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The impact of COVID-19 on health workers: a health labor market perspective to improve response

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Abstract

This paper uses a health labor market lens to examine the impact of COVID-19 on health workers, as well as relevant policy levers. It compiles a collection of literature using a standardized measurement framework to determine the impact of COVID-19 on health workers. It examines the relevant issues under the lens of a health labor market. In particular, the paper interprets this information and knowledge by focusing on the supply, demand, and mismatches in a health labor market. Within this framework, it presents relevant issues on COVID-19 and its impact on health workers, as well as the ensuing policy response. Finally, the chapter presents key lessons learned from COVID-19 to inform future responses related to ensuring a sufficient workforce to tackle them.

JEL codes: I11, I14, I18, J08, J21, J23, J49

Key words: Labour market, employment, Health, healthworkforce, supply, demand

List of Acronyms

CGH	Common goods for health	ICU	Intensive care unit
COVID-19	SARS-COV-2 virus	LAC	Latin America and the Caribbean
EU	European Union	PFM	Public financial management
HLM	Health labor market	PPE	Personal protective equipment
HLMA	Health labor market approach	PTSD	Post-traumatic stress disorder
HWF	WHO Health Workforce Department	SDGs	Sustainable Development Goals

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Introduction

Health workers are the core element within any health system in that they make its interventions happen. Investments in health workers are fundamental both for maintaining health systems and for achieving the United Nations Sustainable Development Goals (SDGs).(1,2) Many countries faced COVID-19 with underlying challenges and long-standing constraints, including shortages of health workers. The pandemic exacerbated pre-existing health workforce issues, thereby impacting health services. Findings from three rounds of the World Health Organization (WHO) *Global pulse survey on continuity of essential health services during the COVID-19 pandemic* reported health worker availability and capacities as one of the predominant reasons for service disruptions.

In order to strengthen services in any health system, it is important to understand existing mismatches and market failures in the health labor market (HLM), so as to identify and define policies and actions to build workforce readiness. In the context of the COVID-19 pandemic response, WHO produced an interim guide on health worker policy and management (3) and developed a standardized impact measurement approach to assessing and measuring the impact of COVID-19 on health workers.(4) Additionally, it collected workforce intelligence through living systematic reviews. Finally, WHO led country case studies in both Africa and Latin America and the Caribbean (LAC) using the health labor market analysis (HLMA) approach, with the resulting data and analysis used to inform the policy dialogue around regional workforce readiness aimed at recovery.

This paper uses a **health labor market lens** to discuss the impact of COVID-19 on health workforce and policies used to address workforce challenges. It starts by connecting the key elements from the standardized measurement framework on the impact of COVID-19 on health workers (4,5) with the HLM.(6) Elaborating on this framework, the paper discusses the literature on the impact of COVID-19 on health workers and policy response through the supply, demand, and mismatches of the HLM.

Methods used to develop this paper

First, an exploratory analysis of the literature was carried out using the areas outlined in the WHO multidimensional framework² on the impact of COVID-19 (4,5) and on policy response as it relates to health workers. The literature review covered the period from March 2020 to June 2022. It included published literature in the form of reports, journals, and grey literature retrieved from living systematic reviews conducted by WHO; websites of such international organizations as the International Labor

² During health emergencies, it is critical to monitor the multidimensional factors affecting health workers. The WHO Secretariat published a framework to support the standardized measurement and reporting of the multidimensional impact of COVID-19 on health workers.

Organization (ILO), Organization of Economic Co-operation and Development (OECD), and WHO and its Health System Response Monitor (HSRM), as well as databases like PubMed, Embase, and Scopus. Given the paucity of published evidence on results, the exploratory analysis of the literature was complemented by the other evidence inputs such as country case studies.

Second, the paper uses a Health Labor Market lens (6) focusing on supply, demand, and mismatches within the HLM. This will help guide the discussion of the literature review on how COVID-19 impacts health workers and the subsequent policy response.

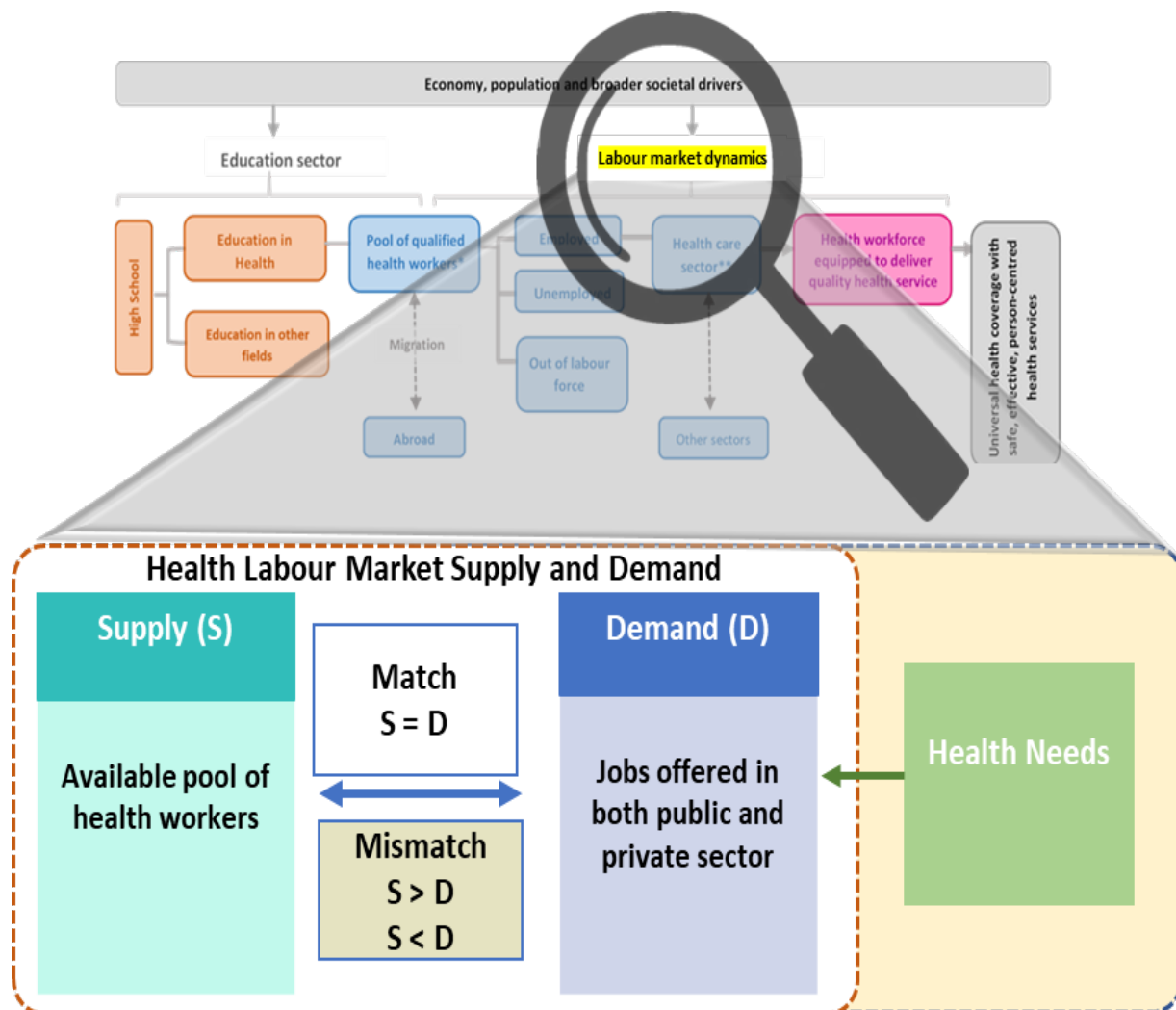
1. COVID-19 and its impact on the health labor market

An HLMA is useful to understand how health emergencies and outbreaks can impact both the education market and the labor market, by providing evidence on which to base policy actions. Analyzing the dynamics behind the supply of and demand for health workers helps to assess any existing mismatches, such as gaps in health worker availability, distribution, and quality. Diagnosing and identifying alternatives for problem-solving are useful when elaborating a national strategy for workforce policy actions, as well as for increasing investments in health workers.

Throughout the COVID-19 pandemic, it has been important to identify and analyze key health worker issues and mismatches that affect the dynamics of the health labor market. With this information, countries can develop preparedness strategies for initial response and ongoing monitoring, as well as provide evidence to update response during further stages.

Figure 1 shows the interrelationships between the existing supply of and demand for health workers and its mismatches.

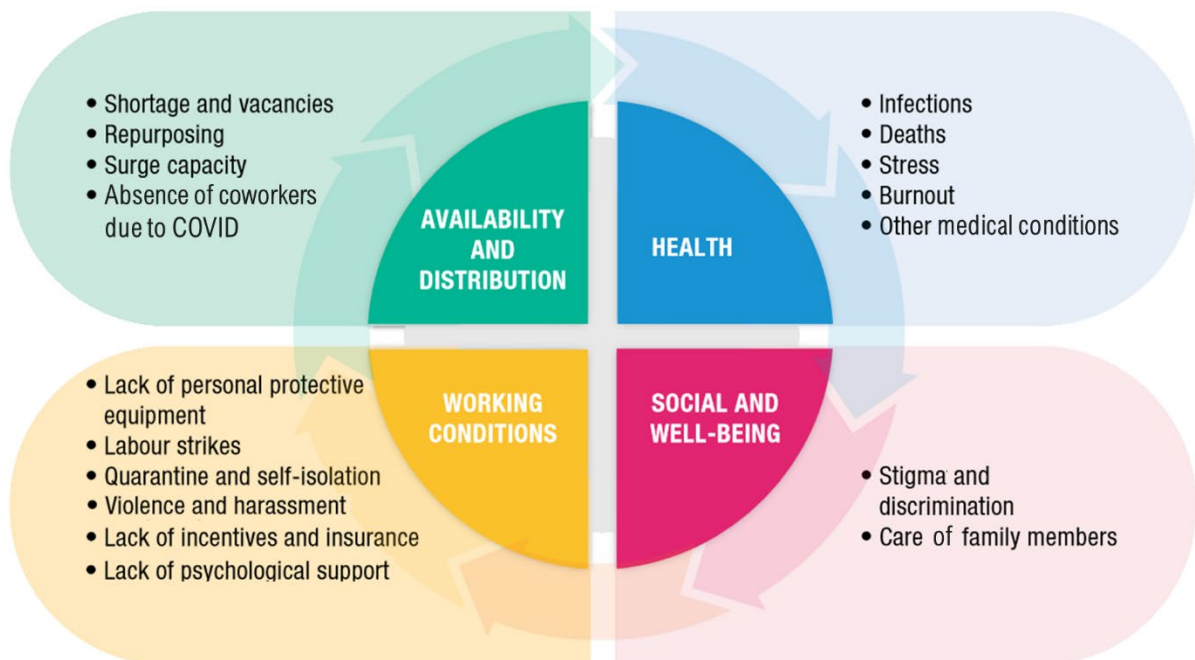
Figure 1: Health labor market supply and demand



Source: (6)

From the **supply side**, the COVID-19 pandemic has had a multidimensional impact on health workers (Figure 2). This includes risk of infection and re-infection, burnout (due to workload, redeployment, etc.), and working conditions, among others.(4,5) This has tended to increase existing health worker shortages. In addition, their social and emotional wellbeing has been affected by stigmatization and discrimination. Indeed, WHO has pointed to an increase in reports of health workers facing verbal harassment, discrimination, and physical violence due to public fears revolving around COVID-19.(7) Moreover, the COVID-19 pandemic has disrupted the education system, which in turn has affected the supply of health workers.

Figure 2: Multidimensional factors related to COVID-19 that affect health workers



Source: Elaboration based on (5) and (8)

From the need and demand side, tackling epidemics and health emergencies requires a diversified workforce. On one hand, the planning tools developed during COVID-19 have been useful for assessing the needs of health workers. On the other hand, the increase in the demand for health workers has relied mainly on a country's financial capacity and its ability to open up potential financial resources. The result of this misalignment between the supply of and demand for health workers has been an exacerbation of existing shortages, which has required an immediate policy response from the countries.

Since the literature around the different issues is vast, **the following sections of this paper will focus on selected topics regarding health worker supply (Section 1.1), demand (Section 1.2), and mismatches (Section 1.3) during the COVID-19 pandemic.**

1.1 Supply of health workers

The supply of health workers refers to the number of health workers willing to work at prevailing wages in a country's health service institutions.(6)

In this paper, the **discussion of the literature on how COVID-19 has impacted the supply of health workers focuses on health (infection, deaths, burnout, and mental health) and working conditions** (see Figure 2). All these tended to exacerbate pre-pandemic shortages in the health sector by negatively affecting health workers' availability and labor force participation. The *Second round of the national pulse survey on continuity of essential health services during the COVID-19 pandemic*, published in April

2021, reported that out of 112 countries, 66% of them identified insufficient availability of staff as one of the main causes for service disruption.(9,10)

1.1.1 Health: infection, deaths, and mental health

One of the effects of the pandemic has been increased attrition³. Service delivery has been impacted (1) when health workers have had to go into isolation, have become ill, or have died from COVID-19; (2) when they have experienced mental health issues (8); or when they have decided not to work due to precarious working conditions.(11)

Infections and deaths

WHO published a population-based estimate of 115 493 as the COVID-19 deaths among health workers between January 2020 and May 2021. This number ranges between 80 000 and 179 500.(4) This estimate suggests that the numbers reported to WHO's surveillance platform (showing 6633 confirmed COVID-19 deaths among health workers by 16 May 2021) are actually underreporting the true magnitude.(4) Challenges to reporting deaths from COVID-19 include country capacities for testing and tracking infections and deaths, as well as for case management, among others. For instance, reports are reduced to those testing positive for COVID-19 or those cases occurring in hospitals or health facilities showing limited capacity. Also, some countries prefer not to report health workers' deaths in order to prevent hesitancy and fear among the population, or because there is no information available about that occupational group.(4)

Many countries reported COVID-19 infection data (166 out of 195 countries): 130 countries released the total number of confirmed cases among health workers, and 67 of them reported at least one death in that group.(12) Some of the country reports published contain disaggregated data on health workers' COVID-19 confirmed cases and deaths by occupational group. Indeed, the literature indicates that confirmed cases of COVID-19 among health workers do vary according to occupational group. Bandyopadhyay (2020) found that by May 2020, 14 countries had data available on COVID-19 cases among health workers by occupational group. Information has indicated that confirmed COVID-19 cases in health workers were mainly among nurses (38.6%, 10 706 out of 27 725), while reporting a higher percentage of deaths (51.4%, 525 out of 1021) among physicians.(12) Reported results of a survey sent to 37 countries⁴ from Africa, the Americas, Asia, and Europe between 22 July and 15 August 2020, show that 26 countries sent data disaggregated by doctors, nurses, and other medical staff. In 19 of them, more than 60% of the number of total confirmed COVID-19 cases among health workers were

³ This is broadly defined as exits from the workforce, which can be due to emigration, voluntary exits (for example, to other sectors of employment), illness, death, or retirement.(6)

⁴ Afghanistan, Albania, Azerbaijan, Bangladesh, Botswana, Bulgaria, Colombia, Croatia, Czech Republic, Denmark, Egypt, France, Hong Kong, India, Iran, Italy, Jordan, Kosovo, Lebanon, Mexico, Nepal, North Macedonia, Oman, Pakistan, Palestine, Gaza, Peru, Poland, Portugal, Romania, Sierra Leone, Slovakia, Spain, Syria, Tunisia, the United Kingdom, the United States of America, and Uzbekistan.(13)

concentrated in nursing professionals and doctors. In 17 of the 26 countries, nurses were the occupational group with the highest number of confirmed cases.(13)

Countries participating in WHO country case studies (11,14) reported the highest concentration of confirmed COVID-19 cases among doctors and nursing personnel:⁵

- In **Latin America**, Chile, Colombia, Ecuador, and Peru implemented health worker information systems to track confirmed cases and deaths among health workers:
 - In *Chile*, for example, 79.6% of all confirmed cases of COVID-19 among 14 occupational groups (41 611 out of 52 241) were concentrated in three of them (paramedic assistants, nursing professionals, and doctors).(15)
 - In *Colombia*, 70% of all confirmed COVID-19 cases (15 131 out of 21 832) were among nursing assistants, doctors, administrative staff, and nursing professionals from 37 occupational groups.(15)
 - In *Ecuador*, which issued weekly reports of confirmed COVID-19 cases among health workers, 88.2% of all confirmed COVID-19 cases were (10 145 out of 11 507) concentrated among doctors, nursing professionals, and nursing assistants from six occupational groups.(15)
 - In *Peru*, 63.6% of all confirmed COVID-19 cases among health workers (15 853 out of 24 922) were among healthcare technicians, nursing professionals, and doctors from 19 occupational groups.(15)
- In the case of the **Caribbean** countries, information was available for a few occupational groups:
 - *Jamaica* only has data on the number of doctors, nurses, and hospital workers tested. It indicates that nurses accounted for 1 out of 5 confirmed COVID-19 cases (20%) among health workers.(14)
 - *Belize* has information on testing among medical practitioners, hospital workers, and others. The main group identified was nurses, who accounted for 1 out of 4 such cases (25%), followed by medical practitioners (18%).(14)

Mental health

Health worker's wellbeing affects their availability within the supply of health services. The burden placed on health workers due to covering for staff shortages or taking on additional functions with inadequate resources may result in demotivation and burnout (see Figure 2). Countries increased their health workers' workload by extending hours or cancelling leave; but this entailed some risk, namely burnout and mental health issues.(16) During the COVID-19 pandemic, health workers have experienced stress, long shifts, and excessive workloads—in addition to the uncertainty that comes with facing a new pathology and the worry of exposing their own family to this disease. In this sense, then, COVID-19 has had consequences for their **mental health**.

⁵ In Colombia and Chile, health workers had to test every 15 days in accordance with risk assessment, so this may have a bias based on doctors and nurses who were the occupational groups most dedicated to tending to confirmed cases of COVID-19.

A probable result is depression (with between 21% and 37% of all health workers suffering from it), anxiety (with between 23% and 46% showing symptoms) (8), and insomnia (with 33% having trouble sleeping) (17). In addition, the global prevalence of post-traumatic stress disorder (PTSD) has been estimated at 17%; but among health workers working in COVID-19 units, this rose to 31%, with nurses at 28%—which is much higher when compared to other health workers.(8) A systematic review including *Australia, China, France, India, Iran, Hong Kong, Romania, and Singapore* demonstrate a high prevalence of stress (45%), anxiety (25.8%), and depression (24.3%) among health workers caring for COVID-19 patients (18). This makes them prone to developing such disorders as burnout and PTSD (19)—especially among professionals who had experienced previous PTSD symptoms, have had family members or friends die from COVID-19, or have a high level of risk perception and/or low resilience (20). A more recent review of meta-analyses evaluating the prevalence of mental health symptoms among hospital staff during the COVID-19 pandemic found that around 30% of hospital staff treating COVID-19 patients suffered from anxiety and depression, while 40% suffered from insomnia. Hospital staff treating COVID-19 patients had a higher prevalence of insomnia (50.5%) and acute stress (64.8%), regardless of their profession, though without statistical significance in this context. The study also looks at PTSD, suggesting a prevalence of 19% among hospital staff. The study also found that the impact of COVID-19 on the mental wellbeing of health workers varied between doctors and nurses. Insomnia, anxiety, and depressive symptoms were higher among nurses as compared to doctors, while doctors were affected the most by stress and PTSD. This confirms the importance of analyzing mental health issues by occupational profile and team. (21)

Available evidence suggests that medical students' mental health status is poorer than that of the general population.(22) This highlights the need for "Emergency Preparedness" to be embedded into the medical curriculum, in order to provide sufficient preparation for mitigating moral trauma and other adverse health outcomes. In the case of residents, a study conducted in *Kenya* showed that residents directly involved with caring for COVID-19 patients had statistically higher incidences of depression and interpersonal disengagement, as well as lower professional fulfillment in comparison to second-line residents.(23)

Workload also affects mental health. A qualitative analysis highlighting the effects of the pandemic on work procedures followed by physicians, nurses, and community health workers in *Brazil* shows how changes in their tasks varied by cadre and affected their mental health.(24) The authors found that supporting health workers during emergencies is an essential component for health systems' proper functioning. Additionally, there are hierarchies and inequalities inside health teams, which can also have a derogatory effect in terms of support, training, and resources.

1.1.2 Working conditions

This section focuses on two aspects of working conditions: (a) types of contracts and (b) scales of remuneration (see Figure 2). Both of these affect a person's willingness to work in the health sector—which in turn affects the available supply of health workers.

The importance of decent, well-paid work cannot be understated when it comes to attracting and retaining health workers. Indeed, this has been acknowledged by the United Nations in the connection between SDG 3 (Health), SDG 5 (Gender equality) and SDG 8 (Decent work and inclusive economic

growth).(1,2) From the supply side of the labor market, types of contracts influence health workers' willingness to work in health; and in health emergencies, short term contracts can negatively affect the supply of health workers. An example from **Latin America** of how this has influenced health workers during COVID-19 is the case of *Ecuador*, where many health workers treating confirmed cases of COVID-19 had three-month contracts. This unstable type of contract, together with the risk of infection and death, increased health workers' level of demoralized resignation.(11) Literature shows that health workers receiving a lower level of remuneration, or within population groups like women or younger people, perceived a higher occupational risk that has caused them psychological distress. In *Pakistan (Asia)*, there has been a significant increase in anxiety levels among health workers and non-health workers alike.(25) In addition, lower remuneration scales have impelled health workers in **Africa** to seek better opportunities overseas, thus worsening the "brain drain".(26)

1.2 Need and demand for health workers

Analyzing the need and demand for health workers during the COVID-19 pandemic has been crucial when (a) identifying national and subnational health worker gaps, (b) analyzing budget capacity, (c) addressing potential financial needs, and (d) identifying the different actors needed to coordinate policies that address shortages in both the public and private sectors.

The demand for health workers reflects job availability and affordability, yet the **demand** for health workers does not necessarily coincide with the **need** for health workers. The latter is made up of the number of health workers required to reach the objectives of a health system, such as providing universal health coverage (UHC).(6)

Section 1.2.1 discusses the literature on the estimates of health workers' needs. Section 1.2.2 discusses the budget capacity to increase the demand of health workers.

1.2.1 Planning tools used to assess needs among health workers

Many countries have made efforts to design and develop methods that model health workers' needs in the move towards universal health coverage.(27,28) Planning tools⁶ provide information on health workers' future needs to analyze the dynamics behind the health labor market.

Health worker information disaggregated by density, occupational profile, and distribution at the subnational level has been key in planning the response to the pandemic. Countries that collected these data on a routine basis used them to estimate the health worker gap when responding to COVID-19. In order to do so during the COVID-19 response, countries updated the latest information they could obtain on health worker availability. This enabled them to estimate the total supply of health workers and compare it to the need, in order to ensure a well-tailored response to COVID-19. To estimate the

⁶ The HLM analysis guidebook mentions the following four methods and approaches: health needs method, workforce-to-population ratio method, service demands method, and service targets method.(6)

required number of health workers, countries used different variables, among which are the following (11): (i) bed capacity in hospitals and intensive care unit (ICUs); (ii) initial information and estimates on health worker reduction due to infection, deaths, and isolation; (iii) risk groups; and (iv) team composition.

In **Latin America**, *Colombia*, *Chile*, and *Peru* developed methodologies to estimate health worker needs. In *Chile's* particular case, these methodologies have been used on an annual basis to establish the required budget necessary to address the existing gap.(11)

Some studies have highlighted the difference in planning for the required number of health workers when countries' healthcare systems are largely decentralized. In **Europe**, for example, *Germany* carried out a systematic search on action and planning vis-à-vis health workers between 18 and 31 May 2020 at both the federal and state levels, covering 16 states (as conducted by the Ministry of Health and state public health authorities). While all the states included health worker planning, the study nonetheless found that their preparedness plans were not necessarily COVID-19-specific and that there was limited planning to increase health worker capacity. Lower Saxony was the only state with a kind of staffing plan that consisted of an overview of the number of health workers but with no minimum staffing levels.(29)

In **Asia**, the Ministry of Health of *Kyrgyzstan* used the WHO *Adaptt* platform and *Health Workforce Estimator* (HWFE) planning tool, based on epidemiological data and the target number of mild, moderate, severe, and critical patients per day. Doing so enabled the country to rapidly assess the workforce requirements needed to respond to COVID-19. The projections helped inform operational planners and managers by providing data both on the available number of health workers, collected both nationally and in the Bishkek (capital) region, and on the number of patients hospitalized over time. It made recommendations for data collection that would identify any regions and occupational groups with a deficit or surplus, thus indicating which health workers might be relocated to best respond to the pandemic in that specific area.(30)

In **Africa**, it is noteworthy that most of the countries lack health worker information systems (31) and planning tools. However, prior to the pandemic, it had been identified that African countries needed to prioritize capacity-building for health worker units, so as develop the corresponding plans that would quantify the need for them, as well as the supply and demand for different health worker cadres. Doing so would enable the countries to make better, more informed decisions on producing, recruiting, and retaining sufficient numbers of health workers.(32)

The next section, 1.2.2, looks at the demand for health workers, while Section 1.3 investigates some key areas of the policy response used to overcome HLM mismatches.

1.2.2 Demand for health workers

The increased demand for health workers during COVID-19 has called for countries to look at their budget capacity and coordinate policies with different stakeholders, so that they can address potential financial resources. In many countries, the increased demand for health workers has been accompanied by an increase in the portion of the national budget dedicated to them and/or external funds, e.g. donations or grants from international cooperation to aid in hiring additional health workers.(11,14,33)

Over the course of 2020, some examples of additional investments to finance this increased demand from general budget were the following (see Annex 1):

- in **Africa**, *Ghana* (34);
- in **Latin America and the Caribbean**, *Chile*, *Colombia*, and *Peru* (11) on the continent; and *Belize*, *Grenada*, and *Jamaica* (14) in the Caribbean; and
- in **Europe**, *Belgium* (35), *Italy* (36), *Poland* (37), *Portugal* (38), and *Sweden* (39).

In **Latin America**, *Ecuador* supplemented these investments with grants and loans from multilateral organizations; while in *Bolivia*, the main funding source was a World Bank loan that had been made available before the pandemic and was subsequently repurposed.⁽¹¹⁾ In **Europe**, *Slovakia* supplemented existing resources with repurposed aid from the European Regional Development Fund.⁽⁴⁰⁾

Health workforce governance—which is understood as comprising leadership, coordination, articulation, and budget allocation—has been key for financing and implementing policy response during COVID-19.

- **Caribbean** countries coordinate between their ministries of health and finance to find ways to hire additional health workers.⁽¹⁴⁾
- In **Latin America**, *Bolivia*, *Chile*, *Colombia*, *Ecuador*, and *Peru* have used a coordinated approach among their Ministries of Health, Education, Labor, and Finance to implement mechanisms aimed at increasing health worker availability, protection, and training.⁽¹¹⁾
- In **Asia**, *Pakistani* government organizations made staff available from the Ministries of Defense, Housing, and Human Resources, working in conjunction with local governments, to help supplement public health teams during the pandemic.⁽⁴¹⁾

A common feature of health systems in many countries is the existence of multiple sources of financing and the coexistence of various health service providers.⁽⁶⁾ This is also reflected by a fragmentation in hiring health workers who might contribute certain advantages. Nevertheless, there are concerns with respect to coordination and the effectiveness of regulations. On the one hand, having the autonomy to hire health workers from the private sector can increase effectiveness by improving health worker surge capacity; but on the other hand, fragmentation can reduce the overall effectiveness of regulation and governance.⁽⁴⁾ In **Europe**, for example, *Germany* displayed its lack of integrative health worker governance during COVID-19, the process being stuck between the federal and local levels with numerous coordination problems ensuing.⁽²⁹⁾

Finally, potential funding sources that might help maintain and increase health workers during health emergencies are as follows: (a) domestic budgetary allocation, (b) reprogramming existing expenditures by reprioritizing budgetary allocations, (c) increasing government debt, and (d) improving the quality of public financial management (PFM). One of the main PFM bottlenecks in the health sector is caused by a certain rigidity in resource management. In order to provide increased flexibility in the use of budgetary resources during COVID-19, various countries used temporary program line grouping: for example, COVID-19 vaccination inputs.⁽³³⁾

1.3 Supply and demand mismatches and policy response

Previous sections have discussed the literature around issues individually affecting the supply of and demand for health workers. This section discusses the mismatches between the supply and the demand during COVID-19 and the subsequent policy response. The *HLMA Guidebook* identifies three main types of supply and demand misalignments: labor shortage or surplus, mismatches in skills, and labor discrimination.⁽⁶⁾ In this paper, the focus is on labor shortages.

During COVID-19, existing shortages of qualified health workers in areas of need has resulted in some services not being available. Pre-pandemic shortages were exacerbated during the pandemic, but they varied by type based on occupational profile, skills mix, and subnational distribution of health workers, according to the demand for them during COVID-19 and their availability in the country. The demand for health workers has increased with the pandemic, and countries have implemented policies aimed at optimizing their supply. However, in many cases, countries have found themselves with unfilled job vacancies. The difficulty they have experienced in filling these positions reflects a combination of market failures and mismatches within the health sector, which has affected health workers' distribution inside the country as well as their overall availability.

On the one hand, it shows the mismatch between individuals' willingness to work in the health sector during the COVID-19 pandemic and the demand for them, given the salary levels and working conditions offered. Most analyses of labor supply elasticity vis-à-vis wages show positive elasticities at a level of below 1 ⁽⁶⁾, which indicates that other non-wage factors are also important in health workers' decisions to participate in the labor market. During COVID-19, the risk of infection has prevented many existing health workers from participating in the labor market; and in many cases, the incentives simply did not compensate for the risk.

On the other hand, the numerous unfilled positions clearly show the limits of the labor supply in terms of health workers with the required education and skills needed, given that the increased demand for health workers to respond to COVID-19 has varied by occupational profile and team composition. The pool of available qualified health workers in the countries depended on domestic training and as well as on net migration flows (see Figure 1).

To respond to the COVID-19 pandemic, countries used different strategies to overcome service disruptions due to health worker shortages, most of which are included in the *WHO interim guidance on health workforce policy and management in the context of the COVID-19 pandemic response*.⁽³⁾ According to the third round of the *Global pulse survey on continuity of essential health services during the COVID-19 pandemic*, health worker mitigation measures have consistently been among the top strategies used to reduce the effect of labor disruptions. Indeed, over 70% of countries (at least 67 out of 95) have applied some of these measures.⁽¹⁰⁾ The literature discussed in this section **focuses on policies aimed at optimizing the supply of existing health workers and increasing their availability to cover the increased demand.**

1.3.1 Measures to optimize and maintain health workers

Policy responses identified to **optimize and maintain the supply of existing health workers** are mainly the six that follow: increasing their workload, relocating them, adapting their roles, providing telehealth, increasing compensation, and preventing and mitigating mental health disorders among them.

The *Third WHO global pulse survey* reported that 71% of the countries (67 out of 95) has used measures to redistribute staff tasks and optimize their roles; 62% (59 out of 95) has provided mental health care and psychological support to health workers; and 47% (45 out of 95) has provided paid sick leave, paid overtime, and hazard pay.⁽¹⁰⁾ Other measures implemented have been developing such ground-breaking concepts as telehealth, teleconsultation, virtual consultations, telemedicine, remote consultations, remote health work, or e-prescribing. These not only ensured less exposure among health workers but also the continuity of health services.

Increasing workload

(i) Many countries implemented programs whereby they asked health professionals to work extra hours, including moving from part-time to full-time or allowing extra overtime in

- **Latin America:** in *Bolivia, Chile, Ecuador and Peru* (11); and
- **Europe:** in *Czechia* (42), *Croatia, Finland, Germany, Norway, Ireland, Italy, Latvia, Poland, Spain, Sweden* (43) and *Portugal* (38).

(ii) Modifying work schedules was used in

- the **Americas:** *Belize; Grenada; and Jamaica* (14); and *Canada* (43); and
- in **Europe:** in *Croatia* (43), *Spain, and Romania*. The latter two countries have suspended ongoing or scheduled external rotations for residents in training.⁽⁴³⁾

(iii) Other countries have suspended exemptions after night shifts or on-call activities or have canceled leaves of absence, foreign travel, or holidays:

- the **Americas:** in *Canada* (43);
- **Europe:** *Belgium* (35), *Czechia, Greece, Luxembourg, Norway, Poland, Spain, and Switzerland*; (43)and
- the **Middle East:** in *Israel*. (43)

Relocating and mobilizing health workers

Countries adjusted their priorities and allowed for disruption of services, the rationale being to relocate health workers to areas of greater need (11,35,38,41,42,44–54). Some countries have relocated health workers to long-term care facilities, to testing and contact tracing (45,48), or to hospitals once medical-surgical units have been converted into ICU beds (45), after cancelling elective and non-urgent treatment (42). In some cases, redeployment has required training.^(16,49)

Some countries have tried to mobilize health professionals working in other sectors outside of health. For example, Belgium has mobilized nursing teachers or nurses working in other sectors.⁽³⁵⁾

The private sector has also been integrated into the response. In **Europe**, for example, public authorities in *Portugal* faced an emergency demand for health workers, straining the supply capacity to non-public healthcare facilities. This necessitated the temporary requisition of healthcare employees from both the public and private sectors to assist in treating COVID-19 patients.(38) Another example is Maharashtra, one of the worst-affected states in *India*, where staff deficiency has led that state to mandate private doctors to work on COVID-19, with failure to do so possibly resulting in revocation of their license.(52)

Adapting staff roles

Health workers' tasks and responsibilities have been modified or expanded either by adopting policies to ease some of the regulations that define health workers roles, or by temporary suspending regulations. This has provided greater flexibility to the tasks undertaken by different professionals, while at the same time taking advantage of the available skill mix.(55) Within a multidisciplinary team, countries have optimized the division of roles among occupations through expansion of scope of practice and redeployment .(16) In some cases, training in COVID-19 care has become necessary.

In many countries, nurses have played a primary part in adapting their role. Some examples found in the literature are as follows:

- In **North America**, *Canada* has trained registered nurses to operate ventilators and provide support to respiratory therapists.(56)
- In **Europe**, *Belgium* has had nurses receiving ICU training and taking on more patients per nurse.(35) *Germany* used task-shifting from doctors to skilled nurses and emergency paramedics until March 2021.(57) *Lithuania* has allowed nurses greater independence in consulting with their patients by phone and has allowed them to be directly involved in managing patients with chronic conditions, as well as those diagnosed with COVID-19. In cooperation with family physicians, nurses have subsequently been allowed to follow up with e-prescriptions, thereby increasing the number of remote consultations led by nurses by 400%, from 17 000 in January 2020 to 83 100 in January 2021.(58) *Sweden* has successfully increased the scope of primary care nursing practice by providing additional training.(39) In *France*, nurses have been able to renew prescriptions for certain chronic conditions.(59)

Other occupational groups that have adapted their role were pharmacists, physiotherapists, dentists, physicians, and long-term care workers, as follows:

- **North America:** Community pharmacists in the *USA* have been authorized by the National Food and Drug Administration to order and administer COVID-19 tests.(56) Additionally, physicians with critical care experience from other departments—such as internists, fellows, and anesthesiologists—have assisted in treating patients with COVID-19.(16)
- **Australia:** Physiotherapists have been trained to work on acute respiratory teams.(16)
- **Europe:** *Austria* has modified the tasks and responsibilities of health and long-term care workers, favoring a mix of skills with different professionals supporting the existing workforce.(55) In *England*, *France*, and *Scotland*, pharmacists have been allowed to supply medicine to patients, in *Scotland* through the extension of Minor Ailment Service (MAS) (56) and in *England* without a prescription if the patients had been receiving their medicine as part of

their ongoing treatment. *England* has also trained and relocated its dentists to carry out tasks generally assigned to community nursing.(16)

Telehealth

Most countries have rapidly adopted and promoted telehealth, with recommendations to use teleconsultation. At the same time, they have expanded regulations and payments to cover teleconsultations. Examples include the following:

- (i) Teleconsultation and electronic prescriptions have been made available in **Europe**: *Austria* (60), *Czechia* (42), *Germany* (56,57), *Ireland* (61), *Hungary* (62), *Luxembourg* (63), *Malta* (64), and *Romania* (53).
- (ii) There have been new regulations in **Europe** promoting teleconsultation and new conditions relaxing requirements to address greater needs and provide higher rates of reimbursement in *Belgium* (35), *Czechia* (42), *Denmark* (47), *France* (56,65), *Germany* (56,57), *Norway* (49), *Portugal* (66), and *Slovakia* (40).
- (iii) New programs have been launched and services expanded in many countries:

In **Europe**, *France* has implemented hotline and email dedicated to long-term care workers in each region, with a geriatric specialist available during working hours every day of the week; and the regions have similarly implemented a hotline and email system for palliative care.(55) *Greece* has instituted an ehealth program.(67) *Ireland* has developed a secure communication portal (*Eire Care*) linking general practitioners and other primary care providers with patients and providing free teleconsultations at point of use.(61) *Lithuania* has implemented doctor-to-doctor remote consultations in which family physicians have the opportunity to consult with specialists on complicated cases.(58) *Luxembourg* created a teleconsultation platform allowing patients to consult their doctors, dentists, or midwives either by phone or virtually.(63) *Malta* has established a telemedicine hub for primary care as well as other remote services, including *Telehealth Physio*.(64) Finally, *Poland* had pre-existing tools and platforms in primary healthcare.(37)

In **Asia**, *Pakistan* has set up a telemedicine web portal and corona mobile application, providing free online consultation services to patients.(68).

All of the previous measures have incremented the use of telehealth overall. Annex 2 provides available information about the use of teleconsultation and e-prescription in countries that have implemented these mechanisms.

Compensation

Countries implemented different types of compensation: bonuses payment raises, add-on payments for attention of COVID-19 patients. Compensation and benefits—including paid raises, bonuses, incentives, and other perks—are important factors when it comes to recruiting and retaining health workers.(6) Many countries used paid increases or bonus payments as strategies to address uneven distribution at the subnational level. For example, establishing salary scales at the subnational level has helped attract health workers, as have national calls. Both have functioned as worthy mechanisms used to overcome such market failures as asymmetry of information or institutional arrangements that influence wage rigidities.(4) In addition, many countries have implemented such policies as life insurance, bonuses and pay increases for health workers.

(i) **Special bonuses were paid on a one-time basis to remunerate workers with additional workloads and those working with COVID-19 patients, as follows:**

- **Latin America:** *Chile, Colombia, and Ecuador* (11);
- **Europe:** *Belgium* (35), *Estonia* (54), *France* (69), and *the Netherlands* (70);
- **Asia:** *Kyrgyzstan* (69); and
- **Africa:** Some countries provided cash incentives.(71)

(ii) **Other countries have paid these bonuses on a recurrent basis to health workers working with COVID-19 patients:**

- **Latin America:** *In Peru*, by providing health workers associated with the *CAS COVID* type of contract with a package of three types of bonuses on a monthly basis between April 2020 and March 2021.(11)
- In **Europe**, there were multiple national initiatives: *Bulgaria* has instituted a monthly premium of BGN 1,000 (€511) for medical and non-medical professionals treating coronavirus patients, to be paid by the end of the year.(72) Hospital staff treating COVID-19 patients in *Germany* have received bonuses that varied according to the prevalence of the disease in their region.(16) In *Latvia* in December 2020, €32 million was made available for allowances paid to doctors dealing with COVID-19 of up to 100% of their monthly salary—in addition to introducing bonuses for doctors, pharmacists, and other health professionals worth an additional 20-50% of their monthly salary during the months of March, April, and May 2020.(73) In *Poland*, health workers involved in the COVID-19 response have received financial bonuses.(37) *Romania* provided bonuses for health workers treating COVID-19 cases.(53) Finally, *Slovenia* (74) has paid special bonuses throughout the pandemic to remunerate health workers experiencing additional workloads.

(iii) **Raises in pay or hourly rates have been increased for those reallocated or working with COVID-19 patients due to hazardous working conditions:**

- In **Europe**, this has occurred in *France*, involving additional fee-for-service payments for general practitioners visiting patients in nursing homes.(16) *Germany* has set higher fees for general practitioners treating patients in long-term care facilities.(16) In *Lithuania*, salaries for health workers providing services to COVID-19 patients have been temporarily adjusted upwards by 60-100%.(69) *Romania* has provided salary increases for those dealing with prevention and control measures.(53) In *Slovenia*, all health workers relocated to areas more affected by COVID-19 have been entitled to a 20% salary top-up, and those working in particularly risky environments had their hourly rates increased by 65% during March to May 2020 and October 2020 to June 2021.(74) Finally, in *Ukraine*, Parliament approved paying a 300% top-up for wages of health personnel working with COVID-19 cases; and additionally, health personnel working at the secondary level started receiving additional wage increases.(75)

(iv) **Add-on-payments for health workers in charge of COVID-19 patients:**

- **Australia** has provided an additional payment of €50 per patient for primary healthcare practices administering services to COVID-19 patients.
- In **Europe**, the *Netherlands* has instituted a one-time payment of €10 per patient in primary healthcare practices and an additional €15 per hour for general practitioners' services outside office hours. (56) The *United Kingdom* has guaranteed a minimum income level for all NHS providers, as well as separate agreements for providers claiming exceptional additional costs due to COVID-19. (56) Finally, *Slovenia* made additional payments to primary-care health workers from March to May 2020.(56)

(v) **Provide health workers with other types of compensation:** In **Europe**, health workers in *Lithuania* received help with childcare.(76) *Italy* has provided a bonus of €1 000 for the purchase of baby-sitting services needed during forced school closure (77), as well as a bonus for continuing education to doctors, dentists, nurses, and pharmacists who have continued working during the COVID-19 pandemic.(69) *Luxembourg* has covered the costs of temporary accommodation for cross-border health workers needing to stay there during the pandemic.(63) *Poland* has instituted such support measures as free childcare, free transport, hotel accommodation, and continuing education credits.(37) Finally, *Turkey* provided free accommodation to health workers isolated there.(69)

Preventing and mitigating mental health disorders

WHO has called for governments and healthcare leaders to address the persistent threats to the health and safety of health workers, including the issue of improving mental their health and psychological wellbeing, through the following recommendations: (78)

- Establishing policies that ensure an appropriate and fair duration of work assignments, working hours, and rest breaks, and minimizing the administrative burden placed on health workers.
- Defining and keeping appropriate and safe staffing levels in healthcare facilities.
- Providing insurance coverage for work-related risks, especially for those who work in high-risk areas.
- Establishing a fair and “non-recriminatory” work culture through open communication, providing legal and administrative protection against punitive actions for reporting adverse safety events.
- Providing health workers with access to mental wellness and social support services, including counseling on work-life balance as well as risk assessment and risk mitigation.

Several specific actions have been identified in the literature to promote the mental health and wellbeing of health workers as per WHO recommendations:

(i) Some countries offered psychological support to health workers either online or by phone, e.g.

- **Europe:** *Croatia* (79) and *Poland* (69);
- **Middle East:** *Qatar* (8); and
- **Asia:** *Thailand* (80) and *China* (81).

In *Poland* (**Europe**) and *China* (**Asia**), this has been possible through the collaboration of mental health specialists willing to offer their services free of charge.

(ii) Other countries have defined mental health plans in the form of guidelines and directives for workers, employers, or national entities responsible for health and safety at work. This took place in

- **Latin America**, in *Ecuador, Colombia, Chile, and Peru* (11). There were programs for emotional discharges in *Chile* (8) and *Ecuador* (11);
- the **Caribbean**, with *Grenada* offered counseling sessions to health workers who volunteered to work with patients with COVID-19, which included their immediate family as well (14);
- **Europe**, in *Scotland* (72), *Malta* (69), and *Ireland* (30); and
- **Australia** (8).

(iii) **Actions such as risk insurance coverage and paid sick leave are aimed at reducing fear and concern regarding the uncertainty surrounding the new pathology and the worry about exposing their family to COVID-19.** Some examples of countries found in the literature are as follows:

- In **Latin America**, this applied to *Bolivia, Chile, and Peru* (11); with COVID-19 defined as a direct occupational disease for health workers in *Chile* and *Colombia* (11).
- In **North America**, *Canada* paid its health workers whenever necessary to self-isolate due to possible exposure at work.(55)
- In **Europe**, *Ukraine* (75) introduced state insurance to health workers covering cases of disability or death due to COVID-19 or related sicknesses.
- In **Africa**, countries have provided life insurance packages.(71)
- In **Asia**, *Thailand's* cabinet of the Finance Ministry has approved doubling financial compensation to COVID-19–positive health workers who required treatment for less than 20 days, amounting to between 50 000 to 100 000 Thai baht.(80)

(iv) **Actions to increase health workers' wellbeing**

- Identification of risk groups by age, comorbidity, and pregnancy, and need for childcare, who have discontinued their activities or sought reassignment to lower-risk activities such as telemedicine. This has taken place in **Latin America** in *Brazil* (82), *Bolivia, Chile, Colombia, Ecuador, and Peru* (11).
- Introducing such concepts as teleconsultations, drive-through pharmacies, and notifications of waiting numbers via texting or WhatsApp, in order to minimize exposure between healthcare personnel and patients. This has become practice in *Malaysia* (41) (**Asia**) and *Brazil* (**Latin America**) (82).

1.3.2 Measures to increase health workers' availability

Measures to increase the number of available health workers have included new recruitment (national and foreign), by mobilizing students, retired health personnel, armed forces, and volunteers. Some 72% (68 out of 95) of the countries have recruited additional staff to overcome disruptions and recover services.(10) In some cases, the implementation of these measures has required making adaptations in legislation and in regulations.

A summary of actions and available data on the measures taken to increase health workers is in Annex 3, showing that most of the countries used two or more of the measures listed above. This is

consistent with other studies,⁷ which found that countries tended to adopt a combination of the measures outlined in the *WHO interim guideline*.(43)

These measures reflect both challenges and strengths (see Table 1). For example, countries hired additional health workers with qualifications from abroad. While this temporarily has helped increase the number of available health workers, it has also increased health workforce gaps related to migration. The fourth round of national reporting on the *WHO Code of Practice on the International Recruitment of Health Personnel* has shown an increased recruitment of international health workers to fill vacancies, particularly in upper middle- and high-income countries.(83)

Table 1: Strengths and challenges in measures to increase the number of available health workers

Mechanism	Strengths	Challenges
Hire additional health workers	Novel hiring mechanisms defined, or adjustments made to existing mechanisms, susceptible to replication and scaling	<ul style="list-style-type: none"> • Develop mechanisms to absorb newly recruited health workers, which in turn largely depends on identifying adequate funding sources. • Balancing decent work with flexibility in hiring and working conditions.
Employ recently qualified health workers	Mechanisms found for loosening requirements and accelerating procedures allowing students in their final stages of medical qualification to graduate earlier and expediting recent graduates' entry into the workforce, susceptible to replication and scaling.	Need to conduct quick trainings in treatment of new diseases requiring specific skills.
Relax regulation provisions to facilitate the entry into practice of foreign-trained health workers, including international cooperation	Increases the number of available health workers currently lacking in the country.	<ul style="list-style-type: none"> • Mitigate displacement of national health workers, avoiding discrimination. • Temporarily eliminate quality controls. • Increase health workforce gaps related to migration.⁸
Employ students about to graduate	Facilitates the continuous flow of health workers to the neediest areas	<ul style="list-style-type: none"> • Requires quick training in new diseases treatment specific skills. • Retention challenge when the mandatory service (residency requirement) ends.
Health workers serving in the armed forces	Increases the number of available health workers at no additional cost.	This mechanism only applies to the current disease outbreak.

⁷ Looking at 44 countries in the European region plus Canada.

⁸ The *health workers Support and Safeguards List* was published in January 2020. During COVID-19, several countries have observed more acute shortages due to health workers being recruited in other countries (83).

Mechanism	Strengths	Challenges
Allow retired health workers to return to practice	Policies adopted to relax some regulations, allowing retired professionals both with and without formal training to step in to support the existing workforce.	This mechanism only applies to the current disease outbreak.
Accept volunteers	<ul style="list-style-type: none"> The number of available health workers is increased at little or no additional cost. Volunteers may include people who have no healthcare training to provide logistical support in general areas in response to the pandemic, allowing medical teams to increase their scope. 	This mechanism only applies to the current disease outbreak.

Source: Elaboration based on (83,84)

2. Measurement and reporting for analyzing mismatches in the health labor market and policy response

There has been an increased awareness of the importance of data in pandemic management. This includes data on health worker availability and on the skill profiles needed to inform actions aimed at handling surge capacity.(16) Before the pandemic, most countries recognized the importance of data and information on health workers in informed policymaking, with the result that countries had already started taking different actions aimed at collecting information. Despite this, there is a deficit of valid and accurate data on health workers in general, particularly of demand-related indicators—which directly compromise the construction of the robust models needed to effectively address the topic of this paper.(27) This section discusses the literature on actions taken by countries to overcome data-related challenges during the pandemic and to identify key actions to taken towards improving data collection and use in a way that strengthens health workers.

Countries can be at different stages in developing their information systems, as well as in their use of information systems as a whole. The literature shows that some countries collect non-standardized health worker data for their definitions, with infrequently collected data, whereas other countries collect detailed data using standardized definitions and frequent surveys and/or sources of information. However, these same countries face challenges either in collecting information from the private sector, or in integrating data that includes different national and local sources. The COVID-19 pandemic has increased the need for and use of digitalization for rapid collection and analysis, not to mention the need to accelerate initiatives related to data and analysis.

For example, case studies from **Latin America** (11) indicate that *Bolivia, Chile, Colombia, Ecuador, and Peru* have used information systems to understand the total supply of health workers and to track health worker cases and deaths from COVID-19. The information varies in two main ways: in terms of public access and frequency of publication, and in terms of data disaggregation by occupational group, subnational level, sex, age, and source of infection. By using their information systems to collect and analyze information on the total number of health workers and COVID-19 confirmed cases and deaths, they have contributed to strengthening both existing health worker data and information analysis.

Before the pandemic, only *Chile* had developed methodologies for measuring health worker gaps to inform decision-making. In the face of COVID-19, each country has either adopted or created a methodology that allows for identifying an agile way to increase or maintain the available number of health workers. Finally, *Bolivia* has created a specific unit devoted to health workers in the Ministry of Health and Sports, even though it does not appear to have information analysis functions, as do the teams of *Chile*, *Colombia*, and *Peru*.(11)

Another way of strengthening health worker data has been to create databases. In **North America**, in the *USA*, the Centers for Medicare and Medicaid Services (CMS) began collecting data on COVID-19 and its impact on both residents and staff. All Medicare- and Medicaid-certified nursing homes in the country were to have submitted responses to questions on personnel and personal protective equipment (PPE) during at least one of the weekly reporting periods within the two study windows (18 May to 19 July 2020). From the 15 388 nursing homes identified, 98% (15 035 out of 15 388) submitted data on staff and PPE shortages to the database of the National Centers for Disease Control and Prevention (CDC) during at least one of the weekly reporting periods during the study period.(85)

In **Europe**, an absence monitoring and reporting system was updated weekly in *Scotland's* National Health Service (NHS), providing data on absence rates as reported by the regional health authority, and disaggregated by main occupation and type of absence (either COVID- or non-COVID-related). They have developed a rapid, standardized, and unified system for reporting absence rates and type of absence covering about 170 000 staff throughout the country. This has helped support more effective governance within the NHS system.(30)

Estonia (54) and *Iceland* (86) created a database on retirees who could work in hospitals as temporary volunteers. *Luxembourg* simultaneously built a platform for both medical and non-medical volunteers, as part of a mandated census of all licensed healthcare professionals.(63) In Portugal, student unions and professional organizations created a database of volunteers who might assist in the national response to COVID-19.(38) Germany used a strategy to temporarily suspend regulations that required a certain number of nursing professionals to work in intensive care or geriatric units.(57)

3. Lessons learned to improve health worker readiness

An HLMA is useful both for analyzing health worker supply and demand and for identifying policy recommendations. The literature on health worker supply during the COVID-19 pandemic has indicated that infection, working conditions, and mental health have all negatively affected the supply of health workers, in that they have increased attrition and decreased health workers' labor force participation. The policy responses documented in this paper have the potential to address the multidimensional impact of COVID-19 on health workers. It has become critically clear that essential health services can't be delivered without health workforce. The literature shows health workforce critical role on delivering health services and the need for its long term capacity building.

Studies showed that working conditions and stressful situations arising from the pandemic have increased the likelihood of mental health conditions. Countries have reported implementing actions to increase health workers' wellbeing. The *WHO report on mental health* provides actions across three

areas: political consensus, investments in quality and consensual mental health for health workers, and improved working conditions.

COVID-19 has increased the mismatch between the supply of and demand for health workers, thus exacerbating pre-pandemic shortages. This paper discusses policy responses to address health worker shortages, it shows the need for retention policies and improving HWF distribution at the sub-national level

The literature shows that countries have implemented flexible contracts and hiring procedures to quickly hire health workers. However, one of the challenges faced was not to worsen contractual arrangements and staff stability. Temporary reassignments of health workers to exclusive treatment of COVID-19 cases have involved partial or total interruption of non-COVID-19 essential services due to health worker shortages.

Countries have employed students and residents to increase the supply of health workers. Nonetheless, the challenge to rapidly train and develop new competencies remains unmet. Strengthening and sustaining a competent and committed workforce is key for health emergency preparedness, response and resilience.

Pandemic preparedness and response have increased awareness of the importance of data and its use for policy guidance. In many cases, it has accelerated collaboration across institutions and stakeholders, inciting them to share data and implement database interoperability. Disaggregation of health workers data is also important, since health workers' emergency responses call for a variety of occupational profiles and team compositions. Additionally, the impact of COVID-19 has varied by age, sex and occupational profiles.

A key factor has been health worker governance, which involves coordinating the public and private sectors as well as articulating with other ministries and stakeholders at both the national and subnational levels. The governance factor has been crucial to the rapid implementation of the pandemic response. Investments in human resources for health need to be prioritized and literature shows an opportunity for improving coordination across sectors to increase budget capacity for health workforce through global, regional and national organizations and networks.

Building from the consensus arrived at in the Italian G20 in 2021, WHO has developed a roadmap for strengthening health and emergency workforces. The roadmap is a vision for strengthening national health worker capacity around the world, as well as for ensuring health security and universal health coverage (UHC). It focuses on three main action areas: defining essential public health functions and sub-functions for national contexts, including a placing focus on emergency preparedness and response; strengthening competency-based education to provide essential public health functions, and; mapping and measurement of all occupations engaged in the public health functions. A global health architecture which can be responsive and resilient to health emergencies requires prioritizing investment in both the clinical and public health workforce at all levels.

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Annexes

Annex 1: Funding for additional human resources for health, by region and country

Country	Additional health workers	Amount	
Africa			
Ghana (34)	45 107 hired	US\$213.58 million	Estimated
Latin America and the Caribbean			
Bolivia (11)	7628 projected	US\$ 8 543 777	Budgeted
Chile (11)	19 027 hired + overtime	US\$ 253 955 686	Executed
Ecuador (11)	no information available	US\$ 43 492 222	Executed
Peru (11)	44 207 hired	US\$ 649 900 457	Budgeted
Grenada (14)	117 + transportation arrangements	US\$ 4.4 million	Budgeted
Europe			
Belgium (35)	no information available	EUR 165 million	Budgeted
Greece (67)	7 500 hired	EUR 85 million	Budgeted
Italy (36)	20 000 projected	EUR 241 million	Budgeted
Ireland (61)	11 000 hired + testing + additional beds	EUR 435 million	Budgeted
Portugal (38)	10 424 hired + bonus + PPE	EUR 504 million	Budgeted

Source: Elaboration based on (34), (11), (14), (35), (38), (67), (36), (61)

Note: Summarized data refers to year 2020

Annex 2: Use of teleconsultation and e-prescription in Europe

Country	Percent (%) of population who reported having received a medical consultation online or by phone	Percent (%) of population who reported having received a prescription online or by phone	Other data available
Austria (60)	35	N/A (not applicable)	
Czechia (42)	47	67	
Denmark (47)	46	N/A	
France (56,65)	N/A	N/A	19 million teleconsultations reimbursed in 2020, with almost 1 million per week in April.
Germany (56,57)	23	N/A	Teleconsultations increased from 1700 (Jan and Feb 2020) to 19 500 (Apr 2020)
Greece(67)	38	N/A	
Hungary (62)	N/A	N/A	71% of people in Hungary accessed a doctor online or by phone for prescription purposes
Ireland (61)	60	66	
Luxembourg (63)	44	N/A	By April 2020, about 600 doctors and more than 4 000 patients had registered with the e-consult platform, and almost 3 000 teleconsultations had been carried out.
Malta (64)	N/A	N/A	15 000 people had made use of the service telemedicine hub by the end of July 2020.
Norway (49)	N/A	N/A	The proportion of ambulatory consultations conducted remotely rose from 3% to 41% between early 2020 and the end of the first wave.
Portugal (66)	44	N/A	N/A
Poland (37)	62	N/A	N/A
Romania(53)	30	N/A	N/A
Slovakia (40)	40	65	N/A
EU average (61)	39	53	N/A

Source: Elaboration based on (63), (37), (53), (56,65), (67), (62), (40), (42), (47), (49), (60), (61), (64), (66)

Note: Summarized data refers to year 2020

Annex 3: Combination of measures to increase health workers, by region and country

Country	Measure						
	Hire additional health workers	Employ recently qualified health workers	Facilitate entry into practice for foreign-trained health workers, including international cooperation	Deploy students	Accept support from health workers serving in the armed forces	Allow retired health workers to return to practice	Accept volunteers
Africa							
Ghana (34)	45 107 health workers by November 2020	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented
The Americas							
Bolivia (11) (6777 health workers hired by October 2020	220 recent graduates contracted by October 2020	Not implemented	300 trainee students incorporated by October 2020	Not implemented	Not implemented	450 recent graduates, through agreements with universities
Canada (87)	Not implemented	Not implemented	There were 13 000 doctors and 6000 nurses not working in their fields	Not implemented	Not implemented	Not implemented	Not implemented
Chile (11)	19 027 health workers hired	4000 doctors from assignment and training cycle assigned to COVID-19 treatment	Recruitment of health workers holding an overseas medical qualification, without validation	Students in their final semesters recruited	health workers to treat COVID-19 patients	1500 professionals released from duty re-entered medical practice	1000 students recruited and trained by the University of Chile
Colombia (11)	Recruitment of scarce health workers	2730 places for graduates in medicine (1200), nursing (1300) and bacteriology (230) by August 2020	Accelerated validation of foreign qualifications. 150 health workers recruited via UNHCR & USAID by August 2020	1523 students graduated early in general medicine (1328) and specialist medical fields (195) by August 2020	Retirees from the armed forces and national police	Retired health workers under 60	Not implemented

Country	Measure						
	Hire additional health workers	Employ recently qualified health workers	Facilitate entry into practice for foreign-trained health workers, including international cooperation	Deploy students	Accept support from health workers serving in the armed forces	Allow retired health workers to return to practice	Accept volunteers
The Americas (cont'd)							
Ecuador (11)	3087 health workers hired by December 2020	Enable postgraduate doctors to provide services as part of their training	Not implemented	Not implemented	1523 health workers by October 2020 to strengthen the public network	Not implemented	Not implemented
Peru (11)	44 207 health workers hired by December 2020	5048 health professionals assigned via SERUMS** to vulnerable populations by August 2020	Temporary authorization to practice without validation of qualifications 92 health workers from Cuba and Médecins Sans Frontières by August 2020	Rotation of residents Early completion of residency	Not implemented	Not implemented	Not implemented
Belize (14)	230 community health workers hired	Not implemented	121 health workers from Cuba	Final-year nursing students	Not implemented	Not implemented	500 volunteers
Grenada (14)	118 health workers hired	Not implemented	8 health workers from Cuba	Final-year nursing students	Not implemented	Not implemented	59 volunteers
Jamaica (14)	1000 community health workers hired	Not implemented	140 health workers from Cuba	Not implemented	Not implemented	Not implemented	1000 volunteers

Country	Measure						
	Hire additional health workers	Employ recently qualified health workers	Facilitate entry into practice for foreign-trained health workers, including international cooperation	Deploy students	Accept support from health workers serving in the armed forces	Allow retired health workers to return to practice	Accept volunteers
Asia							
India (52)	Not implemented	Not implemented	Not implemented	Final-year medical students	Not implemented	Not mentioned	Not implemented
Malaysia (41)	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented	Retirees with a medical background, and from private and public entities
Maldives (88)	Not implemented	Not implemented	Facilitate return of Maldivian students	Students in the paraclinical healthcare fields	Not implemented	Not implemented	For logistics and isolation of the cases
Europe							
Austria (60)	Not implemented	Not implemented	Not implemented	Medical students also brought, in exchange for school credit	Not implemented	Consequence of suspension of compulsory registration	Not implemented
Belgium (35)	Recruitment of temporary nurses	Not implemented	Not implemented	Not implemented	Belgian army providing organizational support to hospitals since 23 October 2020	Not implemented	2500 volunteers by March 2020
Cyprus (46)	Doctors in specific specialties Faster recruitment of additional staff	Not implemented	Not implemented	Final-year medical and nursing students	Not implemented	Not implemented	Not mentioned

Country	Measure						
	Hire additional health workers	Employ recently qualified health workers	Facilitate entry into practice for foreign-trained health workers, including international cooperation	Deploy students	Accept support from health workers serving in the armed forces	Allow retired health workers to return to practice	Accept volunteers
Europe (cont'd)							
Czechia (42)	Not implemented	Not implemented	Not implemented	Medical, nursing, and social work students	Not implemented	Not implemented	Health workers from abroad
Estonia (54)	Not implemented	Not implemented	Not implemented	Medical and nursing students	Deployed at various points of the country	Not implemented	NGO set up a database of inactive health workers willing to volunteer
France (89)	Not implemented	Not implemented	Not implemented	Medical and nursing students	Not implemented	Not implemented	National platform to recruit volunteers
Germany (29), (57), (43)	Not implemented	Not implemented	Initiatives launched at state and local levels to recognize foreign-trained physicians waiting for validation of their medical qualifications, to legally enable them to support the response (estimated 14 000, many of whom arrived as refugees in 2015)	1500 medical and health sciences students	3000 members of the armed forces by November 2020	Asking retired health workers to return to clinical practice	health workers from abroad

Country	Measure						
	Hire additional health workers	Employ recently qualified health workers	Facilitate entry into practice for foreign-trained health workers, including international cooperation	Deploy students	Accept support from health workers serving in the armed forces	Allow retired health workers to return to practice	Accept volunteers
Europe (cont'd)							
Greece (67)	Temporary contracts to private sector doctors and nurses	Not implemented	Not implemented	Not implemented	Not implemented	Retired or non-practicing health workers mobilized	10 000 volunteer health workers have applied through a digital platform
Hungary (62)	Not implemented	Not implemented	Not implemented	Not implemented	Deployment of soldiers	Not implemented	900 voluntary health workers
Ireland (41), (61), (41)	11 000 full-time employees between January 2019 and July 2021	Not implemented	Not implemented	Not implemented	Not implemented	Rehiring retired clinicians	Not implemented
Italy (36), (90), (43)	Permanent hiring of 20 000 health workers An estimated 9600 nurses hired in 2021	Not implemented	Not implemented	Final-year medical students	Temporary enrolment of doctors and nurses from the armed forces	Hiring retired doctors	New special units staffed by volunteer medical doctors, specialists, nurses, administrative staff, and psychologists and social work assistants
Luxembourg (63)	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented	Platform for medical and non-medical volunteers

Country	Measure						
	Hire additional health workers	Employ recently qualified health workers	Facilitate entry into practice for foreign-trained health workers, including international cooperation	Deploy students	Accept support from health workers serving in the armed forces	Allow retired health workers to return to practice	Accept volunteers
Europe (cont'd)							
North Macedonia (91)	Not implemented	Not implemented	Not implemented	Medical students	Military doctors, mainly epidemiologists & ICU staff	Not implemented	Not implemented
Norway (49)	Not implemented	Not implemented	Rules relaxed in December 2020	Medical and nursing students	Not implemented	Not implemented	Not implemented
Poland (37)	Not implemented	Not implemented	Regulations relaxed, despite previous opposition	Not implemented	Not implemented	Simplified procedures to allow non-practicing nurses, midwives, and paramedics to return to work	Final-year medical and nursing students
Portugal (38)	Hired health workers directly for up to 4 months and renewed those contracts	Not implemented	Not implemented	Medical students	Not implemented	Not implemented	Not implemented
Romania (53)	2000 temporary jobs	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented
Slovakia (40)	Not implemented	Not implemented	Not implemented	Definition of "health professional" expanded to include students and early internships in medicine, nursing, and emergency healthcare	Not implemented	Not implemented	Not implemented

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Europe (cont'd)							
Slovenia (74)	Not implemented	Not implemented	Not implemented	Medical students	Not implemented	Not implemented	Not implemented
Spain (50), (92)	Facilitate hiring of health workers under short-term, freelance, or temporary contracts	Not implemented	Authorize doctors to practice without validation of qualifications	Medical and nursing students	Deployed at various points of the country	Not implemented	Not implemented
Sweden (39)	Not implemented	Not implemented	Not implemented	Not implemented	Swedish Defense Force called in to assist with staffing, equipment, and logistics	Not implemented	More than 5000 people—including students, retired health workers and others working in other fields—registered as volunteers
United Kingdom (45)	Staff hired from the private sector	Not implemented	Allow foreign-trained but unvalidated health workers to support response	Not implemented	Not implemented	Not implemented	By end of March 2020, 750 000 people volunteered to the NHS Volunteer Responders, surpassing original target of 250 000

Country	Measure						
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Australia (90)	Not implemented	Not implemented	Not implemented	Not implemented	Not implemented	Former medical professionals whose registration had lapsed in the last three years were eligible to work under a one-year pandemic registry	Not implemented

Source: Elaboration based on (11), (14), (71), (41), (35), (54), (37), (53), (74), (63), (29), (38), (57), (34), (67), (36), (61), (62), (40), (39), (42), (43), (45), (46), (49), (50), (52), (60), (87), (92), (88), (89), (90), (90), and (91).