



Rethinking how development assistance for health can catalyse progress on primary health care

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Global campaigns to control HIV, tuberculosis, malaria, and vaccine-preventable illnesses showed that large-scale impact can be achieved by using additional international financing to support selected, evidence-based, high-impact investment areas and to catalyse domestic resource mobilisation. Building on this paradigm, we make the case for targeting additional international funding for selected high-impact investments in primary health care. We have identified and costed a set of concrete, evidence-based investments that donors could support, which would be expected to have major impacts at an affordable cost. These investments are in: (1) individuals and communities empowered to engage in health decision making, (2) a new model of people-centred primary care, and (3) next generation community health workers. These three areas would be supported by strengthening two cross-cutting elements of national systems. The first is the digital tools and data that support facility, district, and national managers to improve processes, quality of care, and accountability across primary health care. The second is the educational, training, and supervisory systems needed to improve the quality of care. We estimate that with an additional international investment of between US\$1.87 billion in a low-investment scenario and \$3.85 billion in a high-investment scenario annually over the next 3 years, the international community could support the scale-up of this evidence-based package of investments in the 59 low-income and middle-income countries that are eligible for external financing from the World Bank Group's International Development Association.

Introduction

Strengthening primary health care (PHC) is the cornerstone of achieving universal health coverage.¹ Integration of core public health functions into PHC-based systems will also be crucial for pandemic preparedness and building resilient health systems that can cope with the health effects of climate change and the rising burden of non-communicable diseases (NCDs).^{2,3} Despite these benefits, investment in PHC has not been a priority for many low-income and middle-income countries (LMICs) or donors. Stenberg and colleagues⁴ estimate that an additional US\$48 per capita needs to be spent annually on core elements of PHC, which would represent nearly a trebling of the current PHC expenditure in low-income countries.⁵

The *Lancet Global Health* Commission on financing PHC argued that, for long-term sustainability, most of this financing will need to come from domestic sources—particularly public financing.⁶ However, there remains an important role for targeting additional development assistance for health (DAH) towards selected high-impact investments in PHC. Just as DAH has had a major role in improving health outcomes related to HIV, tuberculosis, malaria, and vaccine-preventable illnesses, the paradigm of using external financing to make evidence-based investments coupled with a focus on measurable results could help to transform PHC-based health systems in LMICs. Although DAH risks distorting national priorities and siloing health investments, it can have a beneficial role beyond its monetary value. When based on recognised global priorities, DAH can generate attention to an issue and propel a policy process aimed at tackling that issue.⁷

Most DAH is already targeted at interventions delivered in primary rather than secondary or tertiary settings. However, most of this external financing for PHC has been for prevention and treatment of single diseases, often through vertical programmes outside government budgeting processes.⁸ The growing political momentum behind comprehensive PHC has not been matched by increased DAH for integrated, PHC-based health systems. The reasons for this lack of funding include the perception that PHC is hard to define and measure, the concern that the amount needed from donors to enhance PHC is impossibly large, and a sense that efforts to address the underlying challenges of weak health systems have not yielded many results.⁹

In this Health Policy, we challenge these perceptions by showing that it is possible to define a set of concrete, measurable investments in PHC that are amenable to donor financing and can catalyse transformational progress in LMICs for a modest cost. Although PHC can be defined in many ways,¹⁰ we use the approach adopted by WHO and UNICEF that identifies three main components of PHC: empowered people and communities, integrated health services with an emphasis on primary care and public health functions, and multisectoral policy and action.¹¹ We concentrate on the first two of these because they have typically been amenable to DAH, unlike multisectoral policy and action.

A prioritised package of investments to accelerate progress on PHC

We used a five-step process to identify and cost a set of concrete evidence-based investments that donors

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could support that would be expected to have major impacts at an affordable cost. The appendix (pp 1–11) shows the detailed methods.

First, from a literature review, we identified a list of 131 PHC approaches (appendix pp 1–2 shows the search strategy). Second, to facilitate prioritisation, we grouped the 131 approaches into 22 investment areas (table 1). Third, we developed criteria to prioritise these investment areas, including areas that were likely to be transformational, promote equity, and contribute to

building resilience, and the extent to which they were suited to donor financing. Fourth, an international expert working group of 13 academics and practitioners from eight countries, including LMICs, refined these criteria and then used them to prioritise an interconnected package of approaches. The experts were selected on the basis of their knowledge and experience of PHC, aiming for gender and geographical diversity. They prioritised interventions through multiple rounds of a ranking exercise. The final package was organised into three

	Example
Governance and policy frameworks	
Governance arrangements to improve population health outcomes	Participatory learning or consumer involvement in policy and organisational decisions
Public health policy to improve overall health	Subsidies for fruits and vegetables to improve healthy eating and nutritional outcomes
Engagement of communities and other stakeholders	
Community or patient engagement in health decision making	Community coalitions to develop broad social and health system strategies to reduce disparities and improve health status
Health promotion to improve basic health care	Road safety public education and awareness campaigns to improve road safety
Innovative technology and approaches to empower communities to take more control over their health (self-care)	Public communication through social media platforms, online search engines, chatbots
Models of care	
New care delivery models to improve patient case-finding	Active case-finding for identifying undiagnosed disease in the community
New care delivery models to increase access	Community-based HIV services to surmount stigma (eg, service is directly offered by community member instead of through a referral to a health centre)
Public health services to improve overall health	Promotion of handwashing by community health workers
Public health interventions to improve pandemic preparedness and response	Increasing ventilation in buildings or homes (eg, by enhancing air changes per hour) to reduce transmission risk
Primary health care workforce	
Financial and non-financial incentives for health-care workforce	Increasing medical provider coverage in rural areas through requirements or incentivisation (financing or in-kind benefits such as housing)
Task shifting (particularly to community health workers) to improve health access and outcomes	Task shifting to community health workers or other moderately skilled health workers (eg, for health promotion, basic curative services, chronic disease management, or skilled deliveries)
Medicines and other health products	
Strengthening performance of supply chains	Improving access to contraceptives via automated distribution systems (vending machines)
Engagement with private providers	
Private sector approaches to improve quality and service delivery	Contracting delivery to private sector providers to reduce out-of-pocket spending and improve health utilisation and service delivery
Purchasing and payment systems	
Supply-side approaches to improve health financing architecture	Changing national policies to remove user fees at primary care level
Digital technologies for health	
Digital health to improve patient tracking and referrals	Mobile-based patient tracking to decrease loss to follow-up and increase referral uptake
Digital health to improve patient treatment adherence	Biometric-based patient tracking and identification to improve adherence to care and health record management
Digital health to support provider decision making and care practices	Interventions to improve antibiotic prescribing practices
Digital health for pandemic preparedness and response	Digital epidemiological surveillance with machine learning, survey apps, websites, and data extraction and visualisation
Data systems and use to improve quality of health system	Establishing clinical information systems to collect longitudinal data to improve quality and safety
Telehealth to improve access to health care	Clinical care through telehealth or teleconferencing that connects providers at primary care level with specialists
Systems to improve quality of care	
Financial and non-financial incentives to influence patient behaviours	Cash transfers (conditional or unconditional) to reduce structural risk factors
Training, education, and other management techniques to improve provider quality	Routine health information system for health system management, governance, accountability, planning, policy making, surveillance, and quality improvement

Table 1: Initial identification of 22 investment areas, organised using the WHO levers for primary health care

	Current status in many LMICs	Status that could be achieved through additional investment	Examples of LMICs that have made investments in this direction
Individuals and communities empowered to engage in health decision making	Poor, fragmented investment in ensuring that communities are actively involved in decision making within the health system, with accountability typically flowing up (to national governments and donors) rather than to the people most impacted	Interlinked investments that support community empowerment, including through direct financing of capacity building, supportive digital tools, publication of data, and demand-side financing	India, Rwanda, South Africa
A new model of people-centred primary care	Uncoordinated, siloed care skewed by incentives to focus on particular diseases, based on a model of providing care to those patients who are able to show up at facilities	Multidisciplinary teams composed of general practitioners, nurses, and CHWs (and, where possible, others such as pharmacists and counsellors) that ensure care continuity to a defined population, facilitated by digital tools that offer decision support (including by connecting them with specialists at higher-level facilities)	Brazil, Costa Rica, Iran, Rwanda
Next generation CHWs	Sub-scale CHW programmes that are overly reliant on unpaid volunteers with little training, inadequately tied to health facilities, not connected to digital resources, and focused on vertical disease control efforts	Large-scale CHW programmes with a paid, trained workforce that is integrated into care teams based at health facilities and responsible for a defined population, enabled by digital tools, and offering a wide range of services (including case management for both communicable and non-communicable diseases, active case-finding, and public health services, including surveillance)	Bangladesh, Brazil, Ethiopia, India, Indonesia, Iran, Nepal

LMICs=low-income and middle-income countries. CHW=community health worker.

Table 2: A prioritised package of three investment areas

interconnected investment areas (table 2). Finally, we estimated the donor financing required to catalyse scale-up of this package in 74 LMICs: the 59 countries eligible for financing from the World Bank's International Development Association (IDA) plus the 15 so-called blend countries that are eligible for external financing from both IDA and the World Bank Group's International Bank for Reconstruction and Development.

Through this five-step process, we identified three interconnected investment areas that together represent a means by which donors could contribute to systemic change: (1) individuals and communities empowered to engage in health decision making, (2) a new model of people-centred primary care, and (3) next generation community health workers (CHWs; table 2). These three areas would be supported by strengthening two cross-cutting elements of national systems: digital tools and data that support facility, district, and national managers to improve processes, quality of care, and accountability across PHC; and the educational, training, and supervisory systems needed to improve the quality of care. The figure shows a theory of change for how investing in these three investment areas and supporting two cross-cutting systems elements could transform PHC delivery and improve health outcomes.

We estimated the costs of the three interconnected, prioritised investment areas, plus cross-cutting systems support to improve data and health worker education, using publicly available data sources. We combined top-down and bottom-up costing approaches to arrive at reasonable incremental cost estimates for each catalytic category. Two investment scenarios were modelled: (1) a low-investment scenario that included a minimum set of interventions needed to catalyse PHC improvement, and (2) a high-investment scenario that included additional interventions over and above those in the low-investment

scenario. Table 3 shows the costing modules and cost components for each of the different investment areas under the two different scenarios. We adopted a donor's perspective in line with the assumption that the costs estimated represent costs that donors would be willing to bear to catalyse PHC improvement in focus countries.

This package would not be implemented in a one-size-fits-all manner. The design of a prioritised PHC investment package would always need to be led and owned by countries, based on local data and needs. Nevertheless, we believe that the prioritised set of investments defined in this paper is a valuable starting point to understand how additional DAH could help to transform PHC.

Implementation of this package would face multiple challenges. First, many of the approaches in the package are digital—thus, the challenges related to connectivity and digital literacy, particularly in more remote areas and among older populations, must be tackled for them to deliver impact. Second, trained family physicians, primary care nurses, and CHWs are crucial to the delivery of these investments, yet long-standing challenges related to the health workforce have only worsened as a result of the COVID-19 pandemic. Third, financing for these investments should be provided in ways that strengthen national ownership and systems rather than in a vertical manner, as has sometimes been the case for DAH. Over the long term there should be a sustainable plan to transition from DAH to domestic financing; however, as the HIV/AIDS epidemic in Africa has shown,¹² it is important not to let fears about sustainability stand in the way of committing DAH that can save lives today.

Individuals and communities empowered to engage in health decision making

Empowerment of communities and individuals to become more active participants in the PHC system can greatly

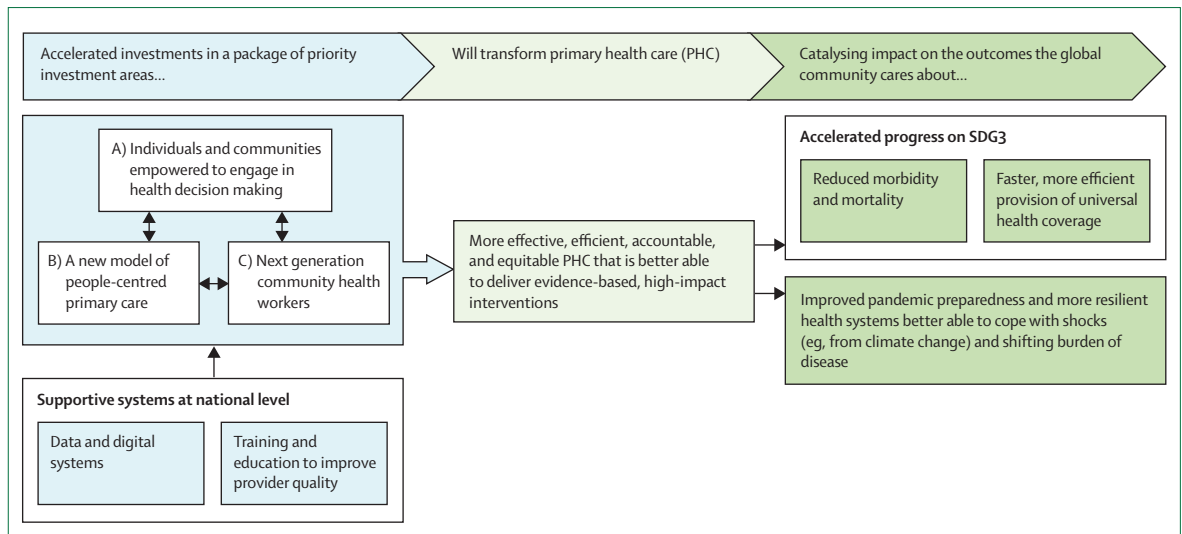


Figure: Theory of change for how the package of donor investments will drive impact
SDG=Sustainable Development Goal.

affect health outcomes. For example, women’s participatory learning and action groups during pregnancy could save an estimated 283 000 newborns and over 36 600 mothers every year if implemented in rural areas of 74 LMICs.¹³ When communities and individuals have access to learning, knowledge, and information, PHC systems place the patient at the centre. Patients can be empowered with digital tools to support self-testing and self-management, and they shift from being passive consumers to co-creators of health prevention and care. Such digital tools should be connected to an infrastructure that would allow for follow-up in the event that a health condition progresses—eg, self-testing for human papillomavirus (HPV) should be linked to appropriate cervical cancer treatment services. There is growing interest in harnessing the knowledge and experiences of the community in co-creating, co-producing, and co-designing PHC interventions.¹⁴

However, to date there has been little dedicated investment in supporting communities and individuals in this way to become actively involved in decision making within the health system. The small amount of investment has been piecemeal, and accountability for such investments has typically been upwards—to central governments and donors—rather than downwards, to people and communities.

PHC in LMICs could be radically transformed by strategic, interlinked international investments to engage communities and individuals through community empowerment efforts and through self-management and self-testing approaches.

A dedicated joined up approach to empowering communities

While donors have funded some community engagement, the full power of community coalition building,

participatory learning and action groups, and patient education and outreach activities has not yet been unleashed. Coalitions that link health workers with communities, particularly when vulnerable populations are involved, can improve individual health outcomes and behaviours and also population-wide PHC delivery systems. Such coalition-driven community engagement strategies have positive effects across a wide range of health issues, including, for example, HIV risk behaviour, immunisation uptake, and breastfeeding behaviour.¹⁵ Participatory groups that mobilise and engage communities in policy, organisational change, public health campaigns, and shaping and preparing information for patients can all have positive effects (panel 1).¹⁶

Self-testing and self-management

New technologies are empowering individuals to have active roles in managing their own health. Self-testing for HPV, for example, has been shown to be acceptable to both women and health workers and effective at getting to communities who live far from health facilities and who are rarely reached by health workers.¹⁷ HIV self-tests allow people to obtain their own HIV status from an oral swab or blood sample; some of these people would not have sought testing at a health facility because of stigma linked with HIV.¹⁸

A digital revolution is underway that empowers individuals to take control over their own health; however, the full potential of this revolution has not yet reached LMICs at scale, with some exceptions. For example, over the past 10–15 years, India has invested in building and scaling up a digital identification programme, Aadhaar, that now covers over 1·2 billion people. Aadhaar enabled the government to build a platform, the Cowin platform,

For more on the Cowin platform see <https://www.cowin.gov.in/>

Investment scenarios and cost components	
Individuals and communities empowered to engage in health decision making	
Element 1: strengthening community and patient engagement in health decision making: annual cost of providing community participatory learning and action cycles per 1 000 000 adult female population aged 15–49 years	<p>Low-investment scenario:</p> <ul style="list-style-type: none"> System set-up costs (eg, staff recruitment and training, securing community approval and adapting intervention delivery methods, content, and materials to the local context) Capital costs (eg, vehicles, IT, and office equipment). <p>High-investment scenario:</p> <ul style="list-style-type: none"> Low-investment programme plus materials costs, implementation costs, other recurrent costs, and staff salaries (programme staff, group facilitators, supervisors)
Element 2: empowering patients to look after their own health: annual cost of providing disease-specific self-diagnostic services per 1 000 000 population	<p>Low-investment scenario:</p> <ul style="list-style-type: none"> System set-up (eg, training for start-up, demand generation) Capital costs (eg, building and storage, equipment, vehicles) <p>High-investment scenario:</p> <ul style="list-style-type: none"> Low-investment scenario plus costs of self-testing kits, and distribution costs; no personnel salaries
New model of patient-centred primary care	
Cost of supporting reforms to introduce new care models	<p>Low-investment scenario:</p> <ul style="list-style-type: none"> Digital diagnostics and decision support: costs related to the development and running of digital tools (clinical decision-support tool, IT kiosks in primary care facilities), including training Empanelment: TA to design system (including IT system design) Multidisciplinary teams: TA to design system reforms; training; operational research around piloting it <p>High-investment scenario:</p> <ul style="list-style-type: none"> Digital diagnostics and decision support: low-investment scenario plus costs for telehealth programme Empanelment: low-investment scenario plus data collection to compile comprehensive database Multidisciplinary teams: low-investment scenario with no additional investments
Next generation CHWs	
Annual cost of providing community-based care through ICT-enabled CHWs per 1 000 000 population	<p>Low-investment scenario:</p> <ul style="list-style-type: none"> CHW training, supplies (including backpacks, drugs and RDTs; costs of IT support included under data and digital systems), management and supervision <p>High-investment scenario:</p> <ul style="list-style-type: none"> Low-investment programme plus CHW salaries, and overhead costs
Data and digital systems	
Cost of implementing a digital health system per 1 000 000 population	<p>Low-investment scenario:</p> <ul style="list-style-type: none"> Set-up costs (eg, standards development, development of platform, training), equipment costs (eg, costs to digitalise health facilities and provide smartphone and data plans to CHWs) <p>High-investment scenario:</p> <ul style="list-style-type: none"> Low-investment scenario plus costs to maintain platform and institutionalise data use, other recurrent costs
Training, education, and other management techniques to improve provider quality	
Cost of setting up an e-learning platform for health workers	<p>Low-investment scenario:</p> <ul style="list-style-type: none"> One-time set-up costs for an e-learning platform (includes standards development, platform development) and a massive open online course Cost categories include personnel, overhead, equipment and material, indirect costs, stakeholder cost <p>High-investment scenario:</p> <ul style="list-style-type: none"> Low-investment scenario plus demand generation, recurrent costs (Cost of devices not included in any scenario [covered under data and digital systems])
IT=information technology, TA=technical assistance, ICT=information and communication technology, CHW=community health worker, RDT=rapid diagnostic test.	
Table 3: Costing modules, investment scenarios, and cost components of catalytic approaches	

that helped in planning and delivering over 1·2 billion COVID-19 vaccine doses.

The rapid rise in the number of people who own mobile phones since the mid-1990s creates an opportunity to use mobile phone apps to facilitate self-management of long-term illnesses, curb NCD risk factors, enable easier access to pooled payment schemes (eg, regional or national health insurance), and provide information on demand for a range of conditions, including for maternal health care^{19–22} (panel 2). Studies have shown improved health outcomes and self-management in people with diabetes or high blood pressure from using such apps.²³ Nevertheless, in many countries, connectivity is limited. Investments in

connectivity need to be complemented by resources that address broader access questions including affordability, building of digital literacy, and equity. With the proliferation of artificial intelligence (AI) and machine-learning solutions, investment in digital public infrastructure could help to maximise the impact of AI for LMICs and minimise the risks of widening existing equity gaps.

A new model of people-centred primary care

The fastest route to improving health outcomes is by increasing the availability and quality of evidence-based, high-impact interventions.²⁴ Yet, many countries have plateaued in the coverage of these interventions as a

result of ineffective and inefficient service delivery systems.

Too often, care is siloed, with external resources used to hire health workers to focus on specific diseases, with laboratory facilities equipped only to diagnose the conditions that receive dedicated support. The model of

facilities relying on sick patients presenting at them is inefficient and inequitable. It ignores technological advances that open up new ways of reaching patients and the successful experiences of several countries in moving to models that engage entire communities.

New models of care that integrate multiple vertical health services around community-based, coordinated, continuous, comprehensive, compassionate, first-contact PHC services are needed to overcome these challenges. For example, Iran uses primary care kiosks called health houses connected to larger primary care centres.²⁵ Rwanda has established health posts that are within 30 min walking distance of all members of the population.²⁶ Brazil's CHWs have played a pivotal role in primary care, with each CHW assigned up to 150 families.²⁷

Large-scale shifts require political leadership and a sizeable commitment of resources to design, test, and ultimately scale up a new model. Many LMICs have shown leadership in championing some of these approaches, but even visionary leaders often do not have the flexible financing required to drive this kind of change. The provision of that kind of financing is a perfect role for DAH.

Panel 1: Community empowerment in action through women's participatory learning and action groups

Participatory learning and action groups for women can increase care-seeking for antenatal care and institutional delivery, as well as improving care practices for mothers and newborns.

A systematic review and meta-analysis¹³ of seven randomised control trials of the role of such groups in maternal and newborn health in four countries (Bangladesh, India, Malawi, and Nepal) found evidence of impressive results for a relatively low-cost investment. On the basis of four studies in which more than 30% of pregnant women participated, exposure to women's groups is associated with:

- A 49% reduction in maternal mortality
- A 33% reduction in neonatal mortality

Research has also shown that the intervention is cost effective.

Panel 2: MomConnect South Africa—a mobile health tool enabling health promotion, health-care data collection, and user feedback on health-care facilities

There are important synergies across the three investment areas that we have described, with the different elements designed to reinforce each other. A good example of how a technology platform can contribute to delivering comprehensive primary health care is the MomConnect programme.

MomConnect is a mobile health programme run by the National Department of Health in South Africa. Designed to improve antenatal and maternal health in South Africa, it has rapidly scaled into one of the world's largest mhealth tools. Pregnant women register themselves or are registered through an initial antenatal appointment at a health-care facility into a national universal pregnancy registry. During their pregnancy and until the child is born, they receive weekly SMS messages providing timely information about safe and healthy pregnancies and child-rearing, including information about nutrition, warning signs of fetal development, and sensitive topics such as domestic abuse awareness. Through an interactive helpdesk, women can ask questions on antenatal, maternal, and child health, and provide feedback on the health-care facilities that they are using.

A companion service, NurseConnect, provides nurses in more than 3000 facilities across the country with a single mobile technology platform that allows them to access information about common conditions, interact with the National Department of Health, and receive emotional support and encouragement.¹⁹

MomConnect is voluntarily used by 60% of pregnant women receiving formal antenatal care in South Africa.²⁰ Users reported feeling empowered by the messages and reported having increased understanding of how to promote maternal and child health.²¹ Furthermore, user data on the quality of care at health facilities help to identify quality issues in health-care facilities.²⁰ Health data collection is facilitated through the creation of a master patient index that can be integrated into an electronic medical system.²²

Digital diagnostic and clinical decision-support tools

Many conditions can be handled by establishing skilled multidisciplinary teams at a PHC facility and the infrastructure needed for PHC delivery, onto which digital technology can be layered. Inevitably, the skills of these teams will reach their limits, meaning that patients need to visit secondary or tertiary facilities, which is often more challenging for people with lower incomes or in more rural settings. Rapid technological advances and new approaches have opened a window of opportunity to rethink the way in which care is delivered to a populations model. Machine-learning algorithms are being used for diagnostic imaging in high-income countries and could be revolutionary in settings with little access to specialists,²⁸ but this technology has barely been deployed in LMICs. For outbreak control, rapid diagnostic tests for various pathogens could be used by CHWs connected to central laboratories via digital apps. PHC centres can establish information technology kiosks that connect patients with specialists located in distant cities who can offer telemedicine consultations or that enable the care teams to get second opinions. Simple decision-support tools can help to optimise treatment regimens for chronic conditions and provide alerts on side-effects.

Multidisciplinary care teams

Siloed service delivery has been important in addressing emergency situations, particularly in the context of the rapid spread of HIV.²⁹ However, integrated approaches are generally more effective and efficient in handling the rising complexity of care created by an ageing population

and the shifting burden of disease, such as multimorbidity tied to the double burden of infections and NCDs.³⁰ Integrated approaches are also needed to build systems that are able to withstand shocks from pandemics and other threats, such as climate change.

The centre of an integrated approach is a service delivery team that brings together primary care doctors, nurses, and CHWs, supported where feasible by laboratory technicians, pharmacists, midwives, and other specialists (eg, mental health professionals). This team serves as the first point of contact with the health system. Brazil's Family Health Teams model has been a cost-effective way to improve PHC service coverage and health outcomes, particularly in the poorest regions (appendix p 13).^{31–36}

New approaches to reaching people

Too many health systems are still organised around an inefficient, ineffective, and inequitable model of relying on individuals to show up at a health facility when they become sick enough to seek care. This model means that some people—particularly the poorest people—wait too long to access services, which often increases the costs of that care because simpler solutions are no longer feasible and outcomes are worse. Others show up more frequently than necessary, increasing the burden on the system.

There are several promising alternatives. COVID-19 has accelerated progress in the use of telehealth. Services can be shifted from static facilities to outposts in communities as a way to bring care to where people are rather than waiting for them to travel to larger facilities. Several countries have improved health outcomes by proactively identifying all people in a given area and assigning them to a care team responsible for looking after their health—an approach known as empanelment (appendix p 14).³⁷ Empanelment can improve care team accountability for the delivery of services that maximise the health of the full population of an area, rather than just the subset that shows up to access care. It promotes equity because those who cannot afford to access care are identified for proactive follow-up if they are not accessing services. The model also strengthens key public health functions, including surveillance and the provision of information and behaviour change messaging.³⁸

Next generation community health workers

Several LMICs have expanded CHW programmes in recent years, which was instrumental in improving health outcomes and in linking PHC with secondary and tertiary care.³⁹ Despite these successful approaches, in many countries CHW programmes are small scale and reliant on volunteers who receive no or minimal pay and little training. Too often, CHWs are insufficiently tied with PHC facilities and so do not have supportive supervision. Some countries have different CHW programmes addressing different diseases, leading to fragmented, inefficient care and insufficient provision of

public health services. Furthermore, the digital revolution has bypassed far too many CHW programmes, so they do not benefit from access to decision-support tools and do not feed data into national monitoring systems.⁴⁰

Investments in CHW programmes are not yet commensurate with the value they offer. The idea of expanding CHW programmes—particularly with paid staff rather than volunteers—may be challenging at a time when the fiscal space in many countries is under pressure. However, the long-term benefits of such expansion, including the eventual economic returns from improved health, are well documented.⁴¹ There is a strong case for increasing DAH to help to fund large-scale CHW programmes, with workers who are paid, trained, and technology-enabled and who provide comprehensive, integrated services. CHWs are also well placed to help to link the health sector with other sectors that affect health, such as sanitation and nutrition.

Large-scale programmes that employ paid, trained CHWs

WHO has long recognised that CHWs should be remunerated for their work and has established benchmarks for the appropriate density of CHWs.⁴² Reaching these standards will require large-scale investments to cover CHW recruitment, payment, and training (appendix p 14).⁴³ These CHWs would provide community case management services and links to facilities when individuals require more advanced care than can be delivered in homes. They could also work with other medical personnel to deliver care in innovative settings such as community-based kiosks. The adequate staffing of CHW programmes would also enable them to serve as the first line of alert in detecting emerging pathogens and unusual disease patterns.

Ensuring that every CHW programme is technology-enabled

CHWs are often treated as second-class members of the health profession and not provided with the equipment and supplies that other health workers benefit from, as seen during the COVID-19 pandemic when many CHWs were not provided with personal protective equipment.⁴⁴ This mindset limited the effectiveness of CHW programmes well before the pandemic because it meant that many of these programmes were not taking advantage of the possibilities presented by digital technologies.

Technological advances and drops in price mean that efficiencies of CHWs being provided with a smartphone, and airtime to use it and the means to charge it, can be leveraged to benefit community health in three particular ways. First, the quality of care delivered by CHWs would improve by being able to draw on digital decision-support tools that can assist with diagnosis and identify when a patient needs referral to a health facility. Second, it would enable rapid feedback and supportive supervision that is currently not possible in most CHW programmes (appendix p 15).⁴⁵ Third, data generated by CHWs could

	Low-investment scenario	High-investment scenario
Individuals and communities empowered to engage in health decision making	This scenario would cover in each country the costs of: (1) setting up a large-scale community empowerment programme (eg, participatory learning and action groups) to reach 30% of the target population (eg, women of childbearing age), including training of community leaders on how to promote and facilitate community engagement, and facilitation, convening, and supplies costs; (2) setting up a national self-testing programme to reach 30% coverage, including training and demand generation costs; and (3) the costs of developing a digital self-care tool (ie, mobile apps)	A high-investment scenario would also cover the costs of procuring and distributing self-test kits for 30% of the population in each country
A new model of people-centred primary care	Donors can catalyse progress by financing: (1) development of decision-support tools; (2) digital devices (smartphones, tablets, laptops) that front-line workers in primary care facilities need to benefit from these tools; (3) provision of the technical assistance needed to redesign models of care and introduce the accompanying policy shifts; and (4) implementation research to identify what works and the barriers to scaling up	A larger investment would cover the implementation costs associated with scaling up telehealth services to reach 30% of the population and the costs of data collection to facilitate empanelment
Next generation CHWs	In this scenario, CHW programmes could be expanded to cover 30% of the population with an enhanced package of services by financing five key areas: (1) technical assistance to support the planning needed to expand CHW programmes, including the long-run fiscal implications; (2) training to ensure that existing CHWs are equipped to deliver quality care in a comprehensive manner and that new CHWs are well prepared for their roles; (3) supplies so that all CHWs have a basic package of materials (eg, basic medicines, rapid diagnostic kits); (4) digital devices (ie, smartphones or tablets, depending on national protocols) and the means to make optimal use of the devices (eg, airtime, subscriptions to apps); and (5) development or customisation of digital decision-support tools for use by CHWs	More substantial financing would support the wage costs associated with expanding CHW programmes to provide comprehensive coverage for 30% of the population

CHW=community health worker.

Table 4: Key differences between the low-investment and high-investment scenarios

flow into national databases in real time, improving the ability of decision makers at all levels to base their plans on the most recent data, including spotting data signals that could help to identify emerging pathogens.⁴⁶

However, expanding the CHW service package will require increasing the number of CHWs to established density standards.¹¹ Support will be needed to define competencies and recruit, train, and equip this expanded cadre. Smartphone provision needs to be coupled with training of CHWs to use digital technologies.^{47,48}

Offering a comprehensive and integrated package

The expansion of CHW programmes enables an important evolution from models in which CHWs focus mostly on disease-specific work or pregnant women to ones in which they engage with everyone in their communities to provide services tailored to community needs. This shift would enable active case-finding, which can connect people with health services early in the course of a disease, when treatment is often more effective. CHWs can also support access to resources that have a direct effect on health status, such as food and housing. The reach of CHW programmes means that they are ideally suited to playing a central role in shifting the focus of health services from dealing with people who are sick to promoting health and preventing illness (appendix p 13).

Cross-cutting systems to improve data and education

The three investment areas that we have described will be more effective if complemented by strengthening: (1) the data systems that monitor patients, staffing, and supplies; and (2) the systems aimed at improving quality of care through education, training, and supervision.

The COVID-19 pandemic highlighted the importance of systems that can produce accurate data in real time. Concerns about the quality of these systems—including

basic elements such as tracking the numbers of people being born and dying—produced uncertainty about the extent and severity of the pandemic in many LMICs. As vaccine roll-out got underway, many countries struggled to identify health-care workers for vaccination because they did not have accurate data about their health workforce. The need to keep track of scarce vaccine supplies also highlighted the value of robust logistics management information systems.

Donor support for these areas has been hampered by fragmentation and questions around sustainability. Recent efforts have started to address this issue, such as donor support for health management information systems and civil registration and vital statistics systems.⁴⁹ Less attention has been paid to other systems that are important for service delivery, particularly electronic medical records systems, human resources information systems, and logistics management information systems. India is building a comprehensive integrated health observatory platform, which could be an exemplar for other countries.⁵⁰

Alongside new investments in data systems, similar investments are needed to address quality of care, since expanded access to services needs to be matched with a focus on quality.⁵¹ Several investment areas that we have described—particularly new models of care—can be important levers for improving the quality of care.

The costs to scale up the prioritised package

We estimate that with an additional international investment of \$1·87 billion in a low-investment scenario and \$3·85 billion in a high-investment scenario annually over the next 3 years, donors could support the scale-up of the above evidence-based package of investments in the 59 IDA-eligible countries. Increasing that amount to \$2·79 billion in a low-investment scenario and \$5·75 billion in a high-investment scenario would allow the 15 so-called

blend countries to also be covered.⁵² The appendix (p 12) shows the breakdown of these costs into different investment areas.

In the low-investment scenario, donor support is concentrated on getting these approaches on the path to scale, such as covering the costs of designing and launching new systems, training, and initial investments in equipment. The projected level of financing would support 30% of the costs of reaching full population coverage of these approaches, as well as 100% of the costs of some key one-off expenditures (eg, designing new software applications). The high-investment scenario would cover all of these costs plus a wider set of implementation costs, including some human resources costs and a more expansive set of capital costs. The financing would also enable these approaches to reach an additional 30% of the population in these countries. Table 4 gives further details of the differences between the low-investment and high-investment scenarios.

Conclusion

Global campaigns to control HIV, tuberculosis, malaria, and vaccine-preventable illnesses showed that large-scale impact can be achieved by using additional external financing to support a small number of evidence-based, high-impact investment areas and to catalyse domestic resource mobilisation. We recognise that these efforts have required decades of investment, and many of them still have a long way to go to reach global disease control targets. Progress has also been set back by the COVID-19 pandemic.⁵³ Nevertheless, they have shown proof of principle that targeted donor financing can make important and outsized contributions to improving health.

Although domestic resources ultimately must be the primary source of financing for these PHC approaches, in the short term, DAH has a crucial role to play in supporting countries in strengthening PHC. A key rationale is that many of the investments needed are in areas such as digital technology that have substantial start-up costs that may prove difficult to cover from domestic budgets affected by COVID-19, inflationary pressures, and debt burdens. These investments will also benefit existing donor financing, because they will help to tackle the bottlenecks that are increasingly recognised as crucial to the challenges faced by donor-funded global health initiatives such as Gavi, the Vaccine Alliance, the Global Financing Facility, and the Global Fund to Fight AIDS, Tuberculosis and Malaria in their work to improve health outcomes. Increasing financing for PHC will also be critical to strengthening pandemic preparedness and response, which, as a recent WHO document put it, “must be built on a foundation of strong national health systems centred on primary health care”.⁵⁴

We have proposed an approach to international investments in PHC built on the proven paradigm of using donor resources catalytically. We identified a package of priority investments in PHC that are amenable to donor

financing, can catalyse transformational change, and can be delivered for the reasonable cost of \$1.9–3.8 billion per year in new DAH. The sharp rise in DAH during the COVID-19 pandemic has shown that there is budgetary room for donors to increase their financing when there is political will. The package would target empowering communities and individuals to engage in health decision making, a new model of people-centred primary care, and next generation CHWs. In each of these, new technologies are creating promising opportunities to move past traditional constraints and scale up the delivery of quality health services. Additionally, systems aimed at improving quality of care must be strengthened through education, training, and supervision.

Countries worldwide—often with support from external partners—are already showing what is possible with these approaches. The challenge has been that these efforts often remain small scale, which is likely to remain the case without a concerted push supported by international investments. Strengthening external support for PHC does not require the creation of a new funding structure. Instead, the global health community could use existing financing structures to invest in PHC more systematically. We believe that the case for increased international investment in PHC is clear and compelling.

Contributors

TK, GY, SD, KKMCD, JL, CL, MMD, OO, PP, CS, AT, and CB were all involved in the initial conceptualisation of the analysis. TK, SD, and GY developed the prioritisation approach. KKMCD and AT conducted the literature review, synthesis, and categorisation of primary health care interventions. MMD, OO, and AZ conducted the modelling of costs. YA, LNA, PB, PJG, DJ, HM, RN, AO, SR, KSR, DS, and BT were members of an international expert advisory group that ranked and prioritised interventions. TK and GY wrote the first draft of the paper, and all authors then reviewed and edited subsequent drafts. GY led the revision process after peer review. All authors were able to access data used in the analysis, and the corresponding author accepts responsibility to submit for publication.

Declaration of interests

TK, GY, SD, KKMCD, JL, CL, MMD, OO, PP, CS, AT, AZ, and CB declare grant funding from the Bill & Melinda Gates Foundation to support this work. TK declares consulting fees in the past 36 months from WHO Eastern Mediterranean Regional Office on models of care for primary health care and from the World Bank Group on integration of primary health care and pandemic prevention, preparedness, and response. KKMCD and GY declare other grants for global health research in the past 36 months from WHO, the Bill & Melinda Gates Foundation, The Carnegie Corporation of New York, the United Nations Economic and Social Commission for Asia and the Pacific, the Alliance for Health Policy and Systems Research, and the New Venture Fund. OO declares other grants for global health research in the past 36 months from WHO, the Bill & Melinda Gates Foundation, the National Institutes of Minority Health and Disparities, Duke REACH Equity, and the Alliance for Health Policy and Systems Research. LNA declares funding from SEEK Development to support this work; in the past 36 months he reports consulting fees from the World Bank to support country-level non-communicable disease (NCD) policy implementation, and consulting fees from WHO to support international and country-level NCD policy implementation. CS declares grants in the past 36 months from WHO and the Medicines for Malaria Venture (MMV) for various strategy consulting projects relating to global health, and consulting fees from the Bill & Melinda Gates Foundation, WHO, and MMV for various strategy consulting projects related to global health. CL and SD declare

consulting fees in the past 36 months from the Bill & Melinda Gates Foundation for various strategy consulting projects related to global health. BT declares that she was previously Executive Director of the Primary Health Care Performance Initiative, funded by the Bill & Melinda Gates Foundation, while this work was being conducted. She works at the United States Agency for International Development, which has broad interest in development assistance for health/primary health care (she is co-authoring this paper in her personal capacity). DJ is supported by the London School of Hygiene & Tropical Medicine Takeda Chair in Global Child Health and declares grant funding from WHO and UKRI Innovation Fund. RN declares grant support from WHO for NCD implementation science research in association with a WHO Technical Advisory Group and from the World Bank for NCD research and policy development in the Europe and Central Asia (ECA) and sub-Saharan Africa (SSA) regions. DS declares that employment as Chief Digital Officer for the international NGO PATH supported the opportunity and ability to contribute to this article (PATH has a PHC programme and works to strengthen PHC in countries around the world). DS also declares board membership of Medic (governance role, uncompensated). DS is Co-Chair of the Leadership and Governance Committee (advisory role, uncompensated) for Transform Health Coalition. PB declares that he is currently the Global Director of Policy Advocacy and Communication at the Bill & Melinda Gates Foundation. He did not review or approve the grant that supported this work. He was a member of the international expert advisory group. All other authors declare no competing interests.

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