CHANGING THE PARADIGM OF DIGITAL HEALTH IN INDIA

REPORT OF THE 5TH GOVERNMENT INDUSTRY DIALOGUE

Wolters Kluwer

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5TH GOVERNMENT INDUSTRY DIALOGUE

Hotel Le Meridien, April 19, 2017

The 5th Government Industry Dialogue (GID) was held on April 19th, 2017 in Delhi. The objective was to bring together government and industry to look at existing gaps in digital healthcare in India and discuss ways to bridge these quickly and efficiently. This was in line with the National Health Policy 2017, that recognizes the potential of digital healthcare in India and advocates extensive deployment of digital tools to improve the efficiency of India's current healthcare system.

The workshop was hosted by Disease Management Association of India, an organization with a Special Consultative Status with the United Nations – ECOSEC, in association with the Ministry of Health and Family Welfare and Personal Connected Health Alliance. The dialogue was supported by the TIFAC - Department of Science and Technology, NHSRC - MOHFW, GOI and Department of Pharmaceuticals - Ministry of Chemicals and Fertilizers, Government of India.

The speakers included senior-most decision makers from the government, industry CEOs and stakeholders in the healthcare ecosystem. This year the participants focused specifically on need gaps in medical devices and examined the latest developments in the Internet of Things (IoT), Point-of-Care (POC) diagnostics and the current status of digital healthcare in India. Also included as part of the roundtable was an open discussion on medical devices, themed "Emerging paradigm & need for standardization for the proposed report on medical devices". In the audience were representatives from the public and private healthcare fraternity across the continuum of care.
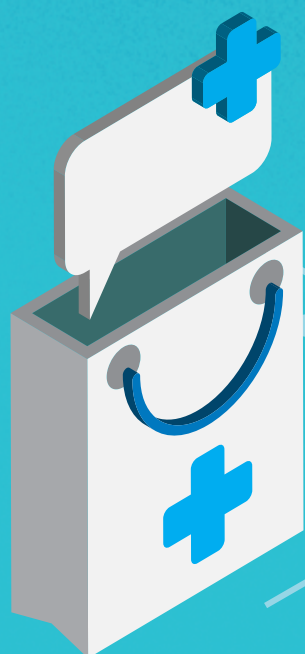
MESSAGE FROM

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन
अनुप्रिया पटेल
Anupriya Patel

स्वास्थ्य एवं परिवार कल्याण राज्य मंत्री
भारत सरकार
MINISTER OF STATE FOR
HEALTH & FAMILY WELFARE
GOVERNMENT OF INDIA

MESSAGE

I am indeed delighted to have participated in the Government-Industry Dialogue held on 19th April 2017. I thank the organizers for providing me this memorable opportunity to exchange my views with the experts from Industry of India as well as abroad and enrich my knowledge of Digital Technology in Healthcare.

The entire nation has joined hands to make the dream of Digital India, a brainchild of our beloved Hon'ble Prime Minister, Shri Narendra Modi ji into the reality. Because of the initiative of our Prime Minister, the youngsters have become enthusiastic, the industry extended support and the country is entering into Digital India revolution.

As part of the cherished dream of Digital India, the Ministry of Health and Family Welfare, under the Cabinet Minister, Shri Jagat Prasad Nadda ji is looking for practical ways to integrate the Digital Technology into healthcare so that the Digital Health eco-system can be built in India and help us achieve the mission of reaching the unreached to provide affordable high quality healthcare to every man and woman in every village of our vast country.

I am sure that the collaboration between Government and Industry – transform our country into Health for All.

I take this opportunity to place my deep sense of appreciation for the organisers for taking this initiative. Thank you.

(Anupriya Patel)

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Mr. Rajendra Pratap Gupta, Advisor to the Union Minister for Health and Family Welfare

राजेन्द्र प्रताप गुप्ता
RAJENDRA PRATAP GUPTA

सलाहकार
केन्द्रीय स्वास्थ्य एवं परिवार कल्याण मंत्री
भारत सरकार
निर्माण भवन, नई दिल्ली—110011
ADVISOR
UNION MINISTER OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF INDIA
NIRMAN BHAVAN, NEW DELHI-110011

June 8, 2017

Message

Today, we take for granted how effortlessly we access the internet on our laptops, tablets and smart phones, across platforms. Digital health, which is the integration of digital technology with health, requires the same kind of seamless connectivity and interoperability so that devices can send and receive health-related data in a secure and safe way.

Digital health requires an "ecosystem" approach, which has the potential to revolutionize healthcare delivery. Not only the 'System Silos' but also the 'Human Silos' have to be addressed, and it is not just the systems interoperability but 'Human Interoperability' that is the precondition for a successful digital health ecosystem. All these issues have been effectively addressed at this 5th Government Industry Dialogue in the day long workshop.

Such a forum provides an opportunity for all stake-holders to come together, deliberate and share their ideas to improve the healthcare delivery. We look forward to more such interactions in the times ahead

Best wishes

Arun Kumar Panda
Additional Secretary &
Mission Director, NHM
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GOVERNMENT OF INDIA
MINISTRY OF HEALTH & FAMILY WELFARE
DEPARTMENT OF HEALTH & FAMILY WELFARE
NIRMAN BHAVAN, NEW DELHI - 110011
8th June, 2017

Message

It was a delight to participate and interact with the decision makers in healthcare at the 5th Government Industry Dialogue organized by Disease Management Association of India, PCH Alliance in partnership with MoHFW, Department of Pharmaceuticals, NHSRC & TIFAC.

Focused and interactive forums like these play an important role in bridging the divide between various stakeholders, and I compliment the organizers for this initiative and for inviting me to share my views. I believe that healthcare offers tremendous opportunities, and healthcare cannot be left alone to either public or private. Both have to work in tandem to achieve the goal of universal healthcare and the sustainable development goals. I strongly believe that technology will play a crucial role in achieving the last mile delivery of healthcare and bridging the divide between urban and rural India. Medical devices play a pivotal role in the health care service delivery as potent tools of technology.

Technology and medical devices together have the potential to transform the healthcare delivery. When we talk of technology and medical devices, we need to understand that probably billions of devices and thousands of solutions will interface with each other and in that the role of standards is critical.

We at the ministry are committed to developing standards. We will engage with all the stakeholders that work in standards development to achieve an interoperable and a seamless healthcare delivery system harnessing the potential of technology.

I wish the very best and we look forward to continuous engagement with various stakeholders on the implementation of the programs of digital health.

Best wishes.

(Dr. Arun K Panda)

Healthy Village, Healthy Nation

Sunil Sharma, IRPS
Joint Secretary

भारत सरकार
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Message

It was indeed a privilege to be invited to the 5th Government Industry Dialogue, and this is the second dialogue I have attended.

The earlier (4th dialogue) came out with very interesting and important suggestions, and we have incorporated the suggestions in our RFP for the IHIP project.

Digital Health is the solution for reaching the unreached, and with 4G deployed already, and the next generation 5G technology being considered for deployment, our healthcare system must be prepared to leverage them optimally

I believe that this forum helps us to break the silos and understand the perspective from multiple standpoints. The interactions are of high quality and important issues gets raised and discussed in detail.

Also, when the Government and the Industry work together, we will certainly achieve our goal of providing affordable and accessible healthcare to all.

Once again, I would like to thank the organizers for inviting me and for initiating such kind of a dialogue, which has proved to be beneficial for one and all.

My best wishes.

(Sunil Sharma)

GOVERNMENT INDUSTRY DIALOGUE
EMPOWERING FUTURE

Mevish P. Vaishnav
National Coordinator

Greetings from the Disease Management Association of India!

It is our fifth year, and we take this opportunity to thank you for the wonderful support. I would like to specially thank these leaders, who have been with us since the very beginning;

- Mr. Krishan Girdhar, Managing Director, Presto Info Solutions Pvt. Ltd.
- Mr. Jeyaseelan Jeyaraj, Oracle India
- Commander (Rtd) Girish Kumar, HP

The 5th Government-Industry Dialogue (GID) was supported by;

- Ministry of Health and Family welfare, Government of India
- Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Government of India
- Technology , Information, Forecasting & Assessment Council (TIFAC), Department of Science & Technology , Government of India
- National Health Systems Resource Centre (NHSRC), Ministry of Health & Family Welfare, Government of India
- PCH Alliance
- Continua

We thank all our supporters and participants for their active involvement to make this initiative a big success.

'Coming together is a beginning, staying together is progress, and working together is success' – said Henry Ford, and together, we can transform healthcare.

Wish you good health!

Ms. Mevish . P. Vaishnav
National Coordinator
Government Industry Dialogue

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AGENDA: 5TH GOVERNMENT INDUSTRY DIALOGUE

8.45 AM - 9.20 AM – Registration and Networking Tea	
9.20 AM – 9.25 AM	Introduction – Ms. Mevish. P. Vaishnav, Coordinator, Government Industry Dialogue
9.25 AM – 9.30 AM	Opening Remarks – Mr. Rajendra Pratap Gupta, Advisor to Union Minister for Health & Family Welfare, Government of India
9.30 AM – 09.45 AM	Mr. Michael Strubin – Director European Program, Personal Connected Health Alliance
9.45 AM – 10.00 AM	Mr. Anand Deshpande, Member – UIDAI, Govt. of India
10.00 AM – 10.10 AM	Mr. Sunil Sharma, Joint Secretary – Ministry of Health & Family Welfare, Government of India
10.10 AM – 10.20 AM	Dr. Arun Panda, Addl. Secretary – Ministry of Health & Family Welfare, Government of India
10.20 AM – 10.35 AM	Address by Chief Guest – Mrs. Anupriya Patel - Union Minister of State for Health & Family Welfare, Government of India
10.35 AM - 11.00 AM – Tea Break	
11.00 AM – 11.10 AM	Prof. Prabhat Ranjan – Executive Director, TIFAC
11.10 AM – 11.20 AM	Mr. T.S.Y Aravindakshan, Microsoft India
11.20 AM – 11.30 AM	Dr. S. B. Bhattacharya & Mr. Kishor Narang, Bureau of Indian Standards - Work done by MHD-17
11.30 AM – 11.40 AM	Mr. Atantra Dasgupta, Samsung India
11.40 PM – 11.50 PM	Mr. S. B. Sinha, Advisor – NHSRC, Ministry of Health & Family Welfare, Government of India
11.50 AM – 12.00 PM	Mr. Ananda Sen Gupta, Track my Beat
12.00 PM – 12.10 PM	Mr. Sushil Kumar, Dy. Director General – TEC, Government of India
12.10 PM – 12.20 PM	Dr. Rishi Bhatnagar, Aeris India
12.20 PM – 12.30 PM	Mr. Milan Rao, GE Healthcare
12.30 PM – 12.40 PM	Dr. Abhishek Sen, Biosense Technologies
12.40 PM – 12.50 PM	Mr. Shireesh Sahai, Wolters Kluwer India
1.00 PM - 2.00 PM – Networking Lunch	
02.00 PM – 03.30 PM	Open Discussion on Medical devices – Emerging Paradigm & Need for standardization for the proposed report on medical devices.
3.30 PM - 3.45 PM – Tea Break	
03.45 PM – 04.30 PM	Continue. Open Discussion on Medical devices – Emerging Paradigm & Need for standardization for the proposed report on medical devices.
04.30 PM	Valedictory Address by Dr. Anand Iyer, Welldoc Inc.
5.00 PM – Close	

EXECUTIVE SUMMARY

WITHOUT DIGITAL HEALTH, THERE WILL BE NEITHER 'UNIVERSAL', NOR 'HEALTH', NOR 'COVERAGE'. 'DIGITAL HEALTH FOR ALL' IS A PREREQUISITE FOR ACHIEVING 'UNIVERSAL HEALTH COVERAGE'.

- Rajendra Pratap Gupta, Advisor to the Union Minister for Health & Family Welfare, Government of India. Member, Steering Committee, Global Digital Health Index

In a rapidly changing world where our physical and virtual environments are converging, the fast-evolving role of digital technology has improved the way businesses operate, grow and attain scalability. For us this is an opportunity to integrate digital technology with healthcare and change the way our healthcare delivery models capture, store, analyze, utilize and share health data. India with its growing base of internet users and a digitally savvy population, is now set to embrace the wave of digital disruption taking over healthcare. In the meanwhile, we must acknowledge the progress we have made so far and find ways to close gaps that impede our efforts to establish a truly universal and sound digital health system in India.

NATIONAL HEALTH POLICY 2017 RECOGNIZES THE ROLE OF DIGITAL HEALTH ACROSS THE CONTINUUM OF CARE .

Increased Penetration of Digital Health Services Across India

The National Health Policy (NHP) 2017 recognizes the potential of digital healthcare in India and advocates extensive deployment of digital tools to improve the efficiency of India's current healthcare system.

The policy proposes the establishment of a National Digital Health Authority (NDHA) to regulate, develop and deploy digital health across the continuum of care. It recommends establishing a federated national health information architecture, consistent with Metadata and Data Standards (MDDS) and encourages greater adoption of Electronic Health Records (EHR). It also proposes the use of digital

tools by AYUSH practitioners, which can support traditional community level healthcare providers and promote household level preventive and curative practices.

The NHP 2017 acknowledges the current shortage of specialized health services, particularly in some states and recommends the use of technology such as tele-consultation to link tertiary care institutions (medical colleges) to district and sub-district hospitals with secondary care facilities. This, the government believes, will ensure that superior medical care reaches the most remote locations of the country. To build capacity and knowledge for last mile delivery of healthcare, the policy promotes utilization of the National Knowledge Network for tele-education, tele-CME, tele-consultations and access to a digital library. Additionally, under the NHP 2017, the government plans to issue a "family health card" that links citizens to primary care facilities and makes them eligible for a defined package of services anywhere in the country.

MEDICAL DEVICES ARE AT THE HEART OF INDIA'S DIGITAL HEALTH JOURNEY

From Reactive to Proactive and Predictive Healthcare

For digital health to work in the remotest pockets of India, there is a need to simplify digital tools and medical devices and to ensure that even newly trained or semi-skilled healthcare workers such as Auxiliary Nurse Midwives (ANMs) and Accredited Social Health Activists (ASHAs) can operate them. Digital tools and platforms should be designed to be simple and easy to operate for end users, so that data that can be converted into information, knowledge, action and outcomes. When it comes to medical devices, wearable technologies and portable low-cost diagnostics have shown

great potential for preventive healthcare and represent an evolving healthcare delivery model. The concept of 'quantified self' well describes the increase in the use of wearable digital health devices that enable consumers and patients to monitor, store and share their personal health data with healthcare providers. This best exemplifies the convergence of fields such as personal health, consumer health, medical devices and medico-health IT.

INTEROPERABILITY AND STANDARDS
The Foundation for a Sound Digital Health System

Lack of standardization and interoperability in digital health systems remain critical issues that must be addressed because they prevent systems from safely and securely communicating and sharing health-related information. This results in healthcare data that is essential for patient care and disease surveillance being scattered between different technologies that do not communicate with each other efficiently and seamlessly. The successful digitization of healthcare demands that the entire system be universally interoperable with seamless connectivity. India needs a digital system and integrated devices that can communicate with each other in a seamless and reliable manner, so that the flow of health-related data is smooth and free of loss, distortion and error.

The government is aware of these challenges and is committed to putting in place a framework that is in line with

health requirements. This proposed 'national digital framework' is expected to clearly define government and private sector roles, with the government leading the project and the private sector providing support to build solutions. The government also recognizes the need to have laws in place that clarify how telehealth should operate in India. For instance, should e-prescriptions by physicians be allowed over a video call with patients in remote locations of the country? Digital health needs to be more pervasive than it is today to drive innovation and improve accessibility of health services. The goal is to expand the application of digital health from the existing doctor – patient dynamic, to include those playing different roles in the health system such as nurses, paramedical staff, ASHA and ANM workers, technicians at diagnostic centers and pharmacists.

CYBERSECURITY
Crucial to Ensure Patient Privacy and Health Data Confidentiality

The information technology world understands security, while the operations technology world is largely safety focused. The successful implementation of digital health platforms is dependent on the Internet of Things (IoT), a virtual relationship that brings with it the challenge of creating and maintaining complete security to safely store and share health-related data. There is, therefore, a need to establish sound security systems. It is proposed that cybersecurity in digital health be approached in a thorough and comprehensive manner, with a strong focus on device security, connection security and cloud security.
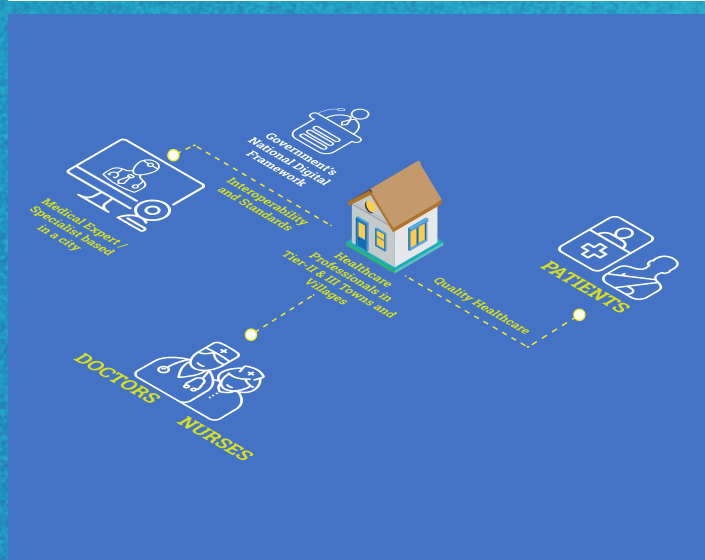
LEADERS SPEAK

Mr. Rajendra Pratap Gupta

Digital health technologies will move from periphery to the core. Digital technologies will play the role of the "first responder" than an "add on".

We need to take note of a few developments that are leading to a paradigm shift in our approach to healthcare in India:

- Healthcare is moving from being doctor-centric to population-centric, now focussing more on population health
- The role of technology, which was earlier peripheral, is now becoming central to healthcare delivery
- 'Do it yourself diagnostics' (i.e. wearables and point-of-care diagnostics) are beginning to play an important role in primary and secondary prevention
- Paramedics have an increasingly important role to play in healthcare delivery
- The patient is more informed than ever before

The potential of Artificial Intelligence(AI) in healthcare must also be considered. AI is not 'Artificial', but Actual, Augmented and Additional Intelligence. It is this Actual/Real Intelligence (AI or RI) that will redefine healthcare decision making in the years to come. India has a tremendous opportunity to become a world leader in developing tools for AI/RI.

THE FUNDAMENTALS OF DIGITAL HEALTH : CONSISTENCY, ACCURACY AND PATIENT SAFETY

By Mr. Ananda Sen Gupta, CEO, Track my Beat

Today, we are already at a point where many of our healthcare processes are dependent on digital infrastructure. Digital health is fast becoming an integral part of healthcare delivery systems in India. It is now up to us to take advantage of this digital revolution and develop tools and systems to improve the health outcomes in our country. The way I see it, there is no better time than now for us to get started and ride on the digital wave overtaking us.

Government's initiative to provide broadband for all will make it possible for paramedics and community health volunteers to collect health data in a timely manner at the point of care and offer support to patients in remote areas by connecting them with doctors at the central level. This will allow us to do what we call 'detailed data analytics', another great advantage of digital health in this context. Such solutions work on the collected health data to produce insights and analyses, which in turn enhance the doctor's ability to provide better care to a larger patient population in less time.

Connected medical devices will play a very important role in our digital health ecosystem. Unlike healthcare workers who collect patient data in the field, connected medical devices will help us collect patient data at any time regardless of the patient's geographical location. The use of these devices will enable medical practitioners to make a data driven analysis of the patient's health and take a more confident clinical decision.

Standards play a very important role in establishing a strong digital health ecosystem in India. Patient safety and data protection should be key drivers for setting these standards and they should be designed to prevent avoidable and unacceptable errors while ensuring product and solution quality. Only then can we ensure that the output is consistent, accurate, medically safe for patients and gives us optimal medical treatment outcomes. Our medical protocols and guidelines for using digital health solutions should be stringent and clear.

I believe India needs to take an evidence-based approach to providing digital health services. We must acknowledge the vastness of our country, the complexities that exist in our health system and the variations in health parameters across different parts of the country. To be future proof, policy makers need to harness centuries of local knowledge and evidence, as well as learn from the experiences of other digital health leaders from around the world.

Mr. Ananda Sen Gupta

Patient safety and data protection should be key drivers for setting digital health standards. Only then can we ensure that the output is consistent, accurate, medically safe for patients and gives us optimal medical treatment outcomes.

WHAT DOES IT TAKE TO BUILD A COMPREHENSIVE HEALTH ECOSYSTEM?

By Mr. Krishan Girdhar, Managing Director, Presto InfoSolutions Pvt. Ltd.

India's complex geography and its very large population have made it difficult to realize many of our health goals. The "health divide" between the rich and poor and between the urban and rural population is already huge and increasing. The way forward for us to bridge these gaps is to use digital technology to expand health care delivery, make both diagnosis and treatment more efficient and encourage the use of digital public health records.

The essence of effective medical care is to make the right clinical diagnosis at the right time. Today, we have sophisticated medical devices that can help in timely diagnosis of patients who are physically unable to visit a hospital or who live in remote, inaccessible parts of the country. Medical devices are also an important link in the process of collecting public health records, which in the future can provide a sound basis for implementing health policies and monitoring performance.

Mr. Krishan Girdhar

We must, however, address the present challenge of interoperability between various devices used in the digital health ecosystem. The lack of interoperability leads to lack of effective data exchange between devices, products, technologies and systems, which defeats the purpose of building a comprehensive health ecosystem.

For India to be future ready in digital health, we must focus our efforts on:

- Providing quality medical care that is accessible in every nook and corner of the country
- Effective policy framework design
- Implementing and monitoring of health policies and schemes based on actual public health records

THE TIME TO EMBRACE DIGITAL TECHNOLOGY IN HEALTHCARE IS NOW

By Mr. Milan Rao, President and CEO, GE Healthcare, India & South Asia

A new era is upon us, with the coming together of the industrial and the digital world: a 'Digital Industrial Transformation'.

The world over, there are four key issues that the healthcare industry faces. These are cost, quality, access and availability of skilled resources. The way I see it, digital solutions are the best way to address these challenges, improving outcomes for patients and driving efficiency of healthcare providers across all levels.

Mr. Milan Rao

The important ways in which digital intervention can play a positive role are:

- Provide a continuous flow and exchange of clinical information through sensors, apps and remote monitoring systems that make up the "Healthcare Internet of Things"

- Enable better and more confident decision-making using advanced analytics based on multi-modal data

- Enable doctors to access information and advise patients in their homes, their offices and in remote locations through cloud-based solutions

- Enable doctors to deliver more efficient and effective treatment outcomes using learning platforms that provide tools at the point of care

- Support simultaneous oversight for millions of patients while providing customized care and monitoring

Digital innovation today is driving inclusive growth and development across various fields in healthcare and beyond. With the Internet of Things, we hope we will soon see a paradigm shift from 'hospital-centric' to 'patient-centric' models. A new era is upon us, with the coming together of the industrial and the digital world, which we at GE have helped pioneer. This 'Digital Industrial Transformation' has been made possible by the operational intersection of physical and material sciences with data and advanced analytics. What is now being explored extensively is the immense potential of pairing hardware with software in health. The future is all about the effective and intelligent combination of hardware and software to drive better outcomes for patients, providers and the healthcare system.

As more and more data are generated through patient scans and reports, software will play a key role in interpreting these data to deliver better patient care. Hardware will continue to be at the core of our processes and the importance and criticality ascribed to the digital side of things will grow. Increased awareness and a mindset change, both amongst patients and healthcare providers will hasten the pace of technology adoption.

Standards will be fundamental to a data-driven, digitally-connected world. Interoperability is critical here but remains a huge challenge. While developing standards, it is imperative that we keep in mind a baseline framework for interoperability. Security and data migration are both issues in non-standard systems but standardization can address these challenges and drive data quality and integrity.

The push must be towards the convergence of healthcare with connectivity and cloud technologies to drive better clinical analytics. We must also encourage the use of digital tools and applications that deliver health advice and provide consultation and information to consumers and patients through their smartphones. Robust protocols that address safety, quality and patient data integrity will further drive confidence. Lastly, all of this must be backed by investments in digital infrastructure to create maximum impact.

Our goal is to 'socialize' the use of digital solutions so that more and more people can benefit from them. The true impact of digital technology on healthcare in India will only be felt when it fundamentally transforms the way value is created at scale for patients and providers alike. It is a leap of faith we must take, which I am convinced will reap high rewards in the not too distant future.

LET US PREPARE TODAY FOR A DIGITAL HEALTH REVOLUTION TOMORROW

By Dr. Neena Pahuja, Director General at ERNET India

Dr. Neena Pahuja

India needs to move fast to stay in step with the rapid progress in digital technology and build the infrastructure and framework to effectively integrate digital technology into the country's healthcare system.

The Internet of Healthy Things, 3D printing, Artificial Intelligence are some of the recent advances in digital technology that are poised to forever change the way healthcare is delivered. India needs to move fast to stay in step with the rapid progress in digital technology and build the infrastructure and framework to effectively integrate digital technology into the country's healthcare system.

In this context, medical devices are expected to play a crucial role and are set to become an integral part of the complete end-to-end digital health process, starting with the recording and storing of patient data. This means we need to develop standards for patient data collection, storage and analyses; protect patient privacy; and ensure full safety and confidentiality of this data. The Indian public and private sectors must work together to do this effectively and to initiate a number of other activities, such as:

- Creation of a legal framework to support telemedicine and digital health
- Creation of an integrated system to record, maintain, store and access electronic health records (EHR) and personal health records (PHR)
- Creation of knowledge management tools and online healthcare libraries
- Support for start-ups and device companies involved in digital technology applications in healthcare
- Support for Artificial Intelligence and its applications in health
- Support for new drug discovery and genomic research
- Support for healthcare education and disease cure pathways
- Automation of healthcare diagnostics

Based on current trends, we should expect to see many changes in our current healthcare system. We will be able to digitally capture patient data and analyze it effectively and efficiently. We will have better tools to educate consumers and patients and enable them to take charge of their own health. Digital technology will give us the tools to simultaneously combine allopathic, homeopathic and Ayurvedic care in one integrated process. Analytics will enable precision care and help us deliver targeted treatment to improve outcomes and bring down the overall cost of treatment. I believe we can harness the full power and potential of digital technology and can do this by equipping and enabling our healthcare system today.

MEDICAL DEVICES: AT THE HEART OF OUR DIGITAL HEALTH EFFORTS

By Prof. Prabhat Ranjan, Executive Director, TIFAC

Any technology that is 'digitized' eventually finds itself becoming 'democratized'. Simply put, this means that as the integration between our healthcare system and the digital world increases, the opportunities to grow and scale our services also increase tenfold. For our country, we must see this as a critical step to making healthcare accessible and affordable to every patient, regardless of geographic location or socioeconomic level.

In the years to come, I believe medical devices will play a crucial role in all aspects of healthcare delivery, especially in technology driven areas such as sensing, processing, communication and battery advancement. In addition to devices used for patients in hospitals, the use of digital health devices will also increase for routine health monitoring by healthy consumers. This trend will make it easier to boost preventive medicine and provide better care for persons with a disability. I envisage a growing use of ingestible devices in health and medicine, which have the potential to reduce the use of invasive methods currently in use and decrease side effects of several treatments. We can also soon expect to see sensors that connect the human brain to computers and the internet, offering us a far better understanding of and a deeper insight into human mental health as we know it.

The many and rapid advancements in technology are likely to make the market life of medical devices shorter as compared to drugs. Therefore, it is critical that standards and compliance certification keep pace with this obsolescence. Localization of devices developed globally and brought into India will also be a major challenge for both maintenance and after sales support. This may require regulatory changes and need a new approach to technical skills training to ensure optimal use of medical devices.

In India, medical devices pose both a challenge and an opportunity. They offer tremendous potential to alter our healthcare delivery models and make healthcare accessible and affordable. However, our challenge is to break away from the silos in which we work and merge medical and engineering education to harness traditional knowledge in a more scientific way. Our present education system must move towards hands-on and problem-based learning from the time our children are in school. Soon enough, India will be able to meet the health needs of its own citizens and become a global leader in medical devices and digital health.

Prof. Prabhat Ranjan

Our challenge is to break away from the silos in which we work and merge medical and engineering education to harness traditional knowledge in a more scientific way.

MAKING INDIA'S HEALTHCARE SYSTEM "FUTURE READY"

By Dr. Rishi Mohan Bhatnagar, President of Aeris India

Dr. Rishi Mohan Bhatnagar

Digital health is transforming healthcare. Limitless possibilities notwithstanding, there remain important changes that need to take place for India to be truly "future ready".

India has entered the era of a "New Health Economy" in which digitally enabled healthcare is no longer merely "nice-to-have", but has become a fundamental business imperative. Technology has now reached a level of maturity where it can enable access to good healthcare services for all Indians. Industry leaders across healthcare services, hospitals and the pharmaceutical industry are experiencing a major shift in how care is being delivered. Digital health is transforming healthcare.

In the next few years, I believe we will see electronic health records (EHR) replacing records on paper; digital consultations slowly replacing about 10% of in-office patient visits; health apps being increasingly used by patients to manage chronic diseases; and data analytics being utilized by doctors to take a personalized approach to care for their patients. We will also be able to use digital technology to tackle the shortage of healthcare professionals in rural and semi-urban areas, where more than 70 percent of Indians reside, by equipping them with modern facilities including medical devices and wearable sensors that can be monitored remotely, enabled by the Internet of Things (IoT).

These limitless possibilities notwithstanding, there are some important changes that need to take place for India to be truly "future ready". We need a National eHealth policy that clearly defines our approach, strategy, framework, operational and governance models for the nationwide use of technology and connected devices in the Indian healthcare system. The policy must address the ownership of patient data, concerns about data privacy and data leakage, interoperability, cyberattacks and conformance to standards and protocols. The eHealth policy should also address the skilling and re-skilling of healthcare professionals and even extend to medical students, chemists and those who are on the field to show them how best to use digital technology in healthcare delivery. Setting timelines and methodology for training will enable quicker operationalization of the technology enabled healthcare services. Given that the healthcare ecosystem now includes multiple players from both the medical and non-medical streams, the policy must include guidelines on each stakeholder's responsibility, including but not limited to doctors, hospitals, medical and research institutes and extending to technology service providers, health system aggregators and insurance companies. This is critical for transparent and integrated service delivery.

Digital technology is advancing at a very fast pace. For us to make optimal use of it in healthcare, we need closer collaboration between government and industry to ensure that we have the necessary physical infrastructure in place, along with strong, secure and robust technology support.

INTEROPERABILITY:
KEY TO THE SUCCESS OF DIGITAL HEALTH IN INDIA

By Dr. Shashi Bhushan Sinha, NHSRC, Ministry of Health and Family Welfare, Government of India

Dr. Shashi Bhushan Sinha

In a digital health ecosystem, medical devices play a vital role to help us track, manage and improve our health and the health of our family members, enabling us to live better, more productive lives. Medical devices can also help us tackle two critical healthcare issues in our country: shortage of doctors and healthcare professionals and inadequate health services in rural areas. For that to happen, medical devices need to be able to "communicate" with each other in the same "language" to transfer digital images without loss of resolution, code alphanumeric data and seamlessly transmit it while maintaining the integrity and privacy of the shared data. This is what we mean by "interoperability".

We also need our experts to develop common standards and ensure compliance and interoperability along the entire healthcare continuum. This will require the involvement of two organizations:

GS1 India: This is a non-profit, industry-led global organisation that develops global standards to "help healthcare companies improve the accuracy, speed and efficiency of the supply chain and care delivery". GS1 India could help us create a national electronic database of all medical equipment and improve supply logistics.

Continua Health Alliance: This is a non-profit organization with more than 240 member companies that looks for ways to promote interoperability amongst personal e-health devices and systems. Interoperability of personal health and fitness devices is a primary focus of this organization.Continua Health Alliance could help us develop guidelines to enable technology experts build interoperable telehealth platforms and health and wellness services.

I believe that in the next few years we will see a thriving digital ecosystem develop in India where 1 lakh community services centres and health and wellness centres will offer telemedicine services to those in the surrounding areas. Teleophthalmology for remote eye examination and teleradiology for X-ray and CT scan services will become commonplace. Online e-pharmacies will offer medication at 40% to 50% discounts. Healthcare "ATMs" enabled with internet connectivity and video consultation will allow patients to send doctors their symptoms via a text message and receive their medication from the ATM. The success of these programmes will hinge on the seamless, secure transfer of information that will depend on the interoperability of medical devices.

> *Medical devices need to be able to "communicate" with each other in the same "language" seamlessly while maintaining the integrity and privacy of the shared data.*

LONG ROAD BUT THE RIGHT TRACK FOR DIGITAL HEALTH IN INDIA

By Mr. Sanjeev Malhotra, CEO of CoE-IoT, Nasscom

Despite the advancements in medical science, we have made uneven progress in delivering quality healthcare where it is needed. The cost of healthcare is very high, access to health services remains limited, quality of products and services is inconsistent and patient outcomes are unpredictable. Digital healthcare has the potential to address these issues and it has so far enabled four major improvements in our healthcare delivery:

BETTER DATA COLLECTION:

Digital health technologies have made it easier for us to gather patient health data at the point of care in remote locations and enabled timely sharing of this data with physicians. This has helped to better predict disease patterns and improve clinical decision making as well as making quality healthcare available in remote areas.

BETTER ACCESS:

Telemedicine and sharing of health information through the internet has contributed to improved access in multiple ways at multiple points. Development of cheaper digital health solutions can further improve this access and outreach.

BETTER DIAGNOSIS:

Today, the computer can be considered a very good diagnostic 'tool', with the accuracy of computer-enabled diagnoses reaching as high as 90%. Integrating computer systems into all our healthcare processes should be a critical next step in India's digital health mission.

REDUCING COST OF TREATMENT:

A good example here is the use of ICU home monitoring systems. In addition to benefiting the patient who saves on hospital room expenses, such systems also benefit hospitals by ensuring optimum utilization of hospital beds and other ICU resources.

Although we have found our direction and are on the right track, I believe that the setting up of a strong digital health ecosystem calls for much more, such as:

- **Create an ecosystem that encourages innovation in digital health:** In this context, funding assumes a critical role. Experience in recent years has shown that personalized health has already attracted investor interest and now the task is to extend funding support to all areas of digital health.

- **Promote development and adoption of newer technologies:** For consumers and patients to quickly benefit from the many efficiencies available through digital health, we need to integrate new health solutions and services into our existing models of care.

Mr. Sanjeev Malhotra

> *Digital healthcare has the potential to address many of our country's health challenges. While we have found our direction and are on the right track, I believe that the setting up of a strong digital health ecosystem calls for much more.*

- **Amend laws to allow data collection for Indian companies:** Laws should be such that there is sufficient freedom for companies to collect health data while ensuring that this data remain confidential and protected. These laws should clarify the type of information that can be shared and whether it identifies individual patients, the types of parties sharing information and the reasons for which the information is shared.

- **Set digital technology/digital health standards that suit the Indian scenario:** Standards and compliance are very important for an efficient digital health system. Today, compliance is driven through popular standards such as CE and FDA but there is limited scope for Indian business startups and manufacturers to comply with these standards. Although newer standards for digital health are slowly beginning to emerge, we need to stay abreast of these developments and adapt them to suit the needs of our country.

- **Encourage commercialization of Make in India products:** Entrepreneur-friendly programs can provide a good platform for innovators and provide them with recognized certification which will help commercialize new technologies.

- **Make India's workforce digitally literate:** This may call for reform in our present education system, which I believe needs to start without delay.

DIGITAL HEALTH OFFERS POTENTIAL TO CHANGE INDIA'S UNIVERSAL HEALTH COVERAGE STORY

By Mr. Thulasiraj Ravilla, Aravind Eye Care System

The Ministry of Health and Family Welfare has started a 'digital health revolution' in the country by introducing several online health information portals and mApps. Supporting this are other measures such as health service delivery trackers and monitors, online consultation technologies for telemedicine and health information surveillance systems. For this digital ecosystem to run smoothly, affordability and ease of operability of all devices and services involved are of paramount importance. This will ensure that we have a digital health system that can efficiently deliver primary care solutions regardless of healthcare disciplines, ranging from complex cardiology to the more common mean corpuscular haemoglobin (MCH) test.

HERE ARE SOME SUGGESTIONS THAT I BELIEVE CAN HELP US BUILD A FIRM FOUNDATION FOR DIGITAL HEALTH IN THE COUNTRY:

- The government should take a close look at the strengths and weaknesses of the current digital health ecosystem before introducing more digital health initiatives. Digital health is not just about technology. It involves the knowledge and management of workflow and calls for defining the various roles that people can and will play in the system.

- Standards for digital health systems should be set, but these should evolve over time in terms of stringency.

- Wherever possible, technology should become an enabler for HR which can then address the current shortfall of trained technicians. We can expect the role of HR to change in light of this digital back-up.

- Lastly, policies should not be restrictive in nature but should be made to facilitate the changes required. This will greatly improve access to medicines, especially in remote areas of the country.

Digital health is the foundational platform for building a healthcare system that can provide universal coverage in India. I believe it has the potential to bridge several gaps that exist in our current healthcare system by overcoming geographic limitations; improving healthcare delivery by extending care to every socio-economic level; reducing the 'competency gap' amongst specialists through telemedicine; encouraging continuous learning for healthcare experts and professionals; and providing regular monitoring of healthcare delivery to assess progress and opportunities for improvement.

Mr. Thulasiraj Ravilla

> *Digital health is the foundational platform for building a healthcare system that can provide universal coverage in India.*

SAFETY, SECURITY AND THE 'INTERNET OF MEDICAL THINGS'

By Mr. T. S. Y. Aravindakshan, Director, Industry Solutions [Health], Microsoft

Mr. T. S. Y. Aravindakshan

There is an increased need to drive operational efficiency in clinical care delivery and the IoT has the potential to help by monitoring medical assets and processes.

According to analysts and trusted internet sources, an estimated 22 billion devices around the world are connected to the internet and by 2020, this number is expected to rise to 50 billion. A strong 'digital wave' is clearly sweeping across the globe to connect the world's 7 billion people to the internet as fast as possible. Consumer personal devices are playing a big role in making this possible. The need now is to keep driving better connectivity and encourage innovation in an intelligent manner to spur the next wave in the Internet of Things (IoT).

Healthcare is also being transformed, moving towards greater integration with the IoT or as I would like to call it 'Internet of Medical Things'. The 'Internet of Medical Things' is slowly but surely addressing the many disparities in health services in India today and medical devices are the biggest enabler in this process.

The potential of IoT in healthcare is immense:

- **Monitoring of patient care:** Medical and consumer health devices allow patients to receive care and services in the comfort of their home. With wearable sensors, doctors can remotely track and respond to a patient's health status in real time.

- **Monitoring of medical assets:** Digital health processes enable experts and medical staff to better track and manage supplies and medicine, giving them more time to spend with patients, since all data and information is stored on a cloud platform which is Health Insurance Portability and Accountability Act (HIPAA) compliant.

- **Predictive maintenance of equipment and devices:** Predictive maintenance ensures that critical medical devices are ready to use when patients need them most by fixing problems before they can occur.

- **Tracking of equipment usage:** This enhances overall patient well-being by tracking how medical equipment is used, from hospital bed sensors to monitoring room temperature and hand washing stations.

Several factors are driving the medical devices industry to integrate with the Internet of Things (IoT). Medical device companies are 'transforming' from being mere device providers to care management providers. There is an increased need to drive operational efficiency in clinical care delivery and the IoT has the potential to help by monitoring medical assets

and processes. There is significant value in creating a system of systems, which combines Information Technology with Operations Technology. This is not likely to be an easy task. Information Technology is focused on security while Operations Technology is largely safety focused, making the integration of IT and OT tricky.

IoT security must be viewed in terms of 'Defense in Depth', which represents the use of multiple computer security techniques to mitigate the risk of one component of the defense being compromised or circumvented. While developing standards for IoT security, we must keep in mind that various stakeholders are responsible for each 'layer of depth', where every layer in turn requires additional safeguards to build this 'Defense in Depth'. It is critical to have security right from the device to the channel and up to the cloud. Our immediate need is for the government to establish a set of IoT security standards for the country, which we can then extend to digital health.

DIGITAL HEALTH

OPPORTUNITIES AND CHALLENGES

The Narendra Modi government has embarked on an ambitious programme to bridge India's digital divide, connect thousands of villages to the internet and create millions of jobs. The Prime Minister's vision is for digital platforms and electronic health tools to be optimally leveraged to address the many challenges of the health sector, such as the shortage of human resources, accessibility of healthcare infrastructure and the affordability of healthcare services. Experts believe that digital technology can help fill these gaps in our health system, particularly in rural healthcare. The broad consensus is that once a high-speed network is in place, it can play a significant role in providing quality healthcare to a large number of people, especially those residing in non-urban and rural areas.
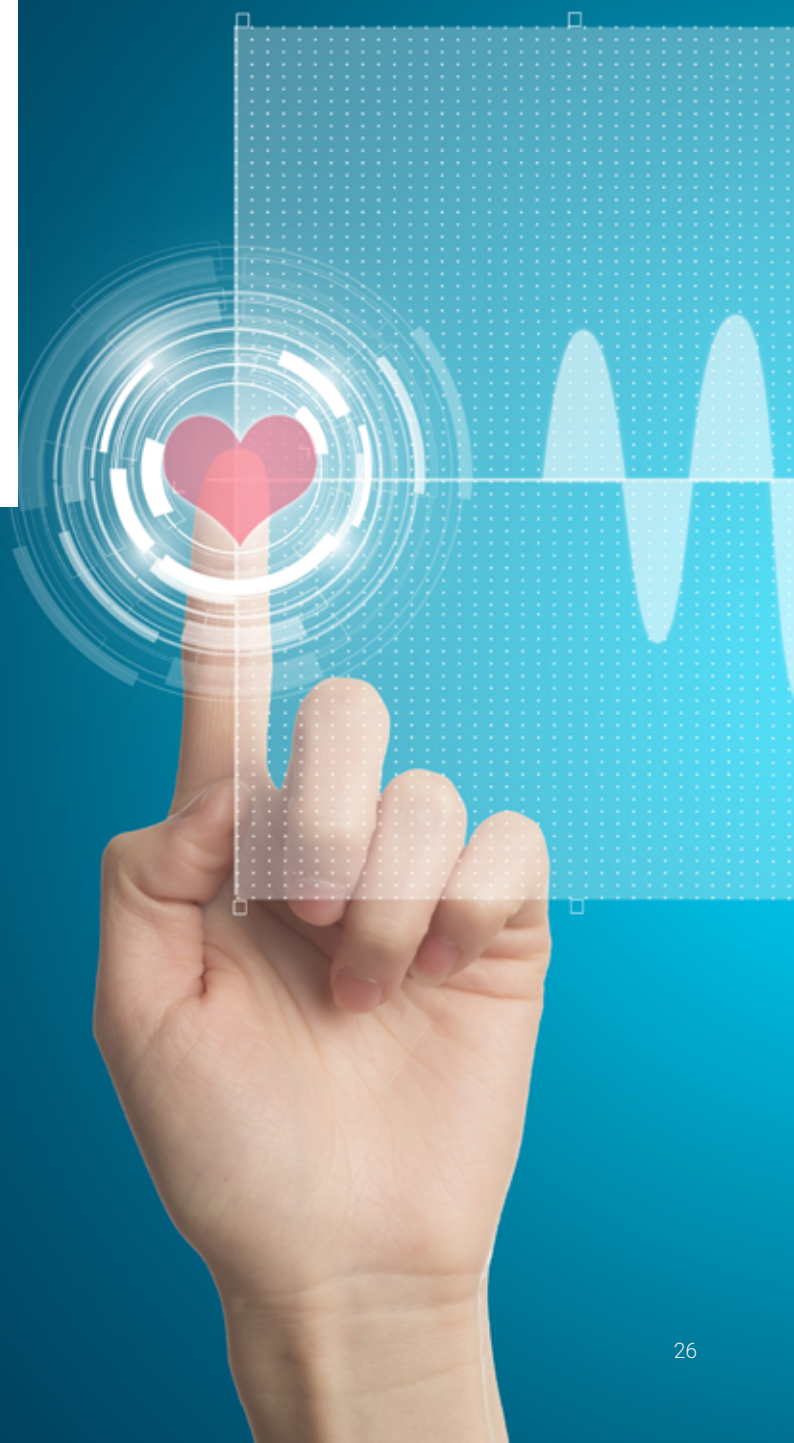
GIVING THE NATION ITS FIRST MEDICAL EMERGENCY RESPONSE NUMBER

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10,850 AMBULANCES SERVING OVER 26,618 EMERGENCIES PER DAY

PRESENT IN 15 STATES & 2 UNION TERRITORIES

**30 MILLION** SUCCESSFUL EMERGENCY SERVICES IN 10 YEARS

In existence for the last 10 years, GVK EMRI has created clinical decision support tools for the 'golden hour' to deliver comprehensive, speedy, reliable and quality emergency care services across the country. An Emergency Response System coordinates every emergency through a single toll-free number 1-0-8. When dialed, the system ensure prompt communication and activation of a response that includes an assessment of the emergency and dispatch of an ambulance with a well-trained medical technician, to render quality pre-hospital care and transport of the patient to an appropriate healthcare facility. Today, 108 is recognized as the best-in-class emergency service and is the largest professional emergency service provider in India. Supported by the Government of India, the initiative operates in 15 states and 2 Union Territories. According to GVK EMRI, it has delivered emergency services over 30 million times in the country since it started operations.

HEALTHCARE ATMS NOW A REALITY IN INDIA

This initiative was set up in 2016 by the Union Health Ministry as a pilot to combine telemedicine with a rudimentary free drugs programme. Currently, five healthcare ATMs are active in Madhya Pradesh, Himachal Pradesh, Odisha and Andhra Pradesh. Each ATM is manned by a multipurpose public health worker (MPHW) or an auxiliary nurse midwife (ANM) armed with a multi-parameter patient vital monitor and other devices. After the patient is registered, basic health parameters such as body temperature, blood pressure, blood glucose and haemoglobin are checked and the data is instantly transmitted to a medical call centre through a GSM-based monitor. The Ministry hopes that such 'healthcare ATMs' will help overcome the shortage of doctors and pilferage that plagues free drug programmes.
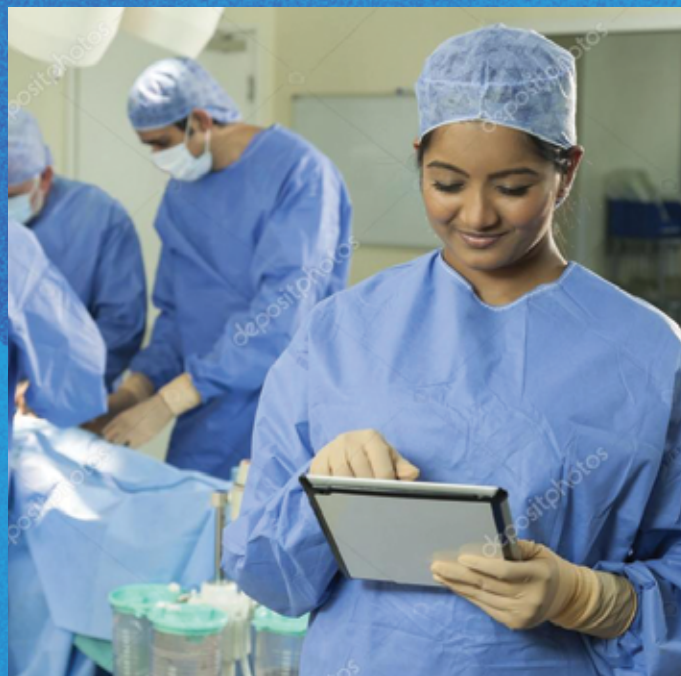
EMPOWERING AUXILIARY NURSE MIDWIVES WITH DIGITAL HEALTH SOLUTIONS

Created by the Union Health Ministry with support from UNICEF, to improve data collection and the overall standard of child and maternal healthcare delivery in India, this project uses an android-based tablet application for auxiliary nurse midwives (ANMs), called ANMOL or ANM Online. The ANMs use the app to enter and update health data of thousands of pregnant women, mothers and newborns on a real-time basis, which is then automatically updated in the central server. In the event of an internet outage, the tablets can also work in an offline mode, saving the data until internet connectivity is re-established. The completely digitized process provides improved accountability and transparency and simplifies the day-to-day workload for the ANMs. In addition to data collection, ANM online provides readily available information about newborns, pregnant women and new mothers in the community. The app is also equipped with pre-loaded audio and video files to counsel women and couples on subjects like high-risk pregnancies, immunization and family planning.

ESTABLISHING ELECTRONIC HEALTH RECORDS AS OUR DIGITAL HEALTH BACKBONE

To further augment the overall electronic health ecosystem, the Ministry is setting up an Integrated Health Information Platform (IHIP). This is a major step in the direction of addressing the existing situation of 'electronic silos' in our health system. The primary objective of IHIP is to create standards-compliant Electronic Health Records (EHRs) for every Indian citizen and to ensure integration and interoperability of EHRs through a comprehensive Health Information Exchange (HIE). IHIP, it is hoped, will enable a more secure management of confidential health data/records, better diagnosis of disease, reduction in patient re-visits, prevention of medical errors, continuity of care, better affordability, timely information exchange and a better decision support system to improve treatment outcomes and public health at the national level.

The Ministry of Health and Family Welfare has also initiated a Health Information Network (IHIN), a think tank of representatives from the private and public sector to advice the government on digital health. The objectives of IHIN include: sharing of learnings from eHealth experiences, discussion of policy level issues and enabling smoother functioning of eHealth practices.

DIGITAL HEALTH TOOLS FOR NATURAL DISASTER MANAGEMENT

Japanese Tsunami Rescue Efforts

Six years ago, the tsunami in Japan coincided with a 9.0 magnitude earthquake that devastated northeastern Japan. The twin disasters resulted in the melting of a nuclear reactor and making large parts of Northern Japan uninhabitable. As part of its rescue efforts, the Japanese Government adopted Continua Certified Solutions' 'Disaster Cardiovascular Prevention Network' (DCAP), as a rapid reaction force to monitor and triage medical care for patients at risk of cardiac events. Patients were equipped with standardized blood pressure cuffs to monitor their blood pressure. Any drastic change in blood pressure levels was flagged through the network and patients received timely medical intervention. A retrospective case study (2016) has shown that this simple, yet effective blood pressure monitoring network yielded tangible healthcare benefits to 341 of the 400 high-risk evacuees who used the system. Today, Continua Health Alliance comprises more than 240 member companies around the world, including technology, medical device and healthcare industry leaders and service providers dedicated to making personal connected health a reality.

HUNDREDS OF LIVES SAVED WITH CLINICAL INFORMATION SOLUTIONS FOLLOWING NEPAL EARTHQUAKE

DIGITAL TATTOOS IN HEALTHCARE: NO LONGER A DISTANT DREAM

In 2015, the earthquake of 7.8 magnitude killed more than 9,000 people and injured more than 23,000 in Nepal. To support disaster relief efforts following the earthquake, Wolters Kluwer, a global company providing information, software and services, announced open access to multiple clinical information solutions, for doctors, hospitals, healthcare institutions and medical relief workers. This comprised full, free access to all UpToDate® clinical decision support resources, Ovid® MEDLINE® and Lippincott Williams & Wilkins journals, ebook collections and expert searches. In Nepal's remote villages, with no internet or cellphone connectivity, Wolters Kluwer's offline tools enabled doctors to access information regarding clinician decisions outside of their specialty and improved response time to patients, saving hundreds of lives during the disaster.

Developed in 2016 by researchers at the University of Illinois, this electronic sticker, or digital tattoo, monitors a wearer's health using power transmitted from the smartphone or tablet. The "optoelectronics system" is the latest in a series of skin-patch electronics and uses little sensors to measure sun exposure and a person's blood oxygenation and heart rate. Information is displayed as a flashing light and is wirelessly transmitted back to the wearer's device.

INDIA'S DIGITAL HEALTH ECOSYSTEM

AN ASSESSMENT

Experts Speak: Experience with Digital Health in India

Representatives from public and private industries in IT, healthcare, technology and education were posed a series of questions regarding the present digital health ecosystem in India, its gaps and opportunities and the scope of digital health in the future.

BALANCING THE QUALITY/ COST EQUATION: THE KEY TO ACHIEVING CLINICAL EFFECTIVENESS

By Dr. Denise Basow, President and CEO of Clinical Effectiveness, Wolters Kluwer Health

Dr. Denise Basow

One of the most pressing issues facing India and nearly every country is the trajectory of healthcare costs. Between 2004 and 2014, Indian medical expenditures per hospitalisation for patients in urban areas increased by an average of 176%. In rural areas, costs increased just over 160%. However, India's per capita Gross Domestic Product growth during that time couldn't keep up, growing by 121%[1]. Yet, just 1.3% of GDP is spent on healthcare, one of the lowest rates in the world[2].

While it is a challenging environment for India's healthcare system; the good news is that new technologies are being developed to help healthcare organizations decrease the costs of care while improving care, outcomes, and ultimately, clinical effectiveness.

STEPS TOWARD ACHIEVING CLINICAL EFFECTIVENESS

To improve quality while containing costs within the healthcare delivery system, organizations must eventually overhaul the actual clinical care being delivered. This requires that providers consistently apply the best knowledge – based on research, evidence-based medicine, and clinical experience – while more deeply engaging patients in their care. It also necessitates a method of continuously defining, monitoring, and measuring the processes at the heart of care delivery. Only when a healthcare system commits to achieving clinical effectiveness within broad-scale practice across all institutions will they begin to make progress in balancing the quality/cost equation.

GETTING A HANDLE ON VARIABILITY OF CARE

One step towards attaining clinical effectiveness requires tackling variability of care, and doing so at scale. In India, stark contrasts in the variability of care can also be illustrated by the wide range of costs for the same treatment. The Ministry of Health in India found that 63 million people are thrust into poverty every year due to expenditures that are "catastrophic[3]." This raises another critical challenge: healthcare costs borne by individuals can have devastating impacts. We now have the know-how, the technology, and the sense of urgency to reduce this variability and work toward standardization of care.

PATIENT–CENTRED CARE AND THE NEW HEALTHCARE CONSUMER

Evolving models of care are putting patients at the centre of their own care, all providers involved in a patient's care can function more consistently and seamlessly to enable greater clinical effectiveness. The industry now has tools that encourage behaviour modification, helping patients to better follow recommendations, to more closely adhere to standards, and to understand the benefit of investing their time by measuring outcomes.

COORDINATING CARE ACROSS THE CONTINUUM

Improving clinical effectiveness will ultimately require a longitudinal view of the patient, rather than the fragmented view that has been more typical. It will also mean that measurement of the various care processes must span the many steps in the continuum of care. Ultimately, this holistic, patient-centred approach will help patients and providers to make the right choices that optimize outcomes.

NEXT–GENERATION TOOLS FOR CLINICAL EFFECTIVENESS

Clearly, several facets of healthcare must change to improve the clinical effectiveness of India's healthcare system. Since coordinated information is at the heart of this vision, advanced integrated technology and content enablement will be required.

At Wolters Kluwer, we've been working to broaden our impact on healthcare by developing the next generation of advanced clinical decision support solutions (ACDS). Building on our CDS foundation, we are developing an integrated solution comprised of patient engagement, personalized medical education, and measurement capabilities that quantify both impact and quality of care.

ACDS offers a better way for patients and providers to make the right choices by having intuitive and actionable content seamlessly embedded into healthcare portals and professional workflows. Ultimately, ACDS is about taking a more comprehensive approach to decision support, one that will help providers finesse the delicate balancing act of curtailing costs while delivering high quality care.

Patients deserve the best care healthcare organizations can deliver. They deserve to have providers making the best decisions possible, with everyone in the healthcare continuum With the right tools and technologies in place, enabled by the next generation of clinical decision support resources, the vision of optimal clinical effectiveness is now within reach.

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CHANGES IN DIGITAL HEALTH AROUND THE CORNER BUT REGULATION NEEDS TO KEEP UP

By Mr. Michael Strübin, European Programme Director,
Personal Connected Health Alliance

In the next five years, we can expect digital health to penetrate all aspects of healthcare delivery, making our health services safer, better and far more efficient. What matters however, is the pace of these changes. Today, the Indian healthcare sector has several stakeholders who have entrenched interests, are resistant to change, and who would like to maintain the status quo. I believe the pressure to change will come from above (policymakers) and below (patients and consumers), who share a common interest in improving access to and efficiency of digital health services.

If you look closely, some degree of change is already upon us. Take for example the world of medical devices. These were initially only operated by the medical community for diagnostic and therapeutic purposes and not freely available to the public. More recently however, the consumer health industry has developed connected health devices and wearable technologies that are marketed and sold directly to patients and consumers, such as heart rate monitors, blood pressure bands and weight trackers. These devices have empowered the public with access to health information and the ability to control their own health data, while allowing for better, more timely communication with physicians.

This leads me to my next question: are these devices truly "medical devices" and should they be regulated as such? Do they pose a huge health risk if they deliver false data or information? These are questions that policymakers and regulators must address. At PCH Alliance, we are aware that medical devices call for stringent regulation and pose several health risks should they fail. So instead of categorizing every such device into the broad bucket of "medical devices", we refer to wearable health solutions as "personal connected health devices", a more relevant term for the devices discussed above.

The data and information gathered through personal connected health devices have enormous potential to advance our understanding of an individual's health and that of the entire population. Our challenge now is to take the vast data that currently exists in silos and enable its smooth flow in a standardised format that can be used by the healthcare system. Soon enough we can expect these personal connected health devices to further advance and improve our country's healthcare delivery, but the pace of change is likely to depend on the regulatory environment and its ability to keep up with the changes.

Today, Continua Guidelines are the only open and international framework for data interoperability for personal connected health devices. India now has an opportunity to recommend standards and guidelines of its own, especially those that are suited to meet our specific health needs. In the near future, I am convinced that this space will invite tremendous investor interest, allowing us to develop intelligent digital health systems and technologies that can also be sustainable.

Mr. Michael Strübin

> *The data and information gathered through personal connected health devices have enormous potential to advance our understanding of an individual's health and that of the entire population.*

DIGITAL EDUCATION AND SKILLS DEVELOPMENT KEY TO FOSTERING DIGITAL HEALTH

By Dr. Bipin Batra, Executive Director, National Board of Examinations (NBE)

We can expect the increasing penetration of digital technology in our healthcare system to soon translate into better health indicators.

The adoption of digital technology has risen exponentially in India and is expected to grow even further in the years to come. The digital health industry must now develop workable business propositions in the domains of mHealth, tele-medicine, remote devices, digital connectivity and wearable devices. We can expect the increasing penetration of digital technology in our healthcare system to soon translate into better health indicators, resulting from improved access to health; improved information flow between patients, service providers and healthcare systems; better quality of health services; and enhanced patient engagement.

While the government has already initiated several digital health initiatives, their successful implementation depends on:

1. Establishing regulatory measures and processes for the adoption, approval and deployment of technology.

2. Introducing productivity budgets for upgrading legacy systems in medical records management, especially for transitioning to electronic health records.

3. Ensuring availability of trained manpower across the digital healthcare pyramid.

4. Encouraging conversant thought processes and policy making across governance domains of Commerce and Industry, Information Technology (IT) and Healthcare.

We must acknowledge the role of medical devices in our journey towards making healthcare digital. The medical devices industry is undergoing a noticeable shift with its increasing adoption of digital technology, whether it is by way of electronic sensors, microchip computing, communication with other devices, control of primary user device or transmission of data to a centralized server. There is a clear shift from traditional medical devices to devices that are increasingly reliant on digital technology. To enhance penetration of these medical devices in our healthcare ecosystem, common communication platforms (such as DICOM) are key, as they transform the way imaging techniques communicate in the hospital information system.

For India's health system to truly embrace digital technology, it is crucial that we put in place frameworks for technology deployment in medical devices, medical informatics and electronic health records. This must also be addressed in our education curricula for physicians, nurses and allied health workers. One option is to introduce this by way of case studies that are combined with practical exposure to the subject.

Dr. Bipin Batra

Here are my recommendations for India to be secure in digital health in the future:

MEDICAL EDUCATION

i) A dedicated model of IT applications in electronic health records should be mandatorily introduced in the graduate medical education curriculum. Young specialists in training who pursue their post-graduation must clock at least 30 working hours in studying this subject.

ii) Every medical institution should have a Chief Technical Officer in place.

iii) Practical aspects of telemedicine and digital communication in medicine should be formally taught to students.

SKILL DEVELOPMENT

We must ensure that our skills development framework addresses issues such as:

1. Adoption of technology in healthcare

2. Fostering innovation and research

3. Augmenting best practices

4. Cost consideration, especially for those promoting the adoption of low cost technologies

As is evident, many of our present challenges can be successfully addressed by integrating digital health technologies with our healthcare delivery models. This will have a direct bearing on improving patient safety by improving collection of primary patient data, tracking and recording of adverse drug reactions, reducing medical errors and facilitating smooth functioning of medical records.

PAVING THE WAY FOR DIGITAL HEALTH IN INDIA

By Dr. Devi Prasad Shetty, Founder and Chairman, Narayana Health

The day is not so far when it will be possible for us to do a "virtual" consultation with a doctor without leaving our home, discuss problems, go through an examination, receive a digitally signed prescription, send it through the internet to an online pharmacy and receive our medicines quickly at our doorstep. We are developing the technology we need for this digital health scenario to become a reality soon. For this we need private and public-sector collaboration to bring about changes in the existing infrastructure and regulatory framework.

We need to encourage our doctors to fill in patient data into Electronic Medical Records (EMRs). The problem is that current formats are not easy and quick to fill. Doctors in the United States have complained that filling EMRs has increased time spent in the outpatient department by 30%. In my opinion, start-up and technology experts should speak to doctors to understand the issues they face, so that they can develop EMR formats that are quick and easy to fill and use. We also need some change in regulation to allow doctors to advise patients on the phone. As of now, Indian law prevents a doctor from giving advice over the phone unless it is an emergency. Doctors should be allowed to use their digital signature for prescriptions that can be sent to e-pharmacies online or emailed to patients. Doctors should also have online access to cutting-edge research articles, which can only happen if the government negotiates with publication houses for bulk subscriptions, that can then be purchased by doctors and medical colleges at affordable prices.

Patients are likely to benefit most from mHealth solutions — mobile apps to scan hard copies of their medical records and store them in a government-managed cloud system; apps that enable easy access to these records when needed; and legalization of online pharmacies to reduce the cost of medicines for patients. Health mobile apps hold a huge potential in India and can drive the digital health revolution effectively.

Government must ensure that there are regulations that specify the minimum standards for EMR developers and provide an Application Programming Interface (API) to ensure interoperability. The regulations should also make it economically viable for startups to develop the technology and software for EMR in India.

Our hospital was the first in the country to use an Indian Space Research Organisation (ISRO) sponsored satellite to offer consultation to over 53,000 patients with heart conditions across the country. Such stories confirm the limitless potential of digital technology in health. All we need to do is to clear the obstacles that prevent its optimal application.

Dr. Devi Prasad Shetty

To pave the way for digital health in India, we need private and public-sector collaboration to bring about changes in the existing infrastructure and regulatory framework.

WHAT WILL IT TAKE TO MAKE INDIA'S FUTURE IN DIGITAL HEALTH SECURE?

By Dr. Patty Mechael, Executive Vice President, Personal Connected Health Alliance

Dr. Patty Mechael

> *To ensure digital health security in the future, India will need to systematically adopt and scale digital health tools that address its national health priorities with a focus on prevention and improved health outcomes.*

The digital revolution has arrived in India and health appears to be the final frontier. Through more proactive strategies, policies, standards and governance, governments are now able to deploy and harness the power of digital health for national health planning, surveillance and delivery. The use of digital health by healthcare facilities and specialists is enabling improvements in the quality of care, producing greater efficiency in health service delivery and resulting in overall improved health outcomes.

Medical devices and wearable technologies have played a big role in this revolution. These are either directly purchased by the public or prescribed by physicians, for conditions ranging from sleep apnea and obesity to diabetes and other chronic diseases. Medical devices and wearables, are in many ways, reducing the burden on our health system by providing opportunities for continuous disease monitoring and increased self-management of lifestyle and chronic diseases. What we need now are clear standards to facilitate smooth and safe data flow between these devices and electronic medical records. The Continua Design Guidelines are the only medical device standards that enable safe, secure and reliable data exchange and have been adopted and promoted by the International Telecommunications Union globally.

To ensure digital health security in the future, India will need to systematically adopt and scale digital health tools that address its national health priorities with a focus on prevention and improved health outcomes. To ensure long-term sustainability, national strategies, roadmaps, standards and budgets will need to be developed that enable newer innovations in health technology and can be adopted as and when they become available in the market. India will also need to find ways to support the use of digital health tools by the public and facilitate the integration of patient-generated health data and genomics into the country's healthcare delivery system. This, in the long run, will lead to better prevention, self-management and continuity of care.

In five years from now, I believe we will have a more engaged public whose health data will flow seamlessly in and out of our healthcare system, which will change our overall approach to public health and health service delivery for the better.

A GLIMPSE INTO THE FUTURE OF DIGITAL HEALTH IN INDIA

By Dr. Ramana Rao G V, Director - EMLC, GVK EMRI

The scope of digital health in India today is immense, considering the shift in our country's disease burden from communicable to non-communicable diseases, the growing purchasing power of the middle class and the increasing familiarity with digital technology. In the next 5 years, we can expect deep penetration of digital health into rural India. Other changes we can expect to see in the digital health space in the coming years include:

- Significant innovation in home-based medical devices

- Demand for and growth of low cost health devices

- Increased use of devices with the ability to transmit timely patient information to doctors supporting the shift to preventive healthcare

- Increased integration of the Internet of Things in hospital systems with medical devices enabling this process

- Greater involvement of public-private partnership (PPP) models in all aspects of healthcare: preventive, promotive, curative and rehabilitative health

- Price regulation and patented digital health solutions

Dr. Ramana Rao

The future of digital health looks good for India, but we must be ready to tap into the many unexplored areas and examine how best to improve our overall healthcare system. Here are some recommendations:

- Encourage production of digital health solutions

- Establish clear standards

- Focus on mHealth as it has great potential

- Prioritize emergency care in digital health applications

- Promote home-based and point-of-contact care devices

- Discourage imports of digital health solutions

- Encourage R&D and explore opportunities to tie-up with universities

- Encourage international collaboration with a focus on Make in India

- Create accountability of the private health sector in digital health

NATIONAL HEALTH POLICY 2017

TAKING US SEVERAL STEPS CLOSER TO DIGITAL HEALTH

NATIONAL HEALTH POLICY

DIGITAL HEALTH

METADATA AND DATA STANDARDS

TELE-CONSULTATION

NATIONAL HEALTH INFORMATION ARCHITECTURE

EMERGENCY SERVICES

ELECTRONIC HEALTH RECORDS

DIAGNOSIS

IMPROVED HEALTHCARE OUTCOME AT REMOTEST LOCATION

PRIMARY HEALTHCARE
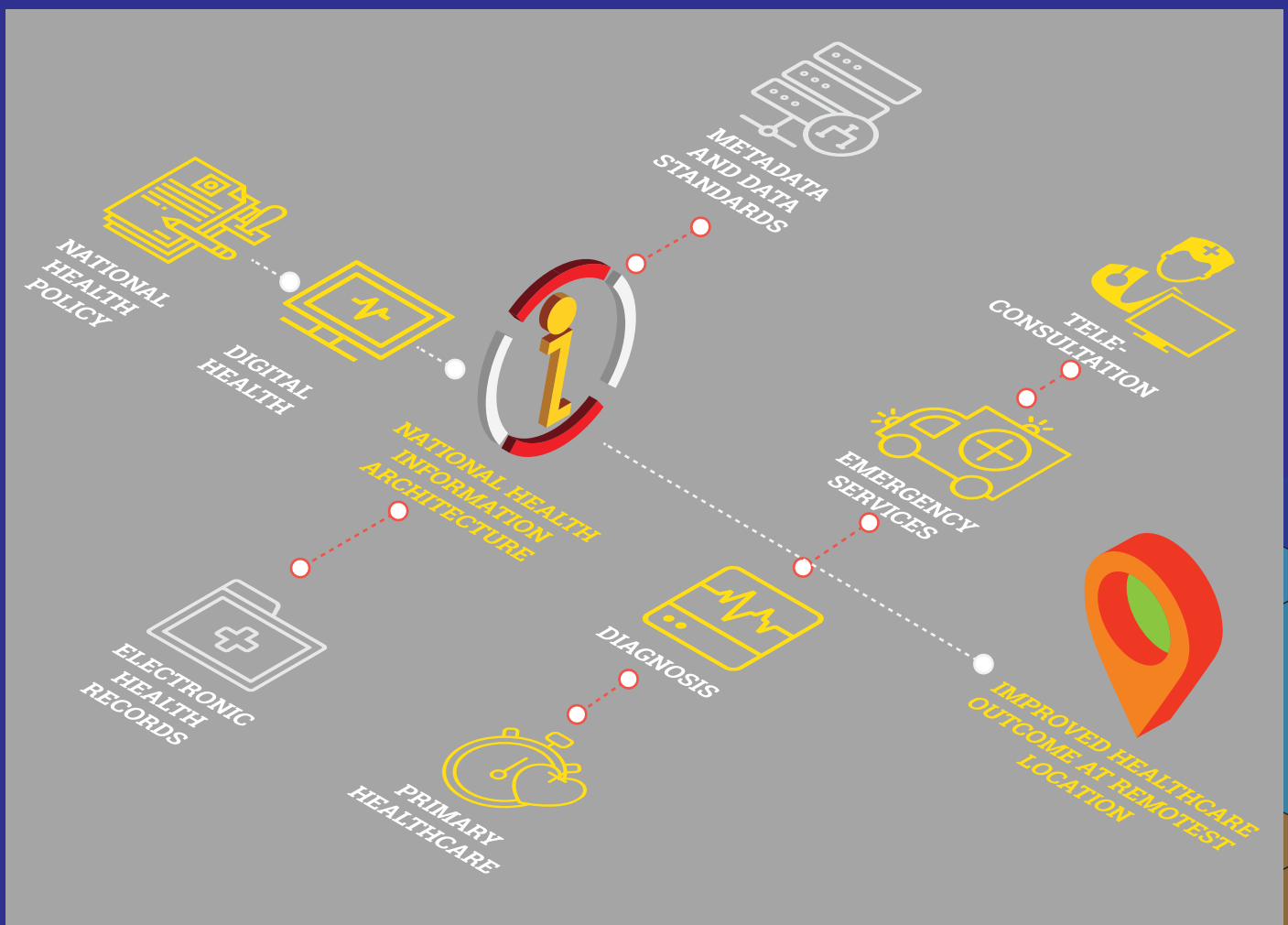
On March 15th, 2017, India got its third approved National Health Policy, formulated after detailed consultations with relevant stakeholders and State Governments. Since the first NHP in 1983 and the one that followed in 2002, the socio economic and epidemiological changes in the country necessitated the formulation of a new National Health Policy, to address the current and emerging challenges of healthcare in India.

KEY HIGHLIGHTS OF THE NHP 2017

- Shift from selective primary healthcare services to assured comprehensive primary healthcare with two-way referrals, including care for major non-communicable diseases (NCDs), mental health, geriatric care, palliative care and rehabilitative care

- Strengthening and designing health systems to make healthcare affordable and available to all through free access to universal comprehensive primary healthcare; free drugs, diagnostics and essential emergency services in government hospitals; and through strategic purchasing of services in healthcare deficit areas, from private care providers and not-for profit providers

- Establishing federated national health information architecture, consistent with Metadata and Data Standards (MDDS), use of Electronic Health Records (EHR), use of digital tools for AYUSH services by AYUSH practitioners, for traditional community level healthcare providers and for household level preventive, promotive and curative practices

- Using technology to scale initiatives such as tele-consultation, linking tertiary care institutions (medical colleges) to district and sub-district hospitals with secondary care facilities, to ensure that excellent medical care reaches the remotest locations

GOVERNMENT INITIATIVES IN DIGITAL HEALTH

In line with the overall objective of 'digitizing' healthcare in India, the government has created a detailed project report under the Digital India programme. The report focuses on key initiatives to boost digital health in the country and can be broadly classified as follows:

- **Online Services:** These include the National Health Portal, Online Registration System, 'Mera Aspataal' (Patient Feedback) Application, Central Drugs Standards Control Organisation "SUGAM", FSSAI Online and the National Organ & Tissue Transplant Organisation Web Portal.

- **Mobile Applications:** Examples include the Vaccine Tracker (Indradhanush Immunization), India Fights Dengue, NHP Swasth Bharat, NHP Directory Services Mobile App, No More Tension, Pradhan Mantri Surakshit Matritva Abhiyan and Mera Aspataal.

- **Service Delivery and Tracking:** This comprises applications and online programmes such as the Mother and Child Tracking System (MCTS) / Reproductive Child Health (RCH) application, Kilkari, TB Patient Monitoring System "Nikshay", Tobacco Cessation Programme and the mDiabetes Program.

- **ERMED (Electronic Resource in Medicine) Consortium:** National Medical Library's ERMED Consortium is an initiative taken by the MoHFW to develop nationwide electronic information resources in the field of medicine. The consortium is coordinated through its headquarter set up at the NML since 2008. At present, 70 states and centrally funded Government institutions (including all AIIMS) from 24 states are selected as its members.

- **Online Consultation and Telemedicine:** Examples include the National Medical College Network (NMCN), National Telemedicine Network (NTN) and Telemedicine Nodes at pilgrim places.

- **Process Automation:** These consist of specialized digital systems such as the Hospital Information System (HIS), ANM Online (ANMOL), Drugs and Vaccines Distribution Management System (DVDMS) ('eAushidhi') and eRakt Kosh.

- **MIS and Surveillance:** Includes the Health Management Information System (HMIS), Integrated Disease Surveillance Programme (IDSP), Dashboard for Pradhan Mantra Swasthya Suraksha Yojana (PMSSY) and a Central Dashboard.

- **Digital Standards and Regulations:** Comprises the National Digital Health Authority of India (NDHAI), EHR Standards, National Resource Centre for EHR Standards (NRCeS) and the National Identification Number (NIN).

- **Capacity Building:** Through a free audio training course called Mobile Academy.

RECOMMENDATIONS

- Discuss next steps of the National Digital Health Strategy

- Prepare a digital health action plan to support the National Digital Health Strategy

- Set up IHIN that was announced in 2015

- Set up the Digital Health Innovation Lab

- Adopt globally accepted standards of interoperability or develop one for India

- Set up a testing lab for medical devices at the NHSRC or TEC

- Develop a logo on the lines of ISI for certified medical devices

- Define the framework for PPPs in digital health

- Provide an immediate focus for Human Resource Development

- Introduce CME programmes for medical and paramedical professionals

- Following the WHO's Executive Board resolution on mHealth last year, conduct a global consultation on the scope of mHealth

- Shift the development of digital health standards from the Bureau of Indian Standards (BIS) to MOHFW. BIS can notify the standards recommended by the standards group at MOHFW

LIST OF ATTENDEES AT 5TH GOVERNMENT INDUSTRY DIALOGUE

Sr. No.	Name	Designation	Organization
1	Mrs. Anupriya Patel	Union Minister of State for Health & Family Welfare	Government of India
2	Mr. Rajendra Pratap Gupta	Advisor to Union Minister of Health & Family Welfare Member- Khadi & Village Industries Commission	Government of India
3	Mr. Anand Deshpande	Member	UIDAI, Government of India & President, Persistent Systems
4	Mr. Arun Panda	Additional Secretary	Government of India
5	Mr. Sunil Sharma	Joint Secretary	eGov, Ministry of Health & Family Welfare, Government of India
6	Prof. (Dr.) Bipin Batra	Executive Director	National Board of Examinations
7	Dr. Neena Pahuja	Director General	ERNET, Government of India
8	Prof. Prabhat Ranjan	Executive Director	TIFAC
9	Shri. Sushil Kumar	Dy. Director General	Ministry of Communication & IT, GOI
10	Mr. Michael Strubin	European Director	Personal Connected Health Alliance
11	Dr. Nimesh Desai	Director	Institute of Human Behaviour & Allied Science (IHBAS)
12	Mr. S. B. Sinha	Advisor	NHSRC , MOHFW, Govt. of India
13	Mr. Jitendra Arora	Director	eGov, Ministry of Health & Family Welfare, Government of India
14	Mr. Rajiv Gupta	Director Project	TCIL, Government of India
15	Prof. Suptendra Nath Sarbadhikari	Project Director, Centre for Health Informatics	NIHFW, Government of India
16	Dr. Sudhir Saxena	Vice President	National Institute of Smart Governance, GOI
17	Dr. B. Srinivas	Asst. Director General	Ministry of Health & Family Welfare, GOI
18	Mr. Ankit Tripathi	Addl. Director, Centre for Health Informatics	NIHFW, Government of India
19	Dr. Ramana Rao G V	Director – EMLC	GVK Emergency Management & Research Institute, Hyderabad - Telangana
20	Mr. Vikram Tiwathia	Deputy Director General	COAI
21	Commander Girish Kumar VSM (Retd)	Country Head, Public Sector & Healthcare	HP Enterprise Services, India
22	Mr. Prabal Chakraborty	Vice President & Managing Director	Boston Scientific India
23	Mr. Atantra Das Gupta	HME Head	Samsung India
24	Mr. T.S.Y Aravindakshan	Director - Industry Solutions [Health]	Microsoft Corporation India
25	Mr. Milan Rao	President & CEO	GE Healthcare
26	Ms. Gisela Abbam	Global Executive Director	GE Healthcare
27	Dr. Anand Iyer	President & COO	Welldoc
28	Mr. Shireesh Sahai	CEO	Wolters Kluwer India
29	Mr. Kumar K. V	VP/Group Head I Information Technology	Narayana Hrudayalaya
30	Mr. Wim Corbijn van Willenswaard	Sr. Architect Interoperability	Philips
31	Mr. Vibhav Garg	Vice President - Health Policy & Government Affairs	GE Healthcare

32	Dr. Rishi Bhatnagar	President	Aeris India
33	Mr. Krishan Girdhar	Managing Director	Presto Infosolutions Pvt. Ltd.
34	Mr. Ananda Sen Gupta	CEO	Track My Beat
35	Mr. Adrian Phillips	Director	Justice & Care
36	Dr. Abhishek Sen	CEO	Biosense Technologies
37	Dr. Yogesh Patil	CEO	Biosense Technologies
38	Dr. Shirshendu Mukherjee	Mission Director, Programme Management Unit (PMU)	Jointly Supported by DBT-BIRAC-BMGF-Wellcome Trust
39	Mr. Kishor Narang	Principal Design Architect	Narnix Technolabs
40	Mr. Sanjay Sood	Director	C-DAC
41	Dr. Meenu Singh	Professor	PGI- Chandigarh
42	Mr. Swaminathan	CGM	GS1 India
43	Mr. Manick Rajendran	Director	EMMI Life
44	Dr. Narendranath. V	Chief Administrator	M. S. Ramaiah Hospital
45	Dr. Pawan Gupta	Additional Director	Jaypee Hospitals
46	Mr. Mehul Sukumaran	State Head - Operations	GVK Emergency Management & Research Institute, Hyderabad - Telangana
47	Mr. Sanjeev Malhotra	CEO	IOT COE, Nasscom
48	Dr. S. B. Bhattacharya	Committee Member	Bureau of Indian Standards, GOI
49	Mr. Rajesh Singh	National Sales Director	Wolters Kluwer India
50	Ms. Ruchi Chauhan	Head of Marketing	Wolters Kluwer India
51	Mr. Mohsin Ali Khan	Chairman	Era Medical College
52	Mr. Ashutosh Chadha	Director Government Affairs	Microsoft Corporation India
53	Mr. Utkarsh Amitabh	National Account Manager	Microsoft Corporation India
54	Ms. Stuti Shukla	Chief Marketing Manager	GE Healthcare
55	Mr. Mohammad Ameel	Consultant	NHSRC
56	Mr. Javesh Jindal	DGM - HME biz	Samsung India
57	Mr. Hitesh Sardana	Sr. Manager - Marketing	Samsung India
58	Dr. Avijit Bansal	Co-Founder, CEO	Windmill Health Technologies
59	Dr. Vishwa Kirti Sharma	Co-Founder	Track My Beat
60	Dr. Nishant Jaiswal	HTA Expert & Scientist	ICMR
61	Dr. Sunil Raj Saxena	-	PHFI
62	Dr. Ashok Agarwal	-	PHFI
63	Mr. Chandrashekhar K	Founder, CEO	Forus Health Pvt. Ltd.
64	Mr. Vinod Rana	Regional Manager	Forus Health Pvt. Ltd.
65	Mr. Zaw Ali Khan	-	Era Medical College
66	Ms. Shweta Berry	Head of Strategic Alliances- Industry & Academia, Events and CSR	Aeris India
67	Ms. Shilpa Pradhan	Deputy Head, Government Affairs	GSK India
68	Dr. Ravikrishnan E	Assistant Professor, Department of Biochemical Engg and Biotechnology	Indian Institute of Technology, Delhi
69	Mr. Rishi Malik	-	Presto Infosolutions Pvt. Ltd.
70	Ms. Mevish P Vaishnav	Coordinator	Government Industry Dialogue

DMAI - (Organization with a Special Consultative Status with United Nations - ECOSEC)

Disease Management Association of India (DMAI - The Population Health Improvement Alliance) was founded by Global Healthcare leaders from India, to bring all the stakeholders of healthcare on one platform. DMAI has been successful in establishing an intellectual pool of top healthcare leaders to become an enabler in building a robust healthcare system in India. In July 2015 , the United Nations (ECOSEC) granted a 'Special Consultative Status' to DMAI.

DMAI has today become the most influential Public Policy Organization in Indian Health Care. Healthcare policies of the Narendra Modi led BJP Government have incorporated the suggestions made by DMAI from time to time, like; formulation of the National Health Policy, reforming medical education, pre-emptive healthcare, child health, mobile health & telemedicine, occupation wellness, chronic disease management, etc.

India is on the verge of building its healthcare system, and it has a long way to go. DMAI is building the knowledge pool to contribute & convert 'Ideas' into 'Reality' for healthcare in India. DMAI is the only not-for-profit organization focussed on population health improvement in India.

NHAP : DMAI is running a 'National Health Awareness Program' for school children and has already imparted awareness to more than 18000 students across various schools.

Government Industry Dialogue (GID) : GID was initiated in 2012, and this dialogue is held on important issues with senior most leaders from the public and private sector. This is a high level forum aimed at bridging the divide between the public and private sector to take the nation towards a double digit growth. For details, please visit http://governmentindustrydialogue.org/

DMAI works with all stake-holders for ensuring Accountable, Affordable and Accessible healthcare in India.

Website : www.dmai.org.in

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For Government Industry Dialogue, please contact : mevish@dmai.org.in / vipdialogue@gmail.com

For National Health Awareness Program, please contact : nhap@dmai.org.in

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