USAID
FROM THE AMERICAN PEOPLE

Pahal
Partnerships for Affordable Healthcare Access and Longevity

IPE GLOBAL
Expanding Horizons. Enriching Lives.

Healthcare Innovations Report

June 2017

Contents

Executive Summary

India has poor healthcare indicators when benchmarked with WHO set standards and an ever changing demography, lifestyle pattern and disease burden makes it difficult to address the healthcare challenges via the traditional healthcare delivery mechanisms. This compounded with lower public and overall expenditure on healthcare (at 1.15% and 4.8% of the country's GDP) creates a worrisome situation for India's underserved and vulnerable population. Adding to the situation is the low health insurance penetration and high out-of-pocket expenditure which leads to over 39 million people being pushed to poverty every year.

On the other hand, India's healthcare sector is growing at a CAGR of 23% and will be a $280 billion industry by 2020. India is witnessing rapid urbanization and rising income levels. By 2030, over 40% Indians will be living in urban areas, accounting for 69% of the GDP, implying higher number of underserved urban poor with a capacity to pay, indicating a huge market opportunity.

The private sector, powered by the growth of social enterprises, provides more than 71% of the healthcare services. It is tapping into this opportunity and has been at the fore front of combining innovation in technology and inclusive business models to create scalable social enterprises making quality healthcare accessible and affordable to the population. However, these social enterprises, at an early stage, face challenges including lack of growth capital, access to newer markets, low cost of products and thin margins, etc. making it difficult for them to scale.

There is an evident need for a larger alignment of private and public players for catalyzing these innovations and developing new business models to address the healthcare challenges, which the PAHAL project intends to provide.

PAHAL (Partnerships for Affordable Healthcare Access and Longevity), a joint initiative of United States Agency for International Development (USAID) and IPE Global, aims to provide catalytic support to growth stage scalable social enterprises in developing affordable & quality healthcare solutions for the urban poor. PAHAL is a collaborative platform which seeks to connect, capacitate and catalyze innovative social enterprises focused on improving health outcomes among urban poor communities.

By 2020 Pahal will

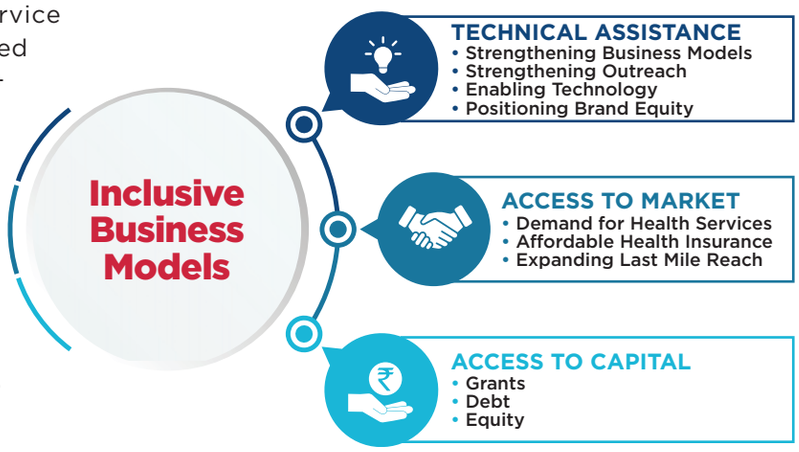
- **Reach 10 Million Urban Poor in India**
- **Reduce Out-of-Pocket (OOP) expenditure by 30%**

PAHAL follows an ecosystem approach to strengthen and scale market based healthcare solutions to improve access to quality care for underserved urban communities. The project focus is to identify innovative business models, and then provide them with Technical Assistance, Market Access and Access to Capital.

PAHAL Platform

PAHAL has built strategic partnerships with several social enterprises in healthcare delivery, innovation, medical technology, skill building, financing, insurance to develop solutions for improving access and reducing cost of quality healthcare.

PAHAL, through its partner service providers, has built an unparalleled platform with a network of 700+ health care facilities, and over 15,000 community workers, reaching out to over 10 million underserved and vulnerable people across key low income states in India. This in itself provides an excellent opportunity to scale relevant innovations to make care affordable and community centric.



Scaling Up of Innovations

The team evaluated 120 healthcare enterprises and shortlisted 70 enterprises for further review (*Annexure 1: Healthcare Innovation Companies*). A detailed description of 25 innovations has been presented in the report. These enterprises have the potential to reduce costs, improve access and quality of healthcare services. Key criterion for shortlisting the innovations was Mother and Child care as well as innovations around early detection and prevention; factors that are in-line with the National Health Policy and Universal Health Access Goals of the Government of India. The innovations thus selected are not exhaustive and the project will keep adding to the pipeline on the go. The team aims to partner with such innovative and scalable social health enterprises and enable them to overcome challenges to scale.

Value proposition for the innovation ecosystem via PAHAL network is outlined as follows:

- Access to large disaggregated private sector markets in underserved communities
- Access to capital (debt and equity)
- Improving risk profile and reducing collateral requirements of innovators through a credit guarantee
- Showcasing and advocating innovations to relevant stakeholders – government, corporates, healthcare providers, etc.
- Bringing stakeholders on a common platform to create structured solutions

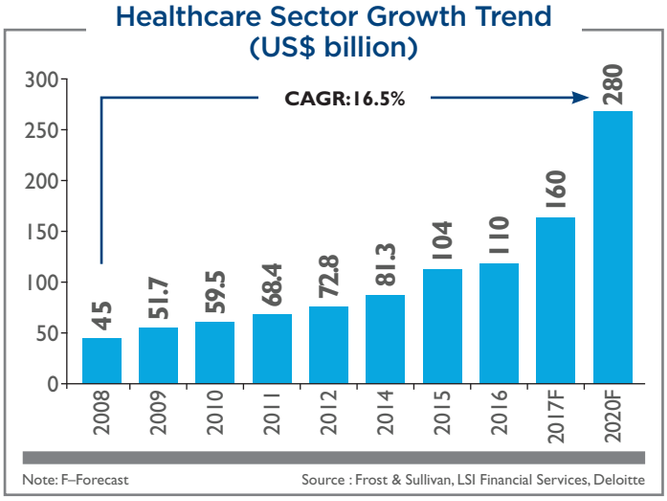
As next steps, PAHAL aims to undertake the following key activities

- Initiate discussion with selected innovators to understand the value proposition and identify synergies and alignment with the project goals.
- Conduct innovation workshops/round tables bringing all the stakeholders relevant to the innovation eco-system primarily innovators, IBM partners, investors to create product/service offerings for relevant markets.
- Work with the innovators in creating/re-modelling/packaging the solution and implement the same on pilot/scaled up mode in the project network along with strong MEL support to monitor the outcomes of such pilot.

Indian Healthcare
Current Scenario & its Challenges

The key segments of the Indian Healthcare Industry are Hospitals, Pharmaceuticals, Diagnostics, Medical Equipment and Supplies and Medical Insurance. Hospitals, consisting of both government infrastructure as well as private setups, constitute the biggest segment at around 71% (Source: Frost and Sullivan). The hospital segment is also mostly fragmented with 90% being established and operated by doctors or trusts and the balance are managed by corporate hospital chains.

The Indian healthcare sector is expected to grow at a 16.5% compounded annual growth rate (CAGR) and is expected to reach $280 billion by 2020 (Source: Frost & Sullivan) with more than half of the sector dominated by the hospitals, nursing homes, diagnostic centers closely followed by pharmaceuticals and medical instruments. Rising income levels, greater health awareness, increased precedence of lifestyle diseases and improved access to insurance would be the key contributors to growth. It is the fastest growing healthcare sector in the world, where global average growth rate has been 5.2% for the period 2011-15. The sector has also seen increased support from the Government with a higher budget allocation in the union budget 2017-18, the overall budget increased from $5.96 billion to $7.3 billion which is 2.2% of the total union budget. (Union Budget 2017-18) Further the government plans to increase the healthcare expenditure from the existing 1.15% of the GDP to 2.5 % by 2025. (NHP 2017)



Even though the healthcare sector is large and is expanding, India's healthcare spending pales as compared to other developed or emerging economies. India currently cumulatively spends 4.8% of its GDP on healthcare, which is significantly lower than half of the global average when compared as a percentage of GDP.

The public sector accounts for a mere 26% of the total healthcare expenditure which is much lower than the global average. (World Health Statistics 2010) This highlights the fact that it is the private sector that plays a dominant role in healthcare delivery in India. India also rates poorly on the basic health indicators. Infant mortality rate is 40 per 1,000 live births (SRS 2013). Access to health infrastructure and trained healthcare professionals is also a major concern in India. The doctor-to-population ratio in India is 1:1,800 (Indian J Med Res v.137 (4); 2013 Apr). India has one of the lowest bed densities standing at 1.3 per 1,000 which is lower than the WHO guideline of 3.5 beds per 1,000. Private sector's share for the same is 40% which again indicates a more dominant private sector. (Mckinsey & Company 2012)

Some of the key healthcare challenges in the Indian context are:

- **Low Affordability:** Almost 70% of India's population lives below $2 per day and with limited public healthcare funding, and low coverage by health insurance the out-of-pocket spending is the only option for India which makes healthcare unaffordable for majority of the population.

- **Low Levels of Expenditure on Healthcare:** With annual per capita income as low as $1,627, people in India are left with very little disposable income to spend on healthcare. Average spend on healthcare by an Indian is $69 as compared to $4,197 in USA and $709 in Brazil (*Source: Organisation for Economic Co-operation and Development*). India spends 4.8% of its GDP on healthcare as compared to 17.9% in USA, 9.4% in Brazil and 5.4% in China.

- **Social Factors:** Indian communities are diversified in their customs and practices and follow a plethora of practices and rituals that makes the delivery of standardized health practices a complex problem.
  - Marriages at young age followed by early child bearing with undesirable spacing between births poses significant risk to both mother and child.
  - Social stigma and hesitancy towards breastfeeding deprive newborn of the much-needed nutrition.
  - Stringent religious belief breeds lack of faith in medical science and practices and causes a strong reliance on the unorganized sector of vaids and hakims.

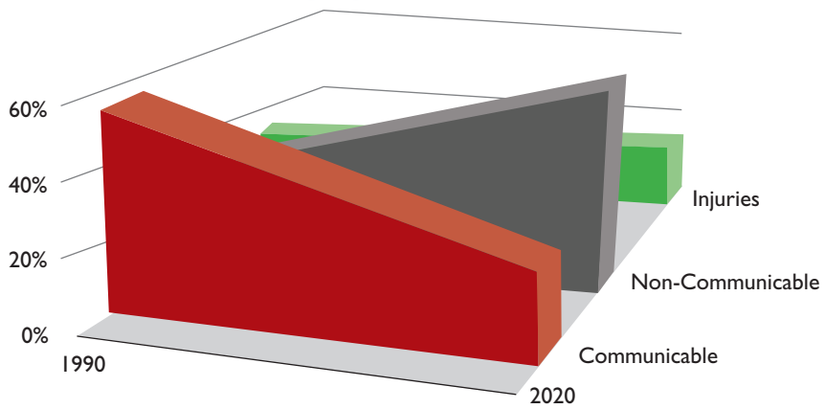
- **Inadequate Infrastructure and Human Resources:** The infrastructure density in India is much lower than the WHO targets or global average. Following table compares the key infrastructure indicators of India with the global averages.

INFRASTRUCTURE INDICATORS (PER 10,000 POPULATION)	INDIA	WORLD
Number of Physicians	7	19
Number of Nursing and Midwifery Personnel	17.1	31
Number of hospital beds	7	29

Source: WHO Statistics 2014 and World Bank Data

- **Burden of Disease:** The country is witnessing a shift in the disease burden. Over the last 10 years, the ratio of non-communicable diseases has increased from 33% to 45%. Non Communicable diseases are expected to have 56% share in disease burden by 2020 and India is going to be the diabetes capital of world with 61 million diabetics.

Changing Disease Burden



Source: Nutrition Transition in India, 1947-2007, Ministry of Women and Child Welfare

1 INNOVATIONS IN HEALTHCARE

Innovation covers a wide range of improvements over the entire healthcare continuum be it in products, services, process operating model or technology. On a broader level, innovations can be classified into three categories – Product, Process and Paradigm. Over the past decade, India has become a leading hub for various innovations in healthcare. Various emerging trends, social & economic growth drivers, government support as well as the massive digital revolution have worked towards the same. This has given rise to many medical applications such as – remote health monitoring, elderly care, fitness programs, sensors, and diagnostic and imaging devices, treatment and medication at home etc. These healthcare services are expected to reduce costs, increase the quality of life, and enrich the user's experience. (IEEE, Vol. 3) The following sections discuss the highlights of each of these in the attempt to answer and understand the need for accepting and scaling up innovations for addressing the healthcare challenges of the country at large.

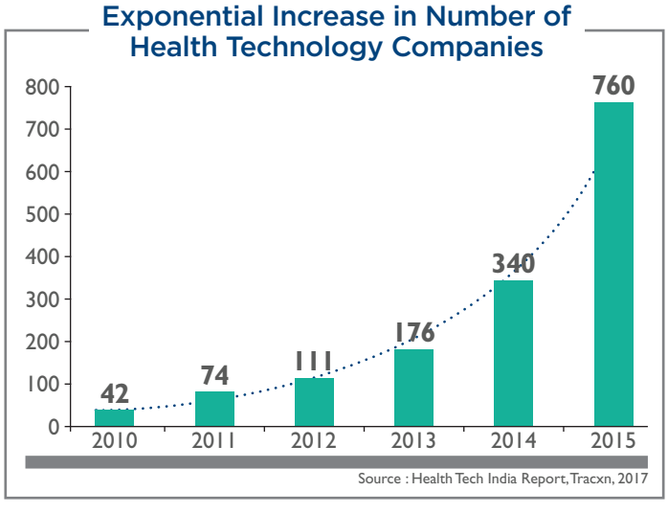
1.1 Emerging Trends & Growth Drivers for Innovation

Delivering affordable quality health care is a complex problem and requires detailed understanding of not only the entire continuum of care but also the various stakeholders involved and the infrastructure that is available and required. The issues of lack of access and availability of sufficient resources coupled with the changing disease burden and the stringent and diverse community behavior pose a unique challenge to the innovation ecosystem both within the country and worldwide.

Rapid development has led to a significant change in the landscape of the country visible via the heavy urbanization and altered lifestyle. All this has led to the change in the kind and magnitude of the diseases and healthcare needs. This in turn has opened the healthcare space for innovative cost effective treatments, transforming the way healthcare is delivered.

Some of the major trends demanding change in the traditional healthcare delivery mechanisms could be identified as follows:

- Shift from communicable to non-communicable diseases
- Increasing demand for high quality and specialized healthcare services in Tier II and Tier III cities and smaller towns
- Emergence of technology driven healthcare services
- Increase in investor interest in new product development, research and specialized delivery models
- Newer delivery models – day care centers, elder homes, Ayurvedic and natural medicine etc.
- Boost to healthcare insurance coverage by various Government or government-sponsored schemes



Several demographic as well as economic growth drivers are pushing India to be the emerging market as well as the playground for healthcare innovations. Some key ones are as follows:

- Population is expected to increase from about 1.2 billion (2011 census) to nearly 1.4 billion (by 2024 est.) (Shetty, et al., 2010)
- Income of people has increased significantly, with the share of households in the ₹2-5 lakh per annum income range expected to go up to 38% in 2017-18 from 28% in 2013-14 thus indicating higher spending capacity on healthcare.
- Increase in urbanization and rising literacy levels have made people more conscious to the benefits of improved healthcare delivery. This is also expected to increase the hospitalization rate for in-patient treatment. The same is expected to be 36% by 2020 in comparison to 31% in 2011.
- The expected increase in the geriatric population in the next ten years is nearly 70 million representing a huge patient base and market for preventive, curative and geriatric care opportunities.
- Various economic growth factors like tax benefits, subsidies, increased depreciation on instruments, reduction in custom duty on imports etc. by the government; Increase in international patients for medical tourism; substantial increase in health insurance coverage; higher spending on health particularly via NRHM etc. have been working collectively to create a conducive environment for increased investment further boosting the innovation ecosystem.

1.2 Government Spending on Healthcare Innovation & Ecosystem

Fund Allocation: The allocation of ₹48,853 crores for the Ministry of Health and Family Welfare (MoHFW) in this year's budget indicates a 27% increase in overall health allocation.

Health Research: Allocation for Department of Health Research has been increased by a whopping 31% over previous year wherein the focus is on development of infrastructure for promotion of health research and setting up of nation-wide network of laboratories for managing epidemics and national calamities.

Pradhan Mantri Swasthya Suraksha Yojana: Six AIIMS like institutions, one each at Bhopal, Bhubaneswar, Jodhpur, Patna, Raipur and Rishikesh in the first phase; and two in West Bengal and Uttar Pradesh in the second phase are being set up under this scheme.

Medical Equipment Manufacturing: The goal with respect to medical devices shall be to encourage domestic production in consonance with the "Make in India" national agenda. Medical technology and medical devices have a multiplier effect in the costing of healthcare delivery. The policy recommends and prioritizes establishing sufficient labeling and packaging requirements on part of industry, adequate medical devices testing facility and effective port – clearance mechanisms for medical products (NHP 2017).

Digital Health Technology Ecosystem: Recognizing the integral role of technology (eHealth, mHealth, Cloud, Internet of things, wearables, etc.) in the healthcare delivery ecosystem, a National Digital Health Authority (NDHA) will be set up to regulate, develop and deploy digital health across the continuum of care. The policy advocates extensive deployment of digital tools for improving the efficiency and outcome of the healthcare system.

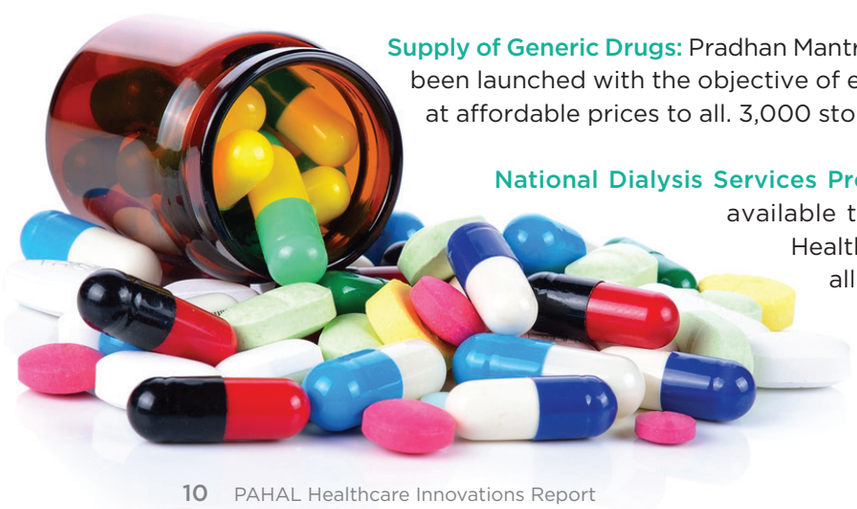
Mahila Shakti Kendra: To provide one stop convergent support services for empowering rural women with opportunities for skill development, employment, digital literacy, health and nutrition. ₹500 crore have been allocated to set up Mahila Shakti Kendra in 14 lakh ICDS Anganwadi Centres.

Maternity Benefit: ₹6,000 each will be transferred directly to the bank accounts of pregnant women who undergo institutional delivery and vaccinate their children.

Elimination of Communicable Diseases: Government has prepared an action plan to eliminate Kala-Azar and Filariasis by 2017, Leprosy by 2018, Measles by 2020 and tuberculosis by 2025 is also targeted.

National Health Mission: Spending under this head which includes Urban & Rural health missions has been increased by 15% from ₹19,000 crore to ₹21,940 crore wherein the focus is on immunization program & control of communicable diseases.

Telemedicine: Allocation under this head has been increased by a whopping 33% over previous year to ₹40 crore.



Supply of Generic Drugs: Pradhan Mantri Bharatiya Jan Aushadhi Pari Yojana has been launched with the objective of ensuring availability of quality medicines at affordable prices to all. 3,000 stores be opened (Approx. cost ₹35 crore).

National Dialysis Services Program: To be started and funds made available through PPP mode under the National Health Mission, to provide dialysis services in all district hospitals.

1.3 Digital Transformation of Healthcare Sector

One of the key pillars of innovation is the access to internet technology in the remotest of corners. India is witnessing a tremendous digital transformation with the usage of smartphones, and internet penetration in India continues to increase at the rate 20%-30% CAGR currently. This digital revolution, enhanced by India's thriving entrepreneurial culture is set to be a game changer for the $100 billion healthcare sector of India.

Some of the key areas of healthcare innovations that have seen a major surge due to this changing digital landscape of the country are as follows:

M-Health: With an estimated market size of ₹2,083 crore in 2015, set to rise to ₹5,200 crore by 2020, 69% of doctors are recommending M-Health and 59% of the patients are already using it. Mobile apps, especially those which are connecting doctors to the patients and enabling remote consultations, are a major segment of it.

Remote Diagnostics: India's remote healthcare delivery market is estimated at $7.5 million in 2011 and is estimated to grow at 20% CAGR. These products help increase access to healthcare for remote and rural populations by providing point-of-care diagnostics, tele-consultation and e-prescription capabilities.

Telemedicine: Telemedicine is the use of technology for remote diagnosis, monitoring and education. India's telemedicine market was valued at $100 million in 2011 and has reportedly grown to four times by the end of 2016. It has helped bring down provider and patient costs as well as improving the accessibility of healthcare in the remotest areas.

Digital & Social Connectivity: On the provider side, this has prompted emergence of digital chatter platforms where medical professionals share knowledge and ask for help. The Indian Government is trying to set up a National OFC Network to connect 250,000 Gram Panchayats to the internet which will help in expansion of e-health.

Wearables & IoT: The wearable healthcare devices can track down basic health indicators to improve diet and exercise outcomes. Now, they are being increasingly used to measure basic health parameters. The healthcare wearable market in India is currently valued at ₹30 crore and is expected to increase in value as the technology is beginning to expand (IEEE, Vol 3).

Big Data Analytics: Different players are now recognizing the value of combining consumer insights with internal company data to inform, customize and optimize their product offerings. E.g. analysis of genome data of a population sample can reveal the cause of the disease/condition.

Electronic Medical Records (EMRs): This digitization has paved the pathway for advanced IT systems such as health information systems and cloud computing to increase remote and ubiquitous accessibility to patient data. The purpose of collecting medical records are manifold – better and evidence based care, increasingly accurate and faster diagnosis that translates into better treatment at lower costs of care, avoid repeating unnecessary investigations, etc., all translating into improved personal and public health. To achieve this, a set of pre-defined standards for information capture, storage, retrieval, exchange, and analytics that includes images, clinical codes and data is imperative (MoHFW). The government also plans to issue Aadhar-based health smart cards to senior citizens which has the potential to be the starting block in building a comprehensive health information system for the country.

2 PAHAL CRITERIA FOR SELECTING HEALTHCARE INNOVATIONS

The objective of PAHAL project with respect to healthcare innovations is two-fold:

1. Create a pipeline of 25 innovations in healthcare or related products, services and processes and do a detailed strategic evaluation of each of these innovations for access to capital and linkages with public and private markets.
2. Identify promising High-Impact innovations in Point of Care devices and technology relevant to the focus area of the project to launch within the project facilities and communities for improved systems and healthcare delivery.

To accomplish objectives set by the project, extensive ground work was undertaken to list and identify several innovations which can reduce costs, improve access, convenience or quality of healthcare services. PAHAL team worked on rigorously scanning the databases of various incubators and angel investors to derive a long list of healthcare innovations that may be relevant to various aspects of continuum of healthcare delivery.

Following table lists the various sources that were explored for this activity.

Table 1: List of Incubators

INCUBATOR NAME	THRUST AREA
TLabs – Times Internet Limited	Healthcare/Technology/E-Commerce/Online Media/ EdTech/Artificial Intelligence/Machine Learning/ Internet of Things/AdTech/FinTech
Venture Cente	Healthcare/Agnostic
SINE (Society for Innovation & Entrepreneurship) – IITB	Healthcare/Agnostic
Excubator Consulting Private Limited	Healthcare/IoT/Artificial Intelligence/IT + C110
National Design Business Incubator	Design/Healthcare
Technovate Innovations	Logistics/Healthcare
Global Incubation Services (GINSERVE)	Technology/Healthcare
IIITB Innovation Center	Healthcare/IT
Nadathur S Raghavan Centre for Entrepreneurial Learning (NSRCEL)/IIMB	Healthcare/Agnostic
Science And Technology Park	Food Processing/Textiles/Building Technologies/ Healthcare
Accel Partners	Healthcare
HTIC	Medical Devices
Startup Oasis	Healthcare/Agnostic
Health Start	Healthcare
VIT Technology Business Incubator	Healthcare/Bio-Technology based industries/ Environmental friendly solutions and products for Leather industries/Automotive/Mechanical Engineering sector related products and services/ Information Technology Products and Solution
IITM's Rural Technology Business Incubator	Healthcare/Rural/Underserved societal segments/ICT (Information and Communication Technologies)
Villgro Innovations Foundation	Healthcare/Agriculture/Education/Energy
NASSCOM 10K Warehouse Telangana	Healthcare/IT and enabled Technologies
IAN Mentoring & Incubation Services	Healthcare/Agnostic

A list of more than 70 innovations has been compiled. These range from innovative business models for tertiary care and speciality hospitals, to super specialized innovations in the field of 3D-Imaging and Robotic surgery, low cost PoC devices for last mile diagnostics and preventive care and finally smart solutions using digital technology for healthcare process optimizations and improved patient engagement.

The next step undertaken was to shortlist the long list further to identify the ones that are affordable however lack access to capital, market and linkages with public and private markets thus leading to very low scale up (only 7% of the innovations have seen appreciable scale up).

2.1 Criteria for Shortlisting

In alignment with the prime objective of the project, the focus of the shortlisting process is to identify such innovations which indicate capabilities for scale up, have potential to reduce out of pocket expenditure for the urban poor, and can help strengthen one or more dimensions of the health care delivery system. While the areas of intervention for such innovations may be diverse, the ones having direct impact on primary healthcare delivery with specific focus on mother and child health, and/or tuberculosis were assigned higher priority. This was primarily to ensure that the innovations thus selected are in line with Government of India's National Health Policy as well as Universal Health Access Goals.

To facilitate such shortlisting, the list of innovations were categorized at a high level on the ***'Level of Care'*** and ***'Area of Intervention'***. The listing was further categorized on the following aspects:

- Program focus area,
- Impact on Out-of-Pocket expenditure
- Stage of the venture
- Experience of working with private partners
- Need for regulatory approval and status of the same

The categorization was largely done by analysing the data and information available through the secondary research mechanism. Once categorized, the specific shortlisting criteria of the innovations for project focus can be summarized as follows:

- Innovations directly impacting the program focus areas of Mother and Child Care, Family planning and TB
- Innovations focused on reducing Out-of-pocket expenditure of the beneficiaries on healthcare products and services
- Innovations that are productized with a commercial solution available to be taken to the private markets
- Innovations that have some experience of working with private markets and are prepared for the higher levels of accountability and competitive expectations
- The process also identified the innovations requiring approvals either from regulatory bodies or from the intended beneficiary.

Defining the Level of Care and Area of Intervention

This included identifying the technical area of intervention as well as the delivery mechanism that are relevant to the project's goal and objective. These were:

- Generic Medical Devices
- Primary Healthcare Delivery/Telemedicine
- Mother and Child Care
- Point of Care Diagnostics and Preventive Care
- Digital Technology for Healthcare Delivery
- Education & Skills Technology
- Pharmacy

Furthermore, the intervention areas were categorized in high, low and no focus priorities:

- **Highest Priority:** Those directly linked to the priority areas of the project. Some highlighted ones are, sanitation products; PoC devices for detection of Diabetes, Hb, sugar, urine analysis, TB, microbial infections, breast cancer, pregnancy, fertility, thyroid; Low-cost innovations in infant care products like warmers, new-born resuscitation devices; Pregnancy care related innovations in labor monitoring tools, solar powered MCH profiling test kits; Telemedicine solutions; Primary clinic models – Paediatric specific, hub-n-spoke models; Health management information solutions; Emergency, trauma and critical care solution etc.

- **Lower Priority:** Either low cost optimization of existing device, technologies, equipment; innovations in other allied services that may help increase sustainability of the private businesses at low cost or even collaboration platform for patient, doctors etc. for reaching out to more and more beneficiaries by leveraging technology platforms etc.

- **Not Immediate Focus Areas:** Wellness and fitness related innovations; DNA screening and bioinformatics for personalized medical therapy.

The PAHAL project has shortlisted a total of 25 innovations in its first phase. The following table lists the count against the area of interventions:

AREA OF INTERVENTION	INNOVATION COUNT
Generic Medical Devices	8
Mother and Child Care	5
Point of Care Diagnostics	5
Primary Healthcare Delivery/Telemedicine	7

2.2 PAHAL Approach for Innovation Scale-up

- Identify promising high-impact innovations
- Shortlist products and solutions that meet the program goal
- Evaluate products and solutions in consultation with IBM partners
- Strategic partnerships to facilitate sector knowledge and dissemination of learning
- Create platforms for exchange between innovators, IBMs and experts for scale up of innovations to increase coverage for urban poor

Following sections share a brief profile for each of these innovations grouped under the key areas of Intervention.

3 PAHAL PIPELINE FOR HEALTHCARE INNOVATIONS

3.1 Generic Medical Devices

The Indian medical device industry is currently valued at $2.5 billion and contributes 6% to the healthcare sector. The industry is growing at a fast pace of 15% CAGR. Medical device industry is influenced heavily by factors such as the country's GDP, overall healthcare expenditure, level of public spend on healthcare compared to private sector, population's disease pattern-linked demand for treatment options, population's awareness of treatment options and their reception to certain device-based therapy, healthcare providers, regulatory environment, taxation & reimbursement options. Government has approved 100% FDI in the sector through automatic route.

3.1.1 Cura Healthcare

Founded in 2011, Cure healthcare is one of the leading medical equipment and device manufacturers in India, with an extensive portfolio of medical equipment and devices.

CURA has equipped the healthcare world with significant innovations and clinical solutions. Cura has state-of-the-art ISO certified manufacturing facilities spread across 50,000 sq.ft. in Chennai manufacturing of a wide portfolio of products including Direct Digital Radiography Systems, Mobile Computed Radiography Systems and other HF X-ray solutions besides manufacturing X-ray table, column stand, etc. The facility also manufactures Critical and Cardiac Care devices such as Patient Monitoring system, Defibrillator, ECG, Stress Test System, Pulse Oximeter. Digital Radiography as well as Critical Care products are CE certified, thus adhering to international standards.

PRODUCTS

CURA has a portfolio of affordable, reliable and end-to-end solutions for the following segments,

- **Imaging Solutions:** DR imaging systems with reduced radiation rates offering enhanced viewing experience together with clinical accuracy and confident diagnosis.

- **Ultrasound:** DE Healthcare, a Cura company, has three specific product lines covering entire need of the clinician for value, premium or niche areas of ultrasound.

- **Women's Health:** Wide range of advanced women's health solutions for early detection of female critical conditions including:
  - Ultrasound
  - Fetal Heart Monitoring
  - Mammography
  - MAMRIT – Mammary Rotational Infrared Thermographic System for Non-invasive Breast Imaging
  - Electrocardiogram
  - Bone Mineral Densitometer
  - Critical Care Devices

- **Cardiology**
- **Anesthesia**
- **Critical Care & OT**
- **Nephrology**

3.1.2 OneBreath

Founded in 2010, OneBreath medical device company that is developing an innovative low-cost mechanical ventilator intended to improve acute ICU care for patients across all communities. It is currently being funded by Ventureast Tenet Fund and the company will use funds to expand into emerging markets such as India, Africa and Eastern Europe. Based on current bed-to-ventilator ratio, India's shortage is over one million devices. New machines cost around $40,000 (₹25 lakh) and are often too complex and fragile for use in harsh rural environments. OneBreath's product, which is priced at around ₹3 lakh or one-fifth of the cost of a regular ventilator, is portable and battery operated. It can be used in rural areas where access to electricity is limited.

PRODUCTS

- **OneBreath:** The ventilator is designed to provide continuous respiratory support for infant through adult patients. It is optimized for low resource environments and designed for novice through advanced users. The device contains advanced ventilation modes including AC, SIMV, +PS, and PSV. It is battery-operated with long-lasting rechargeable batteries, touch-screen and has wireless Bluetooth connectivity.

3.1.3 Remidio Innovative Solutions Pvt. Ltd.

Founded in 2009, Remidio is a healthcare product solutions company engaged in the design and development of imaging devices to diagnose eye diseases. It has a series of patented technologies including one based on the use of smartphone in imaging different parts of eye.

PRODUCTS

- **Fundus on Phone Series (FOP):** Classified into mydriatic and non-mydriatic FOP, these are the world's first high quality pan-eye ophthalmic imaging system on a smartphone.

- **Angio on Touch Series (AOT):** LED powered Fluorescein Angiography Retinal Imaging system.
- **Wide Angle Retina Series (WAR):** World's first non-SLO based True Color '7-segment ETDRS' in one shot Retinal Imaging system.

3.1.4 Forus Health

Forus Health was founded in 2010 and is based in Bangalore, Karnataka. It is a medical technology company to provide easy access and affordable eye care. Forus health generates revenue of ₹7 crore annually, and has presence in over 14 countries with 220 installations worldwide. The company is currently funded by IDG Ventures, Accel India and Asian Healthcare Fund.

PRODUCTS

- **3Nethra Neo:** Contact device that screens premature babies for the problem of Retinopathy of Prematurity (ROP). The product costs ₹5 lakh compared to ₹14 lakh for a traditional one. Four patents have been filed for the product.

- **3Nethra Classic:** Non-mydriatic device that assists clinicians for the evaluation, diagnosis and documentation of visual health. Traditional instruments cost ₹20 lakh while this costs ₹5 lakh.

- **3Nethra Kiddo:** Hand-held refractometer helps detect refractive errors in children and non-cooperative patients.

- **3Nethra Flora:** Mydriatic and non-contact device capturing fluorescein angiography and posterior surface image of the human eye.

3.1.5 Sohum Innovation Lab

Started in 2012, based out of Bangalore, Sohum Innovation Lab develops market-driven solutions to improve health and outcomes of people living in resource-poor settings. The problem of hearing is not lack of testing equipment or availability of implants but early testing.

PRODUCTS

- **The Sohum Device:** The Sohum hearing screening device is a highly proprietary, non-invasive, safe device to screen neonates for hearing impairment with high sensitivity and specificity and is specially designed for **mass screening of neonates in resource constrained settings.** The Sohum product and care cycle are designed so that the needs of all key stakeholders like parents, pediatrician, maternity homes and health care workers, are met. We envision Sohum as a self-sufficient and sustainable business that works toward a large scale and critical social cause. The unique business model links the child directly to Sohum certified audiologists for further care.

3.1.6 MedPrime Technologies Pvt. Ltd.

MedPrime Technologies Private Limited was established in November, 2014 to develop innovative affordable healthcare solutions with a focus on patient monitoring, assistive and diagnostic devices. Winners of several innovation awards in 2015, MedPrime stands today with two innovative products.

PRODUCTS

- **CILIKA (Microsopy Device):** equipped with world class optics to provide crystal clear imaging, it is the first compact digital microscopy platform of its kind.

- **InfuCheck:** A simple, easy-to-use cost effective monitoring system for intravenous (IV) infusions. Sounds and alarm and stops flow when infusion is complete.

3.1.7 Windmill Health

Windmill Health was co-founded by Stanford India Biodesign Fellows of 2011. The first innovation NeoBreathe was conceptualized by the co-founders at All India Institute of Medical Sciences in New Delhi.

PRODUCTS

- **NeoBreathe:** It is the first of its kind foot operated newborn resuscitation system. Key features of the same are:
  - Frees the hand from the task of bagging
  - Ventilation and suction integrated into one system
  - Easier to use for less skilled operators
  - Added functionality for improved ventilation in fragile babies – The ability to control PEEP improves ventilation especially in premature or fragile babies.

3.1.8 Accuster Technologies Pvt. Ltd.

Founded in 2009, Accuster Technologies is a healthcare startup which has developed a kit (size of a suitcase) which can do all the tests (glucose, lipid, blood, etc.) at very reasonable prices ranging from 30 paise to ₹15! The company provides a wide range of diagnostic lab products such as mobile lab, static lab, biochemistry reagents, serology and urology kit, etc. and has revolutionized the field of In-vitro diagnostics by making them highly affordable.

PRODUCTS

- **Health Status Equipment:** It includes foldable stand, weighing machine, LCD display for BMI, Power adapter and Bag.

- **Mobile Lab:** It is a Compact Portable Clinical Laboratory in a suitcase having Power Back- Up which contains all essential instruments like Biochemistry Analyzer, Centrifuge, Incubator, Data Recorder/Mini Laptop with Patient Data Management Software, Micropipettes and other accessories.

- **LaBike:** Portable compact mobile lab with battery and solar power backup lab in suitcase enclosing **Accurate-All-Blood Analyzer** instrument. The instrument has analyze blood sample for 36 parameters.

- **Acckine:** A blood analyzer that can perform 28 tests in visible light and 4 additional tests viz. SGOT, SGPT, Creatinine and Urea in UV light.

- **Army Lab:** The only lab which can move from one place to another, is temperature independent, works successfully in high altitudes, rugged and maintenance free and carries a washing system.

3.2 Mother and Child Care

According to World Health Organization, in 2013 about 800 women died everyday due to complications of pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings and most could have been prevented. Moreover, India has very high maternal mortality ratio of 174 deaths per 10,000 as compared to China's 27 deaths per 10,000. Even Infant Mortality Rate of 40 deaths per 1,000 is more than four times than that of China's. (SRS, 2013) Thus a lot of ground needs to be covered when it comes to mother and child care as this can be prevented with proper medication and care.

3.2.1 Embryyo Technologies

Embryyo Technologies was founded in 2014 and is a medical technology company, which specializes in clinical need finding, inventing and commercializing medical devices.

PRODUCTS

- **BRAIN3D:** Monitors newborn's brain growth velocity with head scanner.
- **BiliScope:** Performs Quick and accurate hyper-bilirubin estimation for jaundice in newborns without blood pricks.
- **SPARSH:** Predicts low birth weight (LBW) infants and intra-uterine growth retardation (IUGR).
- **CerviScope:** A image based device for cervical cancer screening.

3.2.2 Care Mother/Care Nx

Care Mother was founded in 2015 and is into mobile healthcare technology to detect High Risk Pregnancies earlier on. CareMother acts as mobile monitoring tool and mHIMS (Health Information Management System) for gynecologists/doctors and patients.

PRODUCTS

- **CareMother:** A mHealth provider offers Mobile App; solar powered kit with FDA/CE approved testing device & WebApp for MIS reports.
- **CareNx:** It is an in a box which is a portable pathology tests kit.

3.2.3 Sattva Medtech

Sattva Medtech was founded in 2014 by BITS Pilani Alumni. The problem being addressed was lack of fetal monitoring tool during labor in most healthcare settings. Where available these were bulky and difficult to use. Also only highly trained Obstetricians could analyze and act on the output. 300,000 perinatal deaths due to fetal distress and related complications are being reported every year.

- **Sattva Fetal Lite:** is a non-invasive and IEC compliant medical diagnostic equipment that uses advanced sensors to acquire physiological data. Designed for Indian Healthcare settings, it weighs less than 1 kg. The devices uses Stochastical and Pattern Recognition algorithms that gives automated analysis and decision support.

3.2.4 Embrace Innovations

Embrace Innovations is a social enterprise started in 2008 in Stanford University. The goal was to create well-designed baby products and in the process give 1,000,000 premature and underweight babies in the developing world a better chance at life. Today Embrace Innovations stands strong at three product profiles.

PRODUCTS

- **Embrace Nest:** is an easy-to-use, portable infant warmer that does not need continuous power supply. Designed for hospitals and ambulances, it is used in NICUs and wards, and for transport, when skin-to-skin care (a part of Kangaroo Mother Care/KMC) is not possible.

- **Embrace Care:** can be used in homes or hospitals. It works without electricity, and is intuitive enough to be used by a healthcare worker or a mother. Doctors prescribe it as a complement to skin-to-skin care (a part of Kangaroo Mother Care/KMC) to extend reliable thermal care for vulnerable babies.

- **Little Lotus:** Little Lotus baby swaddles, sleeping bags & blankets keep babies at an ideal temperature.

3.2.5 Ayzh

Ayzh was founded in December, 2009 by a TED fellow. Ayzh founder was selected as Ashoka Young Champion of Maternal health. The innovation was finalist of the Global social venture competition in 2010. In 2011, Ayzh received the World Health Congress affordable Health Innovation award.

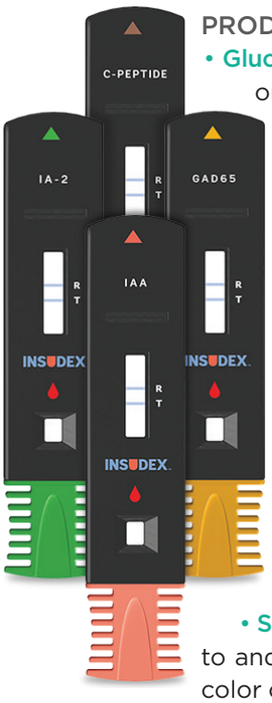
PRODUCTS

- **Janma:** Clean birth kits in a purse.
- **Shishu:** Essential new born kits.
- **Janani:** Postpartum mother care kit.
- **Kanya:** Menstrual hygiene kit.

3.3 Point of Care Diagnostics

3.3.1 Diabetomics

Diabetomics Inc., is a global medical diagnostics company pioneering innovative, non-invasive point-of-care tests for the detection and monitoring of diabetes.



PRODUCTS

- **Glucema:** Point-of-care saliva test for diabetes monitoring Glucema measures sugars on saliva proteins that reflect blood glucose levels.
- **Insudex:** Point-of-care tests for early detection of type-1 diabetes and LADA(Latent Autoimmune Diabetes in Adults).
- **Lumella:** Tests for early detection of preeclampsia and gestational diabetes.
- **Pregnancy Metabollic profile:** Lab test panel for early detection of preeclampsia and gestational diabetes.

3.3.2 Biosense Technologies

Biosense was founded in 2008 and is based in Thane, Maharashtra. It is a medical engineering and design firm which develops New Age diagnostic equipment.

PRODUCTS

- **SuCheck:** A cost effective portable sugar check device which can be connected to android devices. The device uses a colorimetric system to detect the change in color of the test strip. It requires soaking the test area of the strip with a blood drop for 30 seconds following which it is wiped and placed in the reader. The reader detects the change in color and estimates blood glucose concentration accurately.
- **Ucheck:** Performs a wide variety of tests ranging from routine urine analysis to specialised tests without power supply.
- **TouchHB:** Needle free anaemia screening tool.

3.3.3 Jana Care

Founded in 2011, Jana Care's mission is to 'Reverse Diabesity' by building next generation diagnostics and evidence based lifestyle coaching programs for diabetics in the developing world – all on the mobile phone.

PRODUCTS

- **Aina:** A mobile diagnostic platform to screen for and monitor Chronic Disease. The Aina Device can be used at home for the self-monitoring of blood glucose and other blood parameters.

  The Aina Station extends the diagnostic capabilities of a healthcare professional by offering point-of-care tests for essential blood parameteINR. Aina performs five different tests – HbA1c, Glucose, Lipid Profile (TC, HDL, LDL, Trig), Creatinine and Hemoglobin.

- **Habits lifestyle Program:** It helps patients embrace sustainable lifestyle changes critical to managing diabetes. The Habits Program is based on the proven approach of the Diabetes Prevention Program (DPP).

3.3.4 UE LifeSciences

Founded in 2009, UE LifeSciences has a mission to make early detection of breast cancer a reality.

PRODUCTS

- **iBreastExam:** harnesses the power of innovative sensor technology, software computing and mobile revolution, such that a doctor or any health-worker can offer objective and effective breast examinations, with ease and comfort.

Quick Facts

- Bilateral breast exam within 5 minutes (with results at the point-of-care)
- Accuracy to detect clinically relevant breast lesions higher than 85%
- Usable by any health-worker or doctor. No pain, No radiation

3.3.5 Wrig Nanosystems

Based out of Delhi and setup in 2009, Wrig Nanosystems Pvt. Ltd. Was setup up by an IIT Delhi Alumni who developed the first of its kind ultra-convenient hemoglobin measurement device as a MedTech startup. The sole aim of the innovation was to work towards elimination of Anemia in the country.

- **True Hb Hemometer:** The hemometer is a compact and portable device with 99% accuracy. Along with high precision and ease of use, the hemometer boasts of high memory, battery life, high shelf life of strips and quick on the spot results.

3.4 Primary Healthcare Delivery/Telemedicine

Providing healthcare in a country with 1.3 billion people spread over about 3.2 million square km is a humongous task. That's why in India, focus is increasingly falling on investments in healthcare IT to promote remote care like e-health and telemedicine, as a way to manage the growing healthcare sector. This focus on IT is driving a CAGR of 14.02% from 2014-2019 in the Healthcare IT Market in India. Three pillars enabling this transformation of healthcare in India are: e-health, telemedicine and adoption of mobile technologies. The Ministry of Health and Family Welfare, Ministry of Communications and Information Technology, state governments, and ISRO have all taken on significant roles in improving e-health facilities in India. Along with the govt. sector, private firms/startups are playing their role in enabling this transformation.

3.4.1 eVaidya.com

eVaidya runs a dedicated medical helpline wherein doctors are available 24/7 for advice. As it is a telemedicine service, eVaidya can only help in non-emergency conditions, working on primary and preventive healthcare.

SERVICES

- **Dial Ur Doctor:** eVaidya's flagship service, connect with a specialized doctor for customized advice on whatever illness you are facing, all in the comfort of your home
- **Government:** ePHC (Electronic Primary Health Centre) providing primary healthcare in partnership with Govt. of AP
- **Corporate:** Offers comprehensive healthcare packages for the diverse workforce and setting up on demand Digital Clinics

3.4.2 Neurosynaptic

Neurosynaptic offers proven e-health and m-health technology solutions that bring together products, partners and processes in the healthcare delivery ecosystem.

PRODUCTS

- **ReMeDi Solution:** Indigenously developed and patented technology for telemedicine solution. Compliant with ISO and IEC certified. Integrates end-to-end healthcare system with remote clinics, central medical facility, diagnostics centers, hospitals and pharmacy networked on enterprise version. Data storage both on cloud and server.

- **ReMeDi Nova:** Android based portable solution for multiple diagnostic parameters like ECG, BP, Heart Rate, Auscultation, Oxygen Saturation, and temperature. Bluetooth connectivity to mobile, device for data transfer.

- **ReMeDi Platform:** A comprehensive e-health solution for screening, primary diagnosis and triaging that connects entire healthcare ecosystem.

3.4.3 A3 RMT

A3 Remote Monitoring Technologies Pvt. Ltd. (A3 RMT) – an IIT Bombay company, is a pioneering State-of-Art technology company which has been formed by recognizing a confluence of two global trends:

- **Demographic Trend:** A global rise in number of patients with critical, chronic & emergency conditions

- **Pharmaco-Economic Trend:** A huge increase in healthcare costs

PRODUCTS

- **A3.CritiView Series & A3.Criti Servers:** The A3.CritiView Series patient side units capture vital medical parameters and high quality 12 lead diagnostic quality ECG and transmit it wirelessly over any cellular networks. The unit is coupled with remote A3.CritiServe, server which offers additional diagnostics and visualization tools for faster and more accurate ECG interpretation.

- **A3.Add-on-Modules**
  - A3.Criti.Confer: Enables wireless Live Audio/Video transmission with its patient side units
  - A3.Criti.360: Can offer additional parameters like BP, temperature, SpO2 and other vitals in case needed
  - A3.Criti.Stream: Ability to observe live ECG on doctor's mobile
  - A3.Ambulatory: Support for mobile, precision ECG collection in a moving ambulatory/van environment

- A3.Diagnostics
  - A3.Criti.DSS: Diagnostic Support System
  - A3.Criti.Insight: Visualization of Heart rate variability

SERVICES

- Research and Development in areas like Advanced Data Analysis using Data Mining Algorithms Mobile Technologies
- Technology Program/Contract Management Services: A3 acts as a single point contact for the full product development
- Turnkey Product Development
- Technology & Product Evaluation Assignment
- Idea Generation

3.4.4 Glocal Healthcare

Glocal provides quality, affordable, patient – centric healthcare services in medically underserved locations in India currently Eastern India. Glocal hospitals are designed to cater to low income communities.

SEVICES

- Glocal Digital Dispensary
  - Doctor on demand through Video-Conferencing
  - Quick & easy instant testing for most clinical tests
  - Immediate nursing care including vaccinations, injections, dressing, nebulization etc.
  - A high quality generic medicine store

To ensure that protocols can be set in healthcare and it can be made more affordable and error free. Glocal created a suite of technologies that include AI based software for diagnosis and management of diseases, ERP for hospitals & video conferencing suite.

3.4.5 Welcare

Founded in 2013, Welcare has pioneered an innovative approach, wherein Welcare sets up an affordable eye screening service inside existing Diabetes centers, General hospitals, pediatric Clinics and other health centers. Welcare installs an innovative Internet-connected Retinal/ Pediatric screening device and trains a technician to operate the device with patients. Patient information is securely transferred online to Welcare's certified Ophthalmologists for review and diagnostics. The results and recommendations for follow-up are then shared to the patient via staff at the facility they visited.

SERVICES INCLUDE

- Pediatric Vision Screening
- Diabetic Retinopathy Screening

3.4.6 Yolo Health

Founded in 2004 by IIT Mumbai and IIT Kharagpur graduates, the focus of the company is to bring healthcare at doorstep by making primary healthcare more accessible, affordable and accountable. The flagship product of the company is a Health screening kiosk with integrated medical devices and staffed by a medical attendant.

- **Health ATM:** Enabling remote primary healthcare services, the key feature of the health ATM are,

  - Detailed Diagnostics
    - BMI & Body composition
    - Pulse Rate
    - Oxygen saturation
    - Blood pressure
    - Lipid profile
    - Blood Glucose
    - Hemoglobin
  - 12 Lead ECG
  - IR Thermometer
  - Dermascope
  - Digital Stethoscope
  - High definition video conferencing
  - Finger print authentication
  - Touch screen interface
  - Portable printer and scanner
  - Instant health report and prescription

3.4.7 eSahai

MyInd MedTech Innovations Pvt. Ltd. is a Bangalore based technology start-up created to offer range of healthcare services to Urban and Rural population. eSahai is a flagship product of the organization. E-Sahai is India's emergency service transportation cum Medical Taxi solution that provides integrated medical services all at just a click/touch/call away. The entire solution can be used either by a desktop system from within the hospitals (emergency services) or via a mobile based application (individual service for medical taxi). The ambulances are GPS enabled and allow real time tracking of the patients to help prepare for the critical care. They are also equipped with medically trained staff. The eSahai technology platform also for all patient records to be available via the application.

The solution intends to create an ecosystem linking the fleet owners with the patients and hospitals with the intention of improving emergency health care services while creating a sustainable and affordable care model for all stakeholders. The solution has successfully completed the pilot launch phase and is now looking for phase wise expansion in metro cities, their vicinities and finally PAN India.

4 NEXT STEPS – FORGING PARTNERSHIPS, PILOTING INNOVATIONS AND MONITORING OUTCOMES

PAHAL project is committed to drive access to quality healthcare by partnering with transformational technology and solutions. It aims to strengthen market based healthcare delivery systems in India to serve the healthcare needs of the urban poor, with a particular focus on reducing maternal and infant mortality, by combining affordable technology and innovation, training and education, and access to capital.

PAHAL will design and develop need-based solutions to strengthen the service delivery of its network and support innovations, leading to increased access and quality for millions of underserved communities in India.

PAHAL presents a unique value proposition to convene healthcare ecosystem in the following areas:

- **Expanded capability and capacity** to serve, for healthcare providers, with a suite of affordable maternal and infant health products and solutions, ensuring early, effective diagnosis & higher resolution of complications, and improved care coverage;
- **Training and Skilling** for technicians, nurses, and clinicians to strengthen skill-set of care givers, enhance care to patients, and improve clinical outcomes;
- **Deploying innovative** healthcare products and solutions which improve access and reduce cost of care.

As next steps, PAHAL team would identify key intervention areas via need-based analysis of the healthcare delivery networks within the project and Go-To-Market approach for various pilots would be devised. The project will also ensure that outcome indicators for each pilot are identified and evaluation strategy defined. PAHAL project also as next steps, would in the months to come, approach the shortlisted innovations and create a platform for exchange between the innovators, service providers as well as the financial institutions with the aim of:

- Initiating discussion with selected innovators to understand the value proposition and identify synergies and align with the project goals.

- Conducting workshops and round tables bringing all the stakeholders relevant to the innovation eco-system primarily innovators, IBM partners, investors to create product/service offerings for relevant markets.

- Working with the innovators in creating/re-modelling/packaging the solution and implementing the same on pilot/scaled up mode in the project network along with strong MEL support to monitor the outcomes of such pilot.

PAHAL project has also entered in an agreement with the School of Public Health (SPH) at PGIMER, Chandigarh. This partnership is to work closely on the outcome evaluation of each of the interventions taken by the PAHAL project. The project in partnership with SPH will ensure a monitoring framework for each of its innovation intervention (pilot basis) which will help measure the impact of the innovations as well as the overall reach and efficacy of the PAHAL program.

Annexure 1
Healthcare Innovation Companies

COMPANY	BRIEF DESCRIPTION
newndra INNOVATIONS	• JaipurBelt is a product by Newndra Innovations developed under start up Oasis programme • A device to support the human body, especially the spine and waist • JaipurBelt shares the load between the human spine and waist. It is shortlisted and proposed to be supported by Indo-US Science and Technology Forum (IUSSTF)
pro health PARTNERS A Medical Group, Inc.	• A digital platform for searching doctors and hospitals, providers' home healthcare service • It gives information and manages camps and events related to healthcare and curated advice by professional healthcare personals
RXICO	• Founded in 2012 and based in Jaipur, Rajasthan • It is a market place of pharmacies using SAAS named "Rxico" • Developed at the incubation centre at Start up Oasis programme
KiViHealth virtual key to your health	• Founded in 2010 and based in Ahmedabad, Gujrat • Tech start up that aims to provide an affordable, patient-centric, digital health information management system that can be used across multiple clinics, hospitals, labs and pharmacies • Helps find and book online appointments with doctors and labs
medicea	• Founded in 2015 • Offers solutions for supply chain automation and information availability in pharmaceutical market segment • Medicea's technology platform offers a unique solution to provide information on medicine right on your cell phone
Healthians Kyunki baat Accuracy ki hai	• The company was incubated by Healthstart in November 2014, followed by a seed round investment in 2015 by YouWeCan and is Based out of Gurgaon, Haryana • Aggregates local pathology laboratories on its platform, competes with a number of diagnostics chains and now pivoted into an umbrella brand, providing software, hardware and quality management support to them • The company has six labs under the Healthians brand
GYMPIK	• Started in 2013, had earlier raised funding from Delhi-based health-tech incubator Healthstart • A fitness discovery portal that aggregates gyms and trainers • Currently aggregates about 10,000 fitness centres and 6,000 trainers from 20 cities and offers fitness centres a software programme to track performance and fitness schedules
Curofy India's Largest Community of Verified Doctors	• LinkedIn kind of network for Doctors • Funded By RoundGlass Partner, it is based Out of Delhi/NCR region and has over 90,000 Doctors present on the platform

Healthcare Innovation Companies

COMPANY	BRIEF DESCRIPTION
docplexus	• Web based discussion forum for Doctors. Verified Doctors can discuss about practice related issues, non-medical issues etc. • Based out of Pune, it is an online platform for doctors where they can communicate with peers and other healthcare service providers
plexusmd Connecting Doctors Worldwide	• Based out of Ahmedabad, PlexusMD is designed for doctors, by doctors with custom features to provide you with relevant information, share updates and opportunities to drive professional growth • Posted 250+ job openings in various specialties across leading chains (mentioned below) as well as standalone hospitals
credihealth the healthcare answer	• Founded by ex-Facebook Employee Saurabh Arora in 2013, an innovative online and mobile-based platform that connects patients and doctors • Based out of New Delhi, it has raised $11.43 million in 2 Rounds • Users can search Credihealth for doctors and hospitals across 57 different specialties and book appointments with them
Zoctr Health Network	• Based out of Mumbai, provides a comprehensive portfolio of home based medical services including long term Intensive Care, Chronic Care & Wellness, Corporate Wellness and Health Check-up programs • Other subscription based value added services such as Teleconsulting, Home Laboratory Pick-ups, Home/Online Pharmacy and Emergency Management Support to its customers • Have raised $1million in 3 Rounds from 4 Investors since 2013
Medikoe Accessing Healthcare with Happiness	• Hyperlocal healthcare platform • Based out of Bangalore, launched in 2015, it provides the list of healthcare and wellness services available in the vicinity, and connects the users to these service providers. It also shows available offers by its service providers on its platform
eclinic	• Eclinic 24/7, is leveraging modern technology to offer consultation with doctors over voice/video calls from the comfort and privacy of a patient's home • Eclinic's product is a telemedicine platform. It has a cloud based electronic health record (EHR) platform that underlies the consultation experience and integrates the latest standards in clinical data storage and retrieval
clove:) DENTAL	• Clove Dental seeks to offer a comprehensive set of oral healthcare services, leverage best-in-class equipment, and utilize the latest pain-management technology to provide affordable healthcare of the highest quality
Jana Care Reversing Diabesity	• Jana Care works to reverse "diabesity", the twin epidemic of diabetes and obesity, by embedding mobile technology with diagnostics and proven behaviour change science • Based out of Newton, Massachusetts and Bangalore, the team combines experience in engineering, design, medicine and behavioural sciences

COMPANY	BRIEF DESCRIPTION
AXIO	• First company from India to design, develop and commercialize an Emergency Haemostat for Trauma care • Axiostat® is its flagship product developed to reduce the mortality due to traumatic bleeding • Clients include the Indian Armed Forces, the Border Security Force, the All India Institute of Medical Sciences, Apollo Hospitals and St John's Hospital • Axio has received funding from Accel Partners, IDG Ventures and GVFL
VITALSENS	• Next-gen technology platform for wireless monitoring of vital signs, Wearable Health technologies, Platform, ECG Patch, Wrist wearable Health Monitor, Clinical study of prototypes going on • Developed at Healthcare Technology Innovation Centre (HTIC), IIT Madras
SANKARA NETHRALAYA	• A safe innovative technology to deliver cataract surgery to rural India MESU consists of two custom built vehicles, (a) the Preparatory Vehicle, that houses a prep-room and a changing room, and (b) the Surgical Vehicle • MESU has been extensively used by Sankara Netralaya • Developed by HTIC
iQuant Analyzer	• Developed jointly by HTIC and J Mitra & Co.Pvt Ltd., a leading diagnostics company in India specialising in the development of rapid blood test kits, for communicable diseases such as Dengue, Malaria, ChickenGuniya, and also for detection of HIV, HPV • The developed instrument, named iQuant, is designed to read multiple test kits, and reads the calibration information directly from the test kit without a separate chip
Biosense™ health * technology * people	• Founded in 2008 and based in Thane, Maharashtra • Products include: **SuCheck-** A cost effective portable sugar check device which can be connected to android devices; **Ucheck-** performs a wide variety of tests ranging from routine urine analysis to specialised tests without power supply; **TouchHB-** needle free anaemia screening tool • Revenues: ₹0.52 crore and ₹2.08 crore in FY13 & FY14 respectively
iKure	• A medical research technology company, develops Wireless Health Incident Monitoring System, a technology platform and software application hosted in cloud • Product enables health workers/doctors in rural areas to collaborate, seek advice, and escalate cases to specialist doctors working in hospitals in semi-urban areas and cities
XCODE LIFE	• Develops health care software • The Company offers bioinformatics, cloud storage, fitness plan, health tips, and other health related solutions

Healthcare Innovation Companies

COMPANY	BRIEF DESCRIPTION
tricog	• Manufactures cloud-connected ECG devices for faster and accurate diagnosis of heart conditions • Company has already installed 250 devices in hospitals and clinics in Karnataka, and has also conducted trials in countries such as Malaysia and the Philippines
Forus	• Founded in 2010 and based in Bengaluru, Karnataka • Medical technology startup to provide easy access and affordability for eye care • Four patented products have been launched by the company which are as: ▪ 3nethra classic: Non-mydriasis fundus instrument used for identification of common eye problems like diabetic retinopathy, glaucoma, etc. ▪ 3nethra flora: Used for fluorescent angiography and posterior surface image of human eye ▪ 3nethra neo: Used as a wide-field retinal imaging display camera to capture, store and transmit retinal images ▪ 3nethra kiddo: Used for children and non-cooperative patients • All devices are integrated to a cloud based telemedicine platform which enables remote diagnosis • The company has global operations and offers products at less than half of the cost of the next competitor, thus, enabling effective medical care
GENEPATH DX	• Founded in 2012 and based in Pune, Maharashtra • The company provides state-of-the-art in vitro molecular diagnostics techniques to the medical and allied communities • Portfolio includes DNA and RNA based tests for Infectious Diseases, Oncology, Endocrinology, Transplantation typing, Hematology, Pharmacogenetics, and Pre-natal and pre-implantation genetic diagnostics with advanced platform technologies such as quantitative/real-time polymerase chain reaction (qPCR), multiplex ligation-dependent probe amplification (MLPA), Microarrays and Sanger and Next Generation Sequencing (NGS) to the healthcare and allied communities
	• Founded in 2014 and based in Mumbai, Maharashtra • A Wellness company providing healthier lifestyle with the combination of advanced wearable technology and fitness consulting • Product includes a wearable device as health monitor providing personalized advice, coaching by experts, doctor+data, health locker and karma points with minimal costs

COMPANY	BRIEF DESCRIPTION
Coéo Labs	• Founded in 2013 and based in Bangalore, Karnataka • A medical technology company that is developing innovative devices focusing on emergency, trauma and critical care • The projects that COEO Labs is working on are as follows: ▪ Prevention of ventilator associated pneumonia in intubated patients in the ICU ▪ Faster and temporary management of complications of raised Intracranial pressure in patients with traumatic brain injury ▪ A mechanical CPAP for neonates with respiratory distress syndrome in resource constrained settings
hello health	• Founded in 2009 and based in Bangalore, Karnataka • The company is into healthcare services (Home care, check-ups and camps) providing India's first comprehensive Health Service Portal • Offers multiple and coordinated healthcare solutions and personal assistance to individuals, families senior citizens
press.red	• The company is into healthcare services with a medical emergency app • The app helps one to stay connected with nearest medical emergency and ambulance centres at all times! As a member of press.red, one can be sure that medical care reaches them swiftly in case of medical emergencies
lybrate	• Based out of Delhi • The company is into online healthcare with an Online app for doctor consultation for all systems of medicines • Provides and app-based doctor consultation platform to connect to healthcare specialists from diverse fields including Ayurveda and homeopathy. Patients can consult online with over 90,000 healthcare practitioners in across 30 Indian cities
indiolabs	• Founded in 2009 and based in Bangalore, Karnataka • A medical technology company that develops new technological approaches for developing medical devices that are safe, affordable and accessible • **Bioscoop technology** is designed to enable physicians achieve definitive tissue capture using a novel needle design, advanced needle-tissue characterization, and automated control • **BxSeal Technology** is developed for concurrent delivery of haemostatic agents during biopsy
brün health	• Based out of Delhi and promoted by Stanford India biotech program, a medical technology company that has developed a labor monitoring tool with patented technology • Technology ensures easy detection of vital signs improving usability while keeping costs manageable

Healthcare Innovation Companies

COMPANY	BRIEF DESCRIPTION
MARDIL MEDICAL	• Founded in 2008 and based in Hyderabad, Telangana • Medical devices company developing therapies for structural heart defects • Has products on Functional Mitral Valve Regurgitation (FMR) and others in pipeline
medE3 ethics. empathy. expertise	• Founded in 2015 and based in Gurgaon, Haryana • Healthcare concierge service that works with top doctors and hospitals in India • On case-by-case basis, selects doctors, provides access to them, manage health records and alerts, gets second opinion and navigates through the healthcare systems
AlcoChange QS	• A healthcare technology company that has clinically validated and patented behavioural technology platform • Enables an individual to drink responsibly and also influences behaviour to bring a change in the drinking habits and reduce addiction to alcohol
1mg	• Founded in 2015 and based in Gurgaon, Haryana • Online pharmacy providing a consumer health platform • Enables consumers to learn more about medicines and also find more cost-effective substitutes apart from providing medicines online
Sapala Organics	• Founded in 2015 and based in Hyderabad, Telangana • CRO/CMO specializing in the custom synthesis of various organic compounds thus helping in the areas of process development, drug discovery, medical chemistry and analytical services • Japanese management providing state of the art labs with high quality compounds at a fraction of costs and fast turn-around times
Wrig Nanosystems Pvt. Ltd.	• Based out of Delhi, company develops medical devices for solving healthcare diagnostics problem • **TrueHb** is one of its chief product measuring haemoglobin from blood samples which doesn't requires any medical professional help
isansys	• Founded in 2010 and based in Chennai, Tamil Nadu • Healthcare information company that has created a solution to lower the hospital bed days and emergency responses that result from patient deterioration and patient safety events at hospitals and at home • Created Patient Status Engine – the world's first wireless, practical and affordable medical system that can fully "digitize" a patient and apply algorithms to spot and predict the onset of adverse events. This transformative cloud based solution allows early clinical interventions regardless of patient/clinician location with consequent savings in costs and improvements in clinical outcomes

COMPANY	BRIEF DESCRIPTION
HEALERS™ AT HOME	• Founded in 2014 and based in New Delhi, Delhi • Home Healthcare and Wellness company and into Healthcare delivery business at home • Physiotherapy, Yoga, Nursing, Attendant care, Mother & child care are its personalized services
Connexios	• Founded in 2015 and based in Bangalore, Karnataka • A biotechnology company that focuses on early stage drug discovery and development company focused on developing therapies that address the cellular pathology underlying metabolic diseases – namely, Type 2 Diabetes (T2D) and Non Alcoholic Steatohepatitis (NASH) leading to Chronic Liver Disease • Focus on metabolic and cardiovascular disorders with 12 molecules in clinical research
consure MEDICAL	• Consure founded in 2012, headquartered in Delhi, is focused on developing and commercializing novel critical care devices for 80% of global citizens that do not have access to subsidized healthcare • The startup's flagship technology is the **Qora Stool Management Kit**. Qora is the only stool management device that integrates a hygienic applicator to deploy a diverter inside the rectum by a minimally trained care provider or a motivated family
Counsyl	• Founded in 2007, headquartered in South San Francisco, CA • Counsyl is doing genetic tests that look for more than 400 mutations and at least 100 genetic disorders for parents who are planning children • At $599 total, or $99 with insurance, their tests cost a fraction of standard ones, which often only look for a single condition like cystic fibrosis, and run anywhere from $100 to $500
CURA® www.cura.in Growth. Innovation. Reach	• Founded in 2001 and based in Chennai, Tamil Nadu, this company has a focus on the diagnostic imaging space • CURA plans to manufacture top of the line Mobile Computer Radiography Systems, which offers high quality X-ray at the bed side of patients
cure.fit	• Founded in 2016 by Mukesh Bansal (Founder of Myntra.com) and based in Bangalore • Enables user to manage their health proactively through a gamut of service offerings
DIABETOMICS®	• Founded in 2016 and based in USA, Diabetomics has devised a non-invasive, saliva-based glucose monitoring test for diabetes patients • Company's product portfolio includes Insudex(early detection of type-1 diabetes and LADA), Lumella (early detection of preeclampsia and gestational diabetes) and Pregnancy metabolic profile

Healthcare Innovation Companies

COMPANY	BRIEF DESCRIPTION
DxNOW™	• DxNow based in USA, is combining novel, portable bio-imaging systems with microfluidic-based consumables for life science applications leveraging exclusively licensed technologies developed in the Demirci Bio-Acoustic MEMS in Medicine Labs (BAMM Labs) at Harvard Medical School • Company's products address significant market needs in fertility clinics and forensics labs
vaidya®	• Started in 2011 and based out of Hyderabad this company eVaidya runs a dedicated medical helpline wherein doctors are available 24/7 for advice. As it is a telemedicine service, eVaidya can only help in non-emergency conditions, working on primary and preventive healthcare • Company's focus is to make primary healthcare easy, quickly accessible and cost-effective by creating innovative consumer-driven healthcare solutions for individuals and employers
invention labs ENGINEERING PRODUCTS PVT LTD	• Founded in 2007 and based out of Chennai this firm focusses on development of devices that help enable Speech and Language for children with autism
ayzh®	• Based out of Chennai, Ayzh is focused on developing low cost Rural women centric Health & Hygiene products and distributing it amongst rural areas and lower income segments
Nayam INNOVATIONS	• Founded in 2012 and based out of Pune Nayam focuses on elimination of needless blindness using artificial eye implant to treat cataracts and post-surgery vision complications
DAILYROUNDS	• Based out of Bengaluru, Dailyrounds helps doctors take evidence-based treatment decisions by providing daily feeds about different drugs & diseases sourced through their doctor network
Neurosynaptic Communications Enabling Healthcare. Anytime. Anywhere.	• Based out of Bengaluru, this firm focuses on development of High-quality Telemedicine Solutions – ReMeDi, an indigenous and patented technology • ReMeDi® platform enables a video & audio connect between rural customers and remotely located quality physician team for clinical advice and simultaneously diagnoses the customers with low cost point-of-care medical devices
NOORAHEALTH	• An online platform that offers training and information to caregivers and patients for post-surgical care
life in Control™ PLAN ♥ PREDICT ♥ PREVENT	• Based out of Gurgaon, Life in Control seamlessly connects Doctors, Patients and Diabetes Coaches to allow patients to manage their blood sugar level and maintain a healthy lifestyle • Patients get personalised diet and activity plan and continuous access to a Diabetes Coach on chat while Doctors can drive better Patient outcomes and provide a delightful patient experience

COMPANY	BRIEF DESCRIPTION
goAktive	• Founded by Abhinav Somani an IIT and ISB alumnus, goAktive is a tech platform that gamifies wellness and fitness and conducts boot camps for its users
OmiX Labs We make healthcare different	• Founded by Sudeshna Adak a PhD from Stanford University, Omix Provides platform that allows for cost-effective DNA testing for pathogens, outside of laboratory settings • This platform is being developed for use in diagnosis and management of infectious diseases, food testing, and water and environmental testing
Utkar transforming Lives through Innovations	• Provides commercially viable solutions for production, distribution, marketing, and sales of affordable and environment-friendly sanitary pads by local entrepreneurs in areas where these products would otherwise not be available
Innoflaps	• Based out of New Delhi, Innoflaps offers home-based therapy devices for speech impaired people
	• Founded in 2013 and based in Bangalore • Manufactures medical appliances and instruments and appliances for measuring, checking, testing, navigating and other purposes except optical instruments
NAVYA	• Based out of Karnataka, Navya Biologicals has developed technology platforms (YeXtreme & ItensiMAb) that bring together pathway engineering, custom media development and flexible high intensity manufacturing processes, enabling low cost production of high quality biologics
pradin technologies	• Provides innovative solutions for value healthcare, green power and lighting for the rural areas. • It also provides consultation for product design, develop product concepts, build working prototypes and offer technical guidance for manufacturability
sohum INNOVATION LAB	• Based out of Bangalore firm develops market-driven solutions to improve the health and incomes of people living in resource-poor settings • Conducts front-line research and develops technology and strategies that create self-sustaining value chains among the underserved
remidio simply innovate!	• Developed **Fundus on phone** that connects to a mobile phone camera to take pictures of the retina to diagnose diabetic neuropathy • The device is battery operated and can be installed even in remote area outposts increasing accessibility
	• Founded in 2014 • Medaino is a medical device company whose products have the ability to measure Vital Parameters of the body, along with other important physiological data

Healthcare Innovation Companies

COMPANY	BRIEF DESCRIPTION
embrace INNOVATIONS	• Founded in 2011 • Embrace is a globally recognized social enterprise developing disruptive healthcare technologies for the disadvantaged • Company makes infant warmers that require little or no power and can be used even by rural mother
OneBreath	• Founded in 2010 • One Breath is a medical device company that has developed a fundamentally simpler platform for mechanical ventilator • OneBreath's initial offering is a ventilator intended for use in ICUs, emergency rooms, and ambulances which provides continuous respiratory support for infant through adult patients in low resource environments and designed for novice through advanced user
Windmill Health Saving lives should be simple	• Founded in 2012 • Windmill is a medical device company which aims to transform lives through innovation • Company's Neo Breathe: world's first foot operated newborn resuscitation system with premium functionality at an accessible price
WELCARE Health Systems	• Founded in 2013 and based in Chennai, Tamil Nadu • A Ophthalmology focused company which sets up eye screening centres within existing health centres and have certified ophthalmologists working remotely • Provides Tele ophthalmology Service with special focus on Diabetic Retinopathy Screening and Paediatric Vision Screening at affordable prices for Low Income Group
addresshealth Healthy Children. Happy Children.	• Founded in 2010 and based in Bengaluru, Karnataka • A Remote care focused company with a chain of 4 integrated child health clinics which act as a base to Tele Healthcare centres at schools, pre-schools and residential groups • Services include Paediatric Consultation, Dentistry, Vision Services, Psychology & Counselling, Pharmacy, Immunization, Nutrition, Speech Therapy, Obstetrics, General Medicine School Health Services: Includes health check-up, medical room in schools, health education, school psychology
EYENETRA	• Founded in 2011 and based in Somerville, Massachusetts • Company developed a self-test refraction tool powered by a smartphone and an individual can perform eye test using a series of simple game-like interactions in a Virtual Reality headset

Pahal
Partnerships for Affordable Healthcare Access and Longevity

Urban Health (USAID) Project

For more information contact:

L. M. SINGH
Project Director, PAHAL and Head-Impact Investment,
IPE Global Limited

IPE Global House
B-84, Defence Colony
New Delhi-110024, India

Ph: +91 1140755900;
Email: pahal@ipeglobal.com
www.ipeglobal.com

Disclaimer: This publication is made possible by the support of the American People through the United States Agency for International Development (USAID), under the terms of Cooperative Agreement No. AID-386-A-15-00014. The contents of this report are the sole responsibility of IPE Global and do not necessarily reflect the views of USAID or the United States Government.

Design: PealiDezine, *pealiduttagupta@gmail.com*