LEAPFROGGING
HEALTH OUTCOMES
IN INDIA

OPPI

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CONSULTING
GROUP

F O R E W O R D

The healthcare system in India is at the cusp of transformation. Undoubtedly, the country has witnessed significant progress on health outcomes over the last two decades, mostly driven through a set of focused, centrally driven healthcare initiatives. There have also been pockets where local and regional innovations have sprouted, both in the public and private sector. Today, a powerful combination of technological advancements, financial and scientific innovations and government participation presents us an inflection point. We have the opportunity to bring major innovation, leveraging technology and operating model changes at a national level. This could enable India to leapfrog the traditional healthcare evolution and achieve step-change improvements in nation-wide health outcomes. However, we need to act with efficiency and speed toward this goal, so that we accelerate and progress on the path of development.

In this joint OPPI-BCG publication, we have explored such leapfrogging opportunities for India along the critical pillars of the health system. To seize these opportunities, we do need a concerted effort by the public sector, the private sector and the start-up ecosystem. When executed well, these initiatives will not only deliver large benefits for the health and wellness of India's population, but also create significant economic impact and new job creation. We believe that the themes discussed in this report will serve as a stimulus for a meaningful discussion among the healthcare participants in the country towards achieving this goal.

We continue to commit our support to collaborate on these initiatives and look forward to the times ahead.

A C K N O W L E D G M E N T S

1 INDIAN HEALTHCARE
Journey & Challenges Ahead

The Healthcare ecosystem in India is at an inflection point. We have good reasons to be optimistic, with healthcare occupying the central space that it deserves in policy making. The story of healthcare in India has been similar to the overall story of India — of progress in the face of disparities, constraints and challenges. The Government has put large efforts toward providing essential healthcare services to the population, with greater attention to the poor and vulnerable strata. Many programs have been launched in the past, and the recently introduced Ayushman Bharat Yojana is wexpected to bring a large portion of Indian population under universal healthcare provisioning.

In parallel, private entities have evolved to provide quality services for the classes that can afford them. The culmination of these developments, largely in the last two decades, has enabled India to have much improved healthcare indicators today.

Much more remains to be done however. Going forward, India will require an integrated health system that leverages technology and puts the patient at the center to deliver quality services to all its citizens.

I. Long strides on Health indicators over the past 20 years

India has taken long strides towards improving health indicators over the past 20 years. This has resulted in better health outcomes overall, and across targeted interventions.

A. Significant improvement in Health outcomes

The average life expectancy has increased from 63 to 69 years with increase from 58.3 to 66.9 years[1] for males and from 59.7 to 70.3 years[2] for females. In parallel, the loss of Disability Adjusted Life Years (DALY)[3] has also decreased significantly by over 25%.

Life expectancy has gone up by six years since 2000 (Years)

1990	2000	2010	Today
58	63	67	69
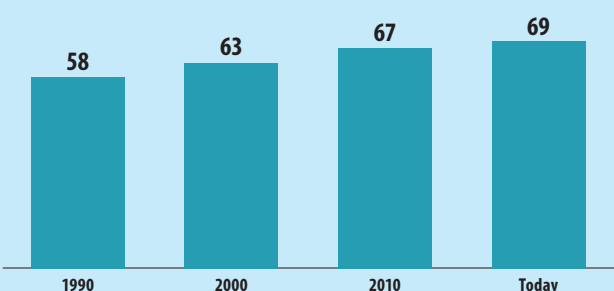
DALY loss has reduced by ~25% since 2000 (Per lakh years)

1990	2000	2010	Today
47,491	42,240	36,159	32,711
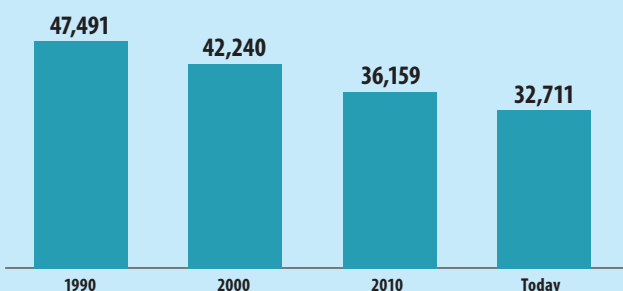
Source: World Health Organization, Institute for Health Metrics and Evaluation

B. Long strides in the direction of Sustainable Development Goals (SDGs)

India has improved on indicators linked to the Sustainable Development Goals too, with a significant decrease in the Maternal Mortality Rate (MMR)[4], a reduction in the Infant Mortality Rate and in the under-5 years mortality rate, and an increase in immunization rates.

Significant improvement in the outcomes under SDG's health related indicators

Maternal mortality ratio
Deaths per 100,000 live births
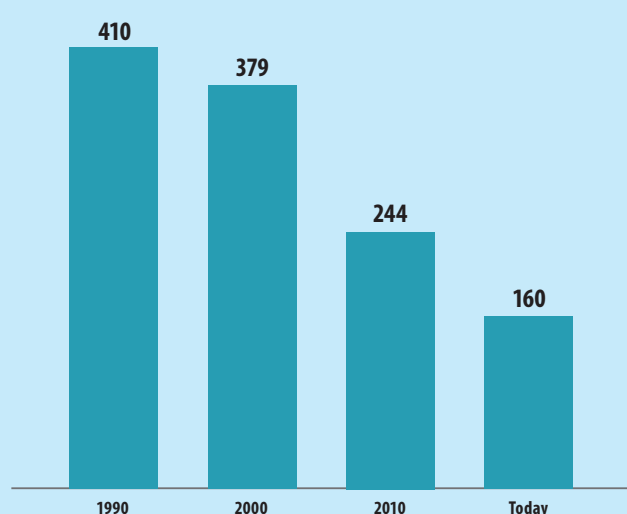
1990	2000	2010	Today
410	379	244	160

Infant mortality ratio
Deaths per 1000 live births

1990	2000	2010	Today
80	68	47	34

U5 mortality ratio
Deaths per 1,000 live births

1990	2000	2010	Today
112	83	56	39
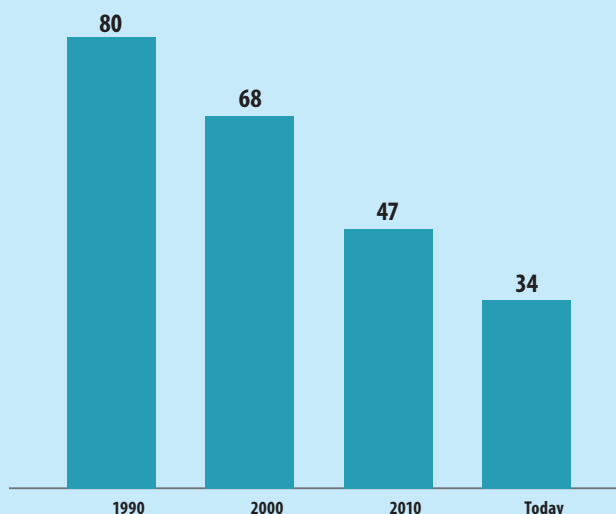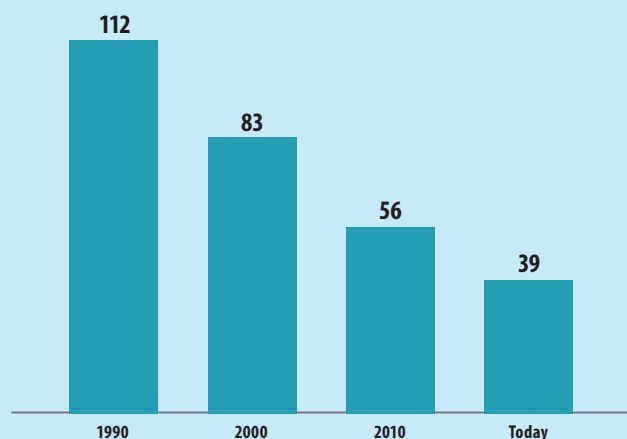
Universal Immunization coverage
(%)

1990	2000	2010	Today
20	23	33	63
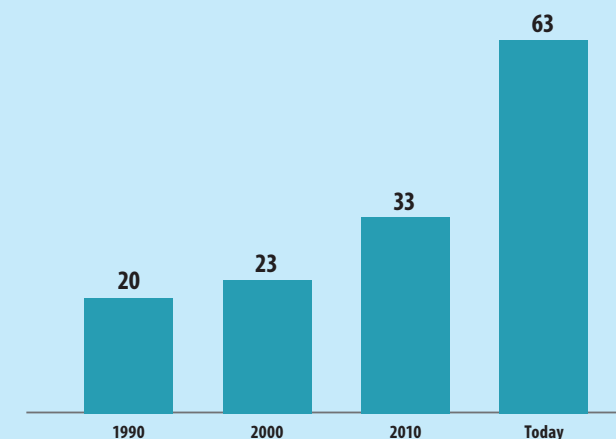
Source: World Health Organization, Institute for Health Metrics and Evaluation, National Health Profile- 2018

Maternal and child care has been an area of focus for the government for many years. Several government schemes such as the Janani Suraksha Yojana (JSY) and the Pradhan Mantri Surakshit Matritva Abhiyan have been launched to achieve that objective. Institutional deliveries have increased from 38.7% in 2005-06 to 78.9% in 2015-16 (NFHS-4 2015-16). Initiatives have been launched to counter commonly occurring child diseases like diarrhoea and pneumonia and enhance nutrition levels. The improvement on this dimension is very encouraging.

C. Control on 'focus' diseases

In the past, India was a high-risk country for many communicable diseases, just like many other developing countries. It faced high incidence of polio, diarrhoea, Tuberculosis (TB), HIV and malaria. Government undertook targeted programs to directly address these diseases over a long implementation period, and has been highly successful.

India has seen significant drop in the incidence of 'focus' diseases

Many national programs have been run by the Govt of India and States with high success rates

NACO

National TB Control Program

NVBDCP

Tuberculosis incidence rate
New cases per 100,000

292.7
257.1
221.4
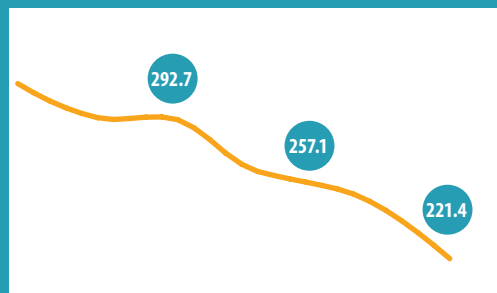
Polio incidence
The number of reported paralytic polio cases

265
43
0
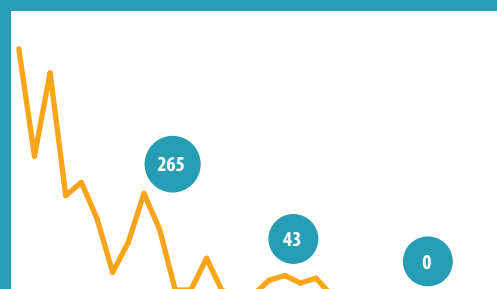
HIV incidence rate
New cases per 1,000

0.261
0.075
0.068
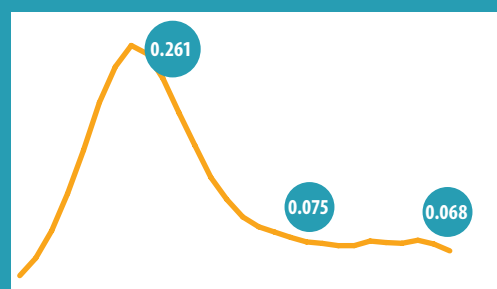
Malaria incidence rate
Cases per 1,000

24.8
17.7
10.2

1990   2000   2010   Today

Source: World Health Organization, Institute for Health Metrics and Evaluation
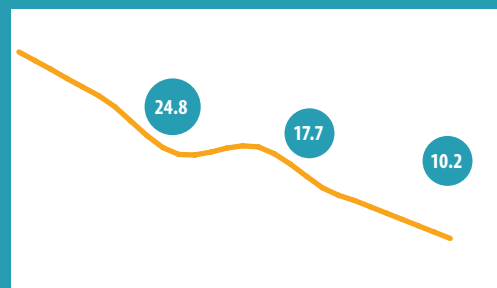
The overall incidence for most communicable diseases has dropped significantly, with the country being free of Polio for the past eight years, free of Tetanus since 2015 and the DALY loss due to Diarrhoeal cases dropping by 60%. India is now pushing towards elimination of Malaria, Tuberculosis, and Lymphatic Filariasis in the coming years.

Steep reduction in DALY losses due to communicable diseases
(Per lakh years)

Legend:
- Diarrhoeal diseases
- Lower respiratory infections
- Measles
- Meningitis

	1990	2000	2010	Today
Total	15,256	10,208	6,074	3,823
Diarrhoeal diseases	6,595	4,459	2,653	1,781
Lower respiratory infections	6,382	4,265	2,626	1,711
Measles	1,413	890	424	119
Meningitis	865	594	371	212
% of total DALY	25%	20%	15%	11%

Source: Institute for Health Metrics and Evaluation

II. India is being globally recognized as a hub for high-quality and affordable care

A salient feature of India's health care sector is the range of quality service available for patients with entities such as Narayana Health provide highly-advanced cardiovascular surgery at low cost, so is the Aravind Eye Care System which provides low cost cataract surgeries enabled by its large volume. India has also built globally renowned medical teaching institutions such as the All India Institute of Medical Sciences.

With significantly lower cost of care compared to the developed world and high-quality care provided by many private entities, India has emerged as a leading destination for medical tourism. This sector is crossing the USD 5 Billion mark and could grow to USD 20 Billion by 2025[5].

India has much lower cost treatment available with high quality, leading to growth in medical tourism

Relative comparison of medical procedure prices 2016[1]   ~$ ('000)

	India	USA	Singapore	Malaysia	Thailand
Heart valve replacement	9	17.9x	1.8x	1.4x	1.8x
Heart bypass	8	15.6x	2.2x	1.5x	1.9x
Spinal fusion	10	10.7x	1.2x	0.6x	0.9x
Hip replacement	7	5.6x	1.9x	1.1x	2.4x
Knee replacement	7	5.3x	2.4x	1.2x	2.1x
Angioplasty	6	4.9x	2.4x	1.4x	0.5x

Medical tourism sector likely to become a $20B play by 2025

($ bn)

+19%

Year	Value
2010	1.5
2015	3.5
2017	4.8
2020F	8.5
2025F	20.3
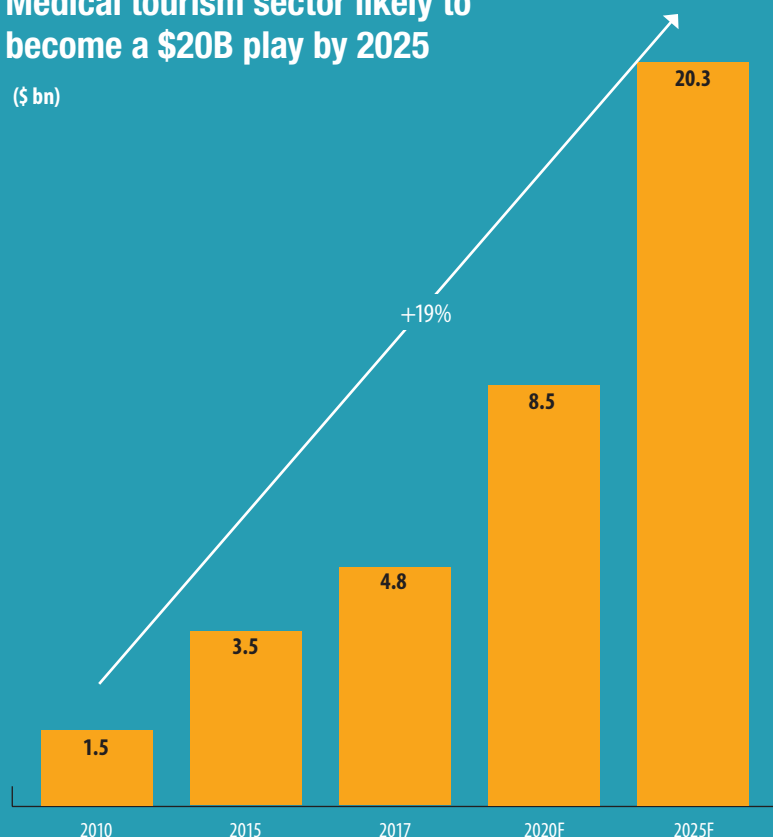
- Indian doctors have a reputation for high-quality medical training.

- 500+ accredited healthcare providers (JCI and NABH)

- India has world class technologies at par with western world

1. Prices are approximate and do not include airfare travel or lodging costs
Note: Relative procedure prices; pegging India as 'x'

Source: Morgan Stanley (Asia hospitals pick 2017), Apollo investor presentation 2017, IMS FICCI Report 2017

III. Long way ahead

Notwithstanding the progress made in healthcare outcomes over the last few decades, India's journey toward providing universally accessible healthcare with high quality outcomes, will still be long and challenging.

A. Outcomes

India still has much lower health outcomes (life expectancy, DALY losses) when compared to OECD[6] countries, and suffers from high disparity in these metrics. There is a large inequity of outcomes between various regions in the country as well as between rural and urban areas. In addition, India has seen a dramatically rising burden of non-communicable diseases.

The rapid growth of the middle and high-income groups has made people more susceptible to lifestyle diseases. Over 55% of the premature mortality today in India in the 30-69 years age group can be attributed to cancer, diabetes and heart diseases. As the economy grows, we are likely to experience a further transition from communicable to non-communicable diseases.

India has a long way to go on Outcomes

Lagging health outcomes compared to OECD

- ~12 years lower life expectancy

- 15% higher DALYs

Inequity in outcomes across the country

- Huge Urban Rural gap – e.g. IMR in urban at 29 vs 46 in rural areas

- Huge gap in different states – e.g. IMR in UP at 46 vs Kerala at 12

Dramatically changing disease pattern

- NCD burden over 55%

- India has 49% of global diabetes patients today

- Continued incidences of communicable diseases, like TB and diarrhoea

Source: IHME, National Health Profile 2018, OECD Statistics

B. Access

Challenges related to access continue to exist in Indian healthcare system. There are large infrastructure gaps when compared to global benchmarks[7], a persisting shortage of healthcare workers[8] and high financial burden on individual patients and their families. Different reports estimate that between 3-7% of population gets pushed below the poverty threshold every year due to healthcare related expenses[9]. India also lags significantly behind in access to the newest and most innovative health solutions — particularly with regard to biological drugs and novel diagnostics.

Access in India is poor along multiple lines

Financial access

- 55% of patient pool not covered by any insurance

- 60% of OOPE on OPD/medication not covered in most existing schemes

- Financially stressful diseases like Cancer and rare diseases not covered

High gap in availability of staff—stagnant/very little growth in past

Doctor/'000	**Nurse**/'000	**Specialists**
India: **0.68**	India: **1.5**	India: **8,000**
WHO: **1.0**	WHO: **2.5**	Requirement: **88,000**
OECD: **3.4**	OECD avg: **9.0**	

Huge infrastructure gap versus benchmarks

- Beds/'000: 1 vs benchmark of 2

- Rural beds/'000: 0.4

Inequity within the country

- Rural: Only 20% of doctors and 3% of specialists covering rural areas

Access to cutting edge solutions

- Most advanced and innovative solutions are not present in India (Biologics/ rare disease) or are launched late

Source: Press Releases, WHO, OECD Statistics, KPMG-OPPI report on healthcare access initiatives

7. Source: World Health Organisation
8. Source: Press Releases, WHO, OECD Statistics, KPMG-OPPI report on healthcare access initiatives
9. NSS, National Health accounts, Household health expenditure survey in India

C. Patient experience

According to a recent estimate, 40% of the population still commutes to a distant location[10] (e.g. district hospital) for treatment. Often, their health condition is not detected early, or is not treated in its early stages and thus has to be escalated to the tertiary level. This increases the demand burden on Tertiary Health Centers[11] (THCs), all of which cannot be addressed effectively at this level. In addition, patients end up commuting repeatedly to these centers for follow up consultations. The absence of post-intervention care in the patient's community further affects both outcomes as well as the patient experience.

Poor patient experience across all steps of healthcare intervention

1 Delayed diagnosis of medical situation, often at a stage when preventative solutions would be irrelevant

2 Need for long commute for even the basic care—e.g. consultation

3 Heavy pressure on tertiary centers—long wait times, poor environment and rushed consultation

4 Need for repeat visits for follow up consultations and diagnostics—often leading to drop outs

5 Absence of availability of medication at the right time and right place—further aggravating the situation

6 No clear visibility on choices for tertiary treatment/IPD care—on quality of outcomes, care and financial impact

7 Poor post intervention care and support, leading to long recuperation period, and resurgence of the condition

Poor health outcomes

Source: Press Releases, WHO, OECD Statistics, KPMG-OPPI report on healthcare access initiatives

10. Rural Health Statistics 2014-15
11. Centers of Tertiary care defined as advanced centers of treatment, with consultative care, along with availability of specialized facilities like ICU, advanced diagnostics support services and specialists

2 LEAPFROGGING
Health outcomes in India

Developed nations have built their health systems by creating infrastructure that requires a large commitment of resources, manpower and investments. They developed health provisioning systems and solutions that were constrained by the state of technology at that time. Many of these solutions are now outdated, but remain ingrained in the current system of care. For instance, America has a sprawling but low-productive network of doctors — with each doctor meeting only 6-7 patients on an average, per day.

As a result, many developed economies now have high – and growing — health care budgets (often upwards of 10% of GDP), with a high healthcare spend per capita. For example, France has a per capita healthcare expenditure of ~USD 4,000, while in the United States the per capita spend is upwards of USD 9,000.

While healthcare expenditure in India has increased, it is still very low compared to the level of expenditure seen in the developed nations. And it would be financially prohibitive and overly time-consuming for India to emulate the developed economies' healthcare models. For instance, creating enough doctors to reach the OECD average, could take upwards of 50 years at the current capacity of medical colleges.

Overall healthcare spend in India has increased, however is relatively low compared to most peers and developed countries

Per capita health expenditure (in USD)
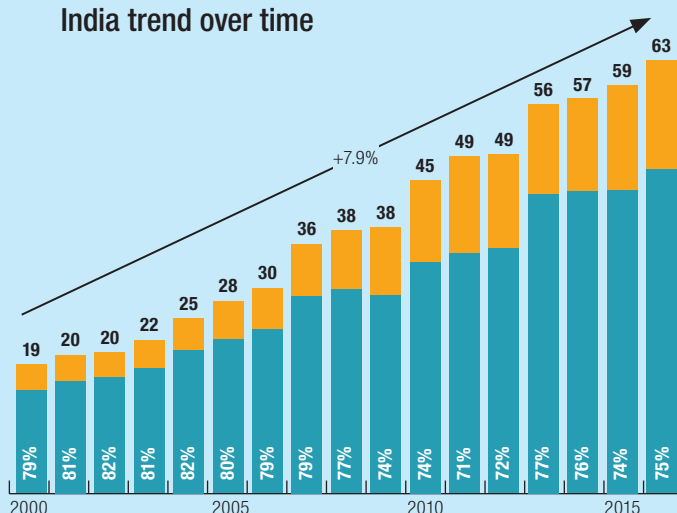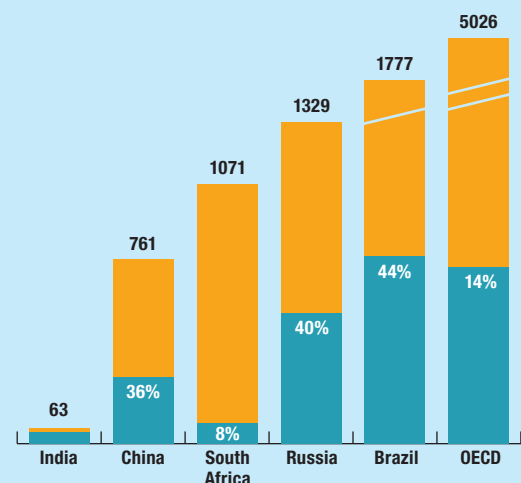
Source: World Bank

Following the traditional path to deliver health outcomes for India would be very time consuming and expensive

India
OECD

		Requirements for traditional path	Time to bridge this gap

Doctors per 1,000
0.7
3.4
+2.7

3.6M Doctors

72 yrs

Nurses per 1,000
1.5
9.0
+7.5

10M Nurses

67 yrs

Beds per 1,000
1.3
4.7
+3.4

4.5M Beds

??
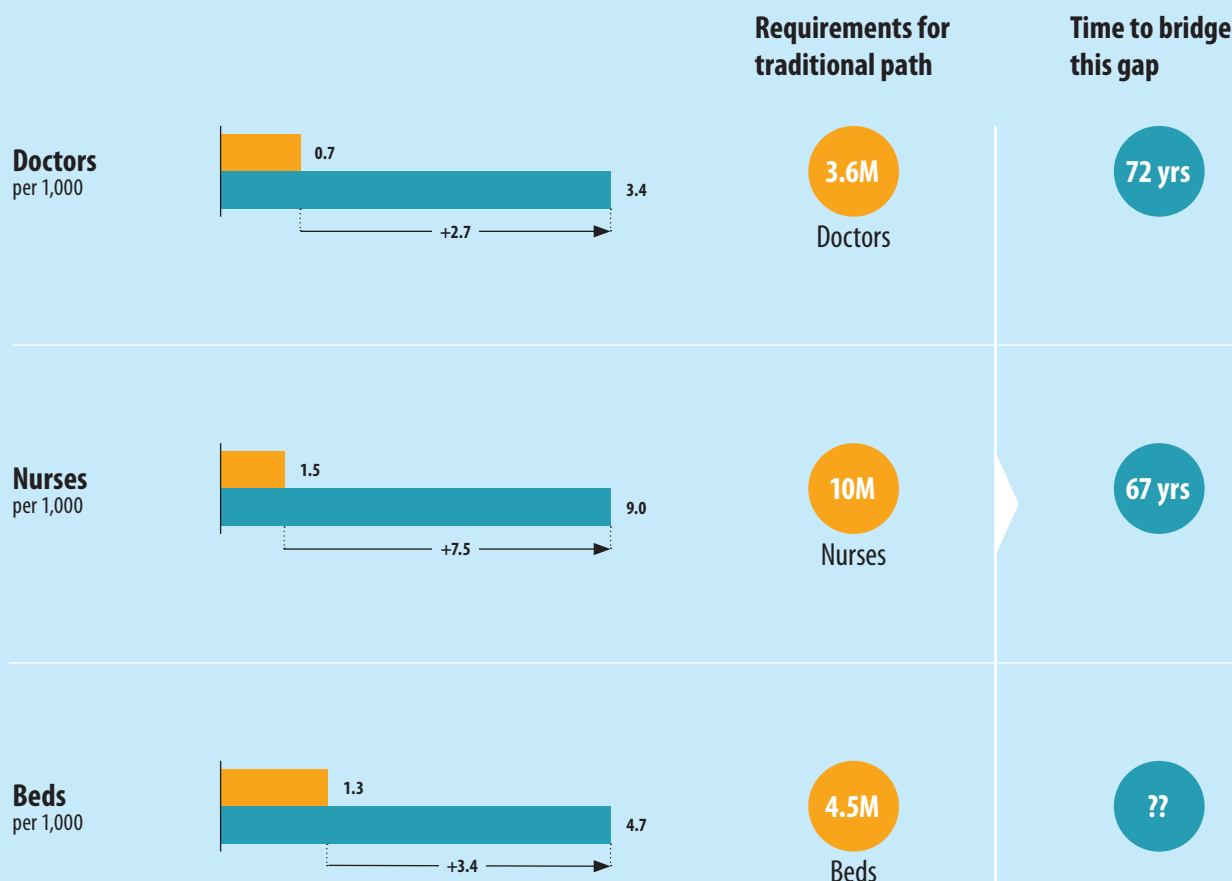
1. Assumption: 50k seats for the doctors, 1.5 lac seats for nurses and ANMs

Source: WHO, World Bank, OECD Statistics

Fortunately, technological advances available today, allow countries to skip a few developmental stages that had previously been unavoidable. An illustration of the leapfrogging phenomenon: widespread mobile phone access in the remotest areas of Africa resulted in those parts reaping the social and economic benefits of modern communication networks without the massive cost of setting up landline infrastructure. Thanks to technological advances, they 'leapfrogged' an entire stage of development, jumping directly from little or no telephone service to the efficient mobile telephony used in the developed world.

The World Economic Forum and BCG have defined 'leapfrogging' in the context of healthcare, as a way of accelerating the development of a system using a new technology, operating model or pattern of behavior. For emerging economies, the most valuable use of leapfrogging is not just to catch up with developed economies –but to use innovation that allows them to take a short route in reaching a more advanced developmental stage without accumulating any of the inefficiencies of the old path of systems evolution. Developing nations should question the underlying assumptions of developed economies' health systems, such as hospital-centric systems and the necessity of highly trained physicians for routine care.

Opportunity for developing economies to create more cost effective path to deliver health outcomes

Countries mapped on Life Expectancy & Health expenditure ($) per Capita

Source: World Bank
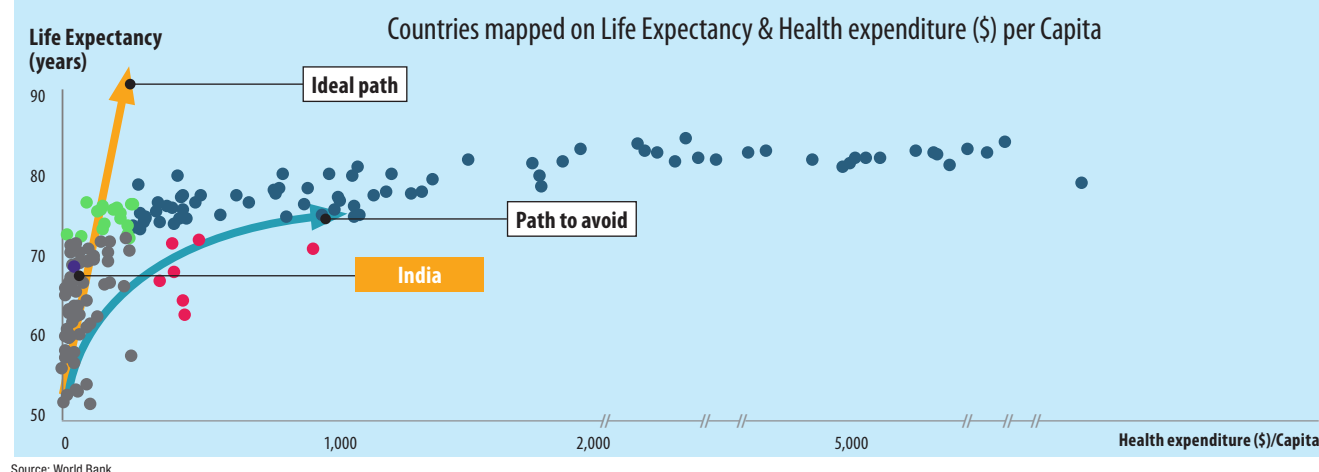
Emerging economies are well suited to 'leapfrogging' as they face much lower barriers to change compared to developed economies:

- Lower sunk costs of existing infrastructure and equipment
- Lower fixed costs of overcapacity
- Lower vested interests from the ecosystem players
- Time and opportunity to shape policy and legal frameworks which will allow for successful leapfrogging (e.g. shaping data sharing laws based on today's technology)
- Access to existing examples of disruptive technological innovations, alternative operating and financing models and new legal frameworks

Leapfrogging framework for the healthcare system

The healthcare system leapfrogging framework by WEF and BCG hinges upon innovative changes in technology, operating models and behaviors along the seven pillars of healthcare systems.

WEF and BCG proposed the leapfrogging framework entailing transformation through innovative changes along the 7 Health System pillars

Innovative changes…
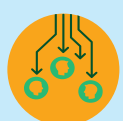
- TECHNOLOGY
- OPERATING MODEL
- BEHAVIOR

… Along Health System pillars

- Prevention and health promotion
- Workforce
- Financing
- Service delivery
- Medical products
- Information
- Governance

There have been many pilot scale initiatives that leverage technology to leapfrog health outcomes, both in India and abroad. These initiatives show a lot of promise, however, they have often remained localized in their reach and impact.

Examples of leapfrogging initiatives in India

Health system categories/ innovation types	Technology	Operating model change	Behaviour change
Prevention and health promotion	Arogya world's mDiabetes services providing multi-language informative text messages on diabetes		HUL's campaign to promote the concept of good hygiene and drive behavior change
Service delivery		SevaMob: Delivers primary care through mobile medical units in underserved areas. Provides basic primary care, medicines and prescriptions delivered using mobile technology.	Abdul Latif Jameel poverty action lab study uses non-financial incentives to increase immunization rates
Medical products	Swasthya Slate- An integrated tablet to conduct 33 diagnostic tests & transfer patient data to distant physicians using mobile technology.		CARE hospitals drive workforce focus on equipment life by emphasizing regular maintenance and safe reuse of devices
Workforce	MOHFW's IVR-based mobile academy equips rural health workers with required skills	Operation ASHA deploys community health workers with limited expertise to monitor compliance to the TB regimen	Narayana Health's cost awareness policy promotes transparency and rewards process improvement
Information	MOHFW's kilkari voice message service increases awareness of low-income group women by providing maternal health information	NABH's hospital accreditation standards allow for meaningful benchmarking	
Financing	RSBY uses biometric smart-cards to register low-income insurance takers, streamline administration/service delivery and facilitate data collection	Narayana Hrudayala's Yeshasvini programme increases access to care for low-income populations while limiting financial risk	
Leadership/governance	A nationwide, integrated electronic health record system being explored to improve quality and efficiency of care		

Source: Press Releases, WEF-BCG Health Systems Leapfrogging in Emerging Economies 2014

True leapfrogging at a health system level can only be achieved through a concerted effort by all players in the health ecosystem including the government, to build and leverage innovation at scale.

In this report, we propose a set of large scale interventions in India (using the seven pillar framework) to achieve transformational outcomes.

Reimagining India

Imagine an India where …

A patient does **not need to travel far**/wait in long queues for consultation. A doctor is able to provide **targeted and quick care basis thorough diagnosis and patient history**

A patient is fully **aware of the clinical, care and financial implication of an intervention choice**, when needed for operative/IPD procedures

A patient obtains the **first line of care** at/very close to her place of residence

A citizen is able to obtain **screening and diagnostics services** free/at nominal fee at/very close to her place of residence

A patient is able to participate in a higher service care, with **access to innovative solutions**, if she so chooses basis a well thought through financial coverage

A citizen is **fully aware of the health risks** she faces, both existing and potential, and is aware of the precautions that she should be taking

A patient has access to **low cost medication at a point closest to her**, with no fear of sub-standard medication; while also having access to innovative best in class solution for a fee

The government is able to take **policy decisions basis up-to-date information on national health situation**; and deliver targeted interventions basis local health situation—prevalence/incidence of particular disease, financial coverage, infrastructure situation etc.

FUTURE

1 2 3 4 5 6 7 8
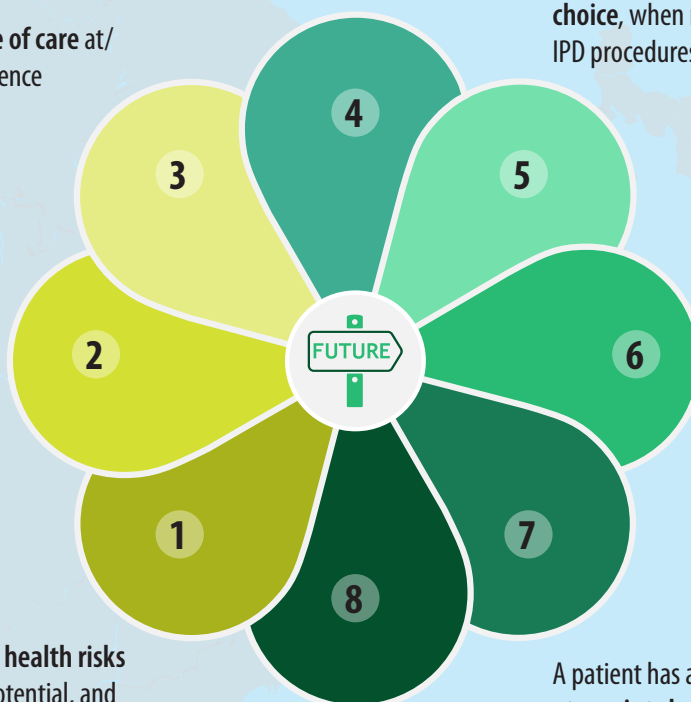
3 THE SEVEN SOLUTION THEMES
Way of healthcare

We identify seven themes that could trigger this transformation of health system

		Technology	Operating model change	Behavior change
	Financing	Introduce expansive financial access program; aimed at universal coverage (covering 50%+ uncovered population; OPD care) for a threshold quality — allowing options for custom service/coverage for people who so desire; and linked to outcomes over time		
	Service delivery	Create an effective connected tiered network of care—with a well equipped first touch point, capable of diagnostics + first line treatment and repeat care; linked to centers of secondary and tertiary care through e-health mechanism, referral and reverse referral system, with shared outcome measurements and accountability (potentially as a quasi profit network). Build tertiary centres/ extensions of excellence with best available solutions through e-health		
	Workforce	Build leverage for the existing doctors and specialists, and access to higher quality advise for patients close to 'home', through creating a well-trained cadre of work-force capable of diagnosis and first line assessment using today's technology enabled solutions, before need for specialist intervention. Simultaneously work on expanding the specialist and doctor capacity		
	Prevention and diagnosis	Create thorough, cheap and fast diagnosis as a 'way of healthcare' through free/ low cost screening and diagnosis services for all close to their place of stay		
	Medical Products	Build access to innovative and new age medical products (biologics/devices/screening solutions) to Indian population through a tiered financial access/ innovative financial solutions/ risk pooling Build a digitally linked supply chain with assured quality to make medicines available across the tiered infrastructure		
	Information	Create a citizen centric data infrastructure and connected health stacks (both public and private); with information on patient history, treatments, responses and analytics enabled treatments. Enable transparency on health outcomes, awareness of health situation at a personal and society level and enable better decision making in policy and health intervention. Further enable sharing of best practices and other data across relevant stakeholders		
	Leadership/ governance	Develop standardized treatment protocols and patient pathways for chronic situations (starting with high DALY loss areas e.g. cancer grid, diabetes, cardio vascular situations...) Institute outcome measurement and create transparency of outcomes for the provider eco-system (with audit systems, and analytics based self-correction of data)		

4 **FINANCING**
Moving towards Universal Healthcare

Historically, India has funded the healthcare expenses largely out of pocket. Initiatives like RSBY and various state schemes have made localized efforts to improve access through financial coverage, however, over 65% of healthcare spend continued to be 'out of pocket[1]' with 86% of population in rural India and 82%[12] of population in urban India not covered under any healthcare expenditure support schemes till last year.

Owing to the high self-funded expenditure on healthcare, 3-7% of population is pushed into poverty every year. It is in fact, the single most crucial factor in people choosing not to seek professional medical care at the onset of a health condition, as well as avoid diagnostics or preventative care.

Financial constraint is the biggest reason for not seeking medical advice for ailments

RURAL INDIA

Other
14%

Absence of medical facility in neighbourhood
15.4 %

Poor quality/ long wait times
7%

Financial constraint
57.4%

Expensive facility
6.2

URBAN INDIA

Absence of medical facility in neighbourhood
1.3%

Poor quality/ long wait times
4.5%

Expensive facility
5.3%

Other
20.6%

Financial constraint
68.3%
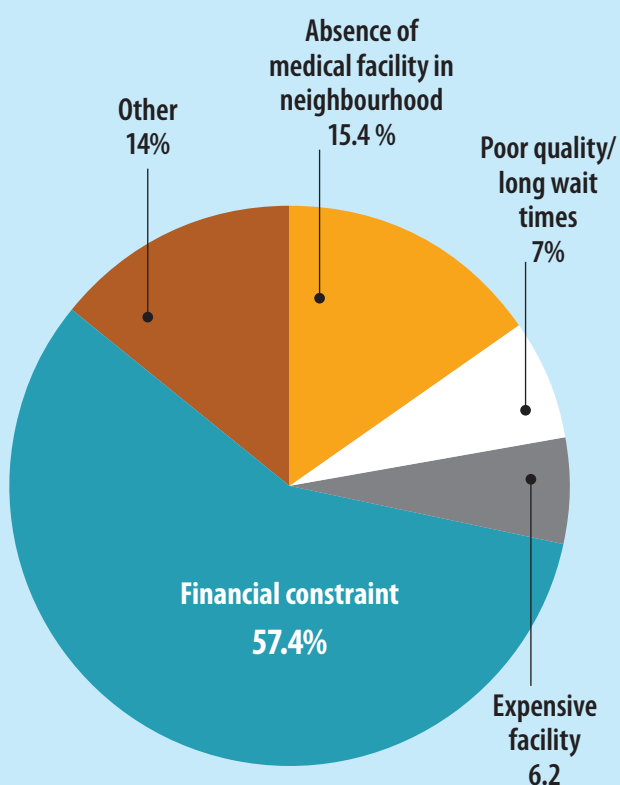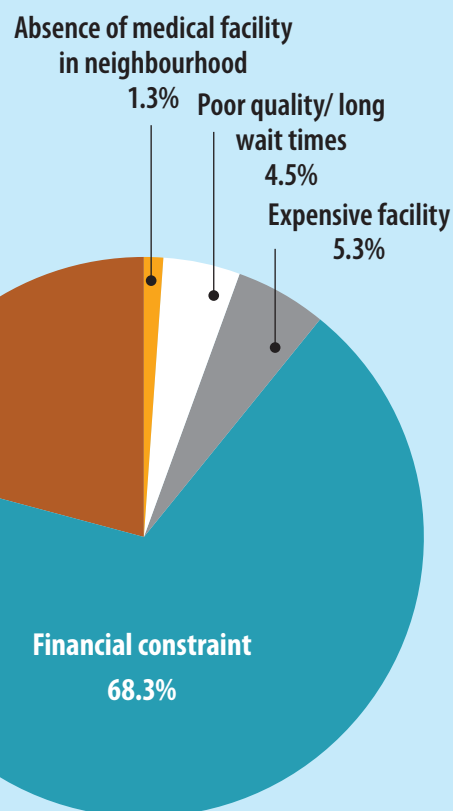
12. Source: NSSO 71st round

The Indian Government is making strong strides towards expanding financial access to the masses through the Ayushman Bharat Scheme. Launched in 2018, it aims to cover 40% of India's poorest populations across rural and urban areas, where each identified household will be insured for an annual sum of INR 5 lakh. This scheme will cover a range of diseases and ailments which require secondary and tertiary interventions. Efforts are being made to enroll both public and private hospitals to provide cashless medical care.

Ayushman Bharat is a leap in improving health outcomes

Coverage for the most vulnerable
- 40% of Population
- Identification basis SECC

Secondary and tertiary hospitalization covered
- Pre existing diseases included
- Portability across the country

Cashless coverage
- Govt. funded premium
- Rs. 5L per family
- Tech enabled platform

Enhanced primary care
- Sub centers upgradation to HWC

However, there continue to be three shortcomings in financial access

Limited Population Coverage
- ~55% of population uncovered for In-patient Department

Continued burden for expense types
- OPD (Out-patient Department, drugs & diagnostics not covered by AB

Limited coverage, high expense situations
- Rare and Orphan diseases not covered
- High co-payments discovered post intervention

Upon successful implementation of the Ayushman Bharat scheme, the poorest strata of society would be insured against costs of hospital-based healthcare interventions. Currently, however, the program is focused only on In-Patient Department (IPD) care. Therefore, there continue to be three major challenges that India faces in improving financial access:

- Financial access: 55% of Indians, largely belonging to the middle class, would stay uninsured for both OPD and IPD care

- Continued burden for OPD and diagnostics: OPD care (including diagnostics), would not be covered, which currently accounts for 60% of out-of-pocket expenses. Additionally, the current structure only includes ~1,300 procedures; procedures outside of these will not be covered

- Limited coverage of high expense diseases: Many rare and orphan diseases (e.g. Sickle cell anemia, mental disorders, advanced COPD and allergic & autoimmune conditions) are currently not covered under most policies in

India. Given the increasing incidence of these conditions among the populace, a high financial burden is looming in the future

As India moves forward, it should continue to pursue its ambition to deliver universal healthcare coverage. Different countries have adopted different models to deliver universal healthcare to their people based on the available resources and structures of their healthcare system:

- The United Kingdom created a publicly-owned and operated health delivery infrastructure, which was funded by tax layout towards operation of the system, with some co-payment mechanisms

- France and Israel, which had a strong network of private service providers, adopted an insurance model wherein insurance (public or private) pays for the intervention to delivery infrastructure

As India has an existing combination of public and private health delivery infrastructure, an insurance-based model, like France or Israel could be better suited for coverage.

We envisage three waves in India's financing journey:

In India, a gradual expansion of the Ayushman Bharat system, can achieve the goal of affordable UHC

Financing Wave 1   **Financing Wave 2**   **Financing Wave 3**

Successful implementation of Ayushman Bharat

Optimize implementation of the scheme

- Increase number of service providers
- Leverage IT to control frauds
- Improve regulation of empaneled hospitals via accreditation- NABH and JCI
- Transition from trust to insurance model

**Launch of Wave 2:
Improved depth and width of coverage**

Engage private sector for creating financial models to expand depth and breadth of coverage

- Lower premiums through scale
- Copayment based models for OPD and advanced medical conditions
- Extra premium based coverage for additional risk coverage

**Launch of Wave 3:
Tech enabled and outcome linked**

Outcome linked payments for providers

- Healthcare providers evaluated basis treatment outcomes
- Tech enabled tracking of treatment outcomes
- Provider rating basis overall performance

Successful implementation of Ayushman Bharat

A. **Increasing the number of empanelled providers:** While public hospital empanelment in Ayushman Bharat has been growing, private sector empanelment has been slow, largely on concerns around fixed reimbursement rates irrespective of service levels and location of the providers. As India relies heavily on private infrastructure as well, it would be critical to expand empanelment of private providers through:

   i.) Review of reimbursement rates for different treatments and procedures, and bringing it in sync with costs: Private hospitals are hesitant to come onboard due to the low levels of pricing. There is a need to review the reimbursement rates considering the historical procedure reimbursements prevailing in other public schemes, or considering cost layout – e.g. For hysterectomy procedure, while Ayushman Bharat reimburses INR 20,000; various state governments have approved higher rates – e.g. Telangana at INR 62,000, Karnataka at INR 50,000 and Maharashtra at INR 35,000

   ii.) Transition from single reimbursement rate to differentiated reimbursement rates based on geography, complexity of treatment and service level

B. **Enabling effective deployment of funds:** Historically, public health insurance costs have seen misuse and cases of false hospitalization that increase costs. To counter this, it would be necessary to:

   i.) Create a robust IT system and tracking mechanism to verify beneficiaries, e.g. deploying health cards and link those with health registries

   ii.) Build additional checks like online biometrics verification or capturing live picture at the time of admission and discharge

C. **Promoting quality of care:** An accreditation of provider network would be useful to maintain a threshold quality of care at the providers. Over time, the reimbursement rates can be linked to the accreditation level, which would create an incentive for providers to enhance the quality and outcomes of care. India could consider:

   i.) Accreditation by National Accreditation Board for Hospitals and Healthcare providers (NABH) as a starting point

   ii.) Building different levels of certification for different levels of care and outcomes

   iii.) Enrolling public provider through the accreditation system. Here the Government could take the lead.

Financing Wave 2: Expand breadth and depth of insurance coverage

The journey towards Universal Healthcare Coverage (UHC) would need to be executed in steps. While Ayushman Bharat helps us target the most vulnerable, India would have to expand the population and disease coverage in a financially sustainable manner to achieve UHC. Having OPD (Out-patient Department) care and diagnostics covered through financial access would be beneficial by enabling early detection of health situations, and thus reducing more costly IPD care required at advanced stages. This could be enabled by undertaking the following actions:

   i.) Working with private insurance companies to build 'at scale, low cost solutions', offered to the population, providing coverage at the hospitals already empanelled for Ayushman Bharat. Penetration of this coverage could be enhanced by creating mandatory linkages (like for automobile insurance), or by meaningful incentives (e.g. access to social schemes)

ii.) Building co-pay solutions for optional add-on coverage (e.g. for OPD, diagnostics), both for Ayushman Bharat and Wave 2 beneficiaries. This could be modelled, for instance, on the 30 Baht scheme for OPD treatments created by Thailand

iii.) Working with the pharma industry, healthcare providers and insurance communities to create innovative solutions – like community risk pooling, EMI mechanisms etc. for coverage of high expense catastrophic diseases, like Cancer

The Government could lead in creation of these co-pay and advanced coverage models through Central Government Health Schemes (CGHS) and then roll out for the population.

Success stories- Universal health coverage in Thailand through a limited private co-pay model led to better health outcomes

2000

- 1/4th people uninsured

- Policies granted incomplete protection.

- 20% of the poorest fell into poverty from out-of-pocket healthcare spending.

**Universal Coverage Scheme
30 baht scheme launched**

- Introduced in 2002

- Financed from general revenue- costs 80 USD per beneficiary

- 30 Baht co-payment for consultations

- Free treatment for certain illnesses

- MPH provided health services & independent NHSO operated UCS

2019

- Achieved 99.5% coverage via 3 govt-run insurance programs

- Reduced families' financial burden for healthcare; reduced infant mortality and decreased worker sick days

Source: Press releases, BCG Analysis

Financing Wave 3: Tech-enabled and outcome linked payments

Eventually, creating a thorough outcome measurement at providers, and linking reimbursement rates with the average outcome levels could create high efficiencies in the healthcare expenses.

In order to undertake this initiative, the following steps could be taken:

i.) Establishing measurement protocols and measuring outcomes: Measurement protocols for treatments have been defined for multiple conditions by international bodies like the International Consortium for Health Outcomes Measurement (ICHOM). The treatment outcomes at providers can be measured, and then benchmarked against these protocols to ascertain effectiveness. Multiple providers in India (e.g. Aravind Hospitals, Fortis) have adopted these standards to evaluate and improve the treatment quality provided by them.

ii.) Building a provider rating system basis quality of treatment and outcomes: Basis the quality of outcomes at the provider level, the hospitals and other healthcare providers can then be rated. This rating can form the basis of determining the reimbursement rates

5 | TIERED SYSTEM OF CARE
Bringing Healthcare closer to Home

India has built a tiered infrastructure of care – with publicly-owned Sub-Centers (~1.5 lakhs), followed by Primary Health Centers (PHCs) (~30,000), Community Health Centers (CHCs) and Tertiary Health Centers (THCs) or District Hospitals (~30,000)[13]. A large network of private hospitals also helps in addressing the secondary and tertiary needs of healthcare. Additionally, there are numerous renowned institutes in the country providing specialized medical care, like AIIMS, Rajiv Gandhi Cancer Hospital and others.

However, in practice, this tiered system is not functioning effectively. There is massive overload at Tertiary Centers, with Sub-Centers and PHCs often overlooked as the first point of care.

A recent study on prescriptions, carried out in Maharashtra, indicated that 50% of the diseases being treated at THCs ideally should have been treated at PHCs.[14] In another study, carried out in rural north Indian states, it was found that 64% of the population does not utilize services provided at PHCs.[15] Similar outcomes were revealed in another study conducted in rural Tamil Nadu.[16]

This problem is caused not only by the lack of an established and thorough referral system but also because of numerous shortcomings in the Primary Healthcare system in India:

- **Accessibility** – Over 30% of the rural Indian population does not have access to an 'operational' first point of care located within a 5 kms radius. Although urban conditions are significantly better, about 15% of urban residents still do not seek medical assistance due to the lack of nearby medical facilities.[17]

- **Quality infrastructure** – Existing PHCs often lack basic infrastructure required for providing primary care to patients. Only 21% of all these centers are functioning in accordance with the Indian Public Health Standards (IPHS) guidelines[18]. Well over 30% of these centers are ill-equipped to handle infant deliveries or even to offer primary care to new born babies. Worse, more than 90% of them are subject to erratic power cuts throughout the day in many regions.[19]

- **Absence of skilled human resources** – Overall, Sub-centers are short staffed by approximately 15-40% according to different surveys.[20]

Due to these challenges, many patients do not get timely consultation, and instead turn to THCs at a later point, leading to long commutes, immense patient load at THCs and an escalation of medical situations.

13. Source: Health And Family Welfare Statistics in India 2018, Ministry of Health and Family Welfare (MoHFW), National Health Profile 2018
14. Source: Potharaju HR, Kabra SG. Prescription audit of outpatient attendees of secondary level government hospitals in Maharashtra. Indian J Pharmacol. 2011
15. Source: Study of Utilization of primary health center services amongst rural population of northern India
16. Source: A study on effective utilization of healthcare services provided by primary health centers and sub-centers in rural Tamil Nadu, India

17. Source: IMS - Understanding Healthcare Access in India 2013
18. Source: Sharma J, Leslie HH, Regan M, et al Can India's primary care facilities deliver? A cross-sectional assessment of the Indian public health system's capacity for basic delivery and newborn services
19. Source: CEEW Report for Chhattisgarh PHCs 2017
20. Source: Press Releases, Directorate of State Health Services

We believe a four-pronged approach is needed to address this:

1) Enable the newly envisaged Health and Wellness Centers/ Sub-Centers as True Centers of first-line treatment, with the required infrastructure and capability
2) Connect the centers of primary, secondary and tertiary care
   a. Robust consultation and treatment linkages, both physical and electronic
   b. Integrated referral and reverse-referral mechanisms
3) Build governance with shared measurements of results for a referral chain
4) Establish local centers of advanced care, leveraging central CoEs from metro cities

1. Enable Health and Wellness Centers as True Centers of first line treatment, with the required infrastructure

The Government plans to introduce 1.5 lakh Health and Wellness Centers (HWCs) across the country. It would be critical to equip them with infrastructure to act as the first point of care. Numerous innovative solutions have been piloted in the past to address infrastructure issues. For instance, the power problem was solved by leveraging solar electricity. Low-cost equipment is now available to address most primary care health requirements (for example in pathology and radiology diagnostics, maternal-neonatal care, and for minor injuries).

These solutions could be scaled up across the HWC network; funded by budgetary interventions, or by creating co-pay mechanisms in which delivery could be managed by private players. Other infrastructure challenges could be addressed by jointly engaging with healthcare/ technology companies, which can build new technology innovations to solve on-the-ground problems.

Challenges in upgradation of HWC and PHC's can be achieved by adopting innovative technology

Challenge:
- 90% PHC had absence of reliable supply of electricity

Pilot Solution:
- Photo-votaic cells installed in PHCs in UP
- Solar cells installed in PHCs in Chattisgarh

Impact:
Solar-powered PHCs showed a
- 59% increase in outpatient services,
- 78% per cent increase in deliveries and
- 45% improvements in laboratory services after installation

Challenge:
- Absence of childcare infrastructure

Solution:
- Embrace baby warmer—a unique low cost product that is portable, easy to use, and does not require a constant source of electricity

Impact:
- Priced at $200, one percent of the price of traditional incubators in western markets
- It has been used for more than 50,000 babies
- Used in 2500 public and private facilities and 200 ambulances

Need to scale these solutions up nationally by making them part of the national support agenda

Source: Press releases, BCG Analysis

2. Build a connected network of care centers

Build consultation and treatment linkages across centers: Telecommunication innovations have now made it possible for consultation networks to be easily established, while maintaining the sanctity of the patient-doctor-drug identifiers. Ghana, for instance, has established an effective tele-healthcare network through a multi-stakeholder partnership, led by the Novartis Foundation. Such linkages will significantly enhance first-point treatment, and follow-on consultations at HWCs, while ensuring high quality consultation.

Different stakeholders collaborated to establish and scale telemedicine centers at Ghana

1 Institutes

Millennium Promise Alliance, Earth Institute, Columbia University for academic expertise

Outcomes

6 telemedicine centres established

50% teleconsultations resolved directly by phone

2 Government

Ghana Ministry of Health, Ministry of Communication, National Health Insurance Agency, and Ambulance Service to facilitate the setting up of centers

24 hour connectivity of community health workers with medical specialists

31% reduction in referral rate

3 Providers

St. Martin's Hospital, MedGate to provide doctors and nurses for consultation

Mobile technology to coach health workers

Empowered community health workers and reduced transport times & costs

4 Telcoms

Ericsson and Airtel to support the information communication between CHWs and doctors

Government could consider:
- Simplifying regulations to promote tele-consultation and e-medicine at scale in all states
- Collaborating actively with telecom providers to set up solutions across the entire care network

Private Sector could participate by:
- Offering linkages with existing private infrastructure for testing/ targeted care
- Providing doctor and specialist bandwidth for the tele-consulting network

Integrate referral and reverse-referral mechanism: A thorough referral and reverse-referral linkage must be established between a HWC/ PHC and the THC in the tiered network; with electronic sharing of patient health records as necessary. It would create significant efficiencies in the treatment journey for a patient by:
- Better navigating the patient to the right point of care based on the criticality of situation
- Eliminating the need to rediscover relevant health parameters at every point (and having a full view of the patient's history in an instant)
- Enabling follow-up consultation/ treatment at HWC/ PHC wherever appropriate, rather requiring a patient to travel again to THC.

Such an integrated tiered system could also be used to improve the availability of medicines and medical consumables at the HWC/ PHC by creating a supply chain link; district hospitals could act as interim storage locations, and supplies could be shipped to the HWC/ PHC based on their inventory and consumption patterns.

3.   **Build governance with shared measurement of results in a referral chain**

Over time, the government could consider measuring Key Performance Indicators (KPIs) as a shared responsibility within a referral chain. This would improve treatment effectiveness, and lead to better execution as a tiered network. Such KPIs could include, among other metrics,
- % of treatments delivered at the right tier of care
- % of upward referrals that were timely and accurate
- % of reverse referrals that were timely and accurate
- Improvement in overall health outcomes in a treatment chain, such as the timely detection of conditions, the effectiveness of treatment interventions, etc.

4.   **Establish local centers of advanced care by leveraging Centers of Excellence (CoEs) from metro cities:**

India relies heavily on the top 6-8 cities for advanced care and managing critical health situations. Technology should be leveraged to expand this to other locations. A recent example is a collaborative venture between Fortis and GE Healthcare, where super-specialty hospitals were connected to district / local hospitals to establish a tele-ICU.

Once primary care is strengthened, use of tech enabled CoE can improve specialist and tertiary care

Collaboration with private sector can be used to build distributed "excellence extensions" at existing facilities

CritiNext, collaborative venture of Fortis and GE health care

- Tele-ICU would connect a command center in a super specialty hospital to a district/local hospital

- Experts provide advanced consultation, care and Remote ICU monitoring

- Technology reduce medical errors by guiding hospital staff

- GE health care provides technology and Fortis group supports manpower needs

Benefits

Patients

- Able to stay and get treated in peripheral set-ups more often

- Avoid expensive/dangerous transfers

- Enable healthcare in far flung locations

Hospitals

- Lower mortality (50-60%)

- Fewer complications (30-40%)

- Better bed utilization: Reduced Average length of stay (30%)

- Better patient care: Real time, 24/7

Such solutions can be deployed at scale, through a collaboration between public and private entities to expand the provisioning of critical care beyond metros. District-level hospitals can be converted into Extensions of Excellence by linking them with a metro-based CoE.

- The public sector can consider providing support infrastructure and space to build and manage such a center within existing hospitals. Different hospitals can be chosen for different healthcare needs, depending on incidence rates in a region, or available capacity in the centers
- Infrastructure can be provided by private entities on a pay-per-use model
- The treatment could be directed by specialists from the CoE, remotely handling cases via tele-consultation, tele-ICU and advanced technology like robotic surgeries. The delivery could be done by local staff

Such a system would also enable creation of a larger pool of doctors who could experience and specialize in interventions and subsequently also be able to independently handle the interventions post necessary training.

6 SKILLING AND WORKFORCE
Bridging the Persistent Gap

One of the key challenges facing the Indian healthcare industry, is an acute shortage of qualified medical professionals across skill levels – from specialists to doctors to nursing staff. Adding to the problem is a high imbalance of workforce between urban vs rural areas, as well as across different states.

- India has an average of 0.7 doctors per 1,000 people, significantly lower than the World Health Organisation's (WHO) global benchmark of 1 doctor per 1,000 people[21]
- This average in urban centers is ~2 doctors per 1,000 people; while the average in rural areas drops drastically with only ~0.2 doctors per 1,000 people
- There is also high regional disparity, for example while Andhra Pradesh and Tamil Nadu have 1 doctor per 1,000 people; and Kerala has ~1.7 doctors/'000; states like UP and Bihar have overall 0.3 doctors/000[22]

The doctor-to-population ratio hasn't increased significantly over the past many years. Other healthcare professionals such as nurses and paramedics are also severely short-staffed

India faces a severe shortage of medical staff and this is compounded by regional disparities

Severe overall shortfall in key medical staff

Doctor per 1,000

2005	2015	WHO	OECD
0.6	0.7	1	3.3
India			

Nurses per 1,000

2005	2015	WHO	OECD
1.3	2.1	2.5	9.1
India			
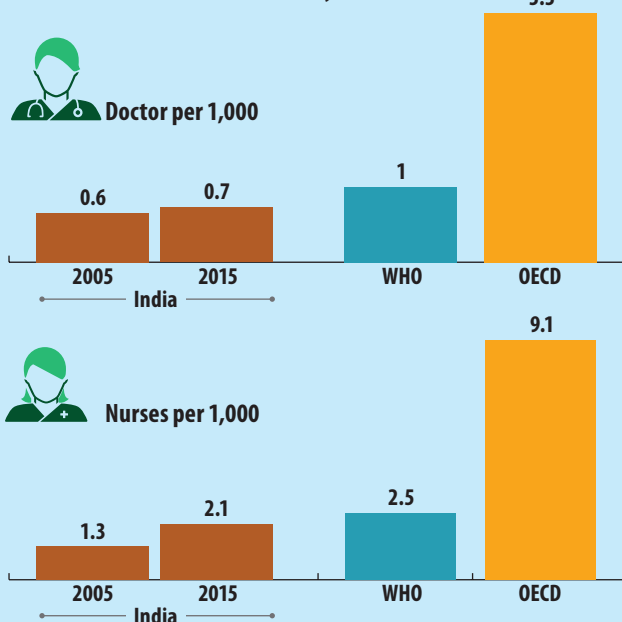
High disparity across regions

Across states
Doctor per 1,000

UP	BH	JH	AP+ TL	PB	India	KL	OECD
					0.7		3

Developed states have >5x doctors per 1000
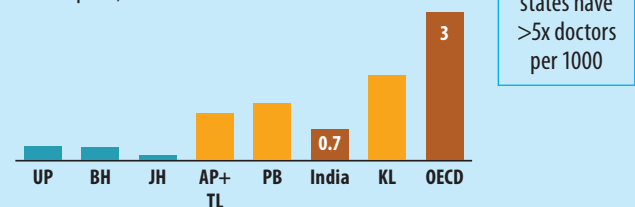
Rural-Urban
Doctor per 1,000

Urban	India	Rural
2	0.7	0.2

Rural India hit by double whammy- high disease burden and fewer health workers
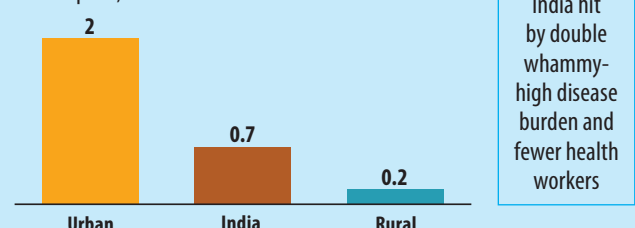
Source: WHO "Heath workforce in India' 2016 report

A survey conducted by the National Health Mission and an analysis by Lancet[23] revealed that India's primary healthcare infrastructure is facing a shortage of workers across different skill levels

- 25% vacancy for doctors' position exists at the primary healthcare level
- 13% nurses' positions are not filled at the PHC and SC level
- Upto 82% shortage of specialists (e.g. Surgeons, Obstetricians & Gynaecologists, Paediatricians etc.)
- 38% shortage in lab technicians in all health centers
- 22% shortage in pharmacists

Even for the filled positions, there is a high rate of absenteeism. The absence of medical staff has forced patients in these areas to turn to unregistered medical practitioners. A World Health Organization study from 2016 indicated that, in rural India, only ~20% of those claiming to be doctors actually possessed a valid medical qualification[24], and that ~75% of treatments received by patients in rural areas were administered by unregistered medical practitioners[25].

There are two major challenges that contribute to shortage of medical staff in the country:

A. Medical Education
- **Shortage of seats:** India produces 57,000 doctors annually, which is low when adjusted for population growth and doctor retirements. While we have seen an accelerated addition of seats over the last couple of years (e.g. 2750 seats planned to be added in 2019-20), there is a significant gap against the requirement. Similarly, India has ~24,000 post graduate medical seats against an estimate requirement of ~84,000[26]

- **Skew in seats:** There is a high variance in the number of seats available in different parts of the country. For example Karnataka has 319 nursing colleges as compared to Bihar, which only has nine. This subsequently affects the number of healthcare professionals in these states

- **Vacant seats:** A large number of seats in nursing and medical support staff also remain vacant. For example, Punjab had 30% vacant seats for nursing in 2018, Gujarat had over 20% vacant seats. This is largely attributed to high costs of studies, low salaries and limited career progression opportunity for support staff

- **Shortage of faculty:** In addition, the medical faculty in the country is short-staffed to the extent of 30-40%. An estimate suggests that India needs an additional 26,000 medical teachers

- **High cost of medical education:** Studying medicine in India is expensive, making it out of reach for many candidates. Private institutions charge 3-4 times more than what it typically costs in countries like China

B. Service conditions in rural India
- **Low compensation:** The average compensation for an Accredited Social Health Activist (ASHA) in India is INR 3,500 per month, while compensation for an MBBS doctor is INR 30,000 per month. Since medical education comes at a high cost, a majority of medical professionals seek urban jobs for better financial compensation

- **Poor career trajectory:** Medical jobs in rural areas have a high attrition rate (28% -35%) due to poor growth opportunities. For instance, even after spending 8-10 years in service, there is limited career growth for ANMs or nurses[27]

23. Source: Ministry of Health and Family Welfare, Statistics Division
24. Source: The Health Workforce In India by Sudhir Anand and Victoria Fan, WHO 2016
25. Source: The Health Workforce In India by Sudhir Anand and Victoria Fan, WHO 2016
26. Source: WHO, Health workforce in India, Press reports
27. Source: Press reports

- **High stress role:** Existing ANMs and nurses experience a high level of stress in their job. This is driven by the substantial shortage of qualified workforce, which inevitably leads to a high work pressure for the existing healthcare professionals

We have outlined three possible solutions for addressing the shortage of medical staff in the country:

1. Creation of a new cadre focused on Primary Health Centers (PHCs)
Many countries have addressed a shortage in primary healthcare professionals by introducing special cadres of Health Workers, who receive a basic primary healthcare training and who are connected to specialized professionals through tele/ physical linkages (See box). Some states in India have explored the creation of these new cadres; Case in point are the Rural Medical Assistants (RMAs) in Chhattisgarh which have a very high rate of "effective" prescription.

India should introduce a basic course to build this primary healthcare cadre, equip them with diagnostics capability, and integrate in the referral system.

- The proposed course could be a basic medicine short-term course over 18-24 months. Such courses can now easily be delivered through technology enabled centers
- The Government could consider bringing existing unregistered workforce, into the ambit of this program, supported by a strong review and accreditation system, to bolster the medical system existing in rural India. This would also build higher control on quality of care.

Special track medical course:
Success stories from Thailand, Vietnam, Bangladesh and India
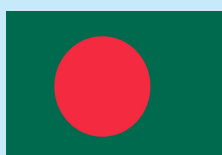
Bangladesh	**Thailand**	**Vietnam**	**India: Chhattisgarh**
	Rural Recruitment Mechanism	**Contract training**	**Rural Medical Officer**
• 3 year training qualifies a sub-assistant community medical officer (SACMO) to practice.	• Special track to recruit from rural areas into medical courses on the condition that they work in their home districts.	• Accepts students with lower-than-standard scores into government medical schools in exchange for, serving after graduation in their native provinces for a minimum of five years.	• 3-year diploma course for training a Rural Medical Assistant (RMA) who will be posted at PHCs as Medical Officer
• 89% of healthcare delivery in rural areas is being taken care primarily by SACMOs.	• Contributed to 20% of national medical student enrolment in past decade		• Helped in bridging the rural doctor gap

2. Introduction of Bridge Courses for upskilling and career advancement

In several countries, health support staff can advance in their professional journey. e.g. For instance, experienced nurses can specialize and become either an 'advanced practice nurse', a 'nurse practitioner', or a 'clinical nurse specialist'. Some countries like Thailand, Nigeria, Australia and Finland allow nurses to practice independently. India should introduce bridge courses to upskill nursing staff and strengthen career trajectories across levels to improve retention rates for healthcare staff.

Support staff growth—Providing a sustainable career will help increase Nurses in India

Enhancing Career opportunity

- Government defined career trajectory for all support staff

- Applicable across Nurses, Paramedics and Pharmacists

- Create provision of lateral entry into MBBS course for those who want to switch

- Expanding the role of nurses in Public health delivery- Vaccination, anesthesia etc.
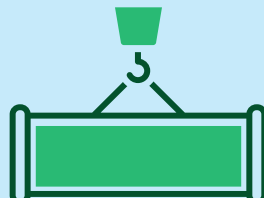
Rationalizing work load

- Creation of norms to rationalize work load basis NABH standards

Example from other country

Australia's Walk-in model-Nurse led healthcare mechanism for minor injuries and vaccinations

Source: BCG Analysis, FICCI, IJME

3. Expand capacity for medical education at MBBS and Specialist levels

The public and the private sector would need to come together to expand the medical education capacity. The government could consider upgrading district hospitals to medical colleges, in partnership with private entities for delivery of education. A suitable system of seat allocation between the private entity and government candidates could enable this arrangement.

In parallel, the Government could also consider easing the requirements for setting up a medical college which would have an impact on reducing the overall costs and hence increase the seats and reduce the fees charged by private colleges.

7 | PREVENTIVE CARE
Making diagnostics a way of Healthcare

Timely detection and diagnosis of health conditions is crucial to deliver optimal healthcare outcomes. It provides critical information required to make informed decisions about the required care across patient lifecycle — prevention, management or treatment. Owing to several factors, India has low rates of diagnosis. For example:

- 36%[28] of Tuberculosis cases go undiagnosed
- 33%[29] of Diabetes cases are not detected
- Over 50% of India's cancer cases are detected at advanced stages 3 or 4[30]

A recent estimate revealed that as many as 44% of the hospitalization cases could have been avoided if action was taken upon early detection and diagnosis[31].

There are three main root causes that contribute to a delayed diagnosis:

1. Lack of awareness and lack of a preventive mindset
In many cases, diagnostics are only considered when a severe health condition manifests. Only a relatively small section of the population spends money on diagnostics for early detection or screening, and to initiate preventive care. Additionally, awareness about effective diagnostic solutions is low. Case in point: 57% of our population is unaware of the diagnostic options available to detect diabetes.[32]

2. High cost of diagnostic services
Relative to overall healthcare spend, most diagnostic tests are still expensive in India, and are not covered by most existing insurance schemes. Almost 11% of the total Out-of-Pocket healthcare spend is used for conducting diagnostic tests. The expense on diagnostics could often be more than the expense on medication. The lower income and poor patient segments are disproportionately affected as they often have access only to publicly owned healthcare facilities which offer limited diagnostic services and have long wait times, which leads to a further disincentive to diagnose early.

3. Lack of adequate infrastructure, particularly in small towns and villages
Even in places where diagnostic equipment is available, we continue to face challenges owing to a lack of skilled workforce, reagents or kits and consumables necessary to conduct diagnostic tests.

The Government is already considering diagnostics as a priority and has undertaken several initiatives to provide diagnostics services, such as:

- **A National List of Essential diagnostics** has been introduced to provide basic quality diagnostics at

28. Source: Global Tuberculosis Report 2018 released by World Health Organization (WHO)
29. Source: Economics of Non-Communicable Diseases in India, 2014, by the WEF & the Harvard School of Public Health
30. Source: Press Release
31. Source: NSSO (2014)
32. Source: Press Release

affordable costs. The list covers all of the high DALY risk areas for India, WHO mandated conditions like HIV and hepatitis and diseases prone to outbreaks like Dengue

- **Health and Wellness Centers** are being established with a clear goal to improve the access to diagnostic and primary care infrastructure

- **Free Diagnostic Service Initiative** has been launched to support the state infrastructure with laboratory and radiology services. For instance, the Delhi Government has partnered with 21 private labs to provide free radiology services if a patient has been referred by Delhi Govt hospitals[33]

The Government aims to reduce the diagnostic gaps via Essential Diagnostic List for HWCs and CHCs

Diseases	Percent of total DALYs	Diagnostic list tests		
Cardio vascular	10%	Blood tests X Ray	👍	
COPD	5%	Lung PFT - NA X Ray	👎	Screening & diagnostics for the diseases contributing to the major DALY burden covered in the National Essential Diagnostic List (NEDL)
Diarrheal diseases	5%	Blood Stool	👍	
Lower respiratory infections	4%	X Ray Ultrasound	👍	
Iron-deficiency anaemia	4%	CBC Heamoglobin	👍	
Tuberculosis	3%	Blood test Sputum test	👍	
Diabetes	3%	Blood Glucose	👍	
Neonatal	8%	RBSK Screening Tools	👍	

These are steps in the right direction that could support a step-change improvement by better leveraging the technology available today.

We have identified three initiatives to commence this leapfrogging journey:

1. Enhance penetration through a compulsory marker testing, linked with Ayushman Bharat and insurance coverage

The proposed HWCs can be used as a stepping stone to introduce compulsory marker testing for the population. These tests can be offered as a precursor to the AB PMJAY coverage and then with the future rounds of insurance coverage for population not covered by PMJAY currently. While the tests need not be linked with the individual

33. https://www.business-standard.com/article/news-ians/delhi-government-announces-free-diagnostic-tests-for-all-117030200945_1.html

Multiple PoC diagnostic systems available, aimed at enhancing ease of diagnosis

Innovation	Features	Diseases Covered	
Swasthya Slate	• Complete 33 diagnostic tests in 45 mins • Maintains EHRs • It costs Rs. 53k compared to 5-6 lac if individual devices are used	**Malaria, dengue, hepatitis, human Immunodeficiency virus, typhoid, cardiovascular disease, diabetes**	**Low cost**
TB detection kit	• Affordable, sensitive, shows rapid result • Minimal training, used by CHWs • Costs $ 15 per cycle	**Tuberculosis**	**Ease of use by CHWs**
True HB Hemometre	• Reads blood samples and gives results in 45 secs. • A CBC counter costs 1-2 lacs, whereas this device costs only Rs 25k	**Anaemia**	**Quick Results**
Breast exam	• Affordable, portable, painless and radiation-free. • Minimal training, used by CHWs • Costs $ 1-5 per scan	**Cancer**	**Point of Care**
Visual inspection with acetic acid (VIA)	• Rechargeable battery • Can be used by an untrained individual • This device costs only $40	**Cancer**	
GeneXpert	• A POC molecular platform • Results within 24hrs of receiving samples	**Tuberculosis**	**No lab testing**

policy rates, they could help in the upfront (and early) diagnosis of a population's health profile and further allow the government to execute customized healthcare system interventions in a geography.

2. Introduce Point of Care (PoC) Devices at HWCs to enable "live diagnosis at the place of residence or work"

A critical shift in behavior would be to make people in India use diagnostics preventively. While it is difficult to have people travel to physical diagnostic centers, today's technology allows for a large range of diagnostics to be conducted at people's residence or workplace. Numerous such technologies have been tested and deployed at a pilot scale, for example the Swasthya Slate, a mobile platform that allows for 33 diagnostic tests to be conducted under 45 minutes. Such devices should be introduced to healthcare workers at PHCs and HWCs, and also to the new cadre of health professionals. The test records could be linked to the patient's health records and be stored digitally in one master file. This could help in providing early treatment to patients diagnosed at early stages, lowering the overall cost burden to the patient and the nation, and improve the quality of life of the patient. The government could also use these aggregated data sets of diagnostic outcomes to formulate new healthcare and policy interventions.

3. Enable implementation through partnerships with the private sector

The private sector can play a significant role in enabling the execution through innovative financing solutions, and by providing delivery solutions (including supply chain for consumables) at the grass root levels.

Several tried and tested financing models already exist, such as:

- **Pay-per-use model:** KRSNAA diagnostics have piloted this model with many state governments and are now present in 270 Government hospitals and 18 private hospitals. They provide diagnostics at upto 50% lower costs than other providers in semi-urban and Tier 2/3 cities, by leveraging the scale provided by the public institutions

- **PPP model:** Private entities like Glocal have introduced a Mini-lab with multiple testing, delivered under a Public-Private Partnership (PPP) model where Glocal operates the center and the government pays for the set-up and Opex

- **Hub-and-spoke model:** Few private players are investing in Tier 3/4 cities and rural towns through a hub-and-spoke model. Such solutions with private funded infrastructure could be tested through creating Health Bonds. The private player could be given full responsibility of execution, with a low fixed fee paid upfront by the user, and the remaining could be funded by the public sector at achieving pre-defined and agreed outcomes for the geography

In addition, a fully connected supply chain could be created leveraging the established tiered network of care. In this situation, consumables could be stored at district hospitals (and managed by private sector entities), and supplied to HWC based on indenting.

MEDICAL PRODUCTS

8 Bringing innovative solutions to Indian population

India has traditionally looked at pricing and financing as the primary narrative on access. The National List of Essential Medicines (NLEM) allows for access to essential medicines at a low and controlled cost. The Jan Aushadhi scheme has been initiated to provide patients with low cost, Government procured, generic medicines. The AMRIT (Affordable Medicines and Reliable Implants Treatment) program has been launched by MoHFW to provide cancer and cardio-vascular drugs and implants available to public at 50-60% lower cost than open market. However, these initiatives sometime attract criticism around disparity in prices across different states, instances of sub-standard medication, and recurrent stock outs of medicines.

While affordability of medicines is an important topic, an equally important question is how to make new and innovative medication and devices available to the population. As the world moves towards introducing new generation therapies for many non-communicable diseases, India lags far behind when it comes to bringing these products to the market here. For example:

- Only 1/3rd of the ~270-oncology molecules launched between 2006 and 2016 are available in India[34]. Similarly, advanced medication for many orphan diseases (e.g. Kalydeco for Cystic Fibrosis) are not available in India

India performs poorly on availability of latest innovations in medical science
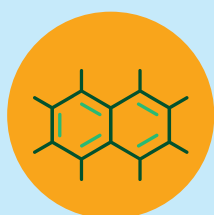
| 1/3rd of the270 oncology molecules launched from 2006–16 available in India | 14% Biologic consumption compared to global average of 24%[1] | Poor availability of Orphan drugs and no single program for their treatment[2] | Hardest hit are NCD patients, which forms the majority of India's disease burden |

1. Technovio, Hardman & Co. 2. NPTRD was withdrawn in December 2018 3. From 2011 to 2015 and refers to new molecules

Source: QuintilesIMS study, IMS 2015 research

34. QuintilesIMS study 2015

- Only 14% of all medicines consumed in India belong to the advanced biologics therapies, compared to 24% globally[35]

Clearing the path for innovative new products in India

The last few years have seen a focused effort towards making innovative new drugs available in India. The Government's intervention to allow innovative products to be exempt from pricing control for five years from the date of launch is a good first step to attract advanced medical products into India. The Intellectual Property (IP) laws have been made more transparent and the clinical trial regulations have been reworked to make conducting clinical trials and tests in India less cumbersome. However, there is still a need for joint engagement with the private sector to arrive at a statistically robust requirement for number of patients required for a clinical trial, and requirement of Phase IV trials in the country. This would help to increase the number of clinical trials which have dropped significantly from 283 in 2011 to just 17 approved trials in 2017.[36] There is a need for joint action towards enabling stronger patent protection, and remove barriers towards licensing and technology transfer. We lay out 2 big themes towards making innovative products available in India:

1. Making innovative financing mechanisms work in India

Considering the low penetration of insurance, and the non-coverage of expensive treatments in many existing insurance products, there is a need to create innovative financial models by working jointly with pharmaceutical companies and insurance companies.

The Government could consider a tiered mechanism of pricing for innovative drugs. It could make the drugs affordable to the poor at a controlled price, procured and distributed by the government, while the affluent class could purchase them at the prevailing market prices.

Tiered access is provided by companies, basis country's level of economic development

Bristol Mayers Squib

Global Access program
- Tiered pricing for Daklinza, a Hepaptitis C drug
- Tiered pricing and direct access for HIV drugs—Videx, Zerit and Reyataz

Key Vaccines sold at upto 90% discount by GSK

Glaxo SmithKline

Tiered pricing program
- Partnership with GAVI for providing cheaper access to vaccines
- Recently introduced middle tier pricing for certain countries

Many ARV drugs provided at generic level prices in Least Developed Countries

Roche

Blue tree program
- Holistic cancer support programfor patients and family
- Assistance with diagnostics, treatment, funding sources, home delivery of drugs, therapy reminders and free medicines

More than 1,800 cancer patients provided drugs at zero cost in India under Blue tree

Source: GSK, BMS, Roche, Access accelerated

35. Source: Press release
36. Source: Press Release

Such a mechanism can be created by engaging directly with the innovative pharmaceutical companies. They could provide the medicine to public system at a lower price, to be used for the poor. It would be useful to deploy this system at a meaningful scale, to substantially impact the disease burden. A scale commitment would also let the pharmaceutical companies to optimize supply chains and incentivize them to provide these medicines at lower cost.

Today, this system can be made possible by using the integrated beneficiary mechanism (Aadhar linked/ otherwise); and can be financed through a public/donor model. Many private companies have, in the past, partnered with other governments across the globe to provide access to medication at lower cost.

Additionally, some companies have tried creating micro-financing options, like Easy Monthly Installments (EMI) for high cost treatments. Implementation of such models could be made more effective by using credit scores and distinct profiling information to enable disbursement of financing support. This could be achieved through a collaboration of insurance providers, banks and telecom providers with the pharma companies.

2. Enhancing the patent and IP protection

India ranks 36th among 50 countries on the strength and quality of patent laws[37]. While it has climbed eight ranks in the past two years, the government could look into fine-tuning some of the open points, to instil a higher confidence in the innovation ecosystem. This would have beneficial long-term effects, not only for enabling new innovative medicine launches in India, but also for promoting the Indian pharmaceutical industry, which is slowly moving toward developing innovative products.

- Build a framework around protection of bio-pharmaceutical IP rights, including clarity on triggers for compulsory licensing, and price regulations
- Fine-tune registration requirements for new product launches in India; mandate only the relevant and necessary information to be shared in the application to control the circulation of IP protected information
- Create transparency on applications and approval of generics for patented products in different states

9 INFORMATION
Leveraging the Power of Data

The Indian health system, like any other health system generates an enormous number of data points on patients across touch points — hospitals, diagnostics labs, pharmacies, clinics and in multiple government surveys and programs. However, these data points cannot be effectively and productively used due to the absence of connected and unified records.

The Government has taken steps to create a data registry for health information in India, with the introduction of eHR (Electronic Health Records) standards in 2013, and the National Digital Health Blueprint recently[38]. However, we will need an accelerated implementation as well as a combination of data systems from the public and private sectors to leverage this health information to its full potential.

India could take a set of steps toward accelerated implementation of this initiative:

1. Build NDHM (National Digital Health Mission) as the single encompassing organization under the government toward implementation of the connected ecosystem. Other organizations under different ministries engaged in digital health initiatives could be merged with NDHM. It would also be important to co-opt National and State medical councils in the NDHM to enable appropriate regulatory supervision of doctors

2. Enable a seamlessly connected healthcare system, with data being collected from the public domain (both Central and state, including various health programs like NRHM (National Rural Health Mission) and existing government solutions like e-rakthakosh) and from the private domain (e.g. hospital management systems) to create the health registries. In addition, the Government should contemplate allowing access to parts of these registries (in a consolidated and anonymized manner) to Private Sector to support health analytics

3. Build a unified Personal Health Identifier for creating health registries. Given the widespread reach, penetration and awareness of Aadhar, the same identifier could be used to accelerate the roll-out. The small portion of population that is currently not covered by Aadhar could be enrolled at the first point of intervention

4. Develop a robust incentive system to promote EHR adoption, coupled with penalties for non-adoption, supported by legislation. Implementing the health registry would also require heavy IT enablement of the health systems, and building of nationwide common minimum featured EHR systems. This can be made possible through a collaboration with the IT and communications entities in India.

5. Data democratization: Promoting active participation from private sector in the health information structure, for two purposes. Firstly, for facilitation of data collection (e.g. from private consultation, treatments) to make the data set more accurate; and secondly, to enable efficiency of healthcare delivery in the ecosystem. This could be done through deploying open standards by all actors

Several countries have implemented data systems and registries in the past, and India can learn from their experiences. For example, in its digital journey, Finland created simplified electronic health records (EHRs) in conformance to clinical terminology and interoperability (HL7) standards. While these EHRs were made mandatory for healthcare providers to adopt, the Finland National Institute of Health and Welfare has had constant interaction with the providers to smoothen the adoption process. It shared outcomes of the analytics with trends at a local or regional level to demonstrate the value to providers, and encouraged providers to share and record data. Finland needed 10 years to establish their first medical birth registry, however, with the advanced technology available today, India can accomplish this faster.

In another example, Canada has been able to form a strong data digitization system across the country. This was made possible through three major developments in the governance system:

- Regulation of health data standards by an independent body
- Decentralization of digital strategy
- Information protection.

Canada has a strong governance system for healthcare data digitization
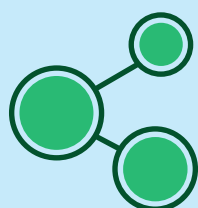
Decentralized digitization strategy

- The role of the Federal Government within health data spectrum is limited to the funding of independent bodies to improve health through digital health innovation; the strategy is then developed and tailored at a Provincial and Regional level

Health data standards regulated by independent body

- Canada's health data standards are defined by an independent body (CIHI[1]), which has proven successful in the exchange of health information since the Board is comprised of multiple stakeholders including Federal, Provincial and non-governmental health groups

Information protection decentralized

- Provincial governments legislate and regulate the protection and sharing of personal health information

1. Canadian Institute for Health Information
Note: Details in appendix

Canada launched an initiative in 2001 to modernize its ICT infrastructure in healthcare. The number of clinicians using EHRs in 2014 was 62,000. In 2015, EHRs were created for 91% of Canadians, and 91,000 clinicians were using EHR systems in their work indicating a   significant growth. Furthermore, 77% of family doctors were using EHRs, a tripling of the adoption rate since 2007.

A successful implementation of data systems will support value-adding analytics and improve decision making. This, in turn, will lead to significant reductions in healthcare costs, and better health outcomes and health services. This would also enable improved policy making.

Adoption of connected data systems has resulted in efficient health care systems across stakeholders

USA, Kaiser Permanente

An online portal allows members to
- view medical records online
- Communicate with physician via e-mail

Impact

Patients
- 10% reduction in primary care visits
- Convenient for patients

Providers
- Increase productivity at lower cost

Hong Kong

- Use of clinical management system & electronic patient record (EPR)
- Data storage & mining to identify elderly "at-risk" patients

Impact

Patients
- Reducing recurrent & unnecessary hospitalization.
- Reduced readmissions by 25%

Providers
- Reduced patient burden

Finland

- Monitoring performance, effectiveness and costs of treatment episodes
- Linking individual-level data via Personal Identity Number

Impact

Patients
- Reduction in deaths for AMI & stroke patients

Providers
- 20-30% of cost of treatment contained
- Quality improvement using benchmarks

10 GOVERNANCE
Making the next leap

A robust governance system has an immense multiplier effect on the healthcare system initiatives in a country. With technology that exists today, we have a way to promote the right and expected behaviors in the health delivery system, and to monitor and link them back to corrective actions.

As India looks at strengthening the governance system, a thorough action plan along three dimensions could go a long way:

1. Revamping Standard Treatment Guidelines (STGs) for India specific requirements
2. Introducing outcome-based measurement in healthcare delivery
3. Linking Financial outlays and payments based on outcomes

1. Revamping Standard Treatment Guidelines (STGs)
STGs are defined norms and procedures for diagnosis and treatment of medical conditions. Well-defined STGs safeguard adherence to quality and ensure the treatment is provided correctly.

Under the Clinical Establishment Act of India, STGs have been created for 200+ conditions in 21 clinical specialties. However, the enforcement of these STGs has not happened in the past.
- Only 11 states and 6 Union Territories have adopted the Act so far
- The established STGs are often critiqued that they have been adapted from international recommendations, and issues relevant to India are missing in the source guidelines in as many as 90% cases

Adopting international guidelines are not always relevant because of variations in the health systems, resource constraints, and different cultural and social contexts of patients that drive preferences. However, the absence of STGs create high variations in clinical practice, potentially leading to cases of poor diagnosis, an irrational use of medicines, and substandard treatment. The absence of STGs also limits the creation of clinical effectiveness evidence based on "home grown" situations.

Recently, some of the leading medical institutions in India have taken the lead in creating STGs. For instance, The Tata Memorial Hospital has started creating the National Cancer Grid for the treatment of cancer, in consultation with leading oncologists in India and with the participation of 100+ centers.

Case study—National Cancer Grid (NCG)

	Aims and Objectives	**Measures taken**
NATIONAL CANCER GRID COLLABORATION FOR CANCER CARE **Network of 155 hospitals and institutions**	• Uniform standards of cancer care	• Adoption of evidence-based management guidelines for common cancers
	• Follow uniform evidence based guidelines for management of patients	• Systematic patient data capture for assessing patterns of presentation (including common cancers, stages of presentation, etc.) and needs of individual centers
	• Develop trained human resource	• Voluntary audit process and peer review
		• Identify the cancer burden real-time and plan strategies to address specific problems
	• Conduct collaborative clinical research	

A similar initiative could be rolled out for other diseases, especially for NCDs where treatment protocols most relevant for India are immediately required. Active engagement with the community of doctors in this process will enable faster adoption. The medical councils of different states could come together to participate in the creation of the STGs, and adopt these grids in phases. Private players can contribute to the creation of such grids leveraging their existing clinical experience.

2. Introducing Outcome measurements in healthcare delivery

Technology now allows measuring outcomes of interventions and tracking results over a long period of time. Many organizations globally are now tracking their outcome levels and are taking initiatives toward improving the overall success of their interventions.

Globally, the International Center for Healthcare Outcomes Measurement (ICHOM) has already created standard outcome measurements and KPIs for over 30 health conditions. Over 50 global providers have started measuring their outcomes using these metrics, reviewing progress over time and comparing them with benchmarks.

Several established Indian healthcare providers, like Fortis, Apollo and Aravind hospitals have also started outcome measurements for some of their interventions. In the public sector, outcomes are currently measured for select mission based diseases, like Tuberculosis.

It is an opportunity for India to introduce outcome measurement as a standard practice across the health systems. India could start in few chronic diseases with a high disease burden such as stroke and diabetes. Over time, this could be extended for other diseases as well .

The outcomes of individual providers should be maintained by registries and published. Such transparency would enable managerial focus toward improving health services, and also provide informed decision-making options to patients.

Aravind Eye Hospital applies the ICHOM, defined six core principles to start outcome measurement

Adapt set of **metrics** to sub-system resources (e.g., start with restricted yet balanced set)

Leverage **leapfrogging technology** (e.g., cloud-based storage, mobile-based PROM capture)

Integrate data collection in care pathways (e.g., collection aligned with patient touchpoints)

Outcome measurement

Free-up physician time through **task shifting** to patients or other health care workers[1]

Create **transparency** for all stakeholders (i.e., patients, providers, payers, government)

Implement **practice improvement** routines (e.g., outcome review meetings, dashboard)

1. E.g., Leverage data entry technicians for patient follow-up and outcome data collection

Source: expert interviews, BCG analysis

Aravind Eye Hospital is now the most productive eye center worldwide, with better outcomes and lower cost than most developed countries

Aravind most productive eye center worldwide translating in 20x lower costs per surgery than US
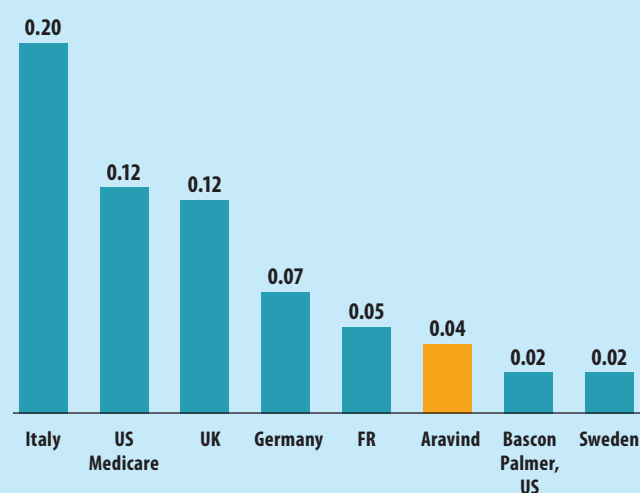
Top Aravind doctors perform ~2,000 eye surgeries a year

- Other Indian and Western specialists perform about 1/5th this amount of surgeries
- High productivity is translated into lower costs per surgery

Estimated cost per cataract surgery ($)[1]

-95

US	Aravind
2,500	120
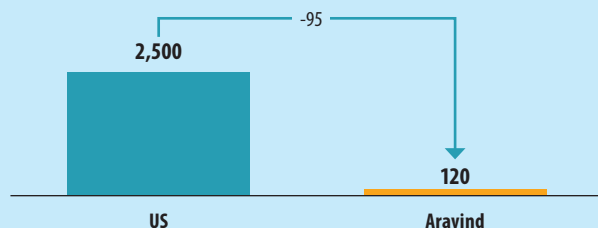
Frequency of postoperative endophthalmitis is among the best in the world (3x lower than US medicare)

(%)

Italy	US Medicare	UK	Germany	FR	Aravind	Bascon Palmer, US	Sweden
0.20	0.12	0.12	0.07	0.05	0.04	0.02	0.02

1. HealthAffairs, Oct 4 2016 by HW Team, sustainable model for delivering high-quality, efficient cataract surgery 2. J Cataract Refract Surg 2012; 38:1360–1369; J Cataract Refract Surg 2013; 39:1421–1431; Bascon Palmer; Ophthalmology. 2012 May; 119(5): 914–922
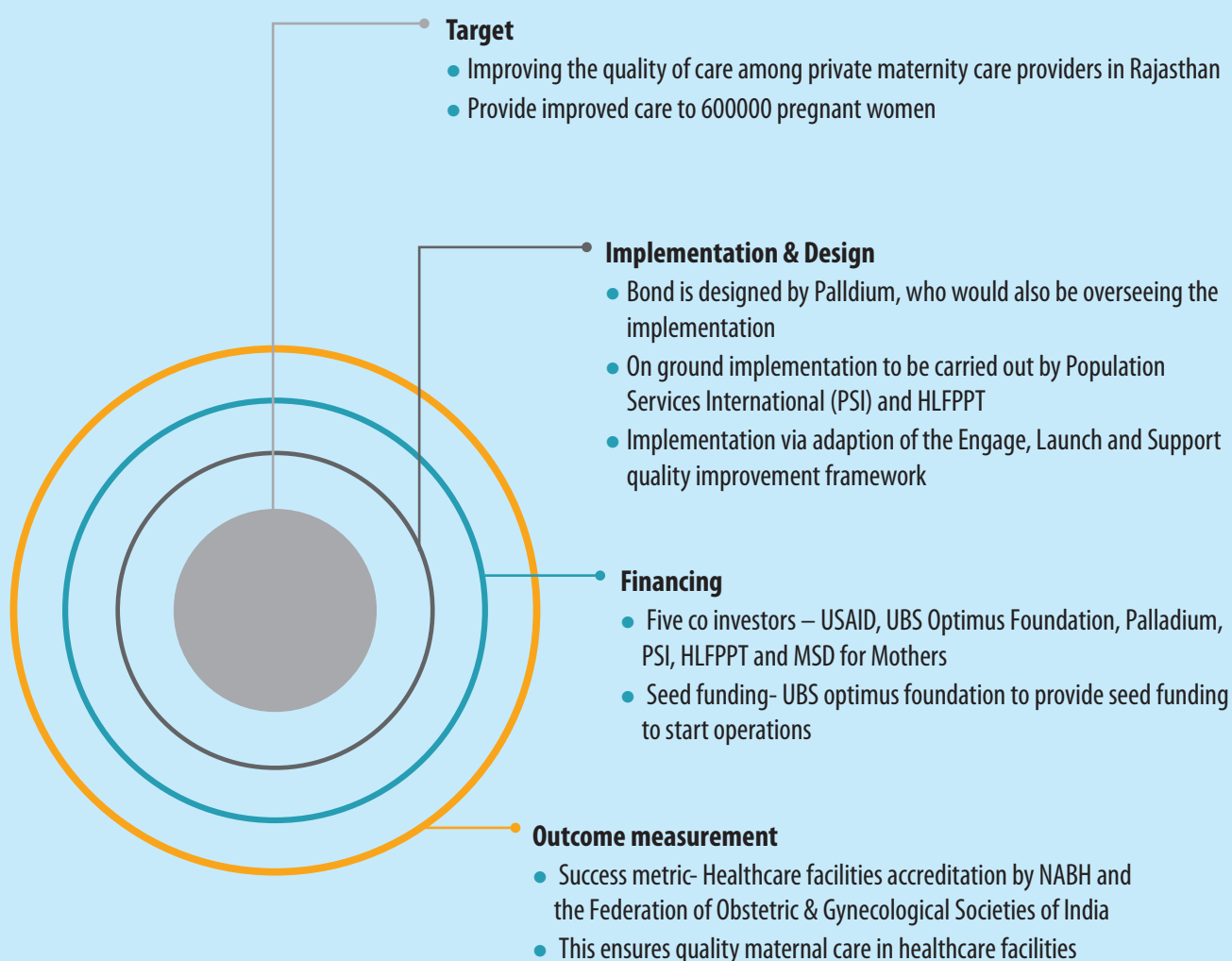
Source: BCG analysis

3. Linking payouts to Outcomes

Over time, a thorough outcome measurement system could inform and affect policy and financing decisions. The reimbursement rates at different hospitals could be defined on the basis of outcomes. A provider or a health system with better outcomes (for example, lower readmission rates, longer protection from recurrence of disease etc.) could be rewarded with higher reimbursement rates and hence promote better care.

Such outcome measurement and financing linkages could also pave the way for creating health bonds where private players deliver healthcare at a geography/ community level and are reimbursed for pre-agreed outcomes for the intervention scope. For example, the Utkrisht bond in Rajasthan is created to enhance maternal care and is being funded by five donor organizations coming together. These delivery models will promote innovation and allow better efficiency in the health systems.

Utkrisht bond- Outcome linked health interventions instrument

Target
- Improving the quality of care among private maternity care providers in Rajasthan
- Provide improved care to 600000 pregnant women

Implementation & Design
- Bond is designed by Palldium, who would also be overseeing the implementation
- On ground implementation to be carried out by Population Services International (PSI) and HLFPPT
- Implementation via adaption of the Engage, Launch and Support quality improvement framework

Financing
- Five co investors – USAID, UBS Optimus Foundation, Palladium, PSI, HLFPPT and MSD for Mothers
- Seed funding- UBS optimus foundation to provide seed funding to start operations

Outcome measurement
- Success metric- Healthcare facilities accreditation by NABH and the Federation of Obstetric & Gynecological Societies of India
- This ensures quality maternal care in healthcare facilities

Source: BCG analysis, Relief web; Note: HLFPPT is a charitable trust promoted by HLL Life care

11 CONCLUSION
The Economic Possibilities

Healthcare spend is historically considered as an expense at a national level. However, following a technology enabled path to achieve better health outcomes could have significant economic benefit to the country. Better health outcomes and higher efficiency in the health delivery system could deliver an incremental economic benefit of US$ ~160-200 Bn per year by 2030 to the country.[39]

The economic benefit would be derived around three dimensions:

- **Economic impact of direct improvement in health outcomes:**
  Preventive care, early detection and better management of health could lead to 15-20% reduction in DALY loss in the country in 10 years. We would also see an enhanced productive life and higher longevity of population. We estimate this to deliver US$~125-160 Bn of incremental benefit to GDP

- **Savings through efficiency gains in healthcare delivery system:**
  Accurate and early diagnosis, treatment at right tier of delivery system, and reduced need for tertiary care and repeat interventions, coupled with thorough outcome measurement could lead to significant reduction in resource wastage in the system. We expect a 15-20% reduction in cost of care as already observed in global situations where outcome measurement has been deployed. This could lead to economic benefit of US$ ~20-25 Bn

- **Economic benefit from job creation:**
  The leapfrogging process will generate a high number of jobs, both in the direct healthcare delivery space, and also in the ecosystem
  — Direct job creation for doctors, nurses, community health workers, technicians across the tier
  — Indirect job creation in insurance, IT and technology, diagnostics, pharmaceutical research, training and skill development, providers etc.

In total, upwards of a million jobs could be created during this process, leading to economic impact of US$ ~10-15 Bn

To realise this benefit, the Government and the private sector need to come together to create a concrete action plan and take steps toward implementation of the healthcare initiatives. The government could focus on creating the base infrastructure and enable the healthcare delivery through positive policy actions, while the private sector could collaborate by innovating on health solutions for different challenges.

The Government has already communicated the intent to increase healthcare spend and bring it to 5-6% of GDP. That layout, over the next few years, might be sufficient to put India on the leapfrogging trajectory of enhanced health.

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39. 15-20% improved DALY x 60% improved DALY coming to productive life x 30-50% productivity during the additional productive life x 2.8 Trillion nominal economy today = USD 120 Bn economic impact.

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A B O U T   B C G

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A B O U T   O P P I

The Organisation of Pharmaceutical Producers of India (OPPI) was established 50 years ago and represents the research-based pharmaceutical companies in India. OPPI remains committed to supporting the nation's healthcare objectives and collaborating with all stakeholders to find sustainable solutions. OPPI believes the need for innovation must be balanced with the necessity for more accessible medicines, within a robust IP environment. A holistic approach is needed to expand healthcare in India and OPPI believes the pharmaceutical industry can form part of the solution.

LEAPFROGGING **HEALTH**
OUTCOMES IN INDIA

August 2019