. Despite the implementation of lockdown measures including travel bans in India and worldwide, there has been an increasing incidence of COVID 19. The number continues to rise as lockdown measures are being relaxed in varying capacities across countries. The impact of COVID-19 on the healthcare domain is huge and it has seriously disrupted the healthcare industry's entire supply chain, from raw materials to manufacturing and delivery. With a shortage of hand sanitizers, counterfeiting of face masks, and many other disruptions in supply chain channels, coronavirus has already created havoc in global markets. Disruptions in the healthcare supply chain have significantly impacted the sourcing, procurement, and management of necessary medical equipment inventories. The COVID-19 global pandemic can may be associated with numerous short- and long-term impacts on the health market, mainly the pharmaceutical sector; which can be seen from both global and local perspectives. Despite the current crisis being a healthcare issue, the private healthcare system in the country continues to reel under the negative impact of COVID-19. There has been a significant drop in both in-patient and out-patient footfall for private hospital chains be it a single speciality, multi-speciality, tertiary-care hospitals or even diagnostics businesses, during this lockdown. The pandemic has driven a sudden realization around the significance of protective investments, especially when it comes to the aspects of health and life security. Health insurance has definitely taken the front seat when it comes to return-based instruments, both from the perspective of securing access to quality healthcare as well as investing in healthcare finances. It is concluded that in spite of the deadly effect of COVID-19, there is a significant positive impact on the healthcare system, pharmaceutical industries and research in India and the whole world. In a nutshell, the healthcare sector witnessed an increased public spend on health and well-being. However, addressing the persistent manpower and skill gap and measures to improve private sector participation will bode well for an overall improvement in healthcare delivery as well as education facilities.

KEY WORDS: *Health care industry, Medical devices, Health Insurance Sector Health care facility*

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I. INTRODUCTION

Severe acute respiratory syndrome novel coronavirus 2 (SARS-CoV-2) was emerged from Wuhan, China in December 2019 and declared as a global pandemic by the World Health Organization (WHO) which designates this SARS-CoV-2 infection as novel coronavirus disease (COVID-19). COVID-19 has spread across the globe infecting more than 150 million population leading to more than 3 lakh deaths. Over 7.5 million people have been infected by COVID-19 globally. In India, the number of cases has risen exponentially from 470 in March to over 4 lakhs, within a span of three months. Despite the implementation of lockdown measures including travel bans in India and worldwide, there has been an increasing incidence of COVID 19. The number continues to rise as lockdown measures are being relaxed in varying capacities across countries.[1]

In terms of employment and revenue, it has been one of the largest sectors and is growing at a brisk pace. Healthcare in India is delivered mainly either by public or private providers. The public healthcare focuses on delivering primary healthcare through community-level health programmes mainly focusing on reducing mortality and morbidity caused by various communicable and non-communicable diseases. It follows a tiered system of infrastructure wherein basic health services are provided through sub-centers and primary health centers, while secondary and tertiary care is delivered at better equipped establishments such as community

health centers, district hospitals and medical colleges that are mostly at district headquarters. With the COVID-19 pandemic testing even the more developed healthcare systems globally, the foundations of India's healthcare system have naturally also been shaken. The overall response to the pandemic witnessed both the private and government sector working in tandem. The private Indian healthcare players rose to the occasion and have been providing all the support that the government needs, such as testing, isolation beds for treatment, medical staff and equipment at government COVID-19 hospitals and home healthcare.[2]

The impact of COVID-19 on the healthcare domain is huge and it has seriously disrupted the healthcare industry's entire supply chain, from raw materials to manufacturing and delivery. The demand for medical ventilators has forced the producers to boost demand by up to 40 to 50% at the global level. In order to meet the increasing demand, producers have also cooperated with automakers. Governments and numerous organizations are deeply engaged in meeting the global situation, along with other industry personals. In order to address the consumer demands of medications, vaccines, diagnostics, and medical equipment's such as ventilators, the leading personals are involved in research and development operations, strategic alliances and partnerships, and innovative product releases.

The world has recognized the need for healthcare segment early warning systems, currently for COVID-19, but in the future, this pattern will continue for all types of diagnostics. Immense growth can be foreseen with respect to the diagnostics industry. The healthcare industry was not well prepared to tackle a public health crisis to this extent. In terms of regulations, risk control, technology, manufacturing, procurement, or supply chain management, the present state of affairs meant that certain business activities were not stringent enough.

The healthcare industry, along with the central and state governments, undertook a robust response plan to tackle the pandemic by setting up of dedicated COVID-19 hospitals, isolation centres and tech-enabled mapping of resources. In order to effectively manage the outbreak, the Indian government also leveraged technology and developed various applications both at the central and state-levels. The Aarogya Setu mobile app which assisted in syndromic mapping, contact tracing and self-assessment was widely used throughout the country. Such technology platforms were used to supplement the response management, which included delivery of essential items in containment zones, tele-consultations with patients, bed management and real-time monitoring and review by the authorities.[3]

Impact on different sectors of the Health Care Industry

- Medical Devices and Equipment's
- Diagnostics
- Pharmaceuticals
- Health care Facilities
- Health Insurance
- Health information Technologies

MEDICAL DEVICES AND EQUIPMENTS

On March 11, 2020, the WHO declared COVID-19 a pandemic. Industries, markets and businesses the world over have been turned upside down by Covid-19, and this impact has been especially profound within the medical device sector. However, while the impact of the pandemic has been overwhelmingly negative in many areas, the medtech industry has experienced both ups and downs throughout the crisis. Massively increased demand for critical pieces of equipment such as PPE (personal protective equipment), ventilators and testing kits along with subsequent shortages of these devices has seen firms do everything they can to keep pace with the ever-growing needs of healthcare providers.

Disruptions in the Healthcare Supply Chain

With a shortage of hand sanitizers, counterfeiting of face masks, and many other disruptions in supply chain channels, coronavirus has already created havoc in global markets. Disruptions in the healthcare supply chain have significantly impacted the sourcing, procurement, and management of necessary medical equipment inventories. China is among the largest suppliers of a majority of healthcare commodities, namely pharmaceutical APIs and components of medical devices. But with China as the epicenter for the pandemic, the healthcare sector is exposed to the risk of COVID-19. As a response to supply chain disruptions, healthcare facilities have started stockpiling available products. Such unrestricted purchasing is further imposing financial pressure on the healthcare sector, which is already suffering issues such as procurement inefficiencies and wasted spend. This has also led to the yield of compromised quality of care. Several instances of sanitizer and face masks counterfeiting have been noted in developing countries, which could negatively impact the healthcare sector as a whole.

COVID-19 has put the medical device industry front of mind, with unparalleled demand for some products like diagnostic tests, ventilators, and personal protective equipment (PPE). However, not all medical devices are essential in the management of patients during the pandemic. Because of the dramatic drop in elective medical procedures, many of which are being postponed or cancelled so that hospitals can focus resources on treating COVID-19 patients, results in a drop in use of other products.[4] The planning and actions taken in the short term can have significant implications, not only for company survival during the pandemic, but in shaping its longer-term recovery for what is likely a significantly different future for the medical device industry.

Medical device companies have changed how they reach their customers and provide services. In addition, the playbook for launching new products and services may need to be rethought post pandemic. The lessons learned during the pandemic will surely shape this new way forward, creating a world that works for both industry and its customers.

Most companies quickly prioritised new digital capabilities to enable digital touchpoints with their customers (such as online customer service representatives, webinars with key opinion leaders, and professional education). This is more easily done for larger and medium-sized organisations. For the smaller, more start up organisations, not so easy but some have managed. Digital capabilities, such as digital detailing and product demonstrations will perhaps become a more normal component of a go-to-market strategy.

DIAGNOSTICS

Diagnostic testing remains the backbone of the coronavirus disease 2019 (COVID-19) response, supporting containment efforts to mitigate the outbreak. The severity of this crisis and increasing capacity issues associated with polymerase chain reaction (PCR)-based testing, accelerated the development of diagnostic solutions to meet demands for mass testing. The National Institute for Health Research (NIHR) Innovation Observatory is the national horizon scanning organization in England. Since March, the Innovation Observatory has applied advanced horizon scanning methodologies and tools to compile a diagnostic landscape, based upon data captured for molecular and immunological based diagnostics (commercialized/in development), for the diagnosis of SARS-CoV-2. In total we identified and tracked 1608 diagnostics, produced by 1045 developers across 54 countries. Stakeholders worldwide required timely and detailed intelligence to respond to major challenges, including testing capacity and regulatory issues. Our intelligence assisted UK stakeholders with assessing priorities and mitigation options throughout the pandemic. Here we present the global evolution of diagnostic innovations devised to meet changing needs, their regulation and trends across geographical regions, providing invaluable insights into the complexity of the COVID-19 phenomena.[5]

During the early phase of the coronavirus disease 2019 (COVID-19) pandemic, design, development, validation, verification and implementation of diagnostic tests were actively addressed by a large number of diagnostic test manufacturers. Hundreds of molecular tests and immunoassays were rapidly developed, albeit many still await clinical validation and formal approval. In this Review, we summarize the crucial role of diagnostic tests during the first global wave of COVID-19. We explore the technical and implementation problems encountered during this early phase in the pandemic, and try to define future directions for the progressive and better use of (syndromic) diagnostics during a possible resurgence of COVID-19 in future global waves or regional outbreaks. Continuous global improvement in diagnostic test preparedness is essential for more rapid detection of patients, possibly at the point of care, and for optimized prevention and treatment, in both industrialized countries and low-resource settings.[6]

As COVID-19 has spread, the demand for molecular testing, regarded as the gold standard for diagnosing infectious disease, has exploded. In Europe and the United States alone, molecular-diagnostic demand rose 20-fold between March and October 2020. While the disease remains uncontained, such demand is likely to keep growing. Meanwhile, the rush to meet it has already driven four main developments in the IVD industry that could prompt structural shifts that will have long-term implications for diagnostic-test manufacturers

As the COVID-19 pandemic gathered force, demand grew for not only faster testing but also testing in much higher volumes. That demand was a struggle to meet when it came to RT-PCR testing, as a result of laboratories' turnaround times and a shortage of reagents.

The response to that struggle has been the accelerated development of new diagnostic technologies, such as next-generation sequencing (NGS) and CRISPR. Those technologies could come to challenge the leading position of the current RT-PCR systems for viral COVID-19 tests, particularly if regulators further facilitate their fast introduction. As of November 2020, the US Food and Drug Administration had granted emergency approval for two CRISPR-based diagnostic tests for COVID-19 from early-stage companies Sherlock Biosciences and Mammoth Biosciences. Approval of the former company's test represented the first time a CRISPR-based product had been authorized for use in healthcare.[7]

Diagnostic-test manufacturers are playing a critical role in government efforts to respond to the COVID-19 pandemic. Yet their work to increase the IVD supply is also initiating changes in the industry that could lead not only to greater adoption but also to greater competition. Much more than the course of the

pandemic is uncertain. What role will POC diagnostics play in the delivery of care? How will the supply landscape for reagents evolve? Will emerging alternative and complementary technologies and platforms have a major impact on the testing landscape—and if so, when? How will regulators respond to the high demand for tests? Will they authorize at-home molecular tests?

The widespread effect of COVID-19 was felt all over the world which led to a drastic increase in the requirement for effective and efficient diagnostics solutions. The lockdown rules were implemented to further curb the rise of the virus among people. Though entire countries were shut down, several hospitals, medical labs, and clinics witnesses a sure in people coming in to get themselves tested for the virus. If people need to travel for essential reasons, they need to be in possession of a negative rt-PCR test. This constant need for the virus detection and initiatives to free the world from it have contributed to the growth of the COVID-19 diagnostics market.[8]

Economic consequences and new business models

Economic aspects concerning diagnostics during the COVID-19 pandemic are complex and multifactorial. Influence by governments, cost-effectiveness of the workflow in laboratories, technological readiness, the need for investment in laboratory tools, academic and industrial funding levels, the need for substantial upscaling of tests and required improvement in data management and IT logistics all have important financial consequences. Hence, COVID-19 led simultaneously to two opposite consequences for laboratory medicine activities. On one hand, microbiology departments faced a huge increase in their diagnostic activities related to the number of patients with suspected COVID-19, and sometimes this even led to the requisition of equipment and reagents from other disciplines.[9] On the other hand, the activities of clinical laboratories not directly related to COVID-19 dropped substantially, including, for instance, genetic testing, which had to adapt to a different, remote-based service model.[10] Moreover, owing to the lockdown, ambulatory activities effectively stopped, which resulted in an immediate economic impact for health-care organizations.[11] As a further example, the stock option of large private laboratory consortia, at the firm level, dropped during the peak of COVID-19, probably owing to the capital intensity from the surge in testing demands. A similar picture was also observed at the hospital level, with a drop of routine activity and the acute need for reallocation of staff and services.[1]

PHARMACEUTICALS

The COVID-19 global pandemic can may be associated with numerous short- and long-term impacts on the health market, mainly the pharmaceutical sector; which can be seen from both global and local perspectives. Identifying these impacts may guide policy-makers in evidence-informed planning and decision-making to combat associated challenges. COVID-19 may be seen as a century's opportunity for pharmaceutical industry; as it increases the demand for prescription medicines, vaccines and medical devices.[13] This can be seen as one of the main short-term effect of COVID-19 epidemic;

Demand change, which leads to shortage, in the case of induced demand and panic-buying of oral home-medications especially for chronic disease may be due to the pandemic (COVID-19-related), and also shortages due to supply-chain inconsistencies.[13]

COVID-19-related*:* Increased hospitalization, incidence of COVID-19-related pneumonia and increased demand for assigning patients to ventilators, contributes to related prescription medicine shortages. A medicine shortage is defined as a "supply issue that affects how the pharmacy prepares or dispenses a drug product or influences patient care when prescribers must use an alternative agent".[14] On the global levels, many regulatory authorities announced confirmed shortage list, mostly including potential COVID-19 treatments and also associated pneumonia.

Induced demand and panic buying:

Induced demand for stocking medication by public, which is called "panic buying", may cause periodic shortage in the market; especially for chronic disease medications. Studies reported that induced demand in global pharmaceutical market, mainly due to "panic buying" of pharmaceuticals for chronic disorders, was estimated to be +8.9%, by March 2020.[15] An study in USA indicated that from 13th to the 21st of March 2020, asthma medications spiked by 65%, and type 2 diabetes medications increased by 25%. Similarly, medicines treating high cholesterol, migraine, and hypothyroidism also saw a noteworthy increase in claims.[16]

Supply shortage of both active pharmaceutical ingredients (APIs) and finished products: China and India are the world's main supplies of APIs, key starting materials (KSMs) and also finished pharmaceuticals. As they are struggling with the disease and also a slow-down in production, this may have contributed to shortage and also price increase in essential prescription medicines, including antibiotics. This shortage has already begun to affect API and bulk prices in Indian party trades. The average increase was reported to be about 10–15%; however, may reach to 50% in some cases.[17]

Shift of communication and promotions to remote interactions through tele-communication and tele-health: In both global and local levels, due to the social distancing precautions, marketing and promotions of health-care products to providers are being shifted from face-to-face towards remote interactions and tele-

communications; for both promotional and patient-support acts. In USA, the number of patients who have visited physician offices or clinics reduced by 70 to 80%.[18]

Research and development changes: In global levels, at least 113 medicines or regimens and 53 vaccines are in research and development pipelines or active clinical trials, as therapeutics for patients diagnosed with COVID-19 [12]. As of April 23, 2020, there are about 924 ongoing trials in the world for the treatment of COVID-19. Only 15% of these studies are based on conventional RCT methods, double-blind and multicenter randomized with comparator arm, but about 40% are not even randomized.[18]

Long-term impacts Approval delays,

moving towards self-sufficiency in pharm-production supply chain, industry growth slow-down and possible trend changes in consumption could be seen as long-term impacts of COVID-19 on the health and pharmaceutical market.

1. Delayed approvals for non-COVID-related pharmaceutical products; as all countries, including Iran, are being under pressure of the crisis and their priority is COVID19 management, approval delays may be seen due to several month of application review postponements.[19]

2. Moving towards self-sufficiency in pharma industry; potential shortages due to export bans in India and China, who are main suppliers of API and generics, made governments of many countries to consider self-sufficiency in supply chain and they have announced regulations to avoid shortages in such crisis.[19]

3.Ethical considerations: One of the long-term effects of growing clinical research related to the current pandemic is the use of poorly evidence centered therapies. Ethical issues should be considered in the use of these medicines as off-label.[20]

4. Consumption trend changes in health-related products: Changing habits related to consumption and refilling prescriptions, especially in chronic disease therapeutic areas, might happen; and may also be further affected by the emerging tele-medicine. Currently, public is concerned with personal hygiene maintenance; using mainly nose/mouth protection, anti infections material for environment and clothing and hand sanitizers. Due to extended period of pandemic, this consumption may remain in behavioural acts of the public, globally and locally.

HEALTH CARE FACILITIES

International hospitals and healthcare facilities are facing catastrophic financial challenges related to the COVID-19 pandemic. The American Hospital Association estimates a financial impact of $202.6 billion in lost revenue for America's hospitals and healthcare systems, or an average of $50.7 billion per month. Furthermore, it could cost low- and middle-income countries ~ US$52 billion (equivalent to US$8.60 per person) each four weeks to provide an effective healthcare response to COVID-19. In the setting of the largest daily COVID-19 new cases in the US, this burden will influence patient care, surgeries, and surgical outcomes. From a global economic standpoint, The World Bank projects that global growth is projected to shrink by almost 8% with poorer countries feeling most of the impact, and the United Nations projects that it will cost the global economy around 2 trillion dollars this year. Overall, a lack of preparedness was a major contributor to the struggles experienced by healthcare facilities around the world. Items such as personal protective equipment (PPE) for healthcare workers, hospital equipment, sanitizing supplies, toilet paper, and water were in short supply. These deficiencies were exposed by COVID-19 and have prompted healthcare organizations around the world to invent new essential plans for pandemic preparedness.[21]

While public policy measures have been implemented to contain the spread of COVID-19, the measures have resulted in significant operational disruption for many companies including those in the Indian healthcare industry. Staff quarantine, supply-chain failures, and sudden reductions in customer demand have generated serious complications for companies across a wider range of sectors than initially anticipated. For most, the revenue lost in this period represents a permanent loss and has put sudden, unanticipated pressure on working capital lines and liquidity.

Despite the current crisis being a healthcare issue, the private healthcare system in the country continues to reel under the negative impact of COVID-19. There has been a significant drop in both in-patient and out-patient footfalls for private hospital chains be it a single speciality, multi-speciality, tertiary-care hospitals or even diagnostics businesses, during this lockdown. This sudden decline in business has had an immediate effect on hospitals' ability to sustain fixed costs. The inability of new centres/hospitals to start generating cash, debt repayment obligations, decreased levels of medical tourism, and increased scheme revenues (which represents credit revenue) are some of the many factors impacting cash flow.[22]

In an effort to sustain these challenges, hospitals have begun implementing measures to reduce or defer costs, with a view to reserve cash in hand. In the context of consumables, supplier consolidation for better rates and renegotiation of credit periods for pharmacy and consumables are some measures instituted by hospitals to conserve their cash flow. On the personnel cost front, changes are being made to doctor-engagement models by moving doctors to fully variable models based on the revenue they generate. In the case of other

staff/employees, increments and variable pay have been calibrated while evaluating shared services, in an attempt to further reduce overall employee costs. With respect to other fixed costs, initiatives such as the renegotiation of rent rates, vendor consolidation (for outsourced services such as housekeeping and security services), and deferral or staggered payment of annual maintenance costs have been administered. Most discretionary spends such as advertisement and sales promotions have largely been ceased.

In such circumstances, there is also an increased focus on monitoring daily, weekly, and monthly cash flows relative to the budgets. Any deviations from the budget are carefully monitored to assess the impact on the cash flow. Revenue and other KPIs are also being monitored with a sharp focus. Hospitals may also have to get used to "the new normal" with increased hygiene measures and staff safety, resulting in costlier procedures.

II. HEALTH INSURANCE

Impact on health insurance industry

While the demand for health insurance is expected to increase considerably, underwriting thresholds may also go up and thus the negative movement may not be offset. It may be noted that India has traditionally been an underinsured country, with private health insurance schemes covering only 18% of the population in urban areas and a little over 14% in rural areas. Although the gap has been bridged somewhat by Ayushman Bharat, which has attempted to insure the poor and vulnerable, most of India continues to be underinsured when it comes to health.[23]Due to the widespread COVID-19 pandemic, health insurance companies are facing various challenges and are foreseeing an impact in the following areas:

1. Claim pay out and liquidity

In order to dispel any general misconceptions about the applicability of health insurance policies to cases of COVID-19, the IRDAI has instructed insurers to accept COVID-19 related claims under active health insurance policies. Since the risk of COVID-19 is not currently priced under active products, these claims may cause an additional burden on the books of insurers if treated outside government hospitals.

Apart from various other things, a nationwide pandemic can result in a significant increase in claims for health insurance companies beyond just COVID-19. Some studies have shown that COVID-19 affects those with co-morbidities such as diabetes, renal and other chronic diseases adversely, and hence prolonging of such co-morbidities can result in a longer trail of non-Covid-19 chronic claims for an extended period beyond COVID-19, says the report.[23]

2. Product development

In the wake of the pandemic, there has been greater concern and awareness about health, and enquiries about health insurance policies have increased by 30–40%. The pandemic also provides an opportunity for insurance companies to innovate and serve the evolving needs of a more informed population. Several insurance companies have launched COVID-19 insurance products in March 2020.

The COVID-19 pandemic has posed a sudden and unexpected shock to the insurance industry. The financial impact is huge with profits dropping by 16.6% within the period under review—Marchto June 2020. Total premiums have dropped by 17.01% while claims have increased by 38.4%. Most companies have reduced market share with only a few maintaining their market share.[24]

The pandemic has driven a sudden realization around the significance of protective investments, especially when it comes to the aspects of health and life security. Health insurance has definitely taken the front seat when it comes to return-based instruments, both from the perspective of securing access to quality healthcare as well as investing in healthcare finances**.** For the healthcare ecosystem, the pandemic has left its mark on almost all industries and sectors across the spectrum, including health insurance. While the pandemic is still showing no signs of abatement, we are now able to forecast its impact the health insurance industry in the near and mid-term future with enough cues from the past quarter's data. Then there has been a clear change in the customer mindset. The pandemic has driven a sudden realisation around the significance of protective investments, especially when it comes to the aspects of health and life security. Health insurance has definitely taken the front seat when it comes to return-based instruments, both from the perspective of securing access to quality healthcare as well as investing in healthcare finances. This could over time lead to health insurance transforming from a traditionally "push" product to a "pull" one. Everyone in the health insurance industry will readily vouch for how drastic the influence of Covid-19 has been on their businesses and lives. A full-scale transformation is indeed underway and of course the digitalisation of the customer journey will be a critical component in this transformation. In my view, the industry and its customers – the insurance buyers – can expect some clear changes in the coming months and years.[25]

HEALTH INFORMATION TECNOLOGIES

The COVID-19 pandemic is ongoing, and it is too early to fully quantify the added value of digital technologies to the pandemic response. While digital technologies offer tools for supporting a pandemic response, they are not a silver bullet. The emerging consensus is that they have an important role in a comprehensive response to outbreaks and pandemics, complementing conventional public-health measures, and thereby contribute to reducing the human and economic impact of COVID-19. Cost-effectiveness and sustainability will require systems-level approaches to building digital online care pathways that link rapid and widespread testing with digital symptom checkers, contact tracing, epidemiological intelligence and long-term clinical follow up. The COVID-19 pandemic has confirmed not only the need for data sharing but also the need for rigorous evaluation and ethical frameworks with community participation to evolve alongside the emerging field of mobile and digital healthcare. Building public trust through strong communication strategies across all digital channels and demonstrating a commitment to proportionate privacy are imperative.[27]

The future of public health is likely to be increasingly digital, and recognizing the importance of digital technology in this field and in pandemic preparedness planning has become urgent. Key stakeholders in the digital field, such as technology companies, should be long-term partners in preparedness rather than being partners only when emergencies are ongoing. Viruses know no borders and, increasingly, neither do digital technologies and data. There is an urgent need for alignment of international strategies for the regulation, evaluation and use of digital technologies to strengthen pandemic management and future preparedness for COVID-19 and other infectious diseases. With the move to telemedicine and remote workforces, the lens is even more focused on identity management practices and security protocols. Allowing the right person access to the right healthcare records, and ensuring appropriate and patient-centric care, is more critical than ever as the pandemic continues to churn through the U.S. These technology needs have not changed, they've only become more critical to ensure proper value-based medical care and to improve healthcare delivery from providers.

the pandemic has also intensified the need for technology to help us with monitoring social factors that affect patient health and understanding their impact on healthcare access and outcomes. COVID-19 brought the integration of social determinants of health into care planning to the forefront. Data showed that the virus spread most quickly through densely populated cities, and disproportionately impacted vulnerable populations. Integrating social determinants of health data into care models can address these disparities and provide better medical care to vulnerable populations. Health system technology departments can't achieve the vision of connected healthcare by working in isolation. It requires a true team approach. As the COVID-19 fight has continued, we've seen healthcare organizations proactively come together to share data and knowledge in an effort to better understand the disease and optimize healthcare delivery. Cross collaboration between health systems, government agencies and academia will remain critical, helping to forge a faster path to data-driven insight around issues like resource allocation, improved outcomes, disease prevention and cost containment.[28]

Digital technologies join a long line of public-health innovations that have been at the heart of disease-prevention-and-containment strategies for centuries. Public health has been slower to take up digital innovations than have other sectors, with the first WHO guidelines on digital health interventions for health-system strengthening published in 2019.[29,30] The unprecedented humanitarian and economic needs presented by COVID-19 are driving the development and adoption of new digital technologies at scale and speed. We have highlighted the potential of digital technologies to support epidemiological intelligence with online datasets, identify cases and clusters of infections, rapidly trace contacts, monitor travel patterns during lockdown and enable public-health messaging at scale.

III. CONCLUSION

It is concluded that in spite of the deadly effect of COVID-19, there is a significant positive impact on the healthcare system, pharmaceutical industries and research in India and the whole world. In a nutshell, the healthcare sector witnessed an increased public spend on health and well-being. However, addressing the persistent manpower and skill gap and measures to improve private sector participation will bode well for an overall improvement in healthcare delivery as well as education facilities. Success would now lie in how these new initiatives are implemented. It will be important to shift the focus towards the quality of implementation of the new programmes and schemes as well as on fostering convergence across health programmes. It might also lead to creation of a robust, collaborative ecosystem for the public and private healthcare providers to work together in quest of desirable outcomes. Driven by better healthcare awareness, rise in incomes, increased access to insurance and lifestyle-related diseases, India's healthcare market is expected to reach USD372 billion by 2022. The Indian government aims at increasing the healthcare spending to 2.5 per cent of the GDP (gross domestic product) by 2025 The COVID-19 pandemic has also transformed the way the government and private players are planning to bring change in the healthcare system

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