
Policy Brief

**Personal Protective
Equipment for Frontline
Health Workers:
An Essential Component of
Pandemic Preparedness &
Response**

January 2022



Executive Summary

This brief takes stock of progress made since December 2020 toward the Pandemic Action Network's recommendations to resolve the global [personal protective equipment \(PPE\) access crisis](#) and build a more reliable and sustainable emergency response supply chain for the future:

- Establish clear points of accountability at regional and country levels to ensure **sufficient supplies of PPE for frontline health workers**.
- Support lower-middle-income countries (LMICs) and lower-income countries (LICs) to scale up **domestic and/or regional production of essential PPE** to ensure reliable and secure access.
- Ensure every country has an **interagency technical working group**, including UN, NGO, and private sector partners, on **essential PPE to ensure routine and stockpile availability for emergencies**.

In December 2020, the Pandemic Action Network's [Pandemic Action Agenda series](#) urged world leaders to [strengthen global health security architecture and governance](#) in the key areas of [pandemic supplies](#), [pandemic financing](#), [country capacity](#), [global health research and development](#), and [improved outbreak detection and reporting](#) to increase accountability and to ensure the world is better prepared for the next pandemic and to respond to COVID-19.

Frontline health care worker shortages predate the COVID-19 pandemic; they are a scarce and valuable first line of defense in emergency preparedness, detection, and response. Since the start of the COVID-19 pandemic, the Pandemic Action Network has consistently advocated for PPE for frontline health workers, including community health workers (CHWs), globally. Protecting them with PPE is not only urgent and [necessary](#) from health and ethical perspectives; it is also [highly cost-effective](#).

“Of all the elements of the COVID-19 response, PPE has received the least attention. Yet the humble face-mask is the unsung hero of the COVID-19 response, playing a crucial role in reducing community transmission and helping protect health workers... The first step is to make sure PPE is on the global agenda. Too often, G7/G20 discussions about the COVID-19 response or pandemic preparedness largely ignore the importance of vital, if unglamorous items like masks, gloves, and aprons. Yet arguably more lives have been saved in this crisis by PPE than by anything else, and more money has been spent on it.”

–*Sir Jeremy Farrar (Director, Wellcome) and Peter Sands (Executive Director, The Global Fund)*
[Transforming the Medical PPE Ecosystem, Working Paper, August 2021](#)

Since our December 2020 brief, there have been several key improvements in PPE supplies for frontline health workers in LMICs and LICs on both the supply and demand sides of the PPE value chain. However, much remains to be done.

- 1. Accountability to ensure sufficient PPE supplies for frontline workers has improved, but key gaps remain and must be addressed. Adequate PPE supplies for one year for an estimated one million CHWs across sub-Saharan Africa would cost an estimated US\$150 million — a modest and highly cost-effective amount in the context of overall pandemic-related funding.** Most human resources for health systems do not include CHW counts (UNICEF personal communication), and most countries lack updated CHW registries, making quantification and advocacy for their needs challenging. Comprehensive PPE quantification guidance along the entire continuum of COVID-19 prevention — including vaccination, detection, testing, treatment, and follow-up is needed. Yet, 44 percent of respondents in Africa versus 26 percent globally reported PPE shortages as a reason for essential health service disruptions in the World Health Organization’s (WHO) [Round 2 pulse survey](#) (January-March 2021).

Recommendation: CHWs must be [counted](#) — guidance now exists on how to do this. Access to COVID-19 Tools Accelerator’s (ACT-A) partners should invest in a public-access global PPE dashboard or tracker similar to [Our World in Data](#)’s testing, vaccination, morbidity, and mortality tracker and policy trackers that track PPE-related progress. This could be combined with other efforts to improve the visibility of demand and supply for PPE and other commodities via control towers.

- 2. Several African countries now manufacture some types of PPE; comprehensive market-shaping approaches must be strengthened and sustained.** The International Finance Corporation and development banks have partnered with governments and the private sector to build this self-reliance, and the [Africa Continental Free Trade Area](#) (AfCFTA) agreement could significantly simplify the flow of PPE and other supplies across national borders. However, raw material scarcity and supply chain disruptions continue to create bottlenecks.

Recommendations: A disciplined [market-shaping](#) approach should be taken to improve the overall PPE market in terms of equitable availability, affordability, assured quality, appropriate design, and end-user acceptability. As part of this approach, there is an urgent need for reliable pooled procurement and group purchasing platforms for emergency response health commodities, such as PPE, that can be accessed by legitimate private sector actors and that offer pathways for small and medium enterprises to participate. We recognize sufficient quality-assured supplies are a prerequisite for such platforms to work.

- 3. Almost all countries now have a national-level COVID-19 Task Force, but most LMICs and LICs lack PPE stockpiles.** COVID-19 task forces allow for improved coordination at the national level. However, there is a need for stronger coordination across the supply chain and community health workforce functions as well as the development of country-based strategies that consider full demand for PPE across health and non-health sectors. At the time of writing this brief, there are no meaningful PPE stockpiles located in African countries.

Recommendation: Strategic stockpiles of PPE that are in African countries are needed to allow for an agile, speedy response in a highly unpredictable pandemic — and to put in place more robust preparedness for the next epidemic or pandemic. This is a missed opportunity for PPE supplies, which typically have long shelf lives.

- 4. Power differentials and lack of voice and representation continue to work against largely female, often volunteer or contract CHW workforces; this is an important gender equality issue.** Women’s representation in COVID-19 Task Forces and in decision-making roles is woefully inadequate. CHWs continue to literally be last in line for PPE supplies for health workers, despite

their important role in COVID-19 related prevention, diagnosis, vaccination, home-based care, and referral. [Female CHWs must make do with PPE designed for males; ill-fitting PPE serves no one and is a safety risk.](#)

Recommendations: There is an urgent need for gender intentionality in all aspects of the COVID-19 response including representation in Task Forces and in decision-making. CHW registries are urgently needed so these frontline health workers are seen, considered, and heard in PPE and other allocations. PPE manufacturers and investors should take specific, time-bound actions to ensure different sizes and designs of PPE are developed for women’s needs, and procurement agencies should adapt their product catalogs to include different sizes where appropriate.

In the table below, we summarize the general direction of progress toward the key recommendations in our December 2020 brief. The remainder of this brief expands upon key supply-side and demand-side factors influencing PPE availability for frontline workers, with a focus on CHWs where information is available.

Progress Toward the Pandemic Action Network’s [December 2020 PPE Recommendations](#)

Recommendations	Status*
1. Establish clear points of accountability at regional and country levels to ensure sufficient supplies of PPE for frontline health workers.	Develop a strategy to align PPE needs and support for their respective geographies. 
	Create and drive widespread usage of a shared, real-time data system to track and manage PPE supply and demand across geographies and environments. 
	Promote greater transparency and accountability for procurement and delivery. 
	Establish regional stockpiles in strategic locations. 
	Conduct post-event reviews and regular assessments of supply chain resiliency. 
2. Support LMICs and LICs to scale up domestic and/or regional production of essential PPE to ensure reliable and secure access.	Design norms and standards for acceptable levels of PPE quality based on expected services. 
	Develop regional strategies to ensure an enabling environment for local suppliers. 
	Develop strategies for private sector engagement that would provide surge capacity of transportation and reduce the risk of disruption to existing routine deliveries. 
	Establish and fund a facility to help local private sector businesses in LMICs access the financial, management, and technical support they need to scale up domestic and/or regional production and delivery of essential PPE. 
3. Ensure every country has an interagency technical working group — including UN, NGO, and private sector partners — on essential PPE to ensure routine and stockpile availability for emergencies.	Define standards, scope needs, and quantify and aggregate in-country public demand across health and other sectors. 
	Include community health resources in supply chain planning. 
	Ensure PPE supply chains are aligned with national preparedness and response plans for emergencies, as part of Emergency Operations Centers (EOC) responsibilities. 

* : On track. : Some progress. : No progress.

Supply-side Factors Influencing PPE Availability for Frontline Workers

This section covers key aspects of the supply side of the PPE value chain as it pertains to all frontline health workers and highlights specific aspects that pertain to CHWs in particular.

Coordination and data at the global level.

During the COVID-19 pandemic, ACT-A's fourth pillar, the [Health Systems and Response Connector](#) (HSRC), is intended to integrate across the diagnostics, treatment, and vaccines Pillars of ACT-A. HSRC is co-led by The Global Fund, WHO, and World Bank and is supported by UNICEF to “*rapidly identify and address country-specific health systems bottlenecks to ensure readiness and enable rapid scale-up and delivery of COVID-19 tools.*” The HSRC's Health Workforce Surge and Protection and Clinical Care workstreams work together to address gaps in PPE procurement and deployment for health workers and are currently sharing several related [resources](#). It is less clear where the mandate for coordination across key actors in the global PPE ecosystem lies, and what progress has been made toward improved coordination.

Normative guidance. WHO now provides, and periodically updates, [guidance on the rational use of PPE for COVID-19 by health workers](#) including CHWs. Similarly, the [Africa Centers for Disease Control and Prevention](#) (Africa CDC) has tailored available guidance on the use of PPE by health workers, including CHWs, in different clinical scenarios for application in the African context. This covers guidance on PPE use recommendations based on the transmission scenario, setting, and activity; optimal use of PPE by health care workers including risks, precautions, and alternatives; advice against PPE reuse; and, PPE decontamination and reprocessing.

Manufacturing. Core PPE supplies for CHWs include gloves, masks, eye goggles and/or face

shields, and gowns. These products are not part of a single supply chain but rather [multiple supply chains](#). Each of these products needs specific raw materials and manufacturing equipment. Two years into the COVID-19 pandemic, PPE production continues to be heavily concentrated in China and the United States, and many supply bottlenecks remain. In the first year of the COVID-19 pandemic, raw material shortages for specific PPE products, for example, shortages in nonwoven propylene and melt-blown fabric needed to manufacture N95 masks, were compounded by other challenges such as the months to a year needed to set up a melt-blown production line. Nitrile shortages and the year or so needed to set up a production unit similarly slowed the ramp-up of medical glove production. As demand surged, the supply of PPE that didn't meet quality standards also increased — aided by a lack of harmonization on required standards across regions and countries.

To [address some of these market failures](#), some country governments have offered manufacturers favorable loan terms (e.g., Ghana) and simplified licensing procedures (e.g., Kenya), as well as leveraging private sector trade associations and other partners to boost in-country PPE production. Fifty-four African nations have signed the [Africa Continental Free Trade Area](#) (AfCFTA) agreement; of these, 36 have ratified the agreement to facilitate trade, simplify regulations, and remove technical barriers to trade. This creates an enabling environment for private sector engagement in the COVID-19 response and should be optimally leveraged, including for PPE stockpiles.

The International Finance Corporation (IFC), supported in partnership with the Government of the United Kingdom, is making significant investments in LMICs and LICs to support [domestic PPE production, improved standards,](#)

[and linkages for market access and distribution](#).

These efforts have leveraged thought leadership from ‘Rethinking PPE’, a collaborative effort of over 50 individuals in the health sector. The IFC and industry partners are also acting to address the enormous plastic waste problem arising from single-use PPE disposal and are supporting efforts to [strengthen circularity through innovation](#) across the PPE value chain. [Over 1.6 million tons of plastic waste](#) have been generated per day since the pandemic started; it is essential to move to renewable, biodegradable, safely reusable, or recyclable materials.

Most PPE supplies aren’t manufactured keeping in mind that an estimated 70 percent of frontline workers are women. This is both a safety and gender equality issue. A recent [Women in Global Health survey](#) and interviews with women health care workers in over 50 countries found that only 14 percent of respondents exclusively used PPE that was fitted to them. PPE is most often too large and thus poor-fitting, its male-centric design doesn’t permit convenient bathroom breaks for women, and CHWs’ lower bargaining power has sometimes resulted in being unable to protest inappropriate PPE reuse.

Financing and procurement. In 2020 and 2021, there were several key sources of funding at the global and regional levels to African countries for the COVID-19 response. Most of these funding streams continue today as the world grapples with the emergence of highly transmissible COVID-19 virus variants and inequitable COVID-19 vaccine coverage in most LMICs and LICs. The description below isn’t exhaustive but seeks to capture contributions of key players in the PPE ecosystem, with a focus on global and African actors.

In January 2020, WHO convened the Pandemic Supply Chain Network to raise awareness of PPE market constraints and serve as the precursor of the WHO’s COVID-19 Supply Chain System (CSCS), which went live in April 2020. The CSCS sourced and allocated COVID-19 supplies

including PPE and was responsible for delivering these supplies by leveraging the World Food Programme’s (WFP) Common Services humanitarian air freight program. The CSCS includes a [PPE purchasing consortium](#) which in 2020, supplied over one billion units of PPE to 169 countries, and established a Control Tower to provide visibility and coordinate across country demand, procurement mechanisms, and logistics. Recognizing the severe constraints and impacts on global, regional, and in-country supply chains as well as funding constraints during the pandemic, an assessment of the CSCS provided important lessons and set a valuable precedent for a willingness to learn and transparency. For example, different PPE specifications across buyers led to an estimated US\$59 million of “non-essential” PPE procured in 2020; there was poor visibility on shipment status and smaller countries lost important opportunities to consolidate orders. These lessons have been largely incorporated into the WHO’s ongoing efforts. PPE products available via the WHO Supply Portal for eligible purchasers are listed in the current WHO [Emergency Global Supplies Catalogue \(COVID-19\)](#). There is, however, still a need to create and drive widespread use of a shared, real-time data system to track and manage PPE supply and demand across geographies and environments to gain a more comprehensive and timely understanding of the local supply and demand for PPE. Ideally, this would build upon an existing system.

From April 2020 to June 2021, the [World Bank](#) committed over US\$157 billion to respond to COVID-19. This included projects supported by the COVID-19 Fast Track Facility (also known as the COVID-19 Strategic Preparedness and Response Program) as well as over US\$50 billion in International Development Association (IDA) resources on grant and highly concessional terms. An estimated [US\\$10 billion](#) of this funding has been allocated to date for PPE, oxygen, and other medical countermeasures.

As a key part of the ACT-A’s response, the

[Global Fund's COVID-19 Response Mechanism](#) (C19RM) awarded US\$267 million overall in 2020 and US\$469 million in 2021 (a 67 percent increase from the previous year) to [procure PPE across almost 100 countries](#). Global Fund grant flexibilities allowed for additional funds to be used for the COVID-19 response. Ninety-eight percent of the PPE that was ordered with C19RM 2020 funds, valued at US\$102 million (this is part of the total of US\$267 million disbursed), was delivered as of August 31, 2021. The Global Fund's use of [Procurement Services Agents](#), UNICEF, and iPlus Solutions, and its pooled procurement mechanism (PPM) that leverages its [wambo.org portal](#) and makes key [pricing, product specification, and lead time information public](#), has helped demystify some aspects of the PPE value chain.

The [African Medical Supplies Platform](#) (AMSP) links African Union Member States to global and African suppliers of certified medical equipment, including PPE, and enables volume aggregation, payment facilitation, and logistics and transportation of medical commodities. The [African Export-Import Bank](#) has provided an overdraft facility for governments to procure COVID-19 supplies — including PPE — from the African Medical Supplies Platform, as well as bilateral and multilateral funding. Several other multilateral, bilateral, philanthropic, and business funders also support the AMSP.

In mid-2020, a new civil society emergency response partnership, the [COVID-19 Action Fund for Africa](#) (CAF-Africa) — of which Pandemic Action Network and several of its members are founding partners — saw an urgent need to fill gaps in PPE supplies targeted specifically for CHWs and mobilized rapidly to act on a larger scale than any single organization could have done alone. CAF-Africa was designed to be a stopgap effort, but as the COVID-19 pandemic persisted, there were enough gaps in PPE supplies for CHWs that it continued operations in 2021 and into early 2022. CAF-Africa has

provided 121.3 million pieces of PPE for CHWs in 18 countries as of January 2022.

In the first months of the pandemic, UNICEF, WHO, the Global Fund, Jack Ma Foundation, and CAF-Africa were the [five largest procurers of PPE](#) for LMICs and LICs, and they all leveraged free cargo flights offered by the [WFP](#) as part of its Common Services COVID-19 response. While the Jack Ma Foundation has since wound down its contributions, the others continue to play important roles.

With limited available or standardized data, domestic funding in LMICs and LICs appears to be largely earmarked for vaccines and it is difficult to discern how much is being used specifically to fund PPE for frontline health workers, including CHWs. [Funding by LMIC and LIC governments](#) for COVID-19 response has come from a mix of budget reallocation, emergency reserves, COVID-19-related bonds (e.g., Indonesia, Peru), user fees to cover part of the cost of vaccines (e.g., Egypt), private sector contributions (e.g., South Africa's National Solidarity Fund), discounts for participating in vaccine clinical trials (e.g., Kenya, Morocco, and South Africa), and public-private partnerships with private medical schemes. Governments have also leveraged grants and loans from development banks.

Private institutional buyers continue to face challenges in aggregating demand and pooling procurement — a challenge not unique to PPE but also extending to COVID-19 tests, vaccines, therapeutics, and other commodities. This merits further exploration and action.

While these are important strides, it is unclear how much of the funded PPE actually reaches CHWs in most countries. We describe possible reasons for this lack of clarity later in this brief. [Adequate PPE supplies for one year for an estimated one million CHWs across sub-Saharan Africa would cost an estimated US\\$150 million](#) — a modest and highly cost-effective amount in the

context of overall pandemic-related funding. There is an opportunity to think more creatively about financing pandemic and epidemic preparedness and response, as has been done for Gavi through the International Finance Facility for Immunisation (IFFIm).

Shipping and logistics. Freight routes run between major producing and purchasing regions and countries. [Shipments routed to African countries](#) go through one or more trans-shipment points. Any upstream or en-route disruptions to the movement of goods and people — such as lockdowns, PPE export bans in major PPE-producing countries, or other supply chain disruptions — can severely disrupt downstream PPE supply security. Such disruptions also add significant costs in both monetary and health terms, and buyers in LMICs continue to compete with better-resourced global players and countries for both PPE supplies and freight and transport options. In the absence of readily accessible stockpiles, the CHWs who serve their communities take the biggest hit.

At the time of writing this brief, the Global Fund’s estimated lead time for PPE by sea freight was

six to seven months, and significantly more expensive air freight would only shorten the lead time to five to six months. Clearly, this isn’t sufficient upstream PPE value chain agility to respond to a highly dynamic pandemic. Efforts to manufacture and procure PPE closer to, and ideally within, their intended country of use must continue alongside strengthening stockpiling in strategic locations that allow for rapid deployment. [UNICEF has been a critically important player and has shipped 895 million items of PPE to 141 countries](#) as of December 2021. UNICEF has also established PPE stockpiles in warehouses in Copenhagen, Guangzhou, Panama City, and Dubai to rapidly respond to surges in need; this is an important step in the right direction. However, there is still a need for funding, planning, maintenance, and appropriate utilization of stockpiles of PPE in LMICs. Air connectivity is a necessary practical consideration for stockpiles located on the African continent, as was demonstrated by the WFP’s Addis Ababa logistics hub set up early in the COVID-19 pandemic to enable efficient PPE distribution to national capitals across Africa.

Demand-side Factors that Influence PPE Availability for Frontline Workers

This section covers key aspects of the demand side of the PPE value chain as it pertains to all frontline health workers and highlights specific aspects that pertain to CHWs.

National level coordination. COVID-19 Task Forces provide an important forum for government, NGO, donor, UN agency, and private sector coordination; Pandemic Action Network members play an active role in these Task Forces and other coordination mechanisms. For example, [VillageReach and Last Mile Health](#)

collaborated with the Liberian Ministry of Health’s Supply Chain Management Unit and other partners to develop a quantification process and tool for PPE.

However, several coordination issues highlighted in December 2020 remain as we look toward year three of the COVID-19 pandemic. Key among these is the need to work more closely across the community health workforce, health supply chain functions, and silos. Where this need has been addressed, there is smoother coordination. A deep understanding of both these components of

a health system is needed to plan, execute, and monitor PPE delivery to its intended recipients at the last mile. Moreover, such coordination needs to be gender intentional. Of 82 national-level [COVID-19 Task Forces across Africa](#), women — who comprise most frontline health workers — are only represented in 20 percent and lead in 15 percent; of 95 COVID-19 Task Forces across Asia, women are only represented in 14 percent and lead in 11 percent. When they are included in Task Forces, women are more likely to serve in advisory than in decision-making roles.

Recognition and representation of community health workforces. Appropriate recognition and representation of community health workforces — including volunteers and contract workers — is an essential part of epidemic and pandemic planning and response. Without such recognition, there is continued inequity in access to, and use of, all COVID-19 tools for frontline workers in LMICs and LICs. For example, although the WHO COVID-19 Essential Supplies Forecasting Tool used by many ministries of health to quantify PPE includes CHWs, its use of International Standard Classification of Occupations (ISCO) codes excludes the hundreds of thousands of hidden volunteer CHWs who do not meet the ISCO criteria but are nonetheless tasked with delivering health-care services in homes and communities.

WHO and UNICEF have developed an [implementation support guide on the role of CHWs in COVID-19 vaccination](#) that highlights their critical roles and emphasizes the importance of vaccinating CHWs as members of the essential health workforce. Frontline health workers' PPE needs can be quantified and budgeted with the WHO and UNICEF's [COVID-19 vaccine introduction and costing tool](#) (CVIC tool). However, CHWs' PPE needs are greater than for vaccines alone, and comprehensive PPE quantification guidance along the entire continuum of COVID-19 prevention, detection, testing, treatment, and follow-up is needed. At the time of writing this brief, the Global Health Cluster

COVID-19 Task Team's [health workforce estimator tool](#) is focused on facility-based health workers and needs to include specific guidance to estimate PPE needs for CHWs in COVID-19 screening, triage, referral, and home-based care. Such tools also need to reflect gender inclusiveness as they continue to use terms like “ward boy” in describing specific health workforce categories.

In the initial months of the COVID-19 pandemic, [PPE supply shortages and poor quantification of CHWs' PPE needs](#) due to a general lack of updated CHW rosters led to the prioritization of PPE for isolation, quarantine, and treatment sites. This was compounded by the “COVID-19 Critical Items” guidance from the WHO which advised: *“Priority for PPE provision is given to health-care workers treating critical and severe COVID-19 patients only.”* [CHWs often encounter the critically ill](#) as part of their routine service delivery, so there was a disconnect between PPE supplies and exposure. We now know that [at least 50 percent of all COVID-19 infections are estimated to originate from exposure to individuals with COVID-19 infection but without symptoms](#). As a result, CHWs in many countries received instructions to either stay home, stop working, and cease to provide essential health care services to their communities or to keep working with no or suboptimal PPE — thus putting themselves, their families, and the people they serve at risk.

Health Worker Quantification. Despite some important strides upstream, it is still unclear how many PPE supplies are reaching CHWs at the last mile. [Routinely updated data on CHWs](#) — including official CHW counts, active status, service location, accreditation status, competencies, and CHW-maintained stocks of essential supplies — are largely unavailable. While WHO's [Global Health Workforce Statistics 2021](#) estimated that there were 3,313,170 CHWs globally, only 75 countries have provided data that comes from various sources. The available data are over a decade old for 40 percent of

countries providing estimates, and for many, they are point-in-time estimates rather than routinely updated health worker registries. This is a foundational challenge in quantifying PPE and other essential health supply needs for CHWs and needs to be urgently addressed as, without this basic information, we cannot assess whether their needs are being adequately met. National georeferenced databases can help close those gaps and unlock new opportunities to better support the critical work of CHWs. [Guidance is now available](#) to help countries better track and support these critical workers.

Access to Testing and Vaccines. While data are sparse on COVID-19 infection among frontline workers in LMICs and LICs, in part because of staggering inequities in [access to COVID-19 testing](#) (only 0.4 percent of 3.3 billion COVID-19 tests carried out globally have been in LICs), it is estimated that [CHWs in African countries suffered a 203 percent increase in COVID-19 infections because they lacked access to PPE](#). In the United States and the United Kingdom, both [reuse and inadequate supplies of personal protective equipment \(PPE\) are associated with significantly increased risk of COVID-19 infection](#) among frontline health workers.

Global efforts to solve the PPE supplies crisis have included estimates of demand for PPE in different scenarios of vaccine coverage. However, the unpredictable path of the COVID-19 pandemic combined with low vaccine coverage suggests that significant quantities of PPE for all frontline health workers, including CHWs, will be needed for some time to come. WHO data from 25 African countries indicates that [only 27 percent of health workers, compared to over 80 percent in higher-income countries, were fully vaccinated](#) as the SARS CoV-2 omicron variant became dominant. While growing evidence of waning immunity several months after full vaccination supports the rationale for booster doses of COVID-19 vaccines, most African countries are still struggling to cover their

populations with first and second doses. Of more than 150,400 COVID-19 infections in health workers reported by countries in the African region to WHO, five countries account for 70 percent of these infections: Algeria, Ghana, Kenya, South Africa, and Zimbabwe. Efforts to target PPE deliveries to these countries, which are clearly in need, must be balanced with the widespread and continued shortages in PPE and vaccine access across the African continent.

Last-mile Distribution to CHWs. There are several pathways in last-mile distribution of PPE to CHWs, with primary health care facilities typically being the distal drop-off point. Actors include Ministries of Health, NGO and faith-based organization partners, UNICEF programs, Global Fund programs, World Bank Health Systems Strengthening (HSS) programs, Gavi programs, public sector and private sector warehousing and logistics providers, private sector employers and associations, etc.

A recent meta-analysis showed a significant ($p < 0.01$) [increase in stock-out levels of essential medicines among CHWs](#) from 26.36 percent in 2006-2015 to 48.65 percent in 2016-2021. Notably, CHWs experienced stock-outs of essential medicines nearly one-third of the time and at a significantly ($p < 0.01$) higher rate than the health centers to which they are affiliated (28.9 percent versus 9.2 percent, respectively). The sheer volume of PPE adds significant strain on already weak last-mile distribution systems. Once PPE arrives in a country, it is frequently prioritized for secondary and tertiary level health facilities in urban areas with rural and primary health facilities receiving less than they need. When PPE reaches CHWs, it is often in insufficient quantities, and items other than masks aren't always supplied.

Conclusion

Today, we have compelling evidence of the risk of leaving frontline health workers unprotected or partially protected against COVID-19. As we look toward year three of this pandemic and beyond, world, regional, and national leaders and policymakers must learn the lessons of this crisis and continue to prioritize sufficient PPE for frontline health workers, especially those who serve the most vulnerable and hardest-to-reach populations.

As the COVID-19 pandemic shows us, this can only be done with strong coordination, planning, improved estimates of health workforces to allow for quantification of PPE needs, sustained and

comprehensive PPE market-shaping approaches, and agility by maintaining PPE stockpiles. It is equally important to ensure that access to PPE is equitable across countries and health care worker cadres and that structures, functions, tools, and data be gender-intentional and include the voices of CHWs — most of whom are women.

Our health care workers cannot protect patients if they cannot protect themselves with essential PPE. Now is the time to translate lessons learned into sustainable solutions that will meet the challenges of this crisis and the next pandemic.