Report

SDG3 Global Action Plan: supporting Accelerator 5 on research, innovation and access

Survey results

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Cover photo: Syrian–American Medical Society Foundation medics undertake a procedure in Gardens Hospital, Jordan, 2018. © James Buck/Flickr.

Authors and acknowledgements

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This report complements research undertaken by Fiona Samuels and Carmen Leon-Himmelstine (both ODI), Rachel Thompson (Consultant) and Cicely Thomas (Results for Development, United States) who assessed innovations at various stages of implementation in country and scale-up at regional level through five case studies.

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Acronyms

GAP	Global Action Plan
GDP	gross domestic product
GHS	Ghana Health Service
HIC	high-income country
LIC	low-income country
MIC	middle-income country
MoH	Ministry of Health
NACOSTI	National Commission for Science, Technology and Innovation (Kenya)
NGO	non-governmental organisation
NIH	National Institute of Health (United States)
PPP	public–private partnership
R&D	research and development
SDG	Sustainable Development Goal
SUS	Unified Health System (Brazil)
TWG	technical working group
WHO	World Health Organization

Executive summary

This report presents the analysis of research conducted by ODI to support 'Accelerator 5' on research and development (R&D), innovation and access, co-led by the Wellcome Trust and the WHO, to help speed up progress towards the 2030 Sustainable Development Goals (SDGs) for health as part of the Global Action Plan (GAP).

In particular, this research aims to provide evidence and conclusions for the two key issues of the GAP, namely: *scaling up innovation* – identifying catalytic actions for national and international organisations to work together to achieve scale and impact; and *elevating country priorities* – consulting directly with countries to create better alignment between national needs and internationally commissioned research and innovations.

From across 22 low- and middle-income countries and one high-income country, we identify institutions and individuals and their roles, and routine systems that are used to assess country healthcare needs, to prioritise them, and to translate these needs and priorities into innovations in healthcare – both through policies and practices. We also distil key enablers and barriers to the innovation sequence – from conceptual blueprints, through incubation and trials to determine their feasibility, to the scale-up of successful pilots into larger (and possible national-level) roll-outs. We have gathered data using two complementary surveys – an online survey and in-person interviews – of the perceptions of healthcare policy-makers, administrators, healthcare funders and providers, international and multilateral agencies, other informed stakeholders such as researchers, and community-based institutions.

The key findings of our analysis indicate the following:

- A majority of countries report that their country has a formal healthcare research and innovation agenda – although there are differences in perspectives on the form, nature, accessibility and use of this agenda. Most countries have a formal health and/or R&D agenda, but a healthcare innovation agenda is more implicit than explicit in its form.
- There is a pattern of dominant roles played by institutions: national governments play the most dominant role in setting the agenda; civil society, and research and innovation institutes in turn play a more prominent role in translating the agenda into specific areas of focus. International institutions and funders play the most significant role in funding the trials and incubations, and their subsequent national scale-up.
- This distribution of roles does not, however, appear to be the result of a coordinated strategy, but rather the outcome of the relative strengths and expertise of the different entities.
- National needs and priorities do seem to get reflected in the systems and funding emphasis of multilateral institutions and international funders; however, this overlap is less by design or active engagement than by coincidence or operational convenience.
- The most common barrier preventing greater harmonisation between national and international entities, and among international agencies, is lack of information – on domestic healthcare needs, gaps and priorities, and on outcomes of innovation trials and experiments. The presence of international political will, and systems/mechanisms to coordinate between national and international healthcare stakeholders are also essential to enable closer alignment between their policies and programmes.
- Regarding the scale-up of innovations, there appears to be a robust pipeline of trial-tested innovations across all categories of countries. The four prominent enablers of effective

scale-up of successful innovations to a national level are: knowledge and accessibility of evidence about successful trials to inform scale-up decisions; adequate and assured or dedicated funding to make roll-out planning more predictable and less risky; the presence of political will and domestic champions who can galvanise grassroots support as well as be catalysts to draw in funding and overcome inertia; and good governance and coordination between agencies.

- The absence of such enabling and fostering conditions creates barriers – resulting in potentially promising healthcare innovations not being scaled up or being abandoned when the results did not match the intended and expected outcomes.
- Lack of funding or regulatory stipulations do not appear to be major impediments to scaling up potentially successful innovations. Inadequate understanding of the value of research and insufficient political buy-in are cited as more important obstacles to successfully scaling up innovation.

1 Background

1.1 Motivation

This research by ODI, conducted in partnership with the Wellcome Trust and the WHO, aims to support the delivery of the SDG3 GAP through supporting the development of 'Accelerator 5' to focus joint action.

The overall scope of research for the SDG3 GAP focuses on generating recommendations in three key areas:

1. **Optimising the global research system**: identifying international systems-level improvements which require coordination and alignment across the sector.
2. **Scaling up innovation**: identifying catalytic actions for national and international organisations to work together to achieve scale and impact.
3. **Elevating country priorities**: consulting directly with countries to create better alignment between national needs and internationally commissioned research and innovations.

This particular exercise aims to provide evidence for the last two of these three key areas. It seeks to identify the routine mechanisms used to assess country healthcare needs and prioritise them. It also attempts to identify the processes, institutions and roles of those involved with translating these needs and priorities into innovations in healthcare – both through policies and practices.

From this, our research aims to distil key enablers and barriers to having a robust system that recognises the potential for innovation in delivering effective solutions to the pressing healthcare needs of local and national communities. This includes the innovation sequence from conceptual blueprints, through incubation and trials to determine their feasibility, to scaling up successful pilots into larger (and possible national-level) roll-outs.

This research is primarily driven through two surveys: an online survey of high-level healthcare policy-makers and practitioners from 22 low- and middle-income countries (LICs and MICs) and one high-income country (HIC), and complementary in-person interviews with a subset of such officials. Both surveys elicited respondents' experiences of elevating country priorities in the healthcare innovation agenda and of scaling up potentially successful innovations. This section of research gathers cross-country evidence on the range of experiences and thereby identifies the more common and possibly necessary elements for successful and responsive healthcare innovations. It also complements a set of more detailed and in-depth case studies with a literature review, key informant interviews, analysis and write-up, and validation of select innovations (ODI, 2019).

1.2 Three core questions

To structure the main elements of our research – elevating country priorities in healthcare innovation, and processes to scale up successful innovation – we ask three core questions:

- How are the *national health research agendas* shaped and how do they work?
- How well are *national priorities reflected* within international systems and funding mechanisms, if at all?
- What is the process to *effectively scale up innovations* at country level?

The emphasis is on evaluating the variety in systems across and within countries, the environment within which they operate, the systemic challenges faced by stakeholders in healthcare service provision – ranging from

policy-makers, to financers, research and innovation institutions, healthcare product developers, service providers and service recipients – and some of the successful and unsuccessful responses to these challenges.

We hope that by enumerating the responses to these three questions, we will not only draw out the range of experiences across the world but will also identify patterns and markers that indicate greater scope for success.

2 Methodology

The main channel for this section of research was primary data-gathering using two complementary surveys. The first was *an online survey* of nearly 100 healthcare policy-makers, administrators, healthcare funders and providers, international and multilateral agencies, other informed stakeholders such as researchers, and community-based institutions. The survey has 35 questions (see Annex 1 for the questionnaire) that reflect the three core questions highlighted in Section 1.1 and takes about 15 minutes to complete. The survey has the following thematic sections:

1. National healthcare research agenda: its presence, its nature, who formulates it and how.
2. Prominent entities in the healthcare research and innovation system: their roles, responsibilities, decision-making criteria or motivations and processes.
3. The process to deliver effective scale-up of innovations at a country level.
4. The prominent enablers and barriers to agenda-setting, prioritising and scaling up innovations.

The survey questions seek the *perceptions of respondents* on the nature of systems, processes and institutions, and involved participants based on their personal experience and knowledge of healthcare innovations in their country. There is a range of responses: numerical, open-ended, those pre-populated with a selected list of common and likely options – as suggested from a literature review of healthcare and of general innovation processes.

We sent out survey requests to 400 potential participants of which 98 responded. These respondents span 22 LICs and MICs in Asia, Africa and South America – and one HIC. Some countries have multiple respondents that thereby permit us to compare differences in perceptions within the same country – depending on differences in respondents' level of engagement, nature of experiences and their understanding and assessments of policies, systems and practices. These 98 respondents completed nearly 85% of the 35-question survey.[1]

The survey is not intended to be representative of the population for the countries they cover; nor is it representative of all regions of the world or of all LICs and MICs. The results from this segment of the survey help us to understand general patterns and to summarise differences between countries, and, to a limited extent, some within-country disparities. We are, however, *unable to make robust statistical inferences* as the sample is non-representative and the sample size of respondents is relatively small.

Many of our online survey respondents were affiliated with research institutions (41%) and national government agencies (29%). A smaller number identified themselves as members of international non-governmental organisations (NGOs) (7%), international research funders (7%) and private healthcare providers (5%). We had fewer respondents from civil society entities, public (non-governmental) healthcare funders, or sub-national government agencies.

The second source of primary data is *a series of in-person interviews* with a subset of the participants selected for the online survey (Annex 2). These face-to-face interviews were conducted by researchers from ODI during a workshop organised by the Wellcome Trust and WHO for the SDG3 GAP in Kigali, Rwanda on 8 and 9 May 2019. The interviews followed a structured questionnaire designed to explore more

1 In our analysis, we omit the five respondents who did not offer responses beyond the first six questions that sought individual respondent details.

deeply some of the pertinent issues identified in the online survey (Annex 3). We conducted 20 interviews following this template, and they lasted for about 20–30 minutes per person.

The difference between the online survey and the in-person survey is that the former uses standardised response options comparable across and within countries. In contrast, the face-to-face interviews offer the latitude to elaborate on specific instances that highlight the issues; they allow for more detailed descriptive responses and specific illustrations that highlight the responses and perceptions. They are, however, limited in number and generate qualitative, rather than quantitative data.

While these interviews might appear to be similar to the key informant interviews in the case study analysis, a critical distinction sets them apart. In our survey interviews, the emphasis was on assessing the processes and systems for setting country-level priorities, and the decision-making and implementation of those priorities. The case study interviews, in contrast, emphasised assessing the experiences of five specific, pre-identified innovations selected based on a combination of criteria (ODI, 2019).[2]

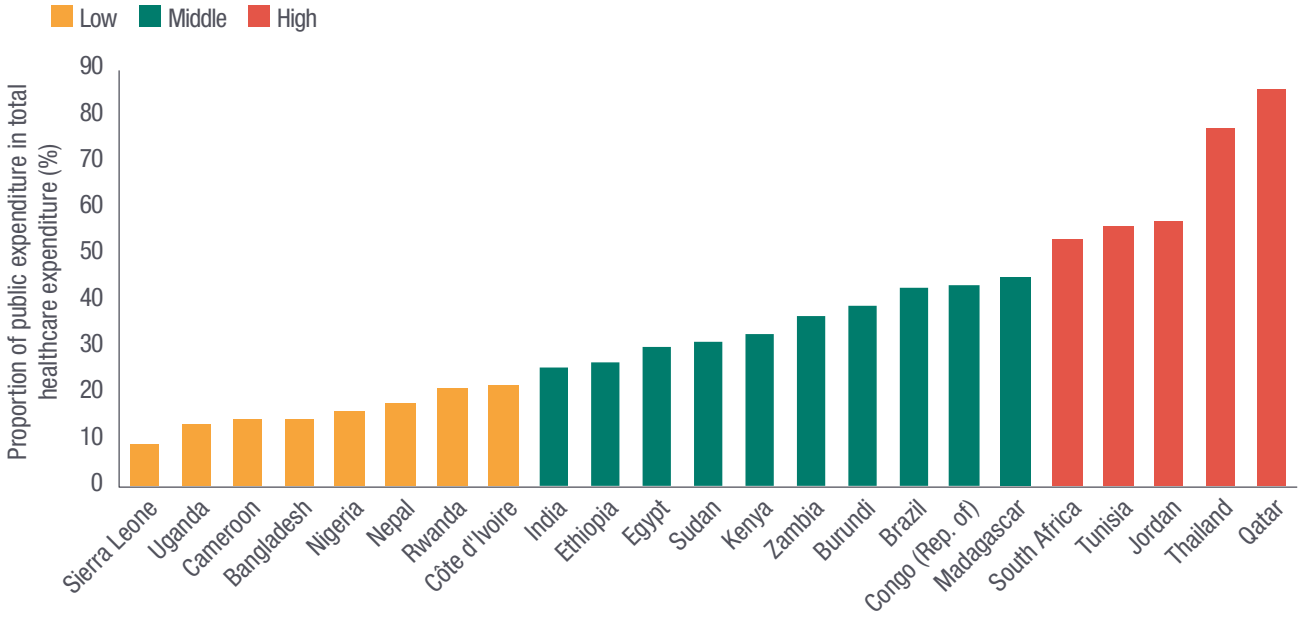
For sections of our analysis, we classify countries covered in our respondent sample into low, middle and high public health expenditure using 'Domestic general government health expenditure (percentage of current health expenditure)' from the World Bank's World Development Indicators. This is a proxy measure of the capacity of public expenditure in health, the extent to which this can be increased in future, and a reflection of the degree of influence that public authorities can be expected to exert on healthcare systems and practices. Using the World Bank's World Development Indicators, the public expenditure proportion ranges in our sample of countries from 9% in Sierra Leone to 85.4% in Qatar. We classify countries with proportions below 25% as low-level; between 25% and 50% as middle-level; and above 50% as high-level. Figure 1 shows the distribution of countries based on this classification.

Public authorities and government ministries, by legislative rights and through their financing importance, have a near monopoly in setting the broader healthcare agenda and to a large extent that of the research and innovation agenda within it. As this study is an assessment of the process of implementing this healthcare research and innovation agenda, it seems appropriate to categorise countries by their proportion of public finance engagement for healthcare.

Since public expenditure funds the bulk of R&D in healthcare service delivery in LICs and MICs beyond new product development, a low proportion of public expenditure in health is an indicator of low stimulus for process innovation. There is also a high correlation between 'Domestic general government health expenditure' (used in our classification above) and 'Research and development expenditure' (both measured as percentage of gross domestic product (GDP)). For the period 2000–2016, across 217 countries in World Development Indicators, the correlation coefficient between government health expenditure and R&D expenditure was nearly 0.45. While this correlation includes all countries for which data is available, and this considers total R&D expenditure not restricted to health, it nevertheless suggests that public health expenditure could be a reasonable proxy for country-level trends of investments in healthcare innovation.

2 Those five selected case studies were hepatitis C testing, treatment and educational campaign – with a focus on Egypt; HIV Self-Testing (HIVST) – with a focus on the STAR initiative in Malawi, Zambia, Zimbabwe, South Africa, Eswatini and Lesotho; MDiabetes – with a focus on India; MenAfricVac – roll out of Meningitis A vaccine in sub-Saharan Africa's meningitis belt; and the Health Intervention and Technology Assessment Programme (HITAP) in Thailand. The selection criteria included their geographical spread – so as to not limit to one region or continent; a span of LICs and MICs as well as countries with different levels of fragility; some with a single country focus while others with a transnational/regional approach; a range of different solutions, devices and therapeutics used; and that involved not just science and/or technology innovations but also process innovations, or those which have innovative ways of managing processes related to, for instance, health planning, setting health priorities, etc; and that they addressed different health-related themes. As a second order of priority, contexts where different levels of donor, national, private sector and community engagement in the innovation was apparent were also included.

Figure 1 Classification of countries according to public healthcare expenditure



Source: Authors' computations using World Development Indicators (World Bank)

In contrast, most private healthcare expenditure targets marketable product innovation or service delivery improvements that can be commercially sold to the beneficiary or reimbursed through some service user fee. These typically benefit wealthier populations (Novignon et al., 2012; Rad et al., 2013). Projection estimates also indicate that public health expenditure is anticipated to drive increased growth in total health expenditure in the foreseeable future – adding to the importance of assessing countries by their current proportion of public health spending (Global Burden of Disease Health Financing Collaborator Network, 2017).

The significant limitation of this study is that the respondents – for both the online survey and face-to-face interviews – were selected individuals in key positions. They tended to be senior-level officials or executives in the national government or research institutions. While there were a few respondents affiliated to healthcare providers, international research funders and research institutions, we lacked robust representation from local civil society institutions or healthcare service funders. We deem these results to be indicative of the main themes and issues, but not to be conclusive.

3 Key results

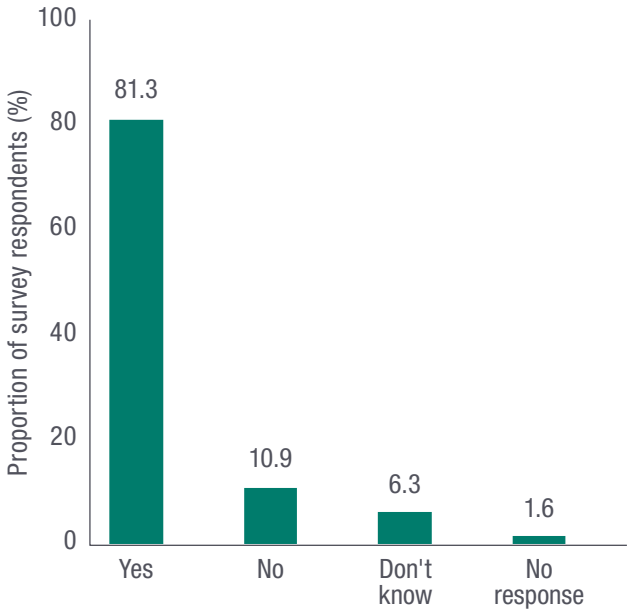
This chapter contains the main results from the survey analysis, categorised by the thematic questions we sought to explore.

3.1 National healthcare research agenda

More than 80% of survey respondents reported the presence of a healthcare research and innovation agenda in their country (Figure 2). We must be careful not to misinterpret this finding; it does not imply that 80% of the countries have such an agenda – as there are multiple respondents from Kenya, Thailand, Bangladesh, India and Rwanda.

In countries with multiple survey respondents, there are, however, disparities among respondents from the same country – indicating differences in perceptions and interpretations of what such an agenda implies; the form in which such an agenda might exist (as a formal document or an informal implied principle that is yet to be codified); the centrality and frequency of its use in active policy-making and programme implementation; how often it is updated; as well as perhaps who has access to this agenda and for what purposes. For illustration, two respondents from Sierra Leone indicated the presence of the healthcare research agenda, whereas one did not; three respondents from Sudan said that such an agenda exists whereas two said it does not; six in Thailand reported that such an agenda exists and two said it does not; and in Kenya eight reported its existence and one did not. Some respondents chose 'Don't know' as their response while others from the same country said that such an agenda exists – in the cases of India, Bangladesh and Jordan. These differences are corroborated by our in-person interviews – where some of the responses of those interviewed did not match the online survey responses from the same country.

Figure 2 Responses to 'Does your country have an agenda for national health research and innovation?'



Source: Authors' computations using survey designed for this report

Brazil has a national agenda specifically for prioritising healthcare research, the National Agenda for Health Research Priorities (*Agenda Nacional de Prioridades de Pesquisa em Saúde*, ANPPS) within a National Policy on Science, Technology and Innovation in Health (*Política Nacional de Ciência, Tecnologia e Inovação em Saúde*, PNCTIS). It is operationalised by the Ministry of Health (MoH) through the Brazilian public Unified Health System (*Sistema Único de Saúde*, SUS) (Vieira-da-Silva, 2017).

Similarly, Viet Nam has a formal National Research Agenda that is updated annually. The Scientific Council in the Directorate of Science and Technology is the custodian of this research agenda, and not the MoH – wherein healthcare innovation is implicit within a broader research context.

India presents an ambiguous case. The country established a National Health Policy in March

2017 (NHP-2017), in line with its commitments to SDG3 and the overall 2030 Agenda principle of 'Leave no one behind'. But it is unclear if this overall health policy explicitly states an innovation agenda. The policy does emphasise 'research on social determinants of health' and seeks to 'advocate extensive deployment of digital tools for improving the efficiency and outcome of the healthcare system'. In order to achieve its 'Health for All' vision, it also seeks to

> ...prioritise the role of the Government in shaping health systems in all its dimensions as – investment in health, organization and financing of healthcare services, prevention of diseases and promotion of good health through cross sectoral action, access to technologies, developing human resources, encouraging medical pluralism, building the knowledge base required for better health… (Singh, n.d.)

It, however, does not specify the role of research and innovation in the process.

In the case of Nigeria, the SDG3 GAP discussion on the importance of a research and innovation agenda appears anecdotally to have been a catalyst in the country. It is now initiating steps to consider devising such a formal agenda that is also inclusive of different natural stakeholders in the healthcare innovation space.

The pattern that emerges from our survey is that most countries have some form of an agenda for healthcare service improvement and/or expansion, and most countries have some form of a doctrine for R&D. However, a research and innovation agenda specific to healthcare appears to be *an implicit component* within this broader research or healthcare context, and not an explicit policy.

From our survey analysis, the presence or absence of an agenda – even where respondents state that their country has one – does not correlate with other macroeconomic parameters of country classification, such as aggregate national income (or GDP), population level, government fiscal capacity or level of public health expenditure as a proportion of government or total health sector expenditure. The financial or technical capacity of the country is thus not the sole or predominant condition for the presence of a healthcare research and innovation agenda.

3.2 Prominent entities in a healthcare research and innovation system

National actors – namely the *national government, national healthcare administrators, and national R&D institutions* – are the prominent entities deliberating on and setting the national agenda where these exist. The main levers they use, highlighted in the interviews, are legal mandates and statutory provisions. As illustration, the National Health Act 2014 in Nigeria provides basic funding and personnel allocations leading to setting priorities, coordinating responses to epidemics and crises, as well as channelling external financing – whether for routine healthcare financing or assistance linked to crisis mitigation. National governments also hold the domain for setting up quasi-public institutions where apex positions are government-appointed and their efficacy is scrutinised by the government line ministries – such as in India and other countries covered in our surveys.

This pattern is demonstrated clearly in Brazil where

> …the federal government is the main actor in the Brazilian health science and innovation scenario because it sets priorities, provides funding for research, fosters collaborations between public laboratories and private companies for technology transfer and manufacturing of strategic products, and purchases a wide range of health technologies. (da Silva, 2014)

The National Healthcare Innovation System (SNIS) in Brazil is an interface with the SUS and the Department of Science and Technology (DECIT) that was created within the MoH (Tenório et al., 2017). DECIT, in turn, manages the sub-agencies implementing the research and innovation agenda, prioritises research projects and public engagements and consultations, as well as seeks approvals through national conferences.

In certain countries and in certain contexts of engagements, national ministries are predominantly the first recipients of funding from multilateral institutions, international agencies and external private donors and agencies. As illustration, health-related projects constitute the largest portion of official development assistance (ODA).[3] Of such ODA, only 2% of bilateral aid goes to civil society organisations (CSOs), and another 13% goes through CSOs; the remaining bulk (nearly 85%) of financing is channelled through recipient governments. These are secondary channels of influence for the national government in determining the research and innovation system, even though the primary source is external.

We also observe an array of competing interests, incentives and motivations within government entities. The lack of alignment or harmony among their internal agendas hinders efforts towards a systematic and long-term outlook to healthcare development. For instance, the MoH in Viet Nam has made substantial progress in the treatment of non-communicable diseases. But this effort has not translated into a matching emphasis on preventive care for these diseases despite evidence that it is more effective. This is primarily because curative processes are set up and funded differently from preventive care; they involve different operational agencies even within the MoH and the national healthcare service; and there is reluctance to change established priorities and systems.

Civil society and community representative organisations appear to have a less prominent role, except in countries that already have a relatively high proportion of public health expenditure. This is despite evidence of the helpful role and contribution that NGOs play in creating a responsive healthcare system – such as in Kenya and Ethiopia which have institutionalised participation of NGOs in their health system decentralisation strategy, and in Ecuador where an international NGO collaborated closely with the public services to deliver preventative and curative health services in remote locations suffering chronic poverty and lack of governance systems (Wamai, 2012; Biermann et al., 2016). One probable explanation, as indicated in our interviews, is that there is little scope and few incentives for civil society to participate in conditions where the spending levels are relatively low to begin with. In addition, some of these countries lack forums and structures to bring together civil society institutions into a unified and cohesive collective that can then offer constructive partnership and dialogues with the national government. There are, however, some exceptions: in Brazil, the National Health Council that advises the MoH includes active civil society participation.

An ongoing concern raised in our interviews is that adding multiple civil society institutions to a healthcare research landscape already fragmented into many competing governmental agencies and myriad health initiatives, adds disproportionately to the complexity of decision-making and implementation, without necessarily matching increases in efficiency of processes or outcomes. The other critique against civil society institutions is that these could be constrained by their limited capacity – as, for example, in Malawi where a set of case studies highlighted the variation and general low research capacity among national and international NGOs – and also could be single issue-oriented. These characteristics potentially hamper the development and implementation of a more cohesive, comprehensive and cooperative healthcare research agenda (Gooding, 2017; Gooding et al., 2018). This hinders the scope of leveraging the positive spill-over impact of innovation and research efforts across multiple healthcare needs. There is also evidence that NGO participation possibly causes adverse unintended consequences, as in the case of reproductive health policy in Malawi and South Sudan (Storeng et al., 2019).

The importance of civil society and its active engagement, however, does emerge strongly when setting the priorities within the overall healthcare research agenda. This concurs with the explanation that these institutions are more effective in helping the national government agencies to distil the broader agenda into focused and directed interventions that are aligned with their expertise and interest. Several interviewees stated that community support and local buy-in

3 Organisation for Economic Co-operation and Development (OECD) classification of Health; Population policies and reproductive health; Water and sanitation. Data from OECD (2019).

for scaling up research were crucial both in order to take the decision to scale up and for it to be successful. Civil society and local representatives can play an important role in generating this support and explaining why scale-up of a successful intervention will benefit recipients.

Healthcare providers – whether public or private – seem to have limited significance in setting the broader healthcare research agenda. In the sequence of roles, their importance, however, grows in subsequent stages involving trials and scale-up activities. International and multilateral institutions also have a limited role in setting the research agenda but increased importance in subsequent stages where they control and manage the funding of trials and scale-up efforts. We discuss the influence of external agencies and institutions in harmonising agenda priorities in more detail in the next section. Following the financial levers of influence, international funders appear to have greater significance in countries where public funding for healthcare is relatively low – and hence international financing is of greater importance and leverage.

There is some evidence that *partnership between the public and private sectors* could be enhanced. The issue of property rights and ownership of research and innovation outcomes, notably through patents, however, poses the challenges of pricing, affordability and therefore scalability. There have been some public–private partnerships (PPPs) but they have most often been involved in the expansion of healthcare services such as universal healthcare (UHC) roll-outs – for example, in Turkey (World Bank, 2017). But there is limited evidence of PPPs being involved in healthcare research and innovation. A programme of delivering anti-malarial medicines in nearly 30 sub-Saharan African countries and India (ASAQ Winthrop) is an illustration of a successful venture. A PPP designed to increase institutional delivery rates (proportion of childbirths aided by skilled birth attendants whether at home or at a healthcare service location) in the state of Gujarat in India, however, generated mixed reviews – some claiming it to be a success, and others reaching different conclusions (Bhat et al., 2009; Mohanan et al., 2014).

Table 1 Prominent institutions involved in healthcare innovation

Role	Institution
Agenda-setting	National government National healthcare administrators
Prioritising	National government National healthcare administrators Civil society and community groups (in high- and middle-level healthcare expenditure countries)
Innovation trial selections	National R&D institutes and laboritories Private healthcare providers
Trial monitoring and assessment	Private healthcare providers Local healthcare administrators
Scaling up innovations	Private healthcare providers
Funding implementation	International healthcare funders Private healthcare providers International research funders

Source: Authors' computations using survey designed for this report

In summary, our survey reveals the following pattern of different entities that play leading roles in separate aspects of implementing nationally scaled-up healthcare innovations (Table 1).

Such a division of roles between separate actors might appear to be effective as an overall strategy for shared responsibilities that reflect specialisations that match their respective expertise. However, in reality, this pattern does not seem to be an outcome of a deliberate coordination of roles and responsibilities among these key actors. Our one-to-one interviews indicate that this pattern is instead the outcome of aligning the main levers that primary actors possess, their incentives and, in some cases, a reflection of the historical patterns of allocating responsibilities – even if their effectiveness might have eroded over time.

Our online survey also highlights the main criteria used by some of these prominent entities in their prioritising processes. The prominent motivations reported are:

1. medical exigencies such as long-term health needs – whether national, regional or local – and the burden of disease
2. the influence of the government agencies.

The prominence of long-term needs in prioritising healthcare innovation – in policy and in implementation – runs contrary to general perceptions. Existing literature indicates that LICs and MICs are forced to prioritise responding to proximate health needs such as epidemics, disease outbreaks and crises over long-term healthcare needs and systems. Particularly in sub-Saharan Africa,

> The continent's healthcare systems remain focused on acute, short-term treatment, and on fighting the traditional battles against infectious and tropical diseases, diarrhoea and maternal and child mortality. (EIU, 2012: 17)

The influence of government agencies meanwhile arises quite naturally from the financial leverage and policy-making powers they possess, as discussed earlier. Paradoxically, the survey reveals that the influence of government agencies is reportedly stronger in countries where public expenditure in healthcare is relatively low as a proportion of overall health expenditure. For these countries, international healthcare funders are also major determinants of priorities for the national healthcare agendas that we discuss in greater detail in section 3.3.

Resource and funding constraints are also an important consideration for setting priorities – across all types of countries regardless of their current level of public funding of healthcare.

Within the country, a recurrent observation is that national policies and programmes are fragmented and very often responsive to specific episodic but critical health needs (such as emergencies and outbreaks), but that there is less emphasis on transforming the initiatives into robust systems beyond the immediate crisis. This short-term response to pressing needs with less emphasis on long-term perspective often produces an overlap of functions and responsibilities, sometimes a duplication of roles. In turn, this results in competition for contested and scarce financial resources (some of which could be wasteful) while simultaneously leaving gaps in coverage in other areas. This was highlighted in experiences in countries such as India, Nigeria and Senegal.

In Nigeria, Emergency Operations Centres have been very successful in focusing on responding to crises. They have periodic and systematic outbreak review meetings and clear lines of responsibilities and accountability. The challenge has been to drive similar commitment, focus and systems even when there is no 'emergency' (*'a crisis-like focus without a crisis'*, as captioned by an interviewee).

A preoccupation with crises – within local and national government, multilateral institutions and international healthcare and research funders – is seen as a major drawback that hinders long-term systematic development and financing of research and innovation. This preoccupation also leads to scarce resources being allocated away from more sustainable investments for long-term healthcare improvements. A cross-country analysis of healthcare interventions in sub-Saharan Africa highlights this problem; a majority of countries lack a conceptual framework for assessing the sustainability of these interventions (Iwelunmor et al., 2016).

3.3 Reflecting national priorities within international systems and funding mechanisms

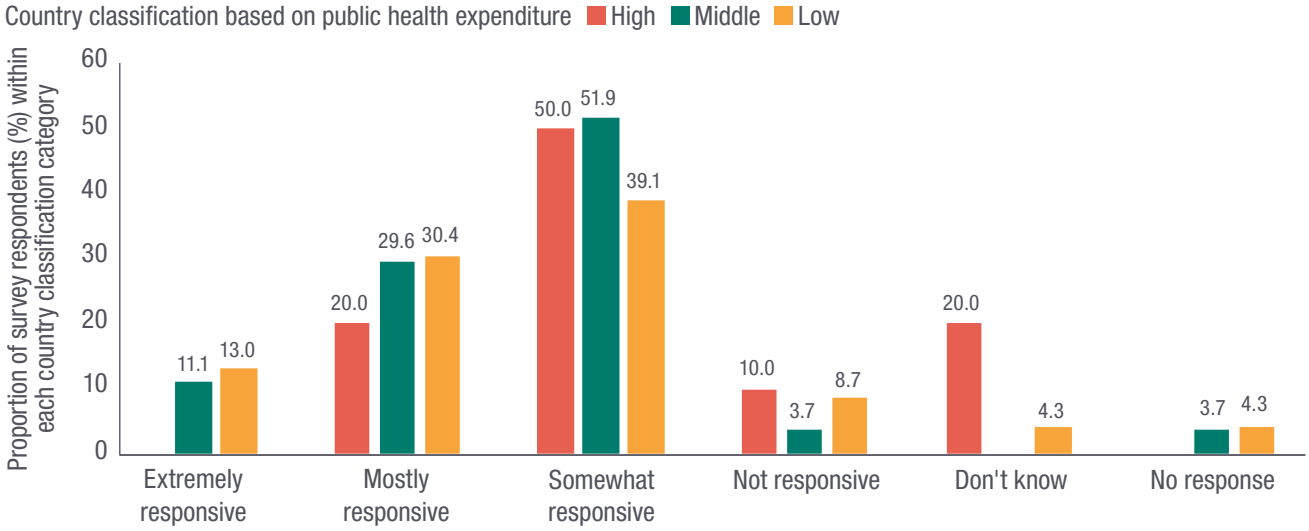
A core issue that we assess is the degree to which respondents perceive that international agencies are cognisant of, and responsive to, the needs and priorities of the country when designing and financing their in-country engagements.

It appears that slightly more than half of the respondents consider that international institutions and agencies are somewhat responsive to local and national needs and aspirations (Figure 3).

Conversely, however, this evidence also suggests that there is scope for greater systematic integration. This would seem to be regardless of the country classification that we have adopted; whether domestic public resources are a major source of healthcare innovation funding, or whether the country relies relatively more on external and international funders.

Evidence from the literature supports our survey and interview findings. For example, in

Figure 3 How responsive are international funders/donors to local and national healthcare needs?



Source: Authors' computations using survey designed for this report

Africa and South Asia (Cambodia and Pakistan), such alignment of domestic imperatives with international priorities is reportedly sub-optimal (Mwisongo and Nabyonga-Orem, 2016; Khan, 2018).

Key multilateral institutions, in particular WHO, have guidelines for country engagements that seek to integrate and harmonise their involvement with country-specific needs and objectives (WHO, 2010). In certain cases, such as Sierra Leone, such guidelines are translated into policy through the Country Cooperation Strategy that explicitly states that WHO's core engagement includes 'shaping the research agenda and stimulating the generation, translation and dissemination of valuable knowledge' (WHO Regional Office for Africa, 2017: 25). It also requires it to 'support the Ministry of Health and Sanitation (MoHS) in identifying national research priorities and conducting cross-sectoral analyses on the determinants of health' (ibid: 26). The challenge, as survey respondents point out, is translating the intent of these strategies into policies and then into routine operations.

Reflecting on the factors conducive to making international funders and donors more responsive to national and local healthcare priorities, our survey respondents cite these three aspects most frequently:

1. information on national healthcare needs and priorities
2. international political will
3. coordination between national and international funders.

Information systems and records of national healthcare services are primarily generated from healthcare administrative records that capture the data at points of service delivery. Such administrative data has limited capacity to indicate gaps, needs or priorities of healthcare. While digitisation in record-keeping has made such data easier to collate and analyse, access to it remains restricted – as seen in Ghana's District Health Management System (DHIMS), which is managed by the Ghana Health Service (GHS). Only select GHS officials have access to the data, which impedes other stakeholders – especially external institutions and funders – from acting on any of the information.

Fragmented local or national initiatives and research agendas within the healthcare system possibly contribute to a corresponding fragmentation of information and records: of who is undertaking what kind of research and innovation, where and for what ends, and what their recorded outcomes are. This poses a challenge for international agencies when devising a healthcare response for a country

as they may not get a clear view of the gaps, needs or priorities. They also lack information on progress made through local initiatives, research and innovation that they could support to overcome healthcare gaps. Conversely, such fragmented information also hinders national agencies in seeking the appropriate level and type of support from international institutions and donors.

Ironically, when country-level policy-makers are not fully aware of evidence and experience in their own country or context, they are compelled to rely on data from multilateral institutions regarding international experiences of successful interventions derived in conditions that may not necessarily reflect those of their own country. These may not match the country's actual needs or priorities; they may also be ill-suited to the specific local contexts or conditions and are more likely to meet with resistance or failure when rolled out without adaptations to country-specific conditions. Our survey respondents indicate the need to strike a delicate balance: on one hand learning from and adapting knowledge that these institutions gain from their experiences in other countries, and on the other hand, giving due importance to the needs and experience of a specific country.

Respondents to our survey noted that poor data systems and repository of evidence has been an ongoing concern. They indicated that despite episodic attempts to find solutions to the information gap, such initiatives have been inadequately sustained or funded. The US National Institutes of Health (NIH) launched World RePORT in 2012 to track international research activities and investments, and to share results with the wider research and funding community:

> Such tracking should allow us to analyse and understand the landscape of research, to identify gaps in funding and areas where there might be a duplication of effort, and to work more effectively to synergise our investments. Local investigators could also become more aware of programmes supported in their institutions to develop local networks and collaborations; some African researchers have reported first learning about studies done in their own country by reading about them in scholarly journals. The ultimate goal of this analysis is to encourage an increase in vibrant, productive, competitive, and self-sustaining research communities in these settings. (Collins et al., 2013: e64)

The current version of this online database lists data for projects funded by 12 prominent international funders and is a helpful start (National Institutes of Health Fogarty International Center, n.d.; WHO Global Observatory on Health R&D, 2019). It does, however, lack data and information on the outcome of this research funding – a critical component for operational decision-making by both national governments and international funders.

Beyond the lack of data, half of those we interviewed described poor understanding or communication between national and international organisations as a barrier to implementing research findings. Our interviewees cited poor communication channels – such as lack of information-sharing platforms or cross-participation in agenda-setting discussions between domestic and international entities that go beyond emergencies. They reflected on the process whereby information-sharing occurs predominantly when international agencies and funders respond to health crises, or conversely when national healthcare administrators and/or providers respond to some existing international priority or funding avenue; there are very few information channels and opportunities to routinely and collaboratively align national and international priorities.

International political will manifests through the commitment of multilateral institutions and international funders to focus and channel resources in long-term strategic planning to support the needs of local communities and countries. Our survey respondents point to two main gaps in international political will.

First, *some funding and other resource commitments tend to follow healthcare emergencies and exigencies* – but this process is inherently stochastic and unsuited to stable long-term planning. The appetite for such engagement wanes once the emergencies have been dealt with. This was illustrated in the

international response to Ebola in parts of sub-Saharan Africa in 2013–2014 – where the initial lack of international response was followed by a burst of international commitment. However, that focus was short-lived and had limited influence on systemic changes that healthcare services could gain from, in case of a recurrence or an expansion to cover other healthcare gaps. A notable long-term positive outcome was the creation of a specialist panel convened by the Global Health Institute at Harvard University and the London School of Hygiene and Tropical Medicine that recommended far-reaching changes to WHO's response systems and the role for national governments and donors (Moon et al., 2015). In this instance, the experience and learnings from the pandemic has led to systemic changes in WHO and how it coordinates with donors in effectively engaging with affected countries – extending beyond the original crisis (Michaud and Kates, 2018). While the refocusing of WHO and interventions such as the creation of the Contingency Fund for Emergencies do not directly impact healthcare innovation processes, they demonstrate how international political will is critical to making sustainable improvements that fulfil long-term healthcare needs.

Second, when international agencies and funders pursue their institutional agenda and research objectives – which may or may not coincide with domestic priorities – their engagement can end up fragmenting overall health systems. National agencies find this situation constraining. Some research, that extends beyond the confines of the funders' institutional agenda, is done on side lines. But overall, external financing tends to have tight usage stipulations and little flexibility. An opportunistic alignment of objectives is when most progress occurs. In Senegal, for example, the *Yeksi Naa*, an innovation in a 'last-mile distribution' system was designed to make the full range of modern methods of contraception accessible to all (Etiebet, 2017). This was possible because there was a convergence of objectives – in this case, concerning increased used of modern contraception – between local and national government and the international funders. The initiative was driven by the Ministry of Health and Social Action and the National Pharmacy (PNA), with support from MSD for Mothers, the Bill and Melinda Gates Foundation, IntraHealth International and other partners where the donor-partners provided funding, and business and technical expertise to help devise, test and scale up a solution tailored to Senegal's needs and priorities (Gueye et al., 2017).

Again, in Senegal, a similar confluence of objectives arose when WHO and the United States Agency for International Development (USAID) asked whether community health workers could help to prescribe and administer antibiotics for respiratory ailments to children. Despite successful trials, the scheme was not scaled up, however, due to opposition from nurses and doctors. This also illustrates that successful scale-up is not just a technocratic process, but just as much a political one too. Interviewees described political will as the most important factor in scaling up, and the lack of it was listed as the most prominent constraint to scale-ups. Many of the researchers we interviewed highlighted the political importance of research being conducted in their country to create the political support necessary for scaling up efforts.

Coordination between national and international funders is facilitated when information on national healthcare needs and priorities and on international political will both exist. But there are structural challenges that prevent such coordination even when they do. One such barrier is the complexity of processes involved for any collaboration and coordination with international entities. Our survey respondents pointed to differences in systems and protocols of engagement among different international agencies (for instance, the United Nations' systems for funding differ from those of multilateral development banks that in turn differ from those of bilateral or large institutional benefactors). Countries are forced to adopt differentiated strategies and mechanisms to deal with these complexities as a necessity, rather than as an efficient choice – which itself is operationally sub-optimal.

Some country-level healthcare policy-makers lamented that they engage with international institutions primarily when their national needs appear to align with pre-existing and established priorities of those institutions – and less so for new, emerging or unmet national priorities.

Instead of international institutions devising their priorities to match those of the countries, the countries devise their priorities to match international agendas – in order to win funding for research, innovation and subsequent scaling. Such retrofitted priority-matching limits the scope and scale of cooperation, and also limits countries to known avenues and mechanisms of collaboration, preventing them from venturing into new and uncharted areas. In the case of Nepal (and other, particularly smaller, countries), engagements with international funders is driven by an overwhelming asymmetry in influence that these global institutions and funders have vis-à-vis the health ministry of a single country. While in principle some of these multilateral and international institutions set internal operating guidelines (as the WHO guidelines highlighted above), in practice, the LICs and MICs have less capacity and few levers to influence the priorities of the large international institutions. They see no evidence that this power relationship is changing significantly despite the emphasis of collaborative and cooperative systems in the 2030 Agenda for Sustainable Development.

Our survey interviewees consistently remarked that much research is undertaken in HICs. This poses a barrier to scaling up research, as policy-makers are often disconnected from the researchers. This claim is also supported by evidence we find in the literature – in this case reflecting on healthcare in sub-Saharan Africa:

> Critical decisions about health interventions in this region are largely based on research findings from studies that were carried out in other parts of the world. Such extrapolations may be inappropriate in that genetic factors, nutritional status, the coexistence of other diseases and various unknown factors affect the clinical response of patients in sub-Saharan Africa. (Lucas, 2005: 482)

One successful strategy to overcome this power asymmetry has been through South–South cooperation – such as the East, Central and Southern Africa Health Community (ECSA) comprising of nine member countries. Its central operations include: '*providing an enabling environment for sharing of best practices, perspectives, new innovations and information*' and '*building and strengthening capacity of member states to collect, synthesise and share information*' (ECSA, n.d.). Such entities help to unify the efforts of individual LICs and MICs by building a strong internal platform for cooperation and projecting their shared healthcare perspectives to the international community. In turn, such bodies also help international institutions to interact with the countries unified in purpose and objectives; it reduces the transaction costs of interacting with each individual country separately.

In our surveys, representatives from countries such as Kenya highlighted some of the qualifying requirements and operational complexities that discourage interested research and innovation institutions from even applying for the Global Grand Challenges funding stream, managed by the Bill and Melinda Gates Foundation. Researchers prefer more national investment and commitment, which is procedurally less onerous. They point to initiatives such as the Global Health Innovative Technology Fund (GHIT Fund) where the Government of Japan, Japanese healthcare technology companies, the United Nations Development Programme (UNDP) and the Bill and Melinda Gates Foundation have together created a unified platform to make available funds for medical research – particularly the development and trial of new pharmaceuticals to find cures for global diseases and those typical in LICs and MICs. Such arrangements are very helpful to foster and stimulate innovation involving both public and private sectors by sharing as well as reducing the administrative costs of seeking development funding. Similarly, the European and Developing Countries Clinical Trials Partnership (EDCTP) – supported under Horizon 2020, the European Union's Framework Programme for Research & Innovation – awards funding to collaborative clinical research projects conducted in sub-Saharan Africa that accelerate the clinical development of new or improved interventions to prevent or treat HIV/AIDS, tuberculosis, malaria and other poverty-related infectious diseases prevalent in the region.

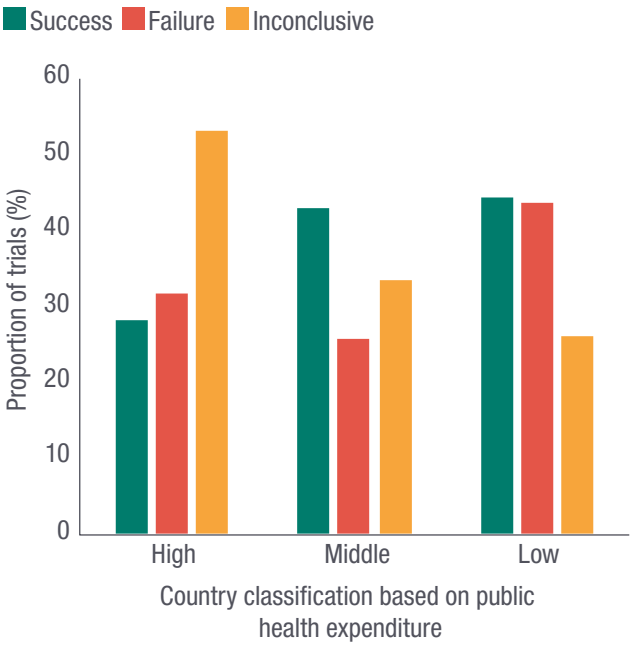
However, survey respondents pointed out that collaborative efforts that directly involve local country participants are few; the GHIT Fund helps Japanese firms and institutions and a few others in select countries (e.g. US, UK, Australia). Some of the more successful and effective collaborations cited include the Africa Health Research Institute (based at the University of Kwazulu-Natal, South Africa, and focused primarily on HIV and tuberculosis), and the African Research Collaboration on Sepsis (based at the Liverpool School of Tropical Medicine, UK and with Uganda, Gabon and Malawi as country partners). As the illustrations indicate, these initiatives are fragmented by design in focusing on specific healthcare needs.

There are other political impediments. India, for instance, has historically been politically reticent to allow national institutions to engage with international agencies – whether for information-sharing or more active partnership in developing innovations and building on them. We did not investigate the source of such reticence; however, self-reliance has been a long-standing national policy emphasis in India and spans beyond the healthcare or research and technology domains. This outlook is reportedly changing; the Indian Council for Medical Research (ICMR) now has a series of agreements with other countries to facilitate cooperation in biomedical research, and is actively seeking out South–South cooperation in research initiatives (ICMR, 2017). Notwithstanding this, some people we interviewed were sceptical of how well this new approach was working.

3.4 Delivering effective scale-up of innovations at a country level

The third segment of the survey looks at the process of translating healthcare innovation agendas from the drawing board to national roll-out. This includes the sequential processes of identifying innovations, undertaking trials and incubations, reviewing their success, and then scaling up country-wide with suitable adjustments for the expanded roll-out. Our emphasis is on identifying from country experiences the enablers and barriers in this process.

Figure 4 Outcome of trials



Source: Authors' computations using survey designed for this report

We find evidence of a robust pipeline of successful innovation trials. On average, respondents reported that more than 40% of healthcare innovations are deemed successful, exceeding the 33% that are regarded as having failed (Figure 4). To put this in perspective, this success rate is significantly higher than the 14% success rate in clinical trials of medicines, or the much lower rates of cure for certain ailments (such as 3.4% for oncology) (Wong et al., 2019). Significantly, the success rate of innovation trials is the highest in countries classified as having relatively low public health expenditure. Interestingly, in countries with high public health expenditure the outcome of trials is inconclusive in more than half of the trials. But this is also the group of countries that spends more resources on revising unsuccessful trials for retrials – giving rise to the optimism that these countries too have a robust pipeline of scalable innovations.

About half of respondents also reported the presence of formal systems to implement, monitor, assess and report outcomes of innovation trials – a necessary condition for successful scale-ups. However, a majority of respondents also indicated that their country either does not have a unified repository of innovation trial results or any coordination

among the key institutions that undertake such trials. The absence of knowledge hampers both local and national healthcare policy-makers and service providers in scaling up successful trials. It is also a significant impediment for external/international institutions and funding agencies to support local initiatives that may have great prospects for expanded roll-outs. This is discussed in greater detail below.

Finally, in identifying the enablers and barriers to national scale-up of successful trials, the four most frequently highlighted factors we find are:

1. the knowledge of evidence to inform decisions
2. assured and dedicated funding
3. political will and domestic champions
4. governance and coordination between agencies and institutions – including aligning incentives between competing entities.

While the presence of these factors was a prominent enabler, their absence or insufficiency was deemed as main barriers to successful national scale-up of potentially promising innovations.

More than 70% of survey respondents chose the first three options as their top three enablers for scaling up successful process and product innovations to a national level. Nearly 40% mentioned the enabling impact of better governance systems to stimulate scaling up; this aspect was even more prominent in our in-person interviews.

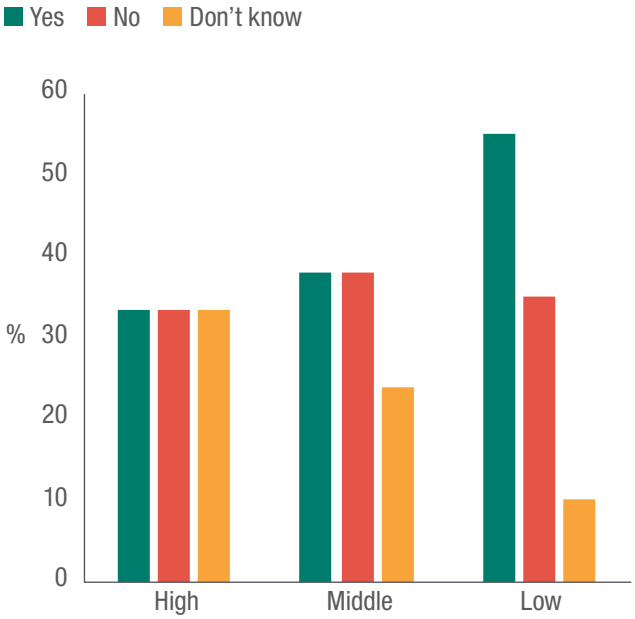
The absence of these four enablers constitutes the most important barriers to the successful scale-up of innovations; the difference is only in the relative ranking of the top four factors. Insufficient financial resources were ranked as the top barrier, followed by a lack of evidence, and insufficient political will and domestic champions. Surprisingly, the presence of regulatory barriers does not appear to be a major impediment.

The next sub-sections elaborate on these overlapping enablers and barriers.

3.4.1 An evidence base to inform decisions

Regardless of whether the country is perceived to have a healthcare research and innovation agenda, our survey respondents expressed a desire for a centralised national or international repository of evidence of successful trials (and best practices). This would be available and accessible for policy-making, planning, for when seeking funding for expansion, and eventual roll-outs. It would be a critical catalyst to a regime of robust and successful scale-up of innovations in healthcare.

Figure 5 Presence of national innovation database
Proportion of respondents; by country classification based on public health expenditure levels

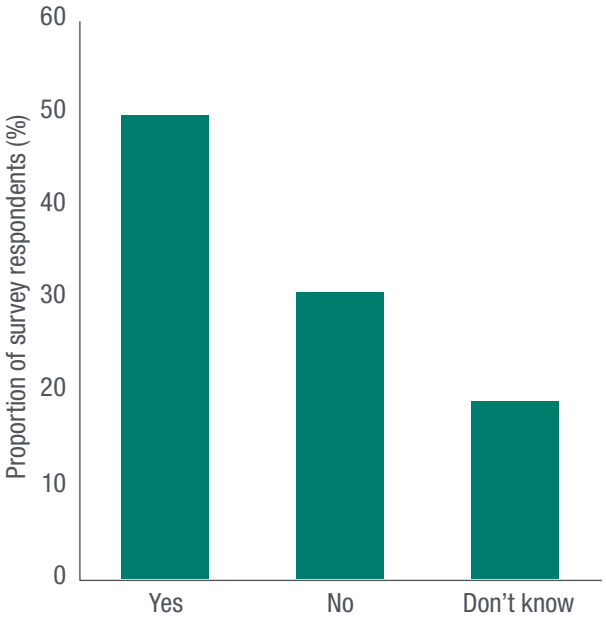


Source: Authors' computations using survey designed for this report

Nearly 42% of survey respondents indicated that their country had a national innovation database (Figure 5), and this proportion was the highest among countries with low levels of public health expenditure. They also indicated that the health ministry was the predominant custodian of this database in their country.

The United States National Library of Medicine database hosted by the NIH lists data from different public, national and international healthcare repositories. Yet even this database primarily collates health statistics and does not list evidence of healthcare innovation trials or scale-ups. We did not find any publicly accessible healthcare innovation repository for LICs and MICs. Where survey respondents indicated that such a database existed, they may have referred to privileged information accessible only to health ministries or the

Figure 6 Presence of a formal system of feedback for innovation trials



Source: Authors' computations using survey designed for this report

Ministry of Science and Technology/Research and Development.

Half of our survey respondents also indicated the presence of formal systems to implement, monitor, assess and report outcomes of innovation trials and scale-ups (Figure 6).

Theoretically, the existence of a knowledge-base of healthcare innovation trial outcomes can only facilitate the process of national roll-outs. It can assist international partners in their engagement with national policy-makers and when making funding decisions. We are unable to assess directly from representatives of international and multilateral institutions the extent to which such information and knowledge figure in their active and direct interactions, planning and decision-making. However, the absence of such local knowledge and experience is one reason why such international institutions rely on their own repository and knowledge base of fundable and scalable innovations – some of which might have limited suitability for local country contexts or conditions, as discussed above.

The lack of actionable information expands the need for having data of trials conducted under local conditions, as opposed to data from international trials and scale-ups. In Kenya, for example, chlorhexidine – a product commonly used as mouthwash but also used in umbilical cord care and proven helpful in reducing sepsis and infections – was not scaled up for national use as there was insufficient trial data on its suitability in the local and national contexts.

3.4.2 Assured and dedicated funding

Along with access to the knowledge base of potential scalable healthcare products and process innovations, the other technocratic enabler to effective and efficient national roll-outs of such innovations is the presence of assured and dedicated funding. There are two components to the financial requirement: first, the magnitude of financing, and second, the long-term predictability of such financial commitment. The process of scale-up – moving from promising ideas through to trial and on to large-scale roll-out – benefits enormously from such committed streams of finance for a few reasons.

First, the magnitude of financial resources required to scale up even successful innovations typically far exceeds the sums required to undertake trials that are limited in scale and scope. Second, even successful trials – and especially those that yield inconclusive results – require monitoring, assessment, feedback and adjustments to ensure that the modifications made for expansion fit the diverse conditions of the national roll-out. These adjustments to make them fit for roll-out add to the unit cost of scaling. Third, scale-ups require more time to incubate and embed before their intended or prospective gains can be realised and measured. This extended duration of adjustment and roll-out further adds to the need for prolonged financial commitment. Fourth, expansion of any new process is an inherently uncertain and risky endeavour. As the scale of operation increases, so do the complexities arising from greater and more diverse sources of uncertainties. Assured long-term funding lowers the transaction costs of undertaking the scale-up efforts and is thus a great benefit to a successful roll-out.

These factors are also echoed in some of our survey interviews. In Viet Nam, the government makes five-year plans – including for technology and innovation – that are linked to annual

budgetary allocations. This provides long-term funding stability and aids planning for R&D. Nigeria, even though it does not have a formal healthcare research and innovation agenda to set the structural and administrative blueprint, has a National Health Act of 2014 that provides legitimacy to pursue healthcare innovation. This helps to secure statutory funding from the annual national budget – thereby creating an enabling legal and financial environment. In Kenya, the National Commission for Science, Technology and Innovation (NACOSTI) coordinates collaboration and cooperation across sectors and manages the National Research Fund, with 30% earmarked towards healthcare research.

Such long-term financial commitments – some from external sources – have provided policy-makers and administrators with the operating space to plan and implement innovation scale-ups. The US President's Emergency Plan for AIDS Relief (PEPFAR) presents an instructive case. Launched in 2003 as a five-year bilateral commitment by the US Government to support HIV/AIDS prevention, care and treatment programmes in developing countries, it has been:

> …an important driving force behind the global scale-up of HIV care and treatment services, particularly in expansion of access to antiretroviral therapy … and directly supported initiation of antiretroviral therapy for 3.9 million people and provided care and support for nearly 13 million people. (El-Sadr, 2012)

But in recent years, the funding levels of PEPFAR have stagnated and its surety has been compromised by proposals for reductions – leading to a reduction in the effectiveness of the programme and potentially jeopardising its 'acceleration strategy' (Fidler, 2018; Rose and Keller, 2019).

Brazil has enabled free distribution of self-testing HIV kits through SUS (HIVST.org, 2018). This follows the success of a self-testing tool for human papillomavirus (HPV). The self-testing HIV kit has now been scaled up to about 53 LICs and MICs worldwide with funding from different sources financing the roll-out (Unitaid, 2018). Another programme in Brazil is seeking to develop and distribute diagnostic self-test kits for detecting hepatitis C – developed in collaboration with the national government, researchers and the private sector (Peeling et al., 2017).

Scarcity of financial resources is often cited as an obstacle in R&D, trialling or scale-ups, and external funding is vital to overcome shortfalls in domestic resource mobilisation. But tight resources are not always the main obstacle. In some instances, external funding is vital to overcome shortfalls in domestic resource mobilisation. In Senegal, for instance, financial commitment is surprisingly not the primary barrier to research and innovation in its health sector – as was indicated in one of our interviews. The country reportedly receives adequate external funding even though domestic budgetary provisions are low. The challenge in raising additional domestic funding, not just in Senegal but elsewhere, is that local governments need to be convinced of the need and importance of investments in R&D and innovation – and that is a hard sell. Local governments are restrained in the financing capacity of their limited and earmarked budgets; national budgets have greater capacity and flexibility.

Only a quarter of our interviewees indicated that resource constraint was a major barrier to scaling up research. A more common complaint was that resources were allocated poorly – biased towards maintaining the status quo or towards financing particular politically motivated projects. This indirectly highlights the recurrent theme of the importance of political will – and also how it has the capacity to skew resource allocation for research, innovation and scale-up efforts.

We were unable to test whether external financing is bunching up – that is, going to select 'donor darling' countries that have financial instruments and capacity to attract and absorb such finances – and leaving other countries behind. We also could not test whether external financing is complementing or displacing domestic funding.

3.4.3 The presence of political will and domestic champions

A recurrent finding in both forms of surveys is that innovation trials and their scale-up are just as much a political process as a technocratic one. The

illustrations from interviews indicate a range of pathways through which political will manifests in this process of scaling up and the critical role that domestic champions play to stimulate this process. Anecdotal evidence also illustrates the bottlenecks when such political will is lacking: in the absence of champions to mobilise public and policy support, there are instances when opposition and inertia to change have derailed innovation scale-up efforts. The involvement and drive of these key individuals become a necessary, although not a sufficient, condition for the scale-up process – from elevating needs and spurring innovative ideas to securing the logistical support and financial backing for trials and scaling.

In countries such as Sierra Leone and Ghana, elite policy-makers and key personnel in positions of political influence – such as the president, vice-president, prime minister, or even spouses of such office-bearers – have been champions of innovation in healthcare. As influence-makers and opinion-builders, their involvement helps to generate awareness; as advocates and champions, they shine a spotlight on a specific healthcare need that their visibility and strong public persona makes it hard to ignore. They help to build a support base within a wider population and among key policy-makers. In some cases, celebrities – such as movie stars and sports personalities – have played crucial roles, both by themselves and in collaboration with visible and charismatic public officials, in stimulating and promoting public opinion for policy action. When such champions are in key decision-making positions in government, they are able more directly to drive policy agendas and processes – including planning and financial – that then secure the resources needed for scaling up.

Political will is also critical in overcoming a reluctance to change in certain segments of policy-making and healthcare administrations. For instance, in India, the individual states – and not the central government – have primary jurisdiction on healthcare. This creates variability in approaches, implementation and public funding. More agencies and institutions need to be convinced to implement a national roll-out; this impedes national scale-ups or limits the potential externality benefits, and results in national scale-ups not being undertaken. There is also systemic and structural inertia regarding any need to up-end entrenched and established systems of functioning, which limits the appetite for scaling up. Sustained and highly motivated political support have helped in overcoming some of these impediments.

Our interviewees cited inadequate political will and/or the lack of domestic champions as the most significant barrier to successfully scaling up innovations nationally. They indicated that it is a challenge to create a coalition of willing backers – even for the technocratic process of designing and trialling innovation – that could then pave the way for generating robust political and public support. One interview respondent stated that:

> …with all the successes I can think of, success seems to be driven by an exceptional researcher who can articulate the benefits of a project well and sees winning support to scale up as part of the project's remit.

3.4.4 Governance and coordination between agencies and institutions

This is cited as a major factor in the success or failure of scale-up processes. There are two competing challenges here. The first is to broaden the active and meaningful participation of a broad array of stakeholders, within the government, and between its agencies and the entities beyond that specifically aligns incentives between competing entities. The second is to manage this process through a well-structured and coordinated system.

In most countries for which we have data, there is abundant evidence of multiple entities – all operating within the healthcare space but at times with poor or no coordination among them. The multiplicity extends to different departments within the government with competing and overlapping jurisdictions and responsibilities – but also results in gaps in roles that no one then ends up accounting for. Healthcare innovation is typically part of the mandate of the Ministry or Department of Health. But there are also instances where the responsibility for innovation is shared by the health ministry with separate ministries, agencies or departments dealing with science and technology, or R&D. The lack of clarity on overall responsibility, accountability and resources

to pursue shared mandates creates systemic bottlenecks when pursuing potentially successful innovations through to their natural extension into scaling for wider adoption.

In Kenya, NACOSTI manages the National Research Fund, including that which is earmarked for healthcare research. But a technical working group (TWG) of the MoH provides guidance and leadership to implement the healthcare agenda, including on research and innovation. In addition, there are specific institutions such as the Kenya Medical Research Institute (KEMRI) with its multiple thematic centres (such as the Centre for Clinical Research, Centre for Global Health Research, Centre for Microbiology Research, Centre for Biotechnology Research and Development – to name a few) that have functional overlaps. It has been a challenge to harmonise and align research efforts among them into a cohesive and structured system – and particularly beyond responses to specific diseases/crises.

The same issue emerges in Nigeria: research objectives are responses to episodic health needs or crises that compartmentalise the policy responses. Each episode leads to different and fragmented TWGs with incomplete coordination among them, and between them and the National Health Committee. While some TWGs have better systems and structures, there is no mechanism to replicate these known successes nationally. Nor are there incentives designed for different TWGs to coordinate and participate beyond their narrow functional focus, or for initiatives to be streamlined where there is overlap in functions, roles or responsibilities.

In Ghana, the R&D Division of the GHS leads the policy planning for the MoH, whereas other functional divisions in the GHS lead on certain aspects of policy implementation. There is low overlap of their roles and operation – which has positive and negative implications. The GHS does invite broader participation in some background discussions leading to policy-making and policy suggestions to the MoH – such as from academia (about 150 development partners), scientists and medical research institutions. However, civil society and private sector participation could be improved upon. International and multilateral agencies such as the Japan International Cooperation Agency (JICA), WHO and the United Nations Children's Fund (UNICEF) deal with government agencies; there is thus a lack of incentive for other stakeholders – especially community groups or thematic NGOs – to engage and participate with these institutional and multilateral funders unless the government provides a mechanism for interactions.

In addition, there are multiple semi/quasi-government entities. Some were set up in response to specific health exigencies, epidemics and crises such as Ebola or cholera outbreaks, and some on specific long-term health themes such as polio eradication and children's malnutrition reduction. As these entities are largely financed through earmarked public funds, there is generally a lack of incentive for them to coordinate and collaborate.

In India, multiple institutions and agencies (Indian Council for Medical Research, ICMR; Department of Biotechnology, DBT; Department of Science and Technology, DST) all operate within the healthcare innovation space, with some operating in niche areas (a specific medical need or healthcare practice) in a contested space with overlapping jurisdiction and responsibilities. There is therefore a lack of coordination and oversight or streamlining of efforts. There are also misplaced incentives preventing collaboration and coordination as these agencies have to justify their budgetary allocations; collaboration is deemed as an existential threat.

In Senegal, the Division of Research Planning within the MoH is the primary agency for overseeing healthcare innovation processes, and it maintains a database of successful innovation experiences. It is theoretically also supposed to provide a roadmap for the development of new healthcare systems and responses to existing, emerging or even potential new healthcare needs/threats. In practice though, the system is hampered by a lack of governance – both in organisation and in management. There is insufficient coordination between the different programmes that work fairly independently and protect their respective domains of work.

The healthcare innovation landscape is further complicated by the presence of an array of community organisations and NGOs that are structurally designed to advocate on

specific healthcare issues – but are not designed or given incentives to broaden their scope or collaborate across processes. This adds to the natural inertia for maintaining the status quo. Their operational mandate and incentive structures hinder the chances of optimising or harnessing opportunities for positive externality through collaboration.

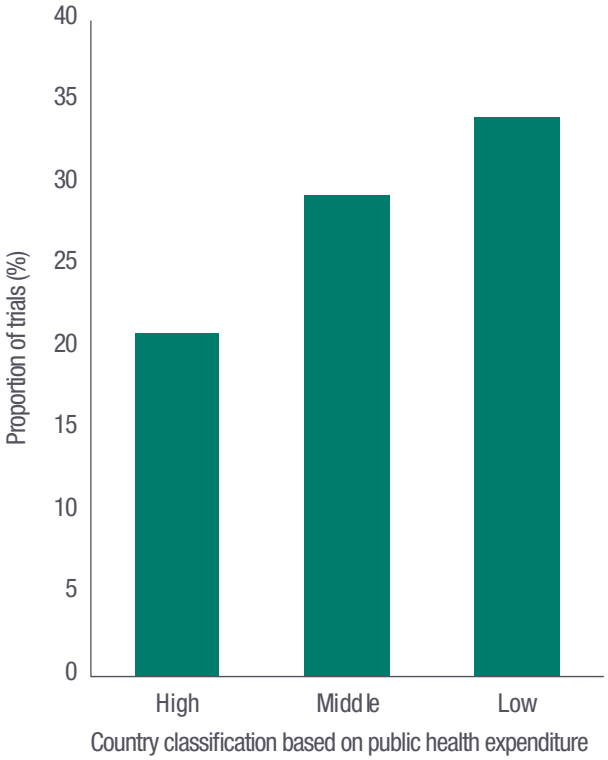
In cases where the health ministry provides guidance or a structure for coordination among these entities, there is greater scope for effective collaboration and less fragmentation and isolation of efforts to pursue innovation from the drawing board to trials to scale-up. But the absence of a governance structure between entities, a lack of convening mechanism or coordination between them, and the low incentives for entities to look beyond a fragmented single-issue focus, are all cited as substantive barriers to realising the potential of innovation.

Our interview responses echoed the discussion above. They indicate the challenges associated with coordinating a scale-up process and the gap between researchers or funders and programme implementers as possibly the second-most significant barrier to successful scale-ups of innovation. Respondents often perceived that the coordination challenge exacerbated the challenge of inadequate political support – particularly when decision-makers did not understand or appreciate the benefits and significance from scaling up. Some even suggested a lack of trust between policy-makers and researchers from different countries, and particularly those from international agencies or HICs. Several interviewees suggested that scale-ups would have a higher chance of success with a better understanding of the benefits of research and the processes around implementation.

It appears from our survey responses that fewer than half of successful trials were scaled up (Figure 7). This could be for various reasons.

But this picture also illustrates the potential for improving the uptake of innovation by building on the enablers of and mitigating the influence of barriers to successful scaling up, in order to effectively fulfil the commitment to achieve SDG3.

Figure 7 Propensity of successful innovation trials to be scaled up nationally



Source: Authors' computations using survey designed for this report

4 Conclusions

The survey respondents from a majority of countries report that their country has a formal healthcare research and innovation agenda – although there seem to be differences in perspectives on the form, nature, accessibility and use of this agenda. We, however, find that most countries do have a formal health and/or R&D agenda, but that healthcare innovation is more implicit than explicit in its form.

In the sequence of activities from agenda-setting to national scale-up of healthcare research and innovation outcomes, the national government of a country plays the most dominant role in setting the innovation agenda – if one exists. In some countries, local government also plays an important role. Civil society, and research and innovation institutes play a more prominent role in the subsequent stages – in translating the agenda into specific areas of focus. International institutions and funders play the most significant role in funding trials and incubations, and their subsequent national scale-ups. This distribution of roles does not, however, appear to be the result of a coordination strategy, but rather the outcome of the relative strengths and expertise of the different entities.

National needs and priorities do seem to be reflected in the systems and funding emphasis of multilateral institutions and international funders, but the alignment of this could also be improved upon. Most often, countries and international institutions tend to have separate healthcare priorities. When priorities overlap or synchronise, it often does so not by design or active engagement but by coincidence. The most common barriers preventing greater harmonisation between national and international entities, and among international agencies, include lack of information on domestic healthcare needs, gaps and priorities, as well as outcomes of innovation trials and experiments. The presence of international political will, and systems/mechanisms to coordinate between national and international healthcare stakeholders, are also essential to enable closer alignment between their policies and programmes.

These findings are all reinforced by the interviews we held, where participants strongly emphasised the need for a greater understanding of the value of research, and for political buy-in to successfully scale up innovation. Interviewees also stressed that a lack of trust and dialogue between researchers and policy-makers held back innovation uptake in many countries, and that this is particularly problematic when the researchers are from wealthier countries.

Finally, when scaling up innovations, there appears to be a robust pipeline of such trial-tested innovations across all categories of countries – from those with low public spending on health to those that spend much more. The four prominent enablers of effective scale-up of successful innovations to a national level are: the knowledge and accessibility of evidence on successful trials to inform scale-up decisions; adequate and assured or dedicated funding to make roll-out planning more predictable and less risky; the presence of political will and domestic champions who can galvanise grassroots support as well as be catalysts to draw in funding and overcome inertia; and good governance and coordination between agencies – whether within the government, or beyond – with their incentives aligned such that the actions of all stakeholders simultaneously support the scale-up effort. The experiences of survey participants indicate that the absence of such enabling and fostering conditions has created barriers – resulting in potentially promising healthcare innovations not being scaled up or being abandoned when the results did not match the intended and expected outcomes.

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Annex 1 Online survey questionnaire

Instructions and guidelines

This is an online survey being conducted by ODI, Wellcome Trust and WHO as a background assessment to inform the SDG3 Global Action Plan R&D, Innovation and Access Accelerator. We truly appreciate you taking the time to participate in this insightful and critical information-gathering exercise.

The survey has 35 questions and should take approximately 15–20 minutes to complete.

It is split into five sections:

1. Your personal/respondent details;
2. How national healthcare research agendas are devised and implemented;
3. How national healthcare priorities get reflected in international systems and funding mechanisms;
4. What are the systems and processes to deliver effective scale-up of innovations at country level;
5. What are the enablers and barriers to scale-up/priority setting/agenda setting at a national level?

In sections 2–5, we would like you to reflect on your perceptions and knowledge of national institutions, processes, agents – and not restricted to your direct sphere of influence.

Data use, storage and confidentiality

Data gathered through the survey will be maintained by ODI conforming to GDPR guidelines. Primary data will only be shared among ODI, Wellcome Trust and WHO for research. In our research as well as in our reporting of results, no personal details of respondents will be shared or used; our analysis will at best disaggregate to the country level and not further.

We thank again for your time and contribution. If you have any questions or queries, we can be reached at: Rachael Crockett, Policy Advisor, Wellcome Trust (UK).

Section 1: Respondent details

Please note that we seek your name and institutional affiliation only to track responses so that we don't send you email reminders to complete the survey. We will not identify you individually in the rest of the survey, nor in the data analysis or reporting of results.

1. **What is your name?**

Note: We seek your name only to track responses so we don't send you email reminders to complete the survey. We will not identify you individually in the rest of the survey, nor in the data analysis or reporting of results.

2. **What country are you based in?**

3. **What is your institution?**

- ☐ National government
- ☐ Sub-national government
- ☐ Research institution
- ☐ International research funder
- ☐ Public healthcare provider
- ☐ Private healthcare provider
- ☐ International NGO
- ☐ Local NGO
- ☐ Civil society organization
- ☐ Affected community group, journalist/media
- ☐ National healthcare funder (non-government)
- ☐ International healthcare funder
- ☐ Other – please specify)

4. **What is your position/rank?**

5. **What is your primary role?**

- ☐ Policy-making
- ☐ Administration, programme design and implementation
- ☐ Medical R&D innovation
- ☐ Systems innovation
- ☐ Healthcare line-management
- ☐ Healthcare provider
- ☐ Civil-society and/or community advocate
- ☐ Donor/funder
- ☐ Researcher
- ☐ Other (please specify)

6. **How many years have you been in this position?** (Indicate in numbers)

Section 2: How national healthcare research agendas are devised and implemented

7. **Does your country have an agenda for national health research and innovation?**

☐ Yes ☐ No ☐ Don't know ☐ No response

8. **If there is, then is this a publicly available document?**

☐ Yes ☐ No ☐ Don't know ☐ No response

9. **If there is, then when was this agenda last set? (Please state the year as YYYY)**

10. **How engaged/involved are the following institutions in deciding the research and innovation for health agenda?**

	Sole decider	Very involved	Somewhat involved	Not involved	Don't know	No response
National healthcare administrators	☐	☐	☐	☐	☐	☐
Local healthcare administrators	☐	☐	☐	☐	☐	☐
Civil society and community groups	☐	☐	☐	☐	☐	☐
National government	☐	☐	☐	☐	☐	☐
National R&D institutes and laboratories	☐	☐	☐	☐	☐	☐
Public healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare funders	☐	☐	☐	☐	☐	☐
International healthcare funders	☐	☐	☐	☐	☐	☐
International research funders	☐	☐	☐	☐	☐	☐
Others (please specify in box below)	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

11. **For those entities involved to any extent: what is/are their main role(s)/channel(s) of involvement?** Please choose at most top 3 roles per entity (e.g. at most 3 in row 1 "National healthcare administrators", 3 in row 2 "Local healthcare administrators" and so on).

	Agenda setting	Prioritising	Innovation trial selections	Trial monitoring and assessment	Scaling up innovations	Funding implementation
National healthcare administrators	☐	☐	☐	☐	☐	☐
Local healthcare administrators	☐	☐	☐	☐	☐	☐
Civil society and community groups	☐	☐	☐	☐	☐	☐
National government	☐	☐	☐	☐	☐	☐
National R&D institutes and laboratories	☐	☐	☐	☐	☐	☐
Public healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare funders	☐	☐	☐	☐	☐	☐
International healthcare funders	☐	☐	☐	☐	☐	☐
International research funders	☐	☐	☐	☐	☐	☐
Others	☐	☐	☐	☐	☐	☐

Section 3: How national healthcare priorities get reflected in international systems and funding mechanisms

12. How important are the following for setting national priorities within the research and innovation for health agenda?

	Extremely important	Somewhat important	Not important	Don't know	No response
Long term local/regional health needs	☐	☐	☐	☐	☐
Long term national health needs	☐	☐	☐	☐	☐
Emergencies	☐	☐	☐	☐	☐
Scale of impact (number of people and/or geographic expanse)	☐	☐	☐	☐	☐
Location of needs	☐	☐	☐	☐	☐
Evidence of success	☐	☐	☐	☐	☐
Burden of disease	☐	☐	☐	☐	☐
Availability of resources (financial, personnel, physical)	☐	☐	☐	☐	☐
Influence of healthcare providers (public/private/other)	☐	☐	☐	☐	☐
Influence of government (national/local; ministries/Individuals)	☐	☐	☐	☐	☐
Influence of healthcare policy champions (individuals, NGOs, INGOs and civil society orgs.)	☐	☐	☐	☐	☐
Influence of R&D institutions	☐	☐	☐	☐	☐
Influence of international funders	☐	☐	☐	☐	☐
Influence of international research and innovation	☐	☐	☐	☐	☐
Time horizon	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

13. Name three systems/people/agencies, if any, tasked to measure and identify gaps between priorities for healthcare research/innovation and healthcare needs.

1	
2	
3	

14. Have these systems/people/agencies improved in matching national health needs to healthcare research priorities over the past 5 years?

☐ Improved a lot ☐ No change ☐ Deteriorated a lot
☐ Improved slightly ☐ Deteriorated slightly ☐ No response

15. Is there dedicated funding (whether government budget allocation or external funding mechanism) to pursue nationally identified priorities?

☐ Yes ☐ No ☐ Don't know ☐ No response

16. Is the funding contingent upon periodic (annual) budget replenishment/allocation cycles or by assessment of healthcare needs?

☐ Budget cycle ☐ A combination of both ☐ Don't know
☐ Healthcare needs ☐ Neither-some other criteria ☐ No response

17. To what extent are international funders/donors responsive to local/national healthcare needs when setting funding priorities?

☐ Extremely responsive ☐ Somewhat responsive ☐ Don't know
☐ Mostly responsive ☐ Not responsive ☐ No response

Section 4: What is the process to deliver effective scale up of innovations at a country-level

18. **Of the healthcare innovations (process/products) that have been tried out in the last 5 years in your country, what proportion were deemed "success", "failure", "neither success nor failure"? (Please indicate percentages that add up to 100).**

Success	
Failure	
Neither success nor failure	

19. **In the last 5 years, approximately what proportion (by count and not investment value) of successful innovations were scaled up to a national level, if scaling was appropriate? (Please indicate percentage as a number 0–100)**

20. **Were non-successful innovations retried with modifications?**

- ☐ Yes, sometimes
- ☐ No, never/hardly ever
- ☐ Don't know
- ☐ No response

21. **How engaged/involved are the following institutions in deciding which innovation for health agenda to trial?**

	Sole decider	Very involved	Somewhat involved	Not involved	Don't know	No response
National healthcare administrators	☐	☐	☐	☐	☐	☐
Local healthcare administrators	☐	☐	☐	☐	☐	☐
Civil society and community groups	☐	☐	☐	☐	☐	☐
National government	☐	☐	☐	☐	☐	☐
National R&D institutes and laboratories	☐	☐	☐	☐	☐	☐
Public healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare funders	☐	☐	☐	☐	☐	☐
International healthcare funders	☐	☐	☐	☐	☐	☐
International research funders	☐	☐	☐	☐	☐	☐
Others (please specify in text box)	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

22. **How engaged/involved are the following institutions in deciding which innovation for health agenda to scale-up?**

	Sole decider	Very involved	Somewhat involved	Not involved	Don't know	No response
National healthcare administrators	☐	☐	☐	☐	☐	☐
Local healthcare administrators	☐	☐	☐	☐	☐	☐
Civil society and community groups	☐	☐	☐	☐	☐	☐
National government	☐	☐	☐	☐	☐	☐
National R&D institutes and laboratories	☐	☐	☐	☐	☐	☐
Public healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare providers	☐	☐	☐	☐	☐	☐
Private healthcare funders	☐	☐	☐	☐	☐	☐
International healthcare funders	☐	☐	☐	☐	☐	☐
International research funders	☐	☐	☐	☐	☐	☐
Others (please specify in text box)	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

23. **Is there a system to implement, monitor, assess, report and feedback in the process between innovation trials, assessment and scaling-up?**

☐ Yes ☐ No ☐ Don't know ☐ No response

24. **Is there a repository/database of health research/innovation in the country?**

☐ Yes ☐ No ☐ Don't know ☐ No response

25. **Who maintains/manages this repository/database?**

☐ Ministry of Health
☐ Ministry of R&D/Science and Technology
☐ Ministry of Public Administration
☐ Ministry of Education
☐ Educational institution
☐ Research institution
☐ WHO Country Office
☐ WHO Regional Office
☐ Other (please specify)

☐ Don't know
☐ No response

26. **How frequently is this repository/database updated?**

☐ Every 6 months
☐ Every 1 year
☐ Every 2 years
☐ No fixed frequency
☐ Don't know
☐ No response

27. **How frequently are international health lessons/innovations taken into account when setting national healthcare innovation practice?**

☐ Always
☐ Sometimes
☐ Rarely
☐ Never
☐ Don't know
☐ No response

Section 5: What are the enablers and barriers to agenda-setting/prioritising/scaling-up innovations at a national level?

28. Thinking about instances where, in the last 5 years, domestic agenda-setting process was responsive to the national healthcare needs, what were the top 3 enablers that helped make the process responsive to healthcare needs?

	Evidence to inform decisions	Domestic political will and champions	Assured and dedicated funding	Coordination among national funders	Coordination among international funders	Coordination between national and international funders
First enabler	☐	☐	☐	☐	☐	☐
Second enabler	☐	☐	☐	☐	☐	☐
Third enabler	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

29. Similarly, in the last 5 years, where domestic agenda-setting process was non-responsive to the national healthcare needs, what were the top 3 barriers that hindered the process from being responsive to healthcare needs?

	Insufficient evidence to inform decisions	Insufficient domestic political will and champions	Inadequate of uncertain funding	Insufficient coordination among national funders	Insufficient coordination among international funders	Insufficient coordination between national and international funders
First barrier	☐	☐	☐	☐	☐	☐
Second barrier	☐	☐	☐	☐	☐	☐
Third barrier	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

30. Over the last 5 years, what were the top 3 enablers that helped make international funders responsive to the national healthcare needs?

	Information of national healthcare needs and priorities	Influence of domestic champions and political will	International will	Coordination among national funders	Coordination among international funders	Coordination between national and international funders
First enabler	☐	☐	☐	☐	☐	☐
Second enabler	☐	☐	☐	☐	☐	☐
Third enabler	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

31. Similarly, over the last 5 years, what were the top 3 barriers that hindered international funders from being responsive to national healthcare needs?

	Insufficient information of national healthcare needs and priorities	Insufficient influence of domestic champions or political will	Insufficient international will	Insufficient coordination among national funders	Insufficient coordination among international funders	Insufficient coordination between national and international funders
First barrier	☐	☐	☐	☐	☐	☐
Second barrier	☐	☐	☐	☐	☐	☐
Third barrier	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

32. **Over the last 5 years, what were the top 3 enablers that helped scaling-up successful process and product innovations to a national level?**

	Evidence of successful impact	Sufficient financial resources	Domestic champions and political will	Limited regulatory barriers	Coordination among national funders	Coordination among international funders	Coordination between national and international funders
First enabler	☐	☐	☐	☐	☐	☐	☐
Second enabler	☐	☐	☐	☐	☐	☐	☐
Third enabler	☐	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

33. **Over the last 5 years, what were the top 3 barriers that hindered the scaling-up successful process and product innovations to a national level?**

	Inadequate evidence of successful impact	Insufficient financial resources	Insufficient domestic champions or political will	Regulatory barriers	Insufficient coordination among national funders	Insufficient coordination among international funders	Insufficient coordination between national and international funders
First barrier	☐	☐	☐	☐	☐	☐	☐
Second barrier	☐	☐	☐	☐	☐	☐	☐
Third barrier	☐	☐	☐	☐	☐	☐	☐

Note: You can tick only one box per row.

34. **Over the last 5 years, how have the enablers of scaling up healthcare innovation changed?**

☐ Become a lot more influential
☐ Become slightly more influential
☐ No change
☐ Become slightly less influential
☐ Become a lot less influential
☐ Don't know
☐ No response

35. **Over the last 5 years, how have the barriers to scaling up healthcare innovation changed?**

☐ Become a lot more influential
☐ Become slightly more influential
☐ No change
☐ Become slightly less influential
☐ Become a lot less influential
☐ Don't know
☐ No response

Annex 2 List of people interviewed and their affiliations

Participant	Institution and location
Anh Tuan, Khuong	Health Strategy and Policy Institute, Viet Nam
Binagwaho, Agnes	University of Global Health Equity, Rwanda
Dhimal, Meghnath	Nepal Health Research Council, Nepal
Iqbal, Sarah	Wellcome Trust/Department of Biotechnology India Alliance, India
Javombo, Mahmoud	Directorate of Science, Technology and Innovation, Sierra Leone
Kumar, Mukesh	Indian Council of Medical Research, India
Lima, Nisia	Oswaldo Cruz Foundation, Brazil
Mburu, Rosemary	WACI Health, Kenya
Muganda, Rosemarie	PATH, Kenya
Mukherjee, Shirshendu	Biotechnology Industry Research Assistance Council, India
Ngirabega, Jean de Deu	East African Health Research Commission, Burundi
Ochu, Chinwe	Nigeria Centre for Disease Control, Nigeria
Okeibunor, Joseph Chukwudi	World Health Organization, Congo
Ongolo-Zogo, Pierre	Centre for Development of Best Practices in Health, Cameroon
Salami, Olawale	Drugs for Neglected Diseases Initiative, Kenya
Sall, Mohamadou	Cheikh Anta Diop University of Dakar, Senegal
Williams, John	Dodowa Health Research Centre, Ghana

Annex 3 In-person survey interview questionnaire

1. How does the National Health Research Agenda work in your country? What can make it more responsive to national/local needs?
2. In your country, how are decisions made on what national research to fund? How are competing objectives of multiple stakeholders balanced? How, and by how much, does the National Research Agenda influence this process?
3. How well do *national* systems, programmes, initiatives and funding mechanisms suit your national priorities? Where they differ, how can they be better aligned and coordinated among themselves?
4. Similarly, how well do *international* institutions, their programmes, initiatives and funding mechanisms suit your national priorities? Where they differ, how can they be better aligned and coordinated? Do you have examples when coordination/partnership with international funders has been successful or not, and some key lessons learned?
5. Can you walk us through a typical process of trial to scale-up of a product/process innovation – with emphasis on the key actors and their decision-making process/criteria?
6. Thinking of some major impediments that prevented scaling up of product/process innovations, what were some prominent barriers and why were they barriers?
7. What have been some notable successes in overcoming these challenges? Can you highlight what made them successful?
8. Would you like to share some personal perspectives or additional experiences relevant for this survey?

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