



May 2021

DESIGNING HEALTH INNOVATION PROGRAMS IN LOW- & MIDDLE-INCOME COUNTRIES

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Edited by: Daniel Barnett

Design by: Mickey Noam-Alon

Published by: American Jewish Joint Distribution Committee, Inc.

Year of publication: 2021

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Acronyms

AI	Artificial Intelligence	LMIC	Lower Middle-Income Countries
ADRRN	Asian Disaster Reduction and Response Network	MCH	Maternal and Child Health
BGU	Ben Gurion University of the Negev	MIC	Middle-Income Countries
CBO	Community Based Organization	MOH	Ministry of Health
CE	European Conformity	MOU	Memorandum of Understanding
CHN	Community Health Nurses	MSF	Médecins Sans Frontières
CHW	Community Health Workers	NCD	Non-Communicable Disease
DHILC	Digital Health Innovation and Learning Center	NGO	Non-Governmental Organization
DFID	Department for International Development	NHI	National Health Insurance
DRC	Democratic Republic of Congo	NTD	Neglected Tropical Disease
EMR	Electronic Medical Records	PGHD	Patient-Generated Health Data
EU	European Union	PHC	Primary Health Care
FDA	Food and Drug Administration	PoC	Proof-of-Concept
FMoH	Federal Ministry of Health	R&D	Research and Development
GDP	Gross Domestic Product	SDGs	Sustainable Development Goals
GHS	Ghana Health Services	SNC	Startup Nation Central
GNI	Gross National Income	TB	Tuberculosis
GRID	Global Response and International Development	TOV	Tikkun Olam Ventures
GSMA	Global System for Mobile Communications Association	UHC	Universal Health Coverage
HE	Health Entrepreneurs	UMIC	Upper Middle-Income Countries
HMO	Health Maintenance Organization	UN	United Nations
ICT	Information and Communication Technology	UNCDF	United Nations Capital Development Fund
ICU	Intensive Care Unit	UNDP	United Nations Development Program
IDC	Inter-Disciplinary Center Herzliya	UNHCR	United Nations High Commissioner for Refugees
INGO	International Non-Governmental Organization	UNICEF	United Nations International Children's Emergency Fund
JDC	Joint Distribution Committee	UNWFP	United Nations World Food Program
LIC	Low-Income Countries	VC	Venture Capital
		WHO	World Health Organization

Terminologies

Innovation: An iterative learning process intended to create or adapt an existing product, process, method or system with the aim of improving the way we think, act, and live. Innovation is not synonymous with technologies. As such, this study explores product innovations, programmatic or process innovations, as well as innovations in social and business models.

Health innovation: Products or process innovation aimed at improving health outcomes.

The triple aim of health care: A framework developed by the Institute for Healthcare Improvement according to which programs must be developed to simultaneously enhance the patient experience of care; improve the populations' health outcomes; and reduce (or control) the costs of healthcare.¹

Digital health: A broad umbrella term encompassing eHealth and mHealth, as well as emerging areas such as the use of advanced computer sciences (e.g., in the fields of “big data,” genomics, and artificial intelligence).²

mHealth: Solutions that use mobile devices such as mobile phones or tablets to support healthcare practices.

eHealth: The use of information and communication technologies (ICT) for health.³ The term refers to healthcare practices supported by electronic processes, and includes technologies such as electronic health records, patient administration systems, and lab systems which cannot be managed using mobile health applications.⁴

TeleHealth: Remote clinical and non-clinical services, including training and continuing medical education.⁵

Telemedicine: Remote clinical services to treat patients who live in remote areas or who want

to reduce waiting time for consultations and receive treatment for urgent conditions only when relevant.⁶

LICs and MICs/LMICs/UMICs:⁷ This study uses the World Bank's country classification as follows:

- **Low-income countries:** Countries, such as Ethiopia, with a GNI per capita, calculated using the World Bank Atlas method, of \$1,036 or less (2020).
- **Middle-income countries** include both **lower middle-income countries** with a GNI per capita between \$1,036 and \$4,045 (2020) and **upper middle-income countries**, such as South Africa, with a GNI per capita of between \$4,046 and \$12,535 (2019).

Growth stages: This study uses the definitions of the innovation growth stages used by the International Development Innovation Alliance:⁸

- **Ideation:** Process aimed at defining and analyzing the problem and generating potential solutions.
- **Research and Development:** Process aimed at further studying and developing innovations with potential for addressing the problem.
- **Proof-of-concept:** Stage in which the concept behind an innovation is field-tested to gain an early, “real-world” assessment of its potential.
- **Transition to scale:** Stage in which innovations that have demonstrated small-scale success develop their model and attract partners to help fill gaps in their capacity for scaling.
- **Scaling:** Process of replicating and/or adapting an innovation large geographies and populations for transformational impact.
- **Sustainable scale:** Wide scale adoption or operation of an innovation at the desired level of scale sustained by an ecosystem of actors.

Executive Summary

This study was commissioned by JDC-GRID to provide an analysis of global health needs and priorities, and identify opportunities for innovation and technology in LICs and MICs, with a particular focus on Ethiopia and South Africa. Specifically, it analyzes opportunities for Israeli innovation to tackle these needs, and provides recommendations for JDC-GRID and its partners to accelerate health innovation programming in LICs and MICs.

The UN Sustainable Development Goal 3 (SDG 3) acknowledges that ensuring healthy lives and promoting well-being is essential to sustainable development. Despite evident progress towards SDG3, much remains to be done to achieve the desired health outcomes, and to address the persistent inequalities and barriers to quality, accessible, safe, and universal health care services in LICs and MICs. COVID-19 has further exacerbated pre-existing vulnerabilities, slowed progress, and created new challenges. As such, innovative solutions are needed to accelerate progress, address emerging challenges, and tackle the many barriers faced by communities, healthcare providers, and systems in these countries.

Part I: Health needs and priorities in LICs and MICs

The study explores health needs and priorities across eight themes: primary health care, maternal and child health, mental health, humanitarian health, non-communicable diseases, communicable/infectious diseases, COVID-19, and cross-cutting topics. Two geographical case studies provide concrete illustrations – Ethiopia and South Africa – both

of them countries where JDC-GRID operates.

The study identifies **five core health pain points** in LICs and MICs:

1. Regions (e.g., sub-Saharan Africa) that bear the highest burden of disease in the world.
2. Ill-equipped healthcare systems (e.g., lack of infrastructure and quality medicines).
3. Understaffed healthcare systems and shortage of well-trained healthcare workers.
4. Lack of access to health services.
5. Unaffordability of healthcare.

Part II: Opportunities, challenges and gaps in health innovation in LICs and MICs

Opportunities for health innovation in LICs and MICs

Research, innovation, and technology are critical components for achieving the healthcare “triple aim” of enhanced patient experience, improved population health outcomes, and reduced or controlled health care costs. Moreover, quality and comprehensive data are key to understanding health needs, designing programs and policies, guiding investment and public health decisions, and measuring progress. As such, there has been a growing number of collaborations and funding opportunities in health innovation for/in LICs and MICs. COVID-19 has also created a surge in demand and funding for healthcare innovation – especially with regards to immunization research and rapid implementation, screening and diagnostics, remote care, and open-source data.

The health markets in LICs and MICs are considerable. In many countries in sub-Saharan Africa and South Asia, people living in poverty use the private sector just as much as people

with more resources. Yet, appropriate care is often expensive and pushes people further into poverty. When well-monitored and regulated, health markets can accelerate creative approaches to expand safe and equitable access to affordable care for underserved populations. For instance, digital strategies are blooming in the African continent where a growing number of governments have committed to create an enabling environment for digital technologies.

According to Global Finance, South Africa is considered a “hot” location for business with good conditions for growth. The country benefits from a favorable business climate and diversified economy, and is an access hub for sub-Saharan markets. In 2019, South Africa was identified as the first regional innovation leader by the 2019 Global Innovation Index. This success is the result of several factors: considerable governmental support for innovation; strong manufacturing capabilities; a well-developed innovation sector and research institutions; a large, young, and growing population spurring the demand for products and services; a sturdy labor market to support new and expanding organizations; and a history of innovation breakthroughs. South Africa’s health and life sciences market is estimated at \$3.2 billion and offers an important breeding ground for innovative solutions tackling the country’s top health challenges.

Ethiopia is classified, by Global Finance, as a “warm” location with business opportunities but also significant barriers to business growth. The health innovation market in Ethiopia faces important obstacles to adoption and scaling of technologies and innovations, essentially due to the country’s social, economic, and humanitarian context. Yet, Ethiopia is starting to invest in health innovation, especially digital health, and has begun to incorporate technology into health

systems. In 2014, Ethiopia’s National eHealth Strategy set out to streamline Information and Communication Technology (ICT) solutions in the country’s healthcare sector. In August 2020, the Ministry of Health opened the Digital Health Innovation and Learning Center (DHILC) in Addis Ababa to serve as a hub for health professionals to design and validate digital health tools and scale-up innovations. Additionally, Ethiopia benefits from the presence of “traditional” humanitarian and development actors who have, over the recent years, increased their support for innovations, including in the health sector. In sum, Ethiopia’s (health) innovation ecosystem has been developing, in recent years, and could attract global innovation actors interested in accompanying the efforts of the government and other national stakeholders to boost the innovation ecosystem.

Challenges and gaps in health innovation processes

Despite significant progress, the world is currently not on track to meet the UN’s health-related SDGs. While many existing health innovations throughout the world (including in Israel) are potentially game changing, many (if not most) solutions are failing to move from proof-of-concept to adoption and scale.

This study concentrates on two categories of gaps and challenges that present important barriers to adoption and scale: (1) structural digital gaps that are inherent to LICs and, to a lesser extent, MICs; and (2) process barriers that relate to the way innovations and programs are conceptualized and implemented. The structural gaps inherent to LICs and MICs encompass limited infrastructures; disparities in digital access; and lack of affordability for technology. Process-related challenges include:

- **Contextualization:** Limited understanding of users’ pains and gains as, well as of needs and

their structural causes, is a major obstacle to successful adoption of a product or program.

- **Coordination and partnerships:** Health systems are extremely complex and rely on a multitude of actors. Hence, health innovation processes must consider the enablers and barriers relating to different actors, including patients and healthcare providers, but also, mobile operators, IT companies, insurance companies, pharmaceutical companies, etc.
- **Moving away from the linearity of innovation:** Too often, innovation processes are product-oriented, i.e., they focus primarily on the solutions rather than on the actual needs and opportunities in specific contexts. Products (and interventions) that are isolated from the systems in which they aim to operate, will not be sufficient to address root causes, health determinants, and complex health problems that require longer-term transformational changes.

To address many of the above barriers, some entrepreneurs and academics have been advocating for **a paradigm shift from product innovation to service innovation**. This requires moving from an approach focused on “injecting” new technologies into health care settings toward one that prioritizes “service design”. This service innovation approach goes beyond the mere technological focus, and considers the entire service delivery system, and all the interacting elements it contains.

Part III: Overview of the Israeli health ecosystem and opportunities

Overview of the Israeli ecosystem

Israel is uniquely positioned to contribute to global health innovation thanks to its history of robust investment in R&D and legacy of

scientific breakthroughs. In 2020, the Pitango Healthtech Fund published a mapping of the Israeli healthcare startup industry which depicted an impressive and diverse landscape with 250 active companies and more than \$6.5 billion raised. According to the Fund, Israeli healthcare startups are reinventing health processes and paradigms, and are thereby advancing the entire health industry, especially with regards to digital health, medical devices, and the biopharma sector. COVID-19 has also propelled the demand and supply of screening and diagnostic solutions, and of remote health services.

As part of the study carried out for this research, **42 Israeli startups** were identified with products or processes potentially relevant for LICs and MICs. This sample group, listed in [Internal Annex 3](#), provides a representative sample (16.8%) of the 250 active startups identified by the Pitango Fund. The majority of these companies’ solutions (28.8%) comes under the primary health care and telemedicine theme, followed by the themes of COVID-19 (19.2%), non-communicable diseases (17.3%), maternal and child health (11.5%), mental health (7.7%), communicable diseases (5.8%), cross-cutting (5.8%), and humanitarian health (3.8%). The COVID-19 theme is relatively large because many health startups have adapted their products or processes over the last year to address COVID-19 challenges. These startups were therefore counted twice; once under their ‘original’ theme, and again under the COVID-19 theme. Additionally, the fast onset of the crisis triggered a sharp rise in demand for diagnostic solutions and subsequent investment.

Within the representative sample, 85% of startups provide digital health solutions. According to many investors and innovators, Israel is becoming one of the world’s leading forces in the digital health sector. In the last three years, Israeli digital health startups have raised a

total of approximately \$800 million. In 2018, the government adopted a \$300 million National Digital Health Plan to support digital health tech startups. Two of the digital health sectors that have attracted the highest amounts of capital are: 1) AI-based solutions, mainly in the fields of imaging and predictive analytics; and 2) Data platforms that collect, present, and contextualize data. Another growing area is patient self-care and personalized treatment.

Israel-specific challenges

Countering VCs' lack of appetite: There is a heavy reliance, among Israeli startups, on domestic investment channels which limit the exploration of opportunities in emerging markets. Many Israeli solutions fail to reach emerging markets due to Israeli venture capitalists' lack of appetite for these "risky" markets. Alternatives to the domestic channel are either deemed too challenging or are not well-known by the startups and the innovation ecosystem in Israel.

Navigating a variety of 'mindsets': Successful innovation adoption processes in LICs and MICs requires full consideration of many different (and sometimes opposite) perspectives and approaches: startups, VCs, NGOs, innovation structures, international institutions etc.

Adjusting the "startup nation discourse" when it comes to LICs and MICs: Many innovation mechanisms in Israel are influenced by the country's "startup nation" paradigm. Israel is a national hub for research and innovation and is ranked seventh out of the world's 60 most innovative countries. Yet, successfully adopting and scaling innovations in/for/with LICs and MICs requires much more than technological innovation and entrepreneurial motivation. It demands a systemic mindset that thoroughly explores the actual needs, resources, and complex systems in the relevant contexts. Supporting startups'

technological growth is only one variable in the equation of successful innovation. Today's problems are too complex and inter-connected to be addressed linearly or in silos.

Part IV: Recommendations

General recommendations were identified to help JDC-GRID and other NGOs successfully integrate health innovation into their programs or effectively support the adoption of health innovations in LICs and MICs:

- **Recommendation #1:** "Innovation-pushed" versus "demand-pulled" approaches
- **Recommendation #2:** Holistic approach
- **Recommendation #3:** Partnerships and collaborations
- **Recommendation #4:** Thematic prioritization and branding
- **Recommendation #5:** Geographical scope
- **Recommendation #6:** Funding
- **Recommendation #7:** Growth stages
- **Recommendation #8:** Selection and compliance
- **Recommendation #9:** Localization of innovation
- **Recommendation #10:** Social impact measurement
- **Recommendation #11:** Sustainability and transition/exit strategies

In addition to the above, Internal Annex 7 contains proposals for specific programmatic options for JDC-GRID'S consideration.



Introduction

I. Contextualization

The United Nations' Sustainable Development Goals (SDGs) – specifically SDG 3 but also other health-related SDGs – acknowledge that ensuring healthy lives and promoting well-being at all ages is essential to sustainable development, and as such, they include universal health coverage (UHC) as a cross-cutting and unifying objective.

Before the COVID-19 global pandemic, major progress had been achieved on improving the health of millions of people worldwide, including: higher life expectancy, reduced maternal and child mortality, and increased immunization coverage.⁹ However, to address persistent and emerging health challenges and reach the SDGs by 2030, this progress must be considerably accelerated, especially with regards to maternal and child health, communicable and non-communicable diseases, access to health in emergencies, and mental health.

COVID-19 has threatened progress by shattering health systems globally. Most countries, especially low-income countries (LICs), have insufficient health facilities, medical supplies, and health care workers to address the increased needs.¹⁰ Some services have been suspended to prioritize COVID-19 patients and reduce the transmission risks. These healthcare disruptions could reverse decades of improvements.

Additionally, emerging challenges posed by demographic, socio economic and environmental factors must also be addressed to counter the widespread disparities across countries and regions.



Box I: The effects of COVID-19 on health systems in LICs.¹¹

- **Hundreds of thousands** of additional under-5 deaths were expected for 2020.
- The pandemic interrupted childhood immunization programs in **70** countries.
- Illness and deaths from communicable diseases will spike and service cancellations will lead to a **100% increase** in malaria deaths in sub-Saharan Africa.

This involves drawing on new technologies and innovations and leveraging on new investment opportunities to attain universal health coverage.

As such, finding innovative and durable solutions to current growing challenges is an urgent task, and requires far more than ad hoc products or interventions. Systemic approaches are needed to tackle structural vulnerabilities and reduce the negative effect of growing shocks and stresses on people and systems.

II. Study objectives

The **objectives** of this study are:

1. To analyze global health needs, priorities, and trends, and identify opportunities for innovation and technology to address needs in LICs and MICs – with a specific focus on Ethiopia and South Africa.
2. To map and analyze opportunities for Israeli innovation and technology to tackle these needs.
3. To draw actionable conclusions for JDC-GRID and its partners to accelerate health innovation programming in LICs and MICs.

The ultimate goal is to spur the development of holistic programs centered around innovation and technology that can effectively and meaningfully reach health outcomes and contribute to the achievement of SDG 3 and other health related SDGs

Box 2: Problem statement.

Despite evident progress toward the achievement of SDG3 and other health-related SDGs, much remains to be done to produce the desired health outcomes, and address the persistent inequalities and barriers to quality, accessible, safe, and universal health care services in LICs and MICs. COVID-19 has further exacerbated pre-existing vulnerabilities, slowed progress, and created new challenges. As such, innovative solutions – products, processes, and business models – are needed to accelerate progress, address emerging challenges, and tackle the many barriers faced by communities, healthcare providers, and systems in these regions.



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III. Scope

Thematic scope:

The study is organized around eight core health themes:



Primary health care (PHC)

is a holistic approach to physical, mental, and social health and well-being centered on the needs and preferences of individuals, families, and communities.¹² Even though some of the themes below essentially fall under the heading of PHC, a differentiation was made (for the purposes of this study) between general access to health and more specific needs.



Communicable diseases

include HIV/AIDS, tuberculosis, malaria, and other infectious diseases.



Humanitarian health

refers to the safe provision of medical care in humanitarian settings for people affected by crisis and displacement.



Maternal and child health (MCH)

refers to health services provided to all women of reproductive age as well as children and adolescents.¹³



Non-communicable diseases (NCDs)

include cardio-vascular diseases, strokes, cancers, diabetes, and chronic lung diseases.



Mental health

is a state of well-being in which individuals realize their own abilities, can cope with the normal stresses of life, work productively, and contribute to society.¹⁴



COVID-19

is included as a separate theme due to its unique nature, scope, and impact.



Cross-cutting themes

include topics that are relevant to all categories, such as: access to health services by marginalized groups; sustainable health financing; health determinants; and behavioral change.



Geographical scope:

This study explores global best practices in health innovation programming in LICs and MICs, with a specific focus on Ethiopia and South Africa – two locations in which JDC-GRID operates. Likewise, given the nature of JDC-GRID’s work, the study places a paramount emphasis on Israeli innovation.

Figure 1: Geographical scope.

IV. Methodology

1. Comprehensive literature review and analysis:

The research team first conducted a comprehensive review of relevant academic sources and grey literature highlighting health priorities and health innovation practices globally, and more specifically in Ethiopia, South Africa, and Israel ([Annex A](#)).

2. Direct interviews with key informants:

The research team then collected feedback from relevant professionals and agencies working in global health innovation through interviews in Israel, Ethiopia, South Africa and globally, including startups, universities, innovation support mechanisms, investors, governmental agencies, NGOs, community structures and representatives, medical institutions, and health innovation actors (Internal Annex 1).

3. Analytical process: Finally, findings were collected, streamlined, and analyzed by a research team composed of two senior public health advisors specializing in South Africa and Ethiopia, one junior public health officer, and one innovation and strategy development specialist from Mindset-PCS, in collaboration with JDC-GRID representatives. Additionally, a forum discussion was organized during the research process to engage a diverse group of stakeholders, explore preliminary findings, and discuss programmatic opportunities.

4. Limitations: The main limitations relate to the large initial scope of the study and the limited time available. Hence, this research provides a preliminary framework that identifies initial directions in line with global,

Israeli, and in-country needs, opportunities, and good practices. More study is needed to develop these findings for implementation purposes, including:

- Comprehensive market analysis, with access-to-markets and willingness-to-pay assessments in South Africa and/or Ethiopia.
- More comprehensive analysis of selected startups.
- Perceptions analysis among potential users of innovations, programs, and services.
- More comprehensive stakeholders' engagement to better explore how health systems work in specific contexts.
- Comprehensive analysis of investment and funding flows.
- More detailed and context-specific analysis on global and in-country regulations governing health products.

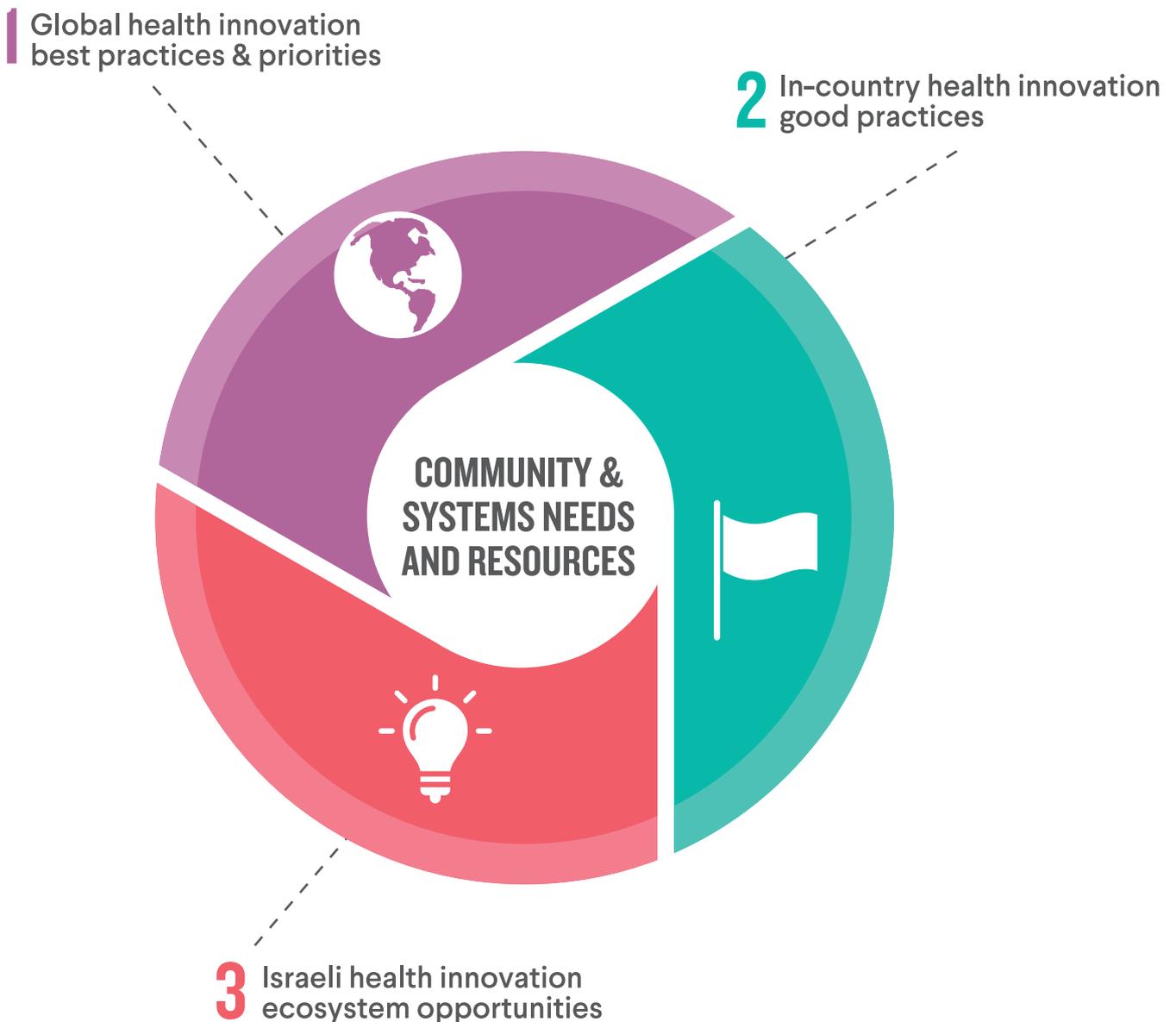


Figure 2: Overview of methodology.

Figure 2 shows that the study is centered around a central pillar, i.e., the health needs and resources of communities, health service providers and systems in LICs and MICs. This was the starting point of the study and formed the basis for the three other inter-connected research focuses, i.e. (1) Global good practices and priorities in health innovation in LICs and MICs; (2) In-country (Ethiopia and South Africa) health innovation good practices and priorities; and (3) Israeli health innovation opportunities.



Part I:

Health needs and priorities in LICs and MICs

I. Overview of global health needs and priorities

The WHO identifies seven cross-cutting priorities for reaching the health-related targets: (1) primary health care; (2) sustainable financing for health; (3) community and civil society engagement; (4) determinants of health; (5) innovative programming in fragile settings and for disease outbreak responses; (6) research and development, innovation, and access; and (7) data and digital health.¹⁵ The present overview of global health needs is organized according to the study's eight selected health themes bearing in mind WHO's cross-cutting priorities.

Primary health care: Primary health care is a highly effective and efficient way to address the main causes and risks of poor health and well-being. Yet at least **half of the world** still lacks full coverage of essential health services.¹⁶ Each year, **100 million people** are pushed into extreme poverty because of health expenses.¹⁷ LICs and MICs account for approximately **20%** of global health expenditure but are home to nearly **85%** of the global population.¹⁸ Finally, a skilled workforce is essential for delivering primary health care. Yet, an additional **18 million** health workers are needed, especially in LICs and MICs, to achieve universal health coverage by 2030.¹⁹

Maternal and child health (MCH): 303,000 women still die annually during pregnancy and childbirth. **2.7 million** babies die in the first month of life. **2.6 million** babies are stillborn.²⁰ The most common direct causes of maternal injury and death are excessive blood loss, infection, high blood pressure, unsafe abortion, and obstructed labor, as well as indirect causes such as anemia, malaria, and heart disease.²¹ In addition, despite progress, much remains to be done to further improve the health outcomes for children. **More than half** of child deaths are due to conditions that could be easily prevented or treated. **94%** of all maternal deaths occur in low and lower middle-income countries.²² Most maternal and child deaths are preventable.²³

SDG goals and targets by 2030:

3.8 *Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality, and affordable essential medicines and vaccines for all.*

SDG goals and targets by 2030:

3.1 *Reduce the global maternal mortality ratio to less than 70/100,000 live births.*

3.2 *End preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least 12/1,000 live births, and under-5 mortality to at least 25/1,000 live births.*

3.7 *Ensure universal access to sexual and reproductive health services.*

2.2 *End all forms of malnutrition, including achieve, by 2025, the targets on stunting and wasting in children under 5, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older people.*

Mental health: More than **80%** of people suffering from mental disorders live in LICs and MICs. Mental illness and substance abuse disorders present a central cause of disease burden, accounting for **8.8%** and **16.6%** of the total burden of disease in low-income and lower-middle-income countries, respectively. Experts predict that **by 2030**, depression is likely to be the **third leading cause of disease burden** in LICs.²⁴

SDG goals and targets by 2030:

3.4 *Reduce by one-third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.*

3.5 *Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.*

Communicable diseases: Sub-Saharan Africa carries a disproportionately high share of communicable diseases, such as the global malaria burden. In 2019, the region was home to **94%** of malaria cases and deaths.²⁵ Children under 5 years of age are the group most vulnerable to malaria. Children account for about **two-thirds** of all malaria deaths worldwide.²⁶ Due to COVID-19, it is expected that illness and deaths from communicable diseases will spike, and service cancellations will lead to a **100%** increase in malaria deaths in sub-Saharan Africa.²⁷ Additionally, **38 million** people were living with HIV in 2019.²⁸

SDG goals and targets by 2030:

3.3 *End the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases, and combat hepatitis, water-borne diseases, and other communicable diseases.*

Non-communicable diseases (NCDs): **71%** of the world's deaths are due to NCDs.²⁹ Almost **three-quarters** of all NCD deaths, and **82%** of the 16 million people who died prematurely, or before reaching 70 years of age, occur in LICs and MICs. The epidemic of NCDs poses devastating health consequences for individuals, families, and communities, and threatens to overwhelm health systems. The socioeconomic costs linked to NCDs make the prevention and control of these diseases a major development imperative of this century.³⁰

SDG goals and targets by 2030:

3.4 *Reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.*

Humanitarian health: In humanitarian emergencies, approximately **44.7 million** people lack basic access to medical care. Supply chain disruptions undermine the allocation of necessary health supplies. Health facilities lack skilled staff, and essential medical supplies and services.³¹ Ensuring that health services are available in emergencies, as well as responding effectively to disease outbreaks, require multi-sectoral coordination, long-term planning and financing, information sharing, and strengthening of health systems and workforce capacity.³²

SDG goals and targets by 2030:

1.5 *By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.*

COVID-19: The pandemic has become the major health, economic and social concern globally since early 2020. Significant disparities exist in countries' abilities to cope with, and recover from, the crisis.³³ The pandemic has negatively affected most health indicators, and has shattered the provision of other health services, creating an additional burden on LICs and MICs. COVID-19 and its impact show the importance of further investing in preparedness and resilience, and integrating emergency health mechanisms into longer-term development efforts.

SDG goals and targets by 2030:

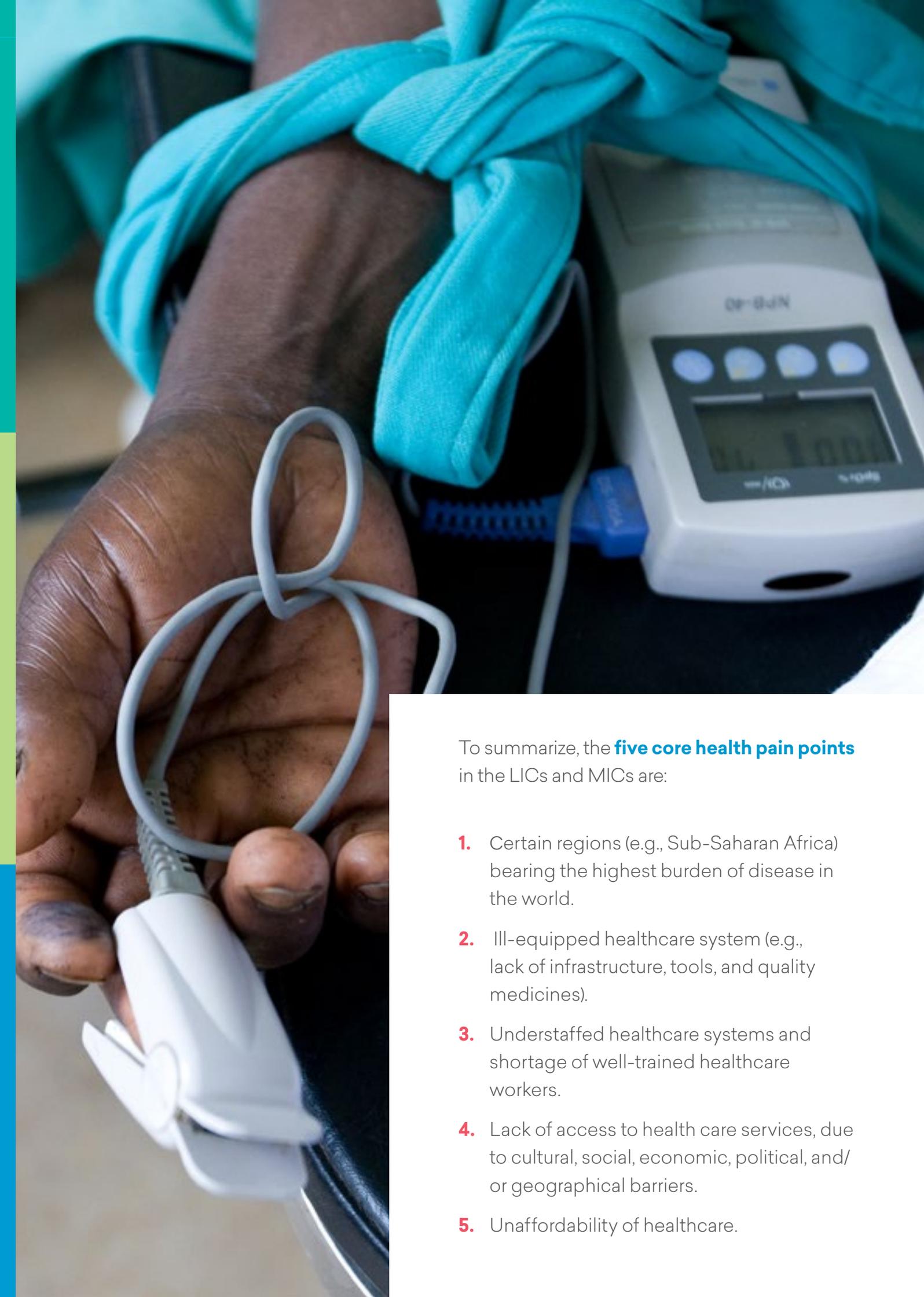
3.D *Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.*

Cross-cutting themes: This category includes topics that are relevant to all themes, including access to health services for marginalized groups such as people with disabilities; gender mainstreaming; determinants of health; community engagement; sustainable health financing; and behavioral change approaches required to bolster access to health.

SDG goals and targets by 2030:

3.C *Increase health financing and the recruitment, development, training and retention of health workforce [...].*

1.4 *Ensure that all men and women [...] have equal rights to economic resources, access to basic services, [...] appropriate new technology and financial services.*



To summarize, the **five core health pain points** in the LICs and MICs are:

1. Certain regions (e.g., Sub-Saharan Africa) bearing the highest burden of disease in the world.
2. Ill-equipped healthcare system (e.g., lack of infrastructure, tools, and quality medicines).
3. Understaffed healthcare systems and shortage of well-trained healthcare workers.
4. Lack of access to health care services, due to cultural, social, economic, political, and/or geographical barriers.
5. Unaffordability of healthcare.

II. Overview of health needs and priorities in Ethiopia and South Africa

Spotlight on health needs and priorities in Ethiopia:

Ethiopia ranks 173 in the 2020 Human Development Index Ranking,³⁴ and 45% percent of its 114 million people live below the poverty line. Economic development, education levels, and health indexes vary widely between the ten regions and two chartered cities, and between urban and rural areas. In the last two decades, major crises such as droughts, locust infestation, epidemics, displacements, and armed conflicts, have repeatedly affected the country, leaving around 21.3 million people – over 18% of the population – in need of humanitarian assistance in 2021.³⁵

Health context:

The limited number of health institutions, inefficient distribution of medical supplies and services, and disparity between rural and urban areas, due to severe under-funding of the health sector, make access to healthcare services very challenging. Seventy-nine percent of Ethiopians live in rural areas, and more than half of the population lives more than 10 km from the nearest health facility.³⁶



Key indicators:

- Life expectancy at birth (2019): **66.24**³⁷
- Total health expenditure per capita (USD) (2018): **24.226**³⁸
- Total health expenditure as % of GDP (2018): **3.296**³⁹
- Physician density / 1000 inhabitants (2018): **0.077**⁴⁰
- Nurse and midwife density / 100 (2018): **0.7135**⁴¹
- Neonatal mortality /1000 (2019): **27.6**⁴²
- Under-5 mortality rate /1000 live births (2019): **50.7**⁴³
- Infant mortality /1000 live births (2019): **36.5**⁴⁴
- Maternal mortality /100,000 (2017): **401**⁴⁵
- COVID-19 (February 2021): **158, 053 cases; 2,354 deaths**⁴⁶
- Human development index ranking (2020): **173**⁴⁷

Major disease burdens:

Measurements of the burden of disease in Ethiopia have found that **communicable diseases** are still the leading contributor, making up 85% of all diseases seen in health institutions.⁴⁸ Although the reduction of their prevalence in children under five has resulted in improved life expectancy, slower improvement has been noted in the general adult population. Main communicable diseases include: lower respiratory disease; diarrheal disease; and neglected tropical diseases.⁴⁹

Non-communicable diseases are less prevalent but are showing a growing burden on mortality (as high as 39% in 2016), mainly due to cardiovascular diseases, diabetes, and neoplasms.⁵⁰ According to interviews, this topic should be prioritized due to the lesser attention and funding it attracts compared with the more prevalent infectious diseases like TB, HIV, and malaria. In addition, addressing the impact of COVID-19 on the conditions of crisis-affected communities within Ethiopia is another major priority for 2021.

The humanitarian community is prioritizing preparedness and response activities including WASH services at health facilities and schools to prevent COVID-19 transmissions and water-borne diseases. In these humanitarian settings, outbreaks of measles and endemic diseases will also further exacerbate the vulnerabilities of health facilities already strained by the pandemic.⁵¹

Governmental strategic priorities (diseases rated important by the Ministry of Health):⁵²

1. **Malaria** is still a leading cause of morbidity and mortality in Ethiopia. 60% of the population lives in endemic areas.⁵³
2. **Tuberculosis:** National incidence rate is 112 per 100,000 population.⁵⁴
3. **Meningitis:** Ethiopia regularly faces outbreaks of meningococcal disease.
4. **Blindness:** The estimated prevalence of blindness is 1.6%, mostly due to trachoma and cataracts, but also to onchocerciasis, Vitamin-A deficiency and complications after measles infection. With appropriate health measures, 80% of these cases could be prevented.⁵⁵
5. **Neglected Tropical Diseases (NTDs):** Seven NTDs are highly endemic in Ethiopia, causing further marginalization, and economic and social challenges for the already disadvantaged population.
6. **Non-communicable diseases:** They are on the rise due to changes in people's lifestyles, especially hypertension, cardiovascular diseases, and diabetes, and is becoming a national health priority.
7. **Mental health:** This has not received the attention it deserves.⁵⁶ The government is working on assessments and strategies. Mental health services are only available in Addis Ababa.
8. **COVID-19:** Testing is done nationally and regionally. In February 2021, about 13.1% of tested cases were positive.⁵⁷
9. **Medical care in emergencies for recurrent crises** – including emergency preparedness, response, coordination and resilience.

Assets for health programing:

- **The number of health centers** have increased nearly five-fold since 1990, but the country still faces a wide urban-rural gap in the utilization rate of health services.⁵⁸
- **Health extension workers** are paid health workers selected by the community in which they live. They complete a one-year training program after which they provide promotive, preventive and selected curative health services.
- **The Health Development Army** organizes women in “women’s development groups” to share information and encourage women in the communities where they live to use services, resulting in decreased maternal deaths and increased immunization of children.⁵⁹
- **Focal nurses:**⁶⁰ The Regional Bureaus of Health operate a large network of nurses conducting outreach work in the communities in their catchment or focal areas. Focal nurses have the responsibility of carrying out screening and interventions within communities, spending most of their time traveling. This solid existing outreach infrastructure provides a possible foundation for innovation uptake and an excellent entry point for community health programs.



Spotlight on health needs and priorities on **South Africa:**

South Africa is part of the World Bank's upper middle-income group,⁶¹ but the country faces important disparities in health indicators among its provinces, between rural and urban communities, and between the public and private sectors. The country has made considerable progress in improving the wellbeing of its citizens since the mid-1990s, but poverty levels have been soaring since 2015, especially for children, black Africans, people living in rural and remote areas, and those with little or no access to education.⁶² Given the population growth rate, gross domestic product (GDP) per capita growth has been close to nil since 2014,⁶³ and was negative in 2020 (-5.8%),⁶⁴ leaving little room to reduce poverty rates. South Africa remains a dual economy with one of the highest inequality rates in the world.

Health context:

South Africa faces three categories of healthcare challenges: (1) its quadruple disease burden (TB, HIV/AIDS, NCDs, and trauma) which causes high levels of mortality and morbidity; (2) systemic and structural challenges in service delivery; (3) and societal challenges associated with poverty. South Africa is introducing universal health coverage to respond to these challenges.⁶⁵ The healthcare system consists of a large and poorly funded public sector which cover 84% of the population and a smaller better resourced private sector. Yet, 70% of doctors work in the private sector.⁶⁶ In addition, several core challenges have been raised by the public regarding public health institutions including: prolonged waiting times due to shortages of human resources; adverse events; poor hygiene and poor infection control measures; increased



litigation because of avoidable errors; shortage of resources in medicine and equipment; and poor record-keeping.⁶⁷

Key health indicators:

- Life expectancy at birth (2020): **64.1**⁶⁸
- Total health expenditure per capita (current USD) (2018): **525.96**⁶⁹
- Total health expenditure as % of GDP (2018): **1.883**⁷⁰
- Physician density / 1000 inhabitants (2017): **0.905**⁷¹
- Nurse and midwife density / 1000 (2017): **1.308**⁷²
- Neonatal mortality /1000 live births (2019): **11.5**⁷³
- Under-5 mortality rate /1000 live births (2019): **34.5**⁷⁴
- Infant mortality /1000 live births (2019): **27.5**⁷⁵
- Maternal mortality /100,000 live births (2017): **119**⁷⁶
- COVID-19 (February 2021): **1,512,225 cases; 49,941 deaths**⁷⁷
- Human development index ranking (2020): **114**⁷⁸

Major disease burdens:

As mentioned, South Africa is facing a quadruple burden of disease:

1. Trauma related to violence and injuries.
2. Tuberculosis (6.4% of total deaths) and other communicable diseases such as influenza and pneumonia (4.2%).
3. HIV/AIDS (4.8% of total main causes of deaths).
4. Non-communicable diseases such as cerebrovascular diseases (5.0%), diabetes mellitus (5.7%), other forms of cardiovascular disease (4.9%), and hypertensive diseases (4.5%).⁷⁹ South Africa is facing a growing burden of chronic non-communicable disease. In 2016, cardiometabolic conditions (e.g., diabetes, and cerebrovascular, heart and hypertensive diseases) and other non-communicable diseases accounted for 57.4% of deaths in the country.⁸⁰ Cancer is not at the top of the disease burden list because of the prevalence in South Africa of preventable diseases and phenomena such as HIV, TB, violence, and car accidents. However, in absolute numbers, there were 107,467 cases of cancer in 2018 and 57,373 deaths. Of these, 13.1% were breast cancers, 12.1% cervical and uterine cancers, 11.6% prostate cancers, 7.7% lung cancers, and 6.5% colorectal cancers. 23.3% of NCD premature deaths are from cancer (2016). The estimation is that by 2040 there will be an increase of 60% in breast cancer cases and 79% in lung cancer cases.⁸¹

Additionally, mental health has a significant impact on South African society. More than 21% of teenagers reportedly considered committing suicide in 2010⁸², and suicide accounted for 9% of all teen deaths.⁸³ There are about 23 known suicides in South Africa per day which represents 11% of all non-natural deaths.⁸⁴

Health sector's strategic priorities (2020/21-2024/25):⁸⁵

Disease burden:

- HIV/AIDS – Provide better diagnosis and treatment and reduce incidence among youth.
- Tuberculosis – Improve the success rate of TB treatment; and improve prevention of new cases, with the goal of eradicating TB by 2035.
- NCDs – Reduce premature mortality rate due to NCDs.
- Maternal health – Reduce maternal mortality rate, and the mortality rates for neonatal cases, infants under one year old, and children under 5 years old; and improve access to maternal health services.

Systems:

- Improve medication procurement strategies.
- Ensure an equitable distribution of staff, with the appropriate skills and attitudes.
- Improve management, governance and infrastructure of health facilities.
- Achieve universal health care by implementing national health insurance (NHI) policy.
- Improve quality of care, including availability of medical products and equipment, safety enhancements, and heightened community engagement.

Added to these priorities is the negative impact of COVID-19 on South Africa's health system.

Overall, due to the large attention already devoted to HIV/AIDS and TB by development actors and donors, health practitioners and

other stakeholders recommend focusing on NCDs, maternal and child health, and mental health.⁸⁶

COVID-19: South Africa was by far the country most affected by COVID-19 on the African continent.⁸⁷ The burden has been particularly high in rural communities (e.g., East Province) where health indicators and health systems are fragile. The South African health system is currently affected by the lack of personal protective equipment; increased mortality rates; mental health problems; substance abuse; and resurgence of NCDs. The pandemic triggered major socioeconomic problems, and “the prolonged effects of lockdown on psychosocial support services resulted in the outbursts of uncertainties, acute panic, fear, depression, obsessive behaviors, social unrests, stigmatization, anxiety, and increased gender-based violence”.⁸⁸

Eastern Cape Province example: The Eastern Cape province is the second-largest province in the country with a population of 6.6 million people (11.3% of the national population). A mainly rural region, it is the poorest of the nine provinces, with rampant unemployment, lack of basic services and insufficient access to running water, sanitation, and electricity. Additionally, many people in the Eastern Cape are entirely dependent on social welfare payments, and therefore are unable to live healthy lifestyles. All these factors pose health risks and leave the population in dire need of support.⁸⁹ Health needs include:⁹⁰

- Health care facilities are often distant, and access requires the use of expensive public transportation.
- Access to specialist services is limited as most of the specialized doctors are in the two major cities in the province. Patients are required to pay for their own transport and

accommodation which is often unaffordable to them.

- Services offered in clinics and district hospitals remain limited (e.g., poor quality of care; lack of medicines; shortage of ambulances services; insufficient infrastructure of health facilities).
- There is a shortage of professional staff due to reluctance to work in rural settings.
- Eastern Cape had the 4th-highest number of confirmed COVID-19 cases out of the country’s 9 provinces, but the highest number of deaths (as of January 2021).⁹¹

Health in townships: The burdens of chronic diseases, infectious diseases, diseases of poverty (such as malnutrition), and higher rates of violence within the townships increase the morbidity and mortality rates in these areas.⁹² Access to public services, including health care, remains a challenge for many South Africans living in the peripheries of urban centers due to apartheid-era urban planning. For example, Cape Town’s Groote Schuur Hospital is in Cape Town’s suburb, far away from patients living in the townships. Transport into the Cape Town city center remains expensive, unreliable, and unsafe.⁹³

Assets:

- South Africa is working to provide national health insurance coverage for all citizens irrespective of their socio-economic status by 2026 with a single fund that buys services on behalf of the entire population, and eventually gives every South African the right to access comprehensive health services free of charge.⁹⁴
- In the 2019 Global Innovation Index, South Africa ranked first in the category of regional

innovation leaders, and in April 2020, the country's digital health market was valued at 3.2 billion USD.⁹⁵ The market for digital health is flourishing. An example of this can be seen in the transition from paper to electronic filing. Since late 2019, the government has already registered 44 million individuals and 3000 clinics in the electronic Health Patient Registration System (HPRS), cutting waiting times down to about 50 minutes.⁹⁶



Part II:

Opportunities, challenges and gaps in health innovation in LICs and MICs

I. Opportunities for health innovation in LICs and MICs

General trends:

Research, innovation, and technology are critical for efforts to attain the health “triple aim” of enhanced patient experience, improved population health outcomes, and reduced or controlled health care costs. Moreover, quality, and comprehensive data are key to understanding health needs, designing programs and policies, guiding investment and public health decisions, and measuring progress. As such, there has been a growing number of collaboration and funding opportunities in health innovation for/in LICs and MICs.ⁱ COVID-19 also created a surge in demand and funding for innovation – especially with regards to immunization research and rapid implementation, screening and diagnostics, remote care, and open-source data.⁹⁷ The crisis further highlighted the importance of digital connectivity in daily life and in service delivery.⁹⁸

Notably, the health markets in LICs and MICs are large. Even where public health facilities offer services at no or limited costs, many people still choose to use private health providers. In many countries in sub-Saharan Africa and South Asia, people living in poverty use the private sector just as much as people with more resources.⁹⁹ However, appropriate care is often expensive and pushes people further into poverty. When well monitored and regulated, health markets can accelerate creative approaches to improve safe and equitable access to affordable care for underserved populations.¹⁰⁰

For instance, digital strategies are blooming in the African continent. A growing number of governments have committed to creating an enabling environment for digital technologies, with more reliable infrastructure, policies, and regulations. National digital health strategies have been adopted by 41 of 54 African countries.¹⁰¹ Digital health innovations are not one-size-fits-all solutions, but if well-designed and contextualized, they can enhance patient experience, improve health outcomes, and control or reduce costs.

When well monitored and regulated, health markets can accelerate creative approaches to improve safe and equitable access to affordable care for underserved populations

ⁱ Examples include the Wellcome Trust, the Gates Foundation, Humanitarian Grand Challenges, Elrha, MIT Solve, UN innovation mechanisms and more.

Box 3: Spotlight on sub-Saharan Africa, “the new breeding ground for global digital health”¹⁰².

The opportunity:

While the region faces the world’s largest burden of disease, it is also witnessing a rapid surge in digital health technologies.

- The Smartphone penetration is increasing exponentially with an estimated coverage of 66% by 2025.¹⁰³
- Forty-three percent of the population are between 0 to 14 of age, and represent a considerable market opportunity.¹⁰⁴ “As the young absorb digital knowledge at a faster pace than their parents, it is reasonable to believe that their health might improve when quality digital health solutions and interventions are implemented on a large scale.”¹⁰⁵
- As an example, Africa now hosts more mHealth initiatives than any other region in the world, with Nigeria, South Africa, and Ethiopia as pioneers.¹⁰⁶
- Digital health has the potential to help achieve universal health coverage.

The priorities:

According to the Global System for Mobile Communications Association (GSMA), digital health needs to focus on three objectives over the next five to ten years¹⁰⁷:

1. Increase coverage and improve access.

Digital health enables wider reach of healthcare delivery as some services can be delivered and managed remotely, for example, via tele-medicine collaborations. Digital health also allows greater

and faster patient access to vital health information delivered via mobile (e.g., mobile phones for maternal health in South Africa).¹⁰⁸

2. Improve the quality of services.

Digital health enables faster and more effective coordination of care among professionals, for example, via solutions allowing information-sharing between rural nurses and doctors.¹⁰⁹

3. Reduce cost.

Health resources can be used more effectively and applied where and when needed thanks to the digital transition. This includes the digitization of drug inventory, supply chain, and patient records.

How to scale digital health solutions?¹¹⁰

Many pilots fail to reach scale due to a lack of sustainable financing, high risks for the different actors involved, and long access-to-market processes for commercial solutions. Greater and more stable government investment in digital health can help drive scale in LICs and MICs. Digital health stakeholders need to stimulate government investment by demonstrating how digital health solutions help address national healthcare issues. Additionally, ecosystem collaboration is needed to address current fragmentation and create a holistic digital health model. Individual companies (especially small ones) do not have the resources to tackle by themselves the complexity of health systems in a holistic way. Public-private partnerships can help share resources, capabilities, opportunities, and risks among stakeholders.

Overview of global health innovation trends:

This study found 11 cross-cutting categories of innovations (see **Figure 3**) that cover all phases of the clinical management flow, from screening to treatment and rehabilitation, as well as prevention, education, community outreach and other core activities necessary for achieving desirable health outcomes.

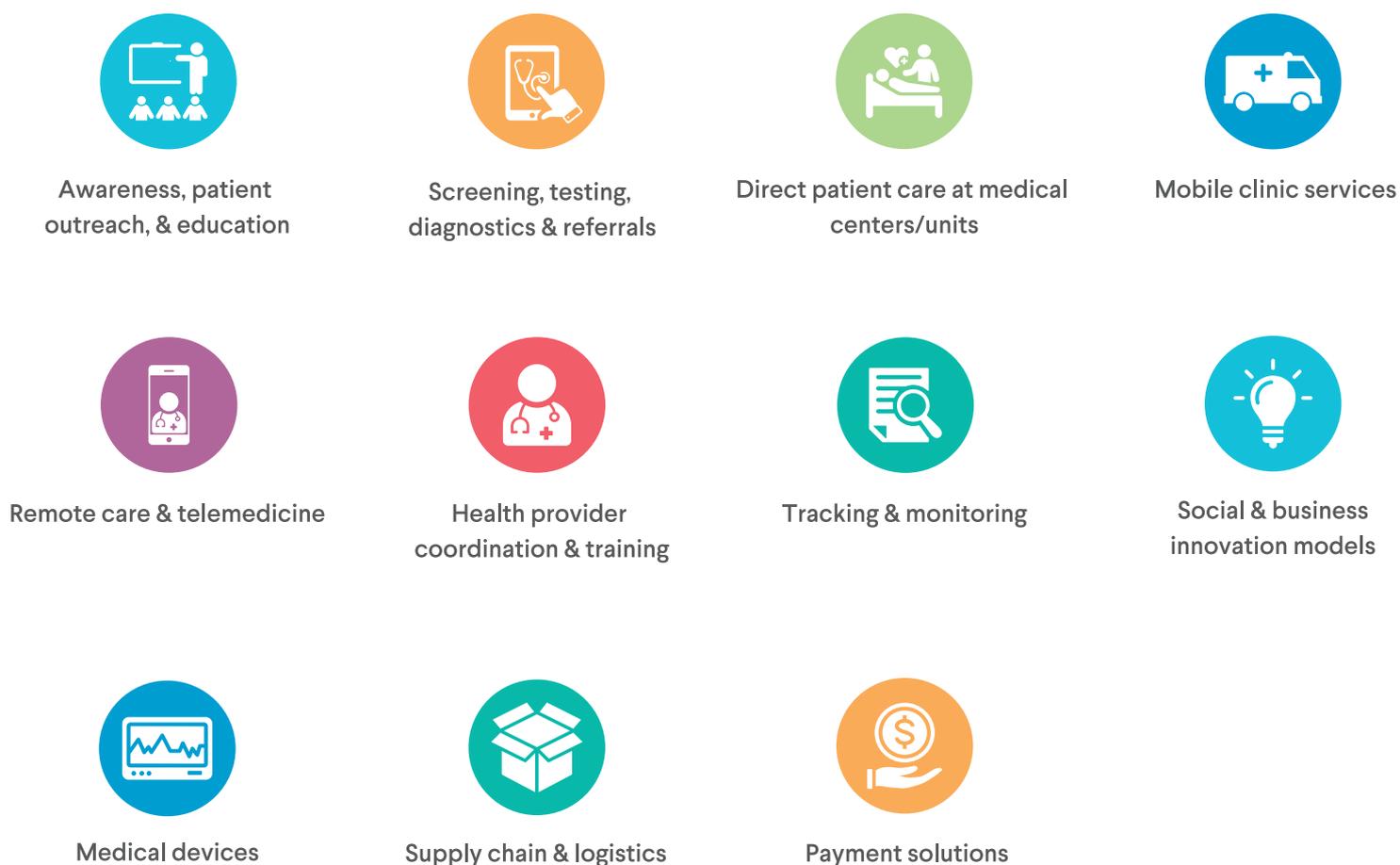


Figure 3: Categories of health innovations.

Figure 4 provides a snapshot of the types of health innovations that exist under each of the eight health themes and organized according to the 11 above-mentioned health categories. [Annex C](#) provides a more comprehensive overview with specific examples of existing innovations under the eight health themes and eleven innovation categories. Both the Figure and the Annex focus on solutions that have successfully reached scale or present the most potential to scale, and that have demonstrated impact (or potential of impact) in LICs and MICs.



Primary Health Care

Solutions to provide services in hard-to-reach areas (e.g. tele-microbiology).	 
Health platforms matching patients and doctors; mobile money solutions; affordable technology-powered screening, tests and diagnostics; e-referrals.	 
Micro-community health insurances.	
Mobile clinics and AI-powered networks of ambulances.	
Social franchising innovations.	
Supply chain enhancement innovations.	 
Wearables, and sensors as diagnostic tools and for easier tracking and monitoring of individuals' health in a hospital setting.	 
Drones used to transport blood and medical supplies from one clinic to another and collect aerial imagery for predictive analytics.	



Maternal & Child Health

Digital solutions for child health, e.g. nutrition scanning and diagnostics.	
Child health devices (e.g. malnutrition bracelet).	
Sensors to monitor key health vitals of neonates.	
Ultrasound radiology service in rural communities.	 
Mobile phones for mothers to access vital information, to know when and where to go for treatment and improve quality of home-based care.	
Holistic programs using smartphone apps to help frontline nurses bring better maternal and child health services in hard-to-reach places and coordinate with doctors remotely.	
Digital health messaging for awareness raising, non-financial incentives, and behavior change program (e.g. through theatres/radio).	
Mobile phones to access a digital health-financing platform.	

Mental Health

Process innovations maximizing community resources, or offering innovative types of interventions; or new methods integrating mental health within PHC.	
Digital screening and diagnostics innovations.	
Digital solutions providing care through phone, internet, chat bots.	
Telepsychiatry.	
Mobile apps for collaboration between service providers.	
Web-based behavioral healthcare management registry to track patient data.	
Digital solutions for awareness raising.	
Videogames helping patients manage behavioral health challenges.	
Mental health mobile clinics.	
Social franchise to support mental health.	

Health in Emergencies

Process and product innovations to collect and share life-saving information in emergencies.	
Innovations improving logistics medical and supply chain – e.g. localizing the manufacturing of essential materials.	
Telemedicine solutions to reach hard-to-reach communities.	
Medical devices to address specific needs in emergencies (3D printed prostheses for refugees).	
New methods of delivering medical services in emergencies (e.g. Surgery rooms in backpacks or low-cost non-electrical instrument for treating large wounds).	 



Communicable Diseases

Digital solutions to eliminate malaria.	 
Low cost lab services or tests for TB or Malaria, e.g. Malaria Rapid diagnostic tests (RDTs) – including through social franchises in remote areas.	 
Consumer education innovations.	
High quality antimalarials, e.g. artemisinin-based combination therapies (ACTs).	
Malaria surveillance systems (Significant gap).	
The use of big data and artificial intelligence for both outbreak control and preparedness.	



Non Communicable Diseases

mHealth for Improving Non-Communicable Disease (NCD) Management (e.g. tablet-based application for diabetes and hypertension care).	 
AI-based devices for cancer screening and referrals.	
Quality Improvement, behavioral science and digital technology to manage chronic disease.	  
Videogames helping patients proactively manage chronic health conditions (cancer, diabetes).	 



Cross-Cutting

Community-based network of support groups to promote inclusion of children and young people with disabilities.	
Behavioral Interventions across mobile phones to change health patterns.	 
Innovative business models to promote 'health entrepreneurs', reduce costs, and improve accessibility in remote areas.	

Figure 4: General overview of global health innovations per health themes.

Box 4 below highlights six selected examples of solutions at different growth stages to highlight the different processes through which innovations are designed, piloted, and, when successful, adopted at scale.

Box 4: Spotlights on good practices and lessons learned.

Spotlight on a mHealth solution led by a company that successfully scaled: Sproxil.

The problem: Sproxil addressed the global counterfeit drug market. 1 in 10 medical products in developing countries is substandard or falsified.¹¹¹

The solution: Sproxil developed a low-cost and easy to use mHealth solution to enable consumers to avoid buying counterfeits. Consumers use any mobile phone to send the code of the product by SMS at the point of purchase and receive a message revealing the authenticity of the product.

Achievements: Leading pharmaceutical companies and regulatory organizations in sub-Saharan Africa and India have been applying this solution to protect consumers since 2009. The innovation has reduced casualties due to counterfeits ingestion; increased access to genuine medicines; and reduced costs arising from complications due to ingestion of counterfeits. The solution scaled in six countries.

Lessons learned: Sproxil successfully scaled due to the following factors:

- **Partnerships:** The company worked very closely with multinational mobile phone companies to reduce the price of text messaging for its clients. It also partnered with large pharmaceutical companies and with Nigeria's National Agency for Food, thus creating a large support base that contributed to its scale.
- **Strong business model:** Sproxil works directly with pharmaceutical companies to provide their verification service for free to consumers. Its first (pharmaceutical) customer made a 1000% ROI after 90 days. Governments also benefit from an increased ability to protect consumers.
- **Strong scale strategy:** To further improve access, Sproxil partnered with all global systems for mobile communication networks in Nigeria, with the potential of reaching 67 million users.
- **User-centered and needs-based approach:** The solution was designed based on actual demonstrated needs. The founding team conducted a thorough market research both at community and governmental levels in Nigeria and concluded there was a huge demand. The needs then informed the design. The solution was also in line with the national government's health priorities.

Spotlight on a holistic program centered around technology led by an INGO: CHN-on-the-Go (by Concern International).

The problem:

Community health nurses (CHN) operating in hard-to-reach areas face many challenges providing care to young mothers and newborns. According to the INGO Concern, the difficult working conditions undermined nurses' motivation, caused high levels of stress, and led to high turnover.

The solution:

CHN-on-the-Go is a holistic program using technology to improve health knowledge, and support career development and connectedness for health workers in rural Ghana. It relies on the use of a smartphone application that enables nurses to improve service delivery for women and children.

Achievements (2016):

The app has provided learning opportunities, improved access to health information for improved patient engagement, allowed immediate diagnostic support from doctors, enhanced confidence of CHN and patients, and increased communication with peers and supervisors. It was designed and developed in collaboration with the Ghana Health Service (GHS) which took over the innovation in 2016, at the early adoption phase after pilots were successfully conducted with 300 nurses.

Lessons learned:

- **User-centric approach:** The nurses and their supervisors were engaged from the start in discussing how an app could support their work. The app continued to evolve based on nurses and supervisors' feedback.
- **Partnerships:** CHN-on-the-Go was part of Concern International's program on innovations for maternal, newborn & child health, in collaboration with Grameen Foundation for app development, JSI Research & Training for monitoring and evaluation, ThinkPlace for user-centered design support, and the GHS for content development.
- **Local ownership & exit strategy:** After a successful pilot, the innovation was handed over to the GHS. This study was not able to establish, however, whether the solution was still in use by the government in 2021.
- **Business model:** Many NGO-led innovations essentially rely on philanthropy through grants especially at early stages to allow the organization to collect enough evidence, pilot in the field, and test assumptions. However, the financial viability of such solutions must be carefully assessed to be able to effectively scale beyond the NGO circles. Securing the government's buy-in at the very beginning is an important factor for ensuring long-term financial viability.
- **Reliance on existing infrastructures:** The GHS partnered in the design and implementation of CHN-on-the-Go, which was built on existing GHS health guidelines and protocols.

Spotlight on mobile social franchise model leveraging technological innovation, business model innovation, and process innovation: Healthy Entrepreneurs (HE).¹¹³

The problem:

Essential medicines and health products in LICs are often unavailable, or of poor quality, and/or too expensive. Moreover, people often lack the information needed to make good decisions about their health.

The solution:

Healthy Entrepreneurs (HE) created a mobile social franchise model leveraging a network of 5,000 community health entrepreneurs. Local entrepreneurs invest upfront 25% of the expenses to enter the business and reimburse after one year. These entrepreneurs run a mobile drugstore or pharmacy, and receive training in health issues and business. The franchise includes a container, products, a bicycle, and a tablet computer including solar charger and HE applications. The Offline applications are used for providing health awareness, product catalogues, stock management and data collection. Products include essential medicines, preventive items (e.g., bed mosquito nets), reproductive health products, and hygiene items. Additionally, HE offers a *Doctor@Distance* service in which entrepreneurs send simple point-of-care test results to a doctor, who advises and/or prescribes medication. The doctor also monitors patients with non-communicable diseases such as hypertension and diabetes in remote settings.

Achievements:

According to HE, entrepreneurs reach on average 3,000 people in their designated

areas. The price of products is lower or similar to other products in the market and, according to HE, availability and quality of products has improved. The model has increased accessibility of products and services in remote areas. At the entrepreneur level, the model is self-sustaining¹¹⁴. A total of 8,299,500 lives were positively affected including 4,500,000 customers. Healthy Entrepreneurs is scaling its network of 5,000 community health entrepreneurs to 25,000 in Kenya, Uganda, Tanzania, and Burundi by 2023.¹¹⁵

The lessons learned:

- **Success factors:** Quality and reliability in service provision, good customer care, and empowerment of health entrepreneurs are prerequisites for success. Entrepreneurs' upfront investment is key to guarantee their commitment. Another core component of establishing franchises is maintaining a store of goods in the country to assure continuous availability of products.
- **Financial viability:** The hybrid business model is based on 41-50% on philanthropy and the rest on revenues.
- **Potential risks:** For such models to be successful, there must be a strong community buy-in, and the program must be anchored in national health priorities in coordination with government and other relevant stakeholders (e.g., pharmaceutical companies). Careful attention should also be paid to potential risks (e.g., safety of the health entrepreneurs) and mitigation strategies.
- **Other challenges:** The success of this model also depends on whether departments of health allow such decentralization of services, especially given the complexity of monitoring service quality.

Spotlight on tele-medicine models.¹¹⁶

The problem:

Millions of people in remote locations lack access to basic medical care. Patients must often travel long distances, incurring high costs, for diagnosis and specialized services.

The solution:

Remote service delivery through ICT provides patients and doctors with access to specialists thus allowing patients from hard-to-reach communities to receive quality and affordable care. Telemedicine also allows rural health practitioners to consult with city-based specialist doctors to diagnose, treat, and prevent disease and injury in remote areas. It also provides distance learning opportunities for community health workers and nurses.¹¹⁷ By contrast with mHealth services – which target patients – telemedicine services target healthcare professionals. Information is transmitted via videoconferencing, teleconsultations, remote patient monitoring using text messages, audio, video, and images. Israel has great expertise in telemedicine services, both in medical institutions (e.g., Sheba Hospital¹¹⁸) and in the private sector, with several startups offering solid products and models.ⁱⁱ

Telemedicine provides healthcare workers with access to expert support, affording reassurance to both community health workers and patients

Achievements:

Telemedicine provides healthcare workers with access to expert support from experienced physicians, affording reassurance to both community health workers and patients. It reduces travel, expense, and stress for patients. It decreases the turnover of community health workers by encouraging them to stay in remote areas while receiving additional support and enhanced professional development.

Lessons learned:

- **Infrastructures:** Telemedicine requires stable infrastructures, such as electricity and communication networks. Poor internet connectivity can significantly reduce uptake, as was the case in Mexico in 2006-2012.¹¹⁹
- **Resistance:** There can be resistance among both patients and health care providers to adopting these solutions. Building awareness of the advantages of telemedicine is crucial for tackling resistance and ensuring effective uptake. Moreover, to gain acceptance from community health workers or local health care providers, the technology and overall program must be designed with their involvement and be user-friendly.
- **Costs:** The costs of telemedicine are often high in LICs and MICs. Most projects are at least partially funded by international agencies. This creates a certain dependency on external funding which is not sustainable. INGOs must be particularly aware of the potentially harmful impact of short-term telemedicine programs that do not have a financially viable transition or exit plan. Hybrid social enterprises models can create

ii. For example: Tytocare - yeleHealth exam kit and app to perform guided medical exams remotely; BeeCardia - remote care/telemedicine services; Datos health - remote monitoring and care.

sustainable models in which patients pay a small affordable fee to access services. For example, with Telemedicine Africa in South Africa, patients pay 2 USD for the consultation in public clinics regardless of whether the consultation involves telemedicine systems. Hence, the costs for telemedicine equipment and services are covered by the hospital and not directly by the patients.¹²⁰

- **Ethics and liability:** Medical personnel may refuse to practice telemedicine due to medical liability concerns. There is also the ethical concern of involving international health practitioners who may not be aware of the nuances of local contexts. There is no global framework defining “good” telemedicine programs as yet, and thus the possibility of “bad practices” remains important. Finally, concerns regarding data protection and confidentiality when using ICT must be seriously considered.

- **Holistic process:** Another challenge is to ensure that the process does not stop at the screening, testing, and diagnostic level, and that there is a viable referral system in place with proper care available.
- **Integration into existing programs:** Some telemedicine companies, such as Vsee, have maximized existing infrastructures, like immunization programs, to integrate a mobile telemedicine component, allowing children and families to access diagnosis, treatment, and referrals.¹²¹
- **Localization:** It is preferable that the telemedicine model links local actors with national or regional actors, rather than international actors, as the latter may not be fully aware of cultural and social contexts and of other factors at play. It is important to localize the project as much as possible.



Spotlight on mobile clinic models.

The problem:

Residents of rural remote communities have very limited access to healthcare and must often walk long hours to reach the nearest clinic.

The solution: In theory, mobile clinics can provide an effective solution for serving remote areas. However, to be successful in practice, several conditions must be fulfilled:

- Mobile clinics are most effective in emergency contexts or in pastoralist and nomadic communities. For instance, the Samaritan Purse model of mobile clinic works well in conflict-affected communities of Gelana in West Guji in Ethiopia.¹²²
- Significant funds are often needed to establish an effective mobile clinic system but more importantly, a thorough understanding of the context is required, including appreciation of the enablers and dividers and risks in a particular context.
- Clinics must be needed and desired by stakeholders, and must be integrated into existing medical structures.

Achievements – Example of the Gye Nyame Clinic in Ghana:¹²³

This holistic model was established in 2007 and offers psychiatric, neurological, pediatric, and pediatric surgery services to rural communities in Ghana via two mobile clinics. The Gye Nyame clinic trains local nurses and medical doctors to deliver services, including safe surgeries. It provides medications, diagnostics, direct care, and where needed, referrals and follow-ups. They are attached to a network of missionary hospitals. This model is successful for the following reasons:

- It is integrated into an existing medical system and utilizes its infrastructures.
- It was established after a long period (1999-2007) of building trust with the communities, health institutions, and the government. It also took two years to build the right team of nurses from the hospital to deliver the services as the work is extremely demanding.
- The model was designed with the communities after a thorough needs and resources assessment.
- Ghana benefits from a public health insurance mechanism that allows for free health care services most of the time.

Lessons learned:

- Starting a new mobile clinic model is not recommended unless the above conditions are met.
- Instead, it is preferable to support an existing functioning model, such as the Gye Nyame clinic.
- For example, in South Africa, it would not be recommended to launch a mobile clinic from scratch. Research into perceptions and experiences of nurses regarding mobile clinics in South Africa found that associated medical-legal risks and a lack of employee motivation to work in a mobile environment, present an unfavorable outlook.¹²⁴ According to Dr. Ben Gaunt, Clinical Manager of Zithulele Rural Hospital, a general mobile clinic will not make an impact because basic services are already available. Instead, he recommends strengthening existing clinics or focusing on specialized mobile clinics providing services such as eye care or dentistry.¹²⁵

Overview of the health innovation ecosystems in South Africa and Ethiopia:

South Africa:

Despite important challenges, including socio-economic inequalities, shortage of highly skilled labor, and insecurity, South Africa is rated, by Global Finance, as a “hot” location for business, with good conditions for growth. The country benefits from a favorable business climate, and a diversified economy, and is an access hub for Sub-Saharan markets.¹²⁶ In 2019, South Africa was identified as the first regional innovation leader by the 2019 Global Innovation Index.¹²⁷ The country’s health and life sciences market is estimated at \$3.2 billion,¹²⁸ and offers an important breeding ground for innovative solutions tackling the country’s top health challenges.¹²⁹ This success is the result of considerable governmental support for innovation, especially digital health innovations; strong manufacturing capabilities; well-developed innovations and research institutions; a large, young and growing population spurring the demand for products and services; a sturdy labor market; and a history of medical innovation breakthroughs. [Annex E](#) provides a snapshot of health innovations in South Africa.

The innovation ecosystem in South Africa with relevant for health innovation includes, for example:

- Research and academic centers such as the Bertha Centre for Social Innovation and Entrepreneurship, associated with the University of Cape Town’s Graduate

School of Business, which focuses on social innovation in the fields of finance, health, education and youth development.¹³⁰

- Several innovation mechanisms that support the incubation, acceleration, and adoption of innovations – including health innovations.ⁱⁱⁱ
- Several innovative initiatives that have been both implemented and developed by governmental entities to address priority health program needs.¹³¹
- Social health-related innovations spurred by civil society at the grassroots level. The Bertha Center for Social Innovation explains that “social innovations are primarily developed at the frontlines of healthcare delivery by individuals and communities in response to a pressing need, often not met by government services.” Examples include:¹³²
 - ✓ Transnet Phelophepa Health Trains uses South Africa’s railway network to take mobile clinics into the country’s heartland, treating 200 000 patients per year.
 - ✓ Iyeza Express, a bicycle courier service, employs local youth as specialized medical couriers to collect medications for chronic diseases from public health facilities and deliver them to over 1000 people living in the Khayelitsha township.
 - ✓ The Umthombo Youth Development Foundation addresses the skills shortages in rural health by providing scholarships for promising young people to study, who then return to their home communities as doctors, nurses,

iii. For example: The MLab Southern Africa, a non-profit organization accelerating mobile technologies including in the health sector <https://mlab.co.za/about-us/>; and the Khayelitsha Bandwidth Barn, a township-based tech hub and key enabler of inclusive innovation, supporting entrepreneurs and organizations creating products and services for township economies; <https://www.citi.org.za/spaces/bandwidth-barn-khayelitsha/>.

social workers, physiotherapists, and other healthcare professionals.

[Annex D](#) provides an overview of innovation support actors in South Africa.

Overall, South Africa's innovation mindset supported by a solid governmental commitment and flourishing ecosystem provides an interesting opportunity for creative synergies, cooperation, and knowledge-sharing between South Africa, Israel and the global health innovation ecosystem, provided that genuinely horizontal collaborations are sought. Many observers describe South Africa as a ripe testing ground for entrepreneurship and social innovation.¹³³

Ethiopia:

Ethiopia is classified by Global Finance as a “warm” location with some business opportunities but significant barriers to business growth. It is a landlocked country vulnerable to commodity price changes, and there are some challenges to the rule of law. However, the country is strategically located in the Horn of Africa, and economic reforms and large-scale privatizations are underway.¹³⁴

The health innovation market in Ethiopia faces important obstacles to effective adoption and scale of technology and innovation, mainly due to the country's social, economic, and humanitarian context. This includes important gaps in telecommunication and other infrastructures, and in digital literacy. Yet, Ethiopia is starting to invest in health innovation, especially digital health. It has also begun to incorporate technology into health systems, especially with regards to the use of mobile phones to improve health outcomes. In 2014, Ethiopia's National eHealth Strategy, led by the

Ministry of Health, set out to streamline ICT solutions in the country's healthcare sector.¹³⁵ More recently, in August 2020, the Ethiopian Ministry of Health, with the support of the Gates Foundation and other partners, opened the Digital Health Innovation and Learning Center (DHILC) in Addis Ababa to design and validate digital health tools, promote and share best practices, and scale-up innovations.¹³⁶

[Annex F](#) shows a snapshot of Ethiopia's health innovations.

Additionally, Ethiopia benefits from the presence of “traditional” humanitarian and development actors who have increased their support to innovations in recent years, including in the health sector. For instance, UNDP launched its Ethiopia Accelerator Lab in 2019 to support local solutions.¹³⁷ Even though health innovation was not one of the core priorities of its 2020 agenda, the accelerator worked on strengthening the innovation ecosystem of the country.¹³⁸ Because Ethiopia has been experiencing humanitarian crises for decades, there is a large number of agencies and funding available to support humanitarian health innovations.¹³⁹ COVID-19 has also shined a spotlight on promising synergies between Ethiopian and international academic actors to accelerate innovation by testing three different innovation models: “innovation for”, “innovation with”, “innovation by” communities.¹⁴⁰

[Annex D](#) provides an overview of innovation support actors in Ethiopia.

In sum, Ethiopia's (health) innovation ecosystem has been developing, over recent years, and could attract global innovation actors interested in accompanying the efforts of the government and other national stakeholders to boost this growing innovation ecosystem.

Despite significant progress, the world is far from achieving the UN's health-related SDGs. While

II. Challenges and gaps in health innovation processes

many existing health innovations throughout the world (including in Israel) are potentially game changing, many (if not most) remain not well-known globally, and do not reach countries and communities at scale. Too many solutions are failing to move from Proof-of-Concept to adoption and scale.

This study concentrates on two categories of gaps and challenges that represent important barriers to adoption and scale: (1) structural digital gaps that are inherent to the LICs and, to a lesser extent, MICs; and (2) process barriers that relate to the way in which innovations and programs are conceptualized and implemented. Although this study is not focused only on technological products, the following section highlights some challenges that are specifically inherent to technology in order to present and explain barriers to adoption.

Structural digital gaps inherent to the contexts:

Gap 1 – Limited infrastructure: Fixed-network coverage, penetration and speeds are still lacking in LICs. Less than 10% of households in low-income countries are fixed broadband subscribers, compared to 70% and close to 90% in middle- and high-income countries, respectively. Additionally, despite a 40% increase in the number of people connected to the internet in the past five years, over 30% of lower-income country populations are not yet covered by 4G and those who suffer from lower speeds, which hampers the adoption of many technological innovations such as digital health.¹⁴¹

Gap 2 – Disparities in digital access: First, in lower-income economies, only 32% of the population have basic digital skills. Second, disparities also exist within national populations, including in MICs. Many individuals and communities face considerable obstacles in accessing digital health, including socio-cultural barriers, such as social and gender norms, urban–rural divides, institutional barriers created by lower institutional capacity, and limited infrastructures.¹⁴² COVID-19 has further highlighted the existing inequalities in access to high-speed fixed and mobile connectivity.¹⁴³

Gap 3 – Technology affordability: In low-income countries, a monthly broadband subscription costs 12% of per-capita monthly gross national income (GNI), while the UN target is for less than 2% by 2025. Similarly, the cost of a basic smartphone (\$150) represents more than 1.2 months' wages in these low-income countries, and at least 3 or 4 times that for laptops.¹⁴⁴

Challenges due to innovation approaches:

Barriers to adoption also include process-related challenges that relate to the way in which innovation is conceptualized and implemented.

Challenge 1 – Contextualization: Limited understanding of users' pains and gains as well as of needs and their structural causes, forms a major obstacle to successful adoption of products and programs.¹⁴⁵ There is a plethora of examples in humanitarian and development settings of products and programs that

were brought in without full consideration of the contexts and with too many untested assumptions, resulting in a waste of resources and limited or no impact.

Full context assessments combining analytical tools from both the business development sector and the humanitarian-development sector (e.g., market analysis, willingness-to-pay analysis, do-no-harm analysis, vulnerability assessment, gender analysis) should be carried out in order to fully comprehend the contexts and markets. Many innovation practitioners and observers share a view that “health information and digital health solutions and interventions should always be co-designed with local communities to ensure uptake.”¹⁴⁶

Challenge 2 – Coordination and partnerships:

Health systems are extremely complex and rely on a multitude of actors. Hence, health innovation processes must consider the synergies and barriers existing among different actors, including not only patients and healthcare providers, but also, mobile operators, IT companies, insurance companies, pharmaceutical companies. Likewise, innovation strategies should be aligned with national health priorities. Successful innovative approaches are those that prioritize multi-sectoral partnerships with key actors.

Challenge 3 – Moving away from the linearity of innovation:

Too often, innovation processes are “solutions obsessed”, meaning that they focus primarily on the development of solutions rather than on the actual needs and opportunities in specific contexts. Products (and interventions) that are isolated from the systems in which they aim to operate, will not successfully address root causes, health determinants, and complex health problems that require longer-term transformational changes. Many commentators explain that in many cases the actual impact of

health technologies have remained limited due to an overwhelming focus on the technology itself without full consideration of the users and the overall system. Matching technologies to needs is not enough; such an approach narrows down the innovation pathway, contributes to the “gadgetization” of programs, and limits actual outcomes and ultimately impact. Hence, health innovation actors must consider, from the very early stage of program design, all the intricate factors, enablers, and barriers at play in the system, including:

- Local and national health priorities.
- The technical innovation itself.
- Policies and regulations – at international, national, and local levels.
- Willingness of political leadership to adopt innovations and governance structure.
- Investment, donors, and other funding trends.
- Financial viability, and scaling strategy including enablers and barriers for adoption and scale.
- Properly understanding the users, as well as all the other actors in the ecosystem.
- “Behind-the-scenes” requirements: supply chain, procurement, manufacturing, legal frameworks.
- Infrastructures requirements.

Considerations for future directions:

To address many of the above barriers, some entrepreneurs and academics have been advocating for **a paradigm shift from product innovation to service innovation**. This requires moving from an approach focused on “injecting” new technologies in health care settings toward one prioritizing “service design”. Such an approach goes beyond the mere technological focus, and considers the whole service delivery within the system, and all elements that interact within it.¹⁴⁷

James Shaw et al. found that previous theoretical approaches for health innovation adoption have practical limitations. He therefore developed a specific method within service design, called [Tool+Team+Routine]. **Figure 5** below provides a practical example of how to apply this methodology in the case of a digital health platform.^{iv}

	 Tool	 Team	 Routine
Description	Explore whether there is a clearly stated value proposition for all those interacting with the digital platform.	Explore whether the team has agreed that there is a problem worth solving.	Explore work-related routines, including patient recording, communications with other health providers, and procurement and maintenance of the tool/ platform.
Core questions	Do physicians, care coordinators, administrators, and pharmacists see how the platform will improve their work? Will the platform help reduce workload, or will it add tasks and responsibilities?	With the coordination platform, will physicians need to interact with pharmacists? Have they ever interacted before? Will they need to develop new relationships? How will that affect workflows?	How will the digital tools be procured, and what changes will it bring for the procurement / administrative staff?

Figure 5: Example of the [Tool+Team+Routine] applied to a digital care coordination platform.¹⁴⁸

iv. Other theories include: The Fit between the Individual, Task and Technology (FITT) model, the ARCHIE framework on technology design and implementation, and normalization process theory.



Part III:

Overview of the Israeli health ecosystem and opportunities

I. Overview of the Israeli ecosystem

General stakeholder overview and opportunities:

A history of robust investment in R&D and a legacy of scientific breakthroughs make Israel uniquely positioned to contribute to global health innovation. In 2020, the Pitango Healthtech Fund published a mapping of the Israeli healthcare startup industry depicting an impressive and diverse landscape with 250 active companies and more than 6.5 billion raised. According to the Fund, Israeli healthcare startups are reinventing health processes and paradigms, and thereby advancing the entire health industry, especially with regards to digital health, medical devices, and the biopharma sector.¹⁴⁹ COVID-19 has also propelled the demand and supply of screening and diagnostic solutions, and remote health services.

The Israeli health innovation ecosystem is highly active. As shown in **Figure 6** below, it comprises various actors including:

- **Startups:** There are 1600 health tech startups,^v including 250 active startups according to the Pitango Fund, of which 42 were found to be potentially relevant for this study ([Internal Annex 3](#)).
- **Universities:** They have their own venture-building or innovation initiatives such as the Hebrew University's Technology Transfer program.
- **Innovation support mechanisms:** They are organizations or mechanisms supporting the creation, early development, or growth of startups, such as Startup Nation Central, including some specifically focusing on health such as HealthIL (Non-profit) or Co-Velocity (For-profit).
- **Donors** specifically supporting the innovation and social impact ecosystem in Israel.
- **Investors:** They include some Health focus investors such as the Pitango Fund or the ARC Fund.
- **Private companies:** Some Israeli health companies such as TEVA have a strong innovation focus and support accelerations of innovations. Global health corporations with a presence in Israel, such as Johnson and Johnson, are also bolstering health innovation.
- **Humanitarian and development NGOs:** Some of them are piloting innovations including health products and processes such as the NALA Foundation in their health programs in Ethiopia.
- **Medical institutions:** They include, for example, innovation departments of medical institutions (e.g., Sheba Hospital), Haddassah, but also the health funds – many of which have their own health innovation support mechanisms (e.g., Maccabi Fund) and are spurring innovation essentially for domestic purposes.

[Internal Annex 2](#) provides a more comprehensive overview of the Israeli health innovation ecosystem.

v. 1,600 health tech startups according to bpiFrance (2021), and 250 active ones according to the Pitango Fund (2020).

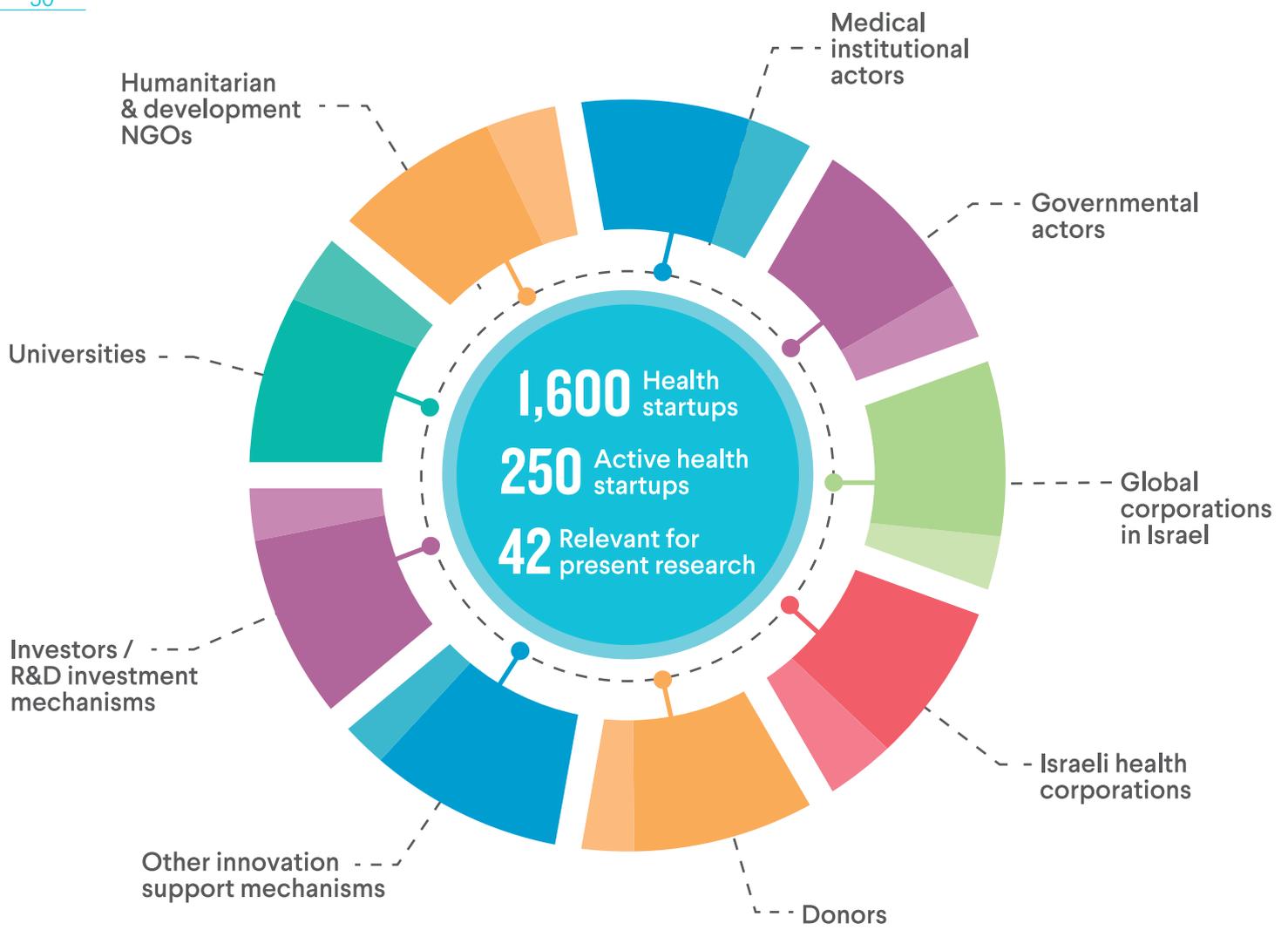


Figure 6: Overview of health innovation ecosystem in Israel.

Startups mapping

The study identified **42 startups** with products or processes potentially relevant for LICs and MICs. This selected group, listed in [Internal Annex 3](#), provides a representative sample (16.8%) of the 250 active startups identified by the Pitango Fund. The analysis was conducted looking at various criteria:

- The eight health themes relevant to the present study.
- The different categories of innovation.
- The growth stages of the startups. We only looked at innovations from the Proof-of-Concept stage onwards.
- Investment stages; funding sources; funding strategies.

- Regulatory status (FDA, CE, Helsinki declaration, etc.).
- Existing pilots and clinical trials and levels of data already collected.
- Revenue streams and users.
- Relevance to the needs identified, i.e. in line with global health priorities and best practices, as well as with health priorities in Ethiopia and South Africa.
- Overall mindset and values: User engagement approach; ethical approach to innovation.

In the 'representative sample', the majority of solutions (28.8%) falls under primary health care and telemedicine theme, followed by COVID-19 (19.2%), NCDs (17.3%), maternal and child health (11.5%), mental health (7.7%), communicable

diseases (5.8%), cross-cutting (5.8%), and humanitarian health (3.8%). The COVID-19 theme is large is because many health startups adapted their products or processes to address COVID-19 challenges. Such startups were therefore counted twice, i.e. in their 'traditional' categories, and in the COVID-19 category. Additionally, the field of diagnostics has been underinvested in for decades before the start of the pandemic. The fast onset of the crisis created a sharp rise in demand for diagnostic solutions and subsequent investment.¹⁵⁰

Within the representative sample, 85% of startups provide digital health solutions. According to many investors and innovators, Israel is becoming one of the world leading

forces in the digital health sector. In the last three years, Israeli digital health startups have raised a total of approximately \$800 million.¹⁵¹ In 2018, the government adopted a \$300 million National Digital Health Plan to support digital health tech startups.¹⁵² Two of the digital health sectors that have attracted the highest amounts of capital are: 1) AI-based solutions, mainly in the fields of imaging and predictive analytics; and 2) Data platforms that collect, present, and contextualize data. Another growing area is patient self-care and personalized treatment.¹⁵³

Internal Annex 4 provides examples of Israeli health startups at different stages and their interests in exploring LICs/LMICs.

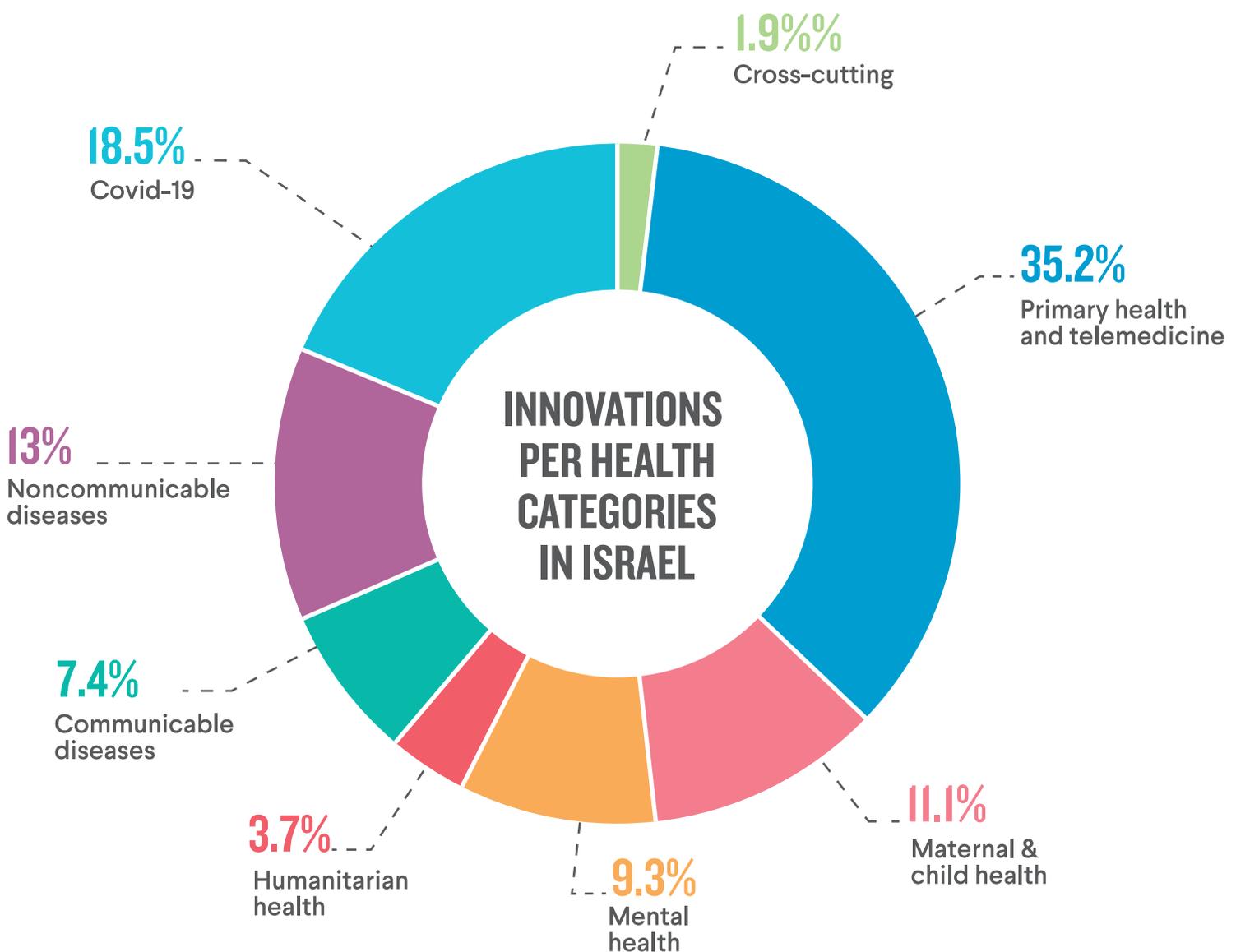


Figure 7: Innovations per health categories from the selected group of startups.

II. Israel-specific challenges

Challenge #1 – Countering VCs’ lack of appetite: Many Israeli solutions fail to reach emerging markets due to Israeli venture capital Funds’ lack of appetite for these “risky” markets.¹⁵⁴ Many Israeli startups that initially sought to explore emerging markets, were forced to re-focus their efforts on North American and European markets due to their investors’ demands. There is a heavy reliance on domestic investment channels which limits the exploration of opportunities in emerging markets. Alternatives to domestic channels are either deemed too challenging or not well known by the startups and innovation actors.

For example, Israeli startups could approach international VCs which are more prone to taking risks by investing in emerging markets. However, there are two major challenges to this alternative.¹⁵⁵ First, international VCs are usually less inclined to support startups that have not previously received domestic investment. Second, international VCs are traditionally more likely to invest in startups that can already demonstrate a significant annual return on investment. This would limit opportunities for early-stage startups. Another direction for these startups could be to access grant funding from international innovation funding mechanisms.^{vi} However, Israeli startups and innovation actors are often not familiar with international innovation funding opportunities.

It is therefore recommended that any program aimed at supporting health innovation in LICs and MICs collaborate with an international entity that would provide a stamp of approval, access to funding and network, and would “reassure” and entice investors; and/or should

target companies at much later stages which do not face this financial risk or companies that do not rely on domestic sources of revenues; or should work solely with NGOs with innovative processes.

Challenge #2 – Navigating a variety of ‘mindsets’: Successful innovation adoption processes in LICs and MICs require full consideration of many different (and sometimes opposing) perspectives on innovation processes:

- **The startups:** Startups can be very product-oriented, in that they are focused on the development of their technologies. However, to successfully design, pilot and scale innovations for complex and volatile environments, much more is needed, including: understanding the specific contexts as well as global priorities; knowing how to position the solution into that broader ecosystem; exploring business pathways that are specifically adapted to the user segments; navigating the social, economic, political, environmental, and cultural dynamics at play; designing localized and sustainable strategies, and more.
- **VCs:** These Funds play an important role in the innovation equation in that they strongly influence the directions chosen by startups. The above-mentioned barriers associated with VCs in Israel must be fully considered.
- **Academic institutions:** These play a crucial role in innovation adoption and scale as they allow for collection of scientific evidence.

vi. These include, for example: the Gates Foundation, the Wellcome Fund, Elrha, Humanitarian Grand Challenge, or MIT Solve; the UNICEF Innovation Fund, UNDP, UNCDF (the UN Capital Development Fund), and the EU.

- **Innovation support mechanisms:** Several institutions support the health innovation ecosystem in Israel, including innovation mechanisms and programs attached to large companies or medical institutions, and specialized innovation actors (see [Internal Annex 2](#)). The remaining gap seems to be in linking these considerable domestic resources and expertise to existing international trends, practices, and opportunities even though efforts are increasingly being made in this direction. Additionally, many innovation support mechanisms still primarily approach innovation processes in LICs and MICs from the business and/or technological angles. While this perspective is essential for successful innovation uptake, it also tends to undervalue the third intertwined and crucial variable of the innovation equation, that is the systemic and context factors. Innovation mechanisms in Israel aimed at LICs and MICs must move away from the traditional vertical approach to innovation processes in which technologies from the Global North are brought in to “solve” problems in the Global South without proper contextualization nor coordination. The limitations of this approach have become very apparent across the globe.
- **Israeli humanitarian and development NGOs:** NGOs can play a crucial role in innovation adoption and be an effective channel for positive change at scale. A growing number of INGOs are successful in developing, adopting, and disseminating humanitarian and development innovations and technologies globally such as Oxfam, Save the Children, and World Vision, all of which have solid in-house innovation cultures. Due to its flourishing innovation ecosystem, Israel could provide a fertile

ground for Israeli NGOs to play similar roles and disseminate Israeli innovation and technologies. However, NGOs may not always have the tools to develop financially viable models due to, for example, their heavy reliance on donors which can be accompanied by varying political and economic interests that are not always sustainable. As such, it is important that NGOs work hand-in-hand with private-sector entities and innovation actors.

Challenge #3 - Adjusting the “startup nation discourse” with regards to LICs and MICs:

Many innovation mechanisms in Israel are influenced by the ‘startup nation’ domestic paradigm. Israel is indeed a national hub for research and innovation.¹⁵⁶ Yet, successfully adopting and scaling innovations in/for/with LICs and MICs requires much more than technological innovation and entrepreneurial motivation. It demands a certain systemic mindset that thoroughly explores the actual needs, resources, and complex systems in place in the relevant contexts. Supporting startups’ technological growth is only one variable of the ‘successful innovation equation’. Today’s problems are too complex, inter-connected, and protracted to continue operating in silos or linear ways. This is one of the reasons why many international innovation mechanisms are testing innovation processes and models that are: (1) more users-led; (2) co-designed with users; and (3) developed within the ‘targeted’ contexts themselves;



Part IV:

Recommendations

I. General recommendations

Recommendation #1:

‘Demand-pulled’ instead of “technology-pushed” approaches.¹⁵⁷

JDC-GRID and partners should embrace a “demand-pull” approach to innovation. Both literature and practice have shown the limitations of the “technology-push” approach when it comes to supporting the adoption and scale of a product (or process) beyond the pilot phase.¹⁵⁸

JDC-GRID and partners may want to build an in-country committee that includes the NGOs’ staff, government representatives, community representatives, health practitioners, health innovation experts, international aid agencies, academics, and other strategic stakeholders.

This committee would be in charge of prioritizing the in-country health needs; formulating one or two high-priority challenges within the pre-defined scope; sharing these challenges with a pool of startups (from the country in question and internationally), ideally pre-selected by JDC-GRID; and selecting, from this pool of startups, the innovation(s) to be piloted with local partners. In this scenario, the burden of innovation selection primarily falls on the committee to ensure a horizontal process shaped by actual demand.

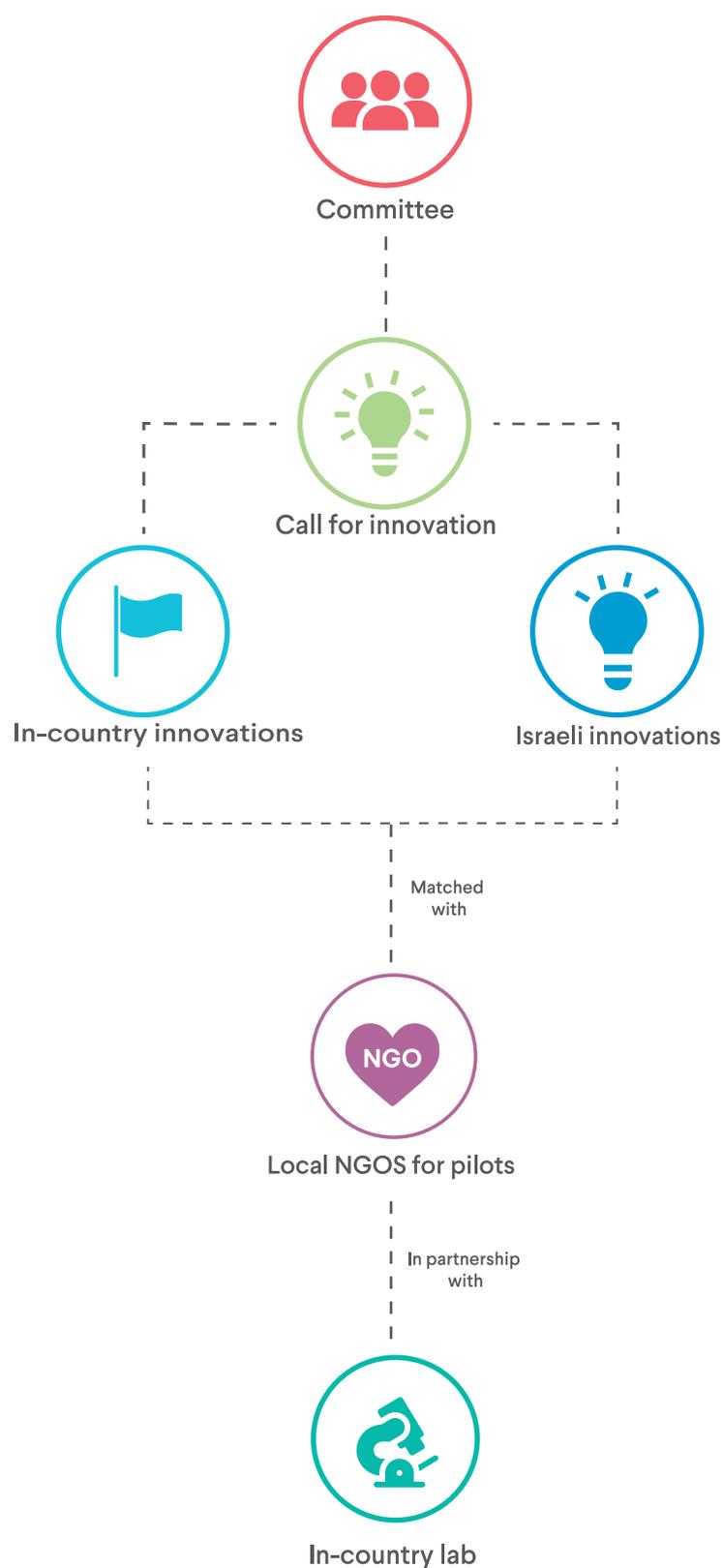


Figure 8: Example of in-country committee-led process.

Box 5: Technology/innovation-pushed versus demand-pulled approaches.

Technology/innovation-push	Demand-pull
The startup has negotiated either a pilot project or larger adoption of its technology in a particular health care environment – often with a manager or other decision-maker who will not interact directly with the product.	A team of people representing a health care environment identify a clear problem they are facing in their service.
The people who will use the product are usually not consulted before the decision to procure is made.	They scope out the nature of the problem, and identify a particular kind of solution that could help address the problem. The team then identifies a particular tool that meets an existing, well-defined need.
This scenario makes adoption more challenging.	This approach generally maximizes the ease of achieving goals.

Recommendation #2: Holistic approach.

Any programs aiming at effectively and meaningfully supporting health innovation should consider a multitude of interconnected factors. **Figure 9** provides an overview of the holistic innovation equation for a successful innovation process. It shows the complexity of the process which should thoroughly examine three intertwined variables: the technology, financial viability, and the needs of communities and systems. Additionally, even if the product or program focuses on a specific phase of the clinical management flow (e.g., screening and detection), it must also consider the other stages of the flow (e.g., referrals and actual services), as well as the ‘behind-the-scenes’ stages such as manufacturing, procurement, supply chain etc.

THE HOLISTIC INNOVATION EQUATION

Factors to consider for a successful innovation process

Technology & Innovation

- Tech relevance to the Triple Aim health outcomes
- Tech sustainability (e.g. training, maintenance, climate-resistance)
- Service design innovation
- Desirability of the tech by users and ecosystem

Financial Viability

Funding:

- VCs' interests in LICs/MICs
- Alternative funding opportunities (e.g. international institutional funding)

Business model viability and scale potential:

- Understanding of user segments' penetration
- Go-to-market strategies
- Willingness-to-pay assessments (who pays? e.g. private clinics, insurances, government?)
- Competition mapping
Financial models
- Scale partnerships (e.g. government, large alliances)

Community and Systems' Needs

Communities/users:

- Genuine and meaningful users' engagement throughout the innovation journey
- No-one-left-behind assessments (e.g. gender analysis)

Systems:

- National health priorities
- Engagement of all stakeholders in the ecosystem - Service design innovation
- Analysis of social and cultural norms (e.g. how will they affect the solution, how the solution will affect them?)
- Social, economic, environmental, and political dynamics
- Governmental positions and other explicit and implicit politics
- Infrastructures

Additional cross-cutting considerations

- Manufacturing, procurement, logistics
- Safety issues
- International and national regulatory frameworks
- Legal and administrative requirements (e.g. customs, registration)
- Corruption, ease of doing business index

Figure 9: Overview of the holistic innovation equation for a successful

Recommendation #3: Partnerships and collaborations.

One way to ensure that all the pieces of the health innovation puzzle are considered is to create a consortium of partners with clearly defined roles. Many Israeli actors interviewed mentioned the importance of having “a big name” in the consortium to support the process – for example, a UN agency or other international organization. To attract such global actors, JDC-GRID and partners can:

- Identify entry points or champions within these organizations to encourage collaborations, and use recommendations and e-introductions from its existing network.
- Play the Israeli innovation card, to a certain extent, provided that it fully reflects global practices and trends and is adapted to the mindset and language of these international institutions.
- Point out that JDC-GRID brings its own funding and is interested in co-funding and technical partnerships. JDC-GRID may want to leverage its access to donors to attract these entities.



Figure 10 below presents an analysis of actors to consider (for specific examples see Internal Annex 5).

	Actors	Roles
Israel	JDC	JDC is the program holder and plays the role of connector between all other partners. It supports the design of the program, secures funding, and is the main focal organization in charge of building a pipeline of Israeli health startups.
	Health startups or NGOs	These provide the technological solutions or the process innovations.
	Innovation actors in Israel	These bring a unique understanding of business development, technological feasibility and sustainability, go-to-market strategies, user analysis, and scale strategies.
In-country	Local health NGOs in targeted countries	These provide fundamental links to communities and health systems and have access to users and other relevant stakeholders. They can lead the user engagement process and make sure the process is demand-based, and can also coordinate with multiple health care providers. Ideally, the NGOs will have a large enough scope to facilitate adoption and scale.
	Health care centers or alliances of doctors directly	Another option is to partner directly with a health care center or an alliance of healthcare providers.
	Local / national government	It is important for the innovation to be aligned with national health policies and priorities to ensure relevance and greater potential for adoption and scale. A memorandum of understanding (MOU) with a ministry or health district/province authorities is a good entry point.
	In-country providers: <ul style="list-style-type: none"> • IT • Telecom • Insurance • Other 	If the focus is placed on digital technologies, it is important to establish a collaboration with IT and/or telecom companies. Likewise, if the innovation process targets public services, a scheme with an insurance company might be needed. Alternatively, partnerships with private centers can be envisaged (except for South Africa).
	Local innovation support mechanisms	These actors are often the pillar of the innovation ecosystem of a country (For details on Ethiopia and South Africa see Annex D).
Global	International institutions	These can provide additional funding. They enable access to a global network, pilot opportunities, and commercialization routes. They also bring global best-practices (See Annex G).
	Adoption and dissemination/scale actors	These entities are crucial for taking the innovations to the next level. They have the ability to disseminate key findings relating to the innovation uptake, and encourage wider adoption such as via international health (innovation) alliances (See Annex G).
Cross-cutting	Academic partners	These can be either partners in Israel or in other countries. Their role will be to gather and share technological or social evidence regarding innovation uptake.
	Investors	It is important to bring aboard VCs to attract them to these settings, and to advocate for more focus on such markets.
	Donors	Relations should be built with global health innovation funders and global innovation support mechanisms (See Annex G).

Figure 10: Overview of possible partners and relevant stakeholders.

Recommendation #4: Thematic prioritization and branding.

Based on the findings of this thorough study, it is recommended that JDC-GRID specializes in one thematic health area (e.g., NCDs, or maternal and child health) along with associated with themes that can be combined into that primary expertise (e.g., mental health). The health sector is too broad and too complex for an organization to simply state that it is “working on health”. This focus will help JDC-GRID create a professional brand that would be based on expertise and, with time, experience.

When considering all the factors at play, four prioritized themes emerge for JDC-GRID to consider when defining the scope of its health innovation programs in LICs and MICs especially South Africa and Ethiopia.

1. Primary health care and telemedicine
2. Maternal and child health
3. Mental health
4. Non-communicable diseases

For specific examples of Israeli and international innovations and technologies matching these themes, see Internal Annex 6.

	 Primary healthcare (which relates to the other 3 themes)	 Maternal and child health	 Mental health	 Non-communicable diseases
Priorities	<p>Screening, testing, diagnostics, and referrals in rural communities.</p> <p>Coordination between central hospitals and rural health centers.</p> <p>Support for health care workers in rural areas.</p> <p>Behavioral change processes.</p>	<p>Remote care for mothers and children (remote monitoring support).</p> <p>Home-based care.</p> <p>Support for frontline nurses.</p> <p>Awareness, outreach, and education</p>	<p>Community outreach and awareness.</p> <p>Screening and referrals.</p> <p>Integration into PHC.</p> <p>Patient accompaniment.</p>	<p>Cancer screening (especially cervical cancers) and referrals.</p> <p>Screening and referral for diabetes, hypertension, and chronic obstructive pulmonary disorder/disease.</p>

Figure 11: Thematic prioritization for JDC-GRID's health programs.

Recommendation #5: Geographical scope.

All the interviews and analysis conducted for this study highlighted that South Africa is a very relevant, promising, and relatively accessible market to explore for health innovation.¹⁵⁹ The World Bank Ease-of-Doing-Business Index ranks South Africa 84 out of 190 (fourth in sub-Saharan Africa, after Mauritius, Rwanda, and Kenya).¹⁶⁰

Ethiopia presents a more complex market, but also offers interesting opportunities. First, it is a humanitarian setting with a strong need for medical innovations for emergencies including:¹⁶¹

- Solutions that ensure capacity-building and coordination, promote the safety of health workers, and enhance relations with communities.
- Solutions for faster or less costly import and distribution of quality essential health supplies; and solutions for the rapid manufacture and use of high-quality and safe supplies.
- Solutions for service providers and communities to reduce the occurrence of, and be better prepared for, health hazards.
- Solutions for the effective management of large epidemics.
- Solutions that focus on access to health care for the most underserved groups.

A growing number of funding opportunities exist in the humanitarian innovation ecosystem that could be maximized in Ethiopia.^{vii} As such, JDC-GRID could devote a specific ad-hoc focus to further mapping and assessing medical

solutions that can be applied directly, or adapted to, humanitarian settings to address acute emergencies when they occur, and enhance preparedness and resilience.

Another relevant option for JDC-GRID in Ethiopia is the possibility of attaching the health innovation component to its existing TOV program – a large food security and agriculture program with a network of farmers. A health component could be added to improve access to health services by the farmers, their families, and communities.

Recommendation #6: Funding.

Systemic health innovation processes are expensive and require significant budgets allocated over several years. It is therefore recommended that JDC-GRID capitalizes on existing funding to identify matching funds. Donor institutions are usually more interested in matching funds to support a specific project. In the case of Israel, discussions could even consider the development of a small fund specifically aimed at supporting the adaptation and adoption of Israeli technologies in LICs and MICs.

vii. To cite just a few examples: elrha, Humanitarian Grand Challenge, UNHCR innovation service, INGOs in-house innovation strategies, and the Response Innovation Lab.

Recommendation #7: Growth stages.

Depending on the different innovation growth stages of the innovations, different programs will be more relevant. **Figure 12** illustrates the type of programs corresponding to each growth stage.^{viii}

(For examples of Israeli startups in each category, see [Internal Annex 3](#)).

	Definition	Relevant types of programs	Possible advantages	Possible limitations	Relevance for JDC
Startups' growth stage	Ideation Process of defining and analyzing the problem and generating potential solutions.	Venture builder (e.g., Pears Challenge).	Helps build the ecosystem. Potentially adds technologies in the pipeline. Helps create awareness and interest.	Hard to measure impact (can be calculated in the long-term). High rate of "failure". Long-term process.	
	R&D Process of further researching and developing innovations that have the potential to address a problem.	Incubator, accelerator, VC (e.g., ARC Ventures).	Supports the development of possibly game changing technologies.	Needs considerable budget, time, health infrastructures, and network.	
	Proof of concept Process of field-testing an intellectual concept behind an innovation to gain an early, real-world assessment of its potential.	Pilots prior to or with FDA/CE-approved technologies. (e.g., Gates Foundation-supported pilots).	Opportunity to further strengthen the business model; engage new user segments; strengthen approach; collect further data.	Ethical considerations of testing health technologies on people. May divert startups from initial fundraising focus (VC issue).	Could be relevant if a thorough compliance process takes place, and depending on regulatory frameworks (FDA/CE).

viii. The categorization of growth stages used here is from the International Development Innovation Alliance: <https://r4d.org/wp-content/uploads/Innovating-to-Address-GBV.pdf>.

	Definition	Relevant types of programs	Possible advantages	Possible limitations	Relevance for JDC
Startups' growth stage	Transition to Scale	<p>Process of developing the innovation model, after demonstrating small-scale success, and of attracting partners to expand and become financially viable.</p> <p>Additional pilots /integration into programs.</p> <p>(e.g., elrha's Journey to Scale program)</p> <p>See Box 6 below.</p>	<p>Opportunity to further strengthen business model; engage new user segments; collect further data.</p> <p>Possibility to 'see' impact more rapidly.</p> <p>Critical phase for the startups.</p> <p>Less of a 'funding diversion' for startups.</p>	<p>Many barriers to scale that must be identified and addressed in the program.</p>	<p>Interesting and relevant phase with a lot of potential, yet many obstacles.</p> <p>Transition-to-scale strategies require thorough analysis, a vast network, funding, and holistic approach.</p>
	Scaling	<p>Process of replicating and/or adapting an innovation across large geographies and populations for transformational impact.</p> <p>Advanced accelerator (e.g., Google SDG accelerator).</p> <p>Partnership facilitation (e.g. CoVelocity).</p>	<p>See above.</p> <p>Lesser risk.</p> <p>Startups with funding already, so less of a "funding diversion" for them.</p>	<p>See above.</p> <p>Scaling innovations may not be interested in a small support program if they have other larger scaling pathways. The program would need to be seen as benefiting the scale strategy.</p>	<p>See above.</p> <p>JDC/NGO would have to identify a strong value proposition to attract scaling startups.</p>
	Sustainable scale	<p>The wide scale adoption or operation of an innovation at the desired level of scale sustained by an ecosystem of actors.</p>			<p>JDC would not offer a strong value proposition here.</p>

Figure 12: Relevant innovation programs for each startup growth stage.

Box 6: Spotlight on elrha's Journey to scale program.¹⁶²

elrha has developed a program to specifically help humanitarian innovations address the many barriers they face to scale. It provides funding and technical support on scale strategies, and facilitates partnership opportunities.

When identifying potential for scaling, it uses the following criteria:

- The innovation addresses an actual need.
- It has a solid business model (or a strong potential for financial viability).
- It shows an ambitious yet realistic scale strategy with solid dissemination mechanisms.
- It is anchored into solid research- and practice-based evidence.
- It is community/user-centered with strong ethical considerations and do-no-harm principles.
- It is part of the ecosystem (and not an ad hoc solution).
- It demonstrates innovativeness in the product, and/or the business model, and/or the overall programmatic approach.

Recommendation #8: Selection and compliance.

JDC-GRID and partners must adopt a solid compliance process to identify the startups/NGOs and innovations with which they will work. Compliance criteria relate to: (1) technological/innovation robustness and feasibility; (2) financial viability of business model (or potential); (3) relevance to health outcomes and priorities; (4) commitment to ethics of intervention; (5) demand-led and user-centered approach; (6) sustainability of the product/approach. Additionally, compliance with regulatory frameworks, such as FDA approval or CE marking, is key and will determine the possibility of further collaborations.

Recommendation #9: Localization of innovation.

It is important to highlight the current global efforts to promote localized innovations in LICs and MICs. COVID-19 has further emphasized the need to invest in existing capacities, ideas, solutions and resources in the Global South. A growing number of actors are seeking to increase support for (1) solutions developed in the global South; (2) solutions co-designed by actors from the Global South and North; and (3) South-South collaborations; and also to redefine the roles of international actors in innovation processes.

Beyond the promotion of localized products, there is also a desire, within the international innovation community, to reflect on the potential negative impact of western-led innovation processes. Vertical innovation processes that are shaped and led exclusively by Global North actors are facing much criticism, and their

limitations have been clearly demonstrated.¹⁶³ For example, Jimenez and Roberts explain that “models of innovation from the Global North are often applied uncritically in the global South. Actors from the Global North are insufficiently mindful of ‘Epistemologies of the South’” despite the fact that “there is a lot to gain from a skillful combination of different ways of knowing.”¹⁶⁴

JDC-GRID and any international actors working on innovation should strive to incorporate support mechanisms for localized innovation

and encourage collaborations between Israeli, international and in-country innovators. This should be done by deploying a combination of the three models of innovation processes, namely “innovation for”, “innovation with”, and “innovation by” communities, as in the cases of Cambridge University in Ethiopia and elrha-START Network-ADRRN’s Community Lead Innovation Partnership (CLIP) program presented in Box 7 below.

Box 7: Two examples of innovation programs combining localized and international.

The Community-Led Innovation Partnership (CLIP) with ADRRN, elrha and Start Network.

The CLIP is a three-year program providing financial and non-financial support to community innovators in the DRC, Guatemala, Indonesia, and the Philippines to improve the relevance and effectiveness of humanitarian preparedness, response and resilience interventions through innovation driven by people affected by humanitarian crises. The country-based Innovation Initiatives support contextualized solutions to local problems in emergency settings, while a global team provides technical support, global partnerships opportunities, cross-initiatives for learning and collaboration, and potential avenues to scale emerging areas of innovation.¹⁶⁵

BIT Maker Space in Ethiopia: Making health innovation more inclusive in Ethiopia.¹⁶⁶

The Centre for Global Equality, Bahir Dar University, and University of Cambridge collaborated to strengthen local responses to COVID-19 through three innovation channels:

- 1. Innovation for:** Solutions evolved beyond local contexts but with end-users *in mind* (e.g., 3D printed face masks, ventilators from the UK).
- 2. Innovation with:** Solutions co-created between actors in and beyond local end-user contexts (e.g., co-designed oxygen concentrator).
- 3. Innovation by:** Solutions designed by actors in local end-user contexts (e.g., automated hand-washing systems; hand sanitizer; disinfection tunnel; infrared thermometer, pulse rate oximeter; COVID-19 App; remote patient IoT monitoring system).

Recommendation #10: Social Impact Measurement.

Programs must adopt a strong social impact measurement strategy from the start to identify and monitor specific deliverables or outputs, as well as the expected changes (or outcomes).

The ultimate goal of the program should be to improve health outcomes. To achieve this goal, changes need to take place, and for this to happen, some specific deliverables must result from activities.

To monitor progress and measure its impact, the program must have both output (or activity) indicators, and outcome (change) indicators to be assessed against a clear baseline. To measure impact, indicators based on SDGs targets should be integrated, when possible, into the monitoring, evaluation and learning framework. The UN SDG compass for businesses can help identify some existing indicators. The latter should however be adapted to the specific targeted contexts.¹⁶⁷

Outputs	Outcomes
<p>Question: What are the concrete/visible/tangible results or deliverables the project will first need to show to reach the expected changes?</p>	<p>Question: What are the changes the program will trigger in the population or the systems that will lead to the ultimate goal (the impact)?</p>
<ul style="list-style-type: none"> • # of people reached (% women, % children, % vulnerable groups, % rural etc.) • # of partnerships / collaborations involved • # of activities performed • # of technologies or innovations successfully integrated and piloted etc. 	<p>Enhanced patient experience (access, availability, quality, satisfaction):</p> <ul style="list-style-type: none"> • Increased access to quality essential health-care services (SDG target 3.8) • Enhanced capacity of care providers to provide safe, quality services • Increased patient satisfaction with care experience • Increased density and distribution of skilled health workers (SDG target 3C) <p>Improved population health outcomes:</p> <ul style="list-style-type: none"> • Indicators in line with national health priorities • Depends on the health topics; can be measured over several years <p>Controlled or reduced health care costs</p>

Figure 13: Examples of outputs and outcome indicators.

Recommendation #11: Sustainability, transition/exit strategies.

First, addressing health challenges is a complex process that requires a multi-year engagement and commitment with a solid period allocated to needs and resources assessment, partnerships development and trust building to create solid foundations for the project. Second, from the start, it is crucial to have a solid sustainability strategy supported by a transition and exit plan. To be successful, health programs must be integrated into existing systems and infrastructures. It is therefore important to have the full buy-in of local actors including governments, health providers, and communities. Likewise, it is fundamental to have, from the beginning, a solid financial sustainability plan that will ensure the economic viability of the project, and not heavily rely on external philanthropy. A good transition/exit goal would be the full adoption of the program/innovation by the government and integration into national health strategies funded by the government (partly or fully). This study provides good examples of successful transition/exit strategies (e.g. Nurses-on-the go, Sproxil, Ghana mobile clinic).

Internal Annex 7 offers recommendations specific to JDC-GRID on possible programmatic options to support the successful adoption of health innovations in LICs and MICs. It is divided into three models, each of them supported by practical examples.



EXTERNAL ANNEXES

Annex A: Literature review – Bibliography.

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Annex B: List of boxes and figures.

1. List of boxes in order of appearance in this study:

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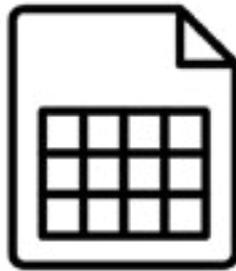
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Annex D: Overview of innovation support actors in Ethiopia and South Africa.



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Annex E: Snapshot of health innovation in South Africa.



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Annex F: Snapshot of health innovation in Ethiopia.



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Annex G: Overview of global innovation support actors.



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