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HEALTH SECURITY WORKFORCE DEVELOPMENT

A knowledge product to support strengthening public health preparedness through developing a health security workforce

NOVEMBER 2020

THE WORLD BANK
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This report was produced by the Center for Global Health Science and Security at Georgetown University for the World Bank Group (WBG).

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KEY MESSAGES

- Ensuring a well-trained and capable workforce is in place is critical for supporting health security functions at national and sub-national levels.
- Health security workforce needs are aligned with those of the broader health workforce, though may require additional volume of personnel as well as specialized training to support specific supplemental functions, as well as multisectoral coordination.
- Principles that underpin successful health workforce development, such as strategic and financial planning to assess and meet needs and developing gender-sensitive approaches to recruitment, training, and retention, are also applicable to the health security workforce, but must engage all relevant sectors in order to be effective.
- Field Epidemiology Training Programs are an example of a highly successful model for in-service health security workforce training that can be implemented at district, intermediate, and national levels to address functions associated with key aspects of surveillance, investigation, and response.

CONTENTS

KEY ACRONYMS

Africa CDC	African Centre for Disease Control and Prevention
AMR	Antimicrobial resistance
CHW	Community health worker
EOC	Emergency Operations Center
FELTP	Field Epidemiology and Laboratory Training Program
FETP	Field Epidemiology Training Program
HRH	Human resources for health
IHR	International Health Regulations (2005)
IHR MEF	International Health Regulations Monitoring and Evaluation Framework
IMS	Incident Management System
ICT	Information and communications technology
IT	Information technology
JEE	Joint External Evaluation
LMIC	Low- or middle-income countries
MPH	Master of Public Health
NPHI	National Public Health Institutes
PAHO	Pan American Health Organization
PEPFAR	President's Emergency Plan for AIDS Relief
RVF	Rift Valley Fever
SDG	Sustainable Development Goals
SPAR	State Parties self-assessment annual reporting tool
TEPHINET	Training Programs in Epidemiology and Public Health Interventions Network
UHC	Universal health coverage
US CDC	U.S. Centers for Disease Control and Prevention
WHO	World Health Organization

OVERVIEW

This document provides an overview of the central role of human resources in global public health and health security. Workforce development represents a substantial, and critical, area for health assistance and capacity building. The document describes how different areas of workforce development support public health and specifically health security functions, and summarizes the key requirements for a robust and resilient public health workforce. Throughout, it provides examples of how workforces for health security are developed and sustained, including best practices as well as common challenges, and finally, lists additional resources for further details on supporting effective workforce development for public health and health security.

What is "Workforce Development" and why is it important?

The World Health Organization (WHO) defines the health workforce as "all people engaged in actions whose primary intent is to enhance health".[1] As such, human resources for health form one of the six core components or "building blocks" of the health system. The health workforce spans both the public and private sectors; voluntary and paid workers; and those working directly in provision of health services and healthcare, as well as personnel engaged in health promotion, health education, and research. The exact boundaries of the health workforce may vary from country to country, and indeed there is little direct research on what constitutes a "good" or "sufficient" health workforce. The WHO, United States Centers for Disease Control and Prevention (US CDC) and other partners have developed targets, but these may not be appropriate short- or even medium-term goals for many low- or middle-income countries (LMICs).[2] Instead, emphasis should be placed on addressing the most urgent needs in a sustainable way, rather than focusing on a pre-determined and potentially unrealistic target. Moreover, increasingly, there is a recognition that beyond healthcare and health service targets and indicators, specific human resource capacities are needed to support health security. In some cases, these human resources align with those delivering other health services, but may require additional volume of personnel in these roles, or supplemental training in specific disciplines. In addition, health security workforce requirements go beyond the traditional health sector, drawing on multidisciplinary expertise and requiring inter-sectoral coordination. This document will primarily focus on the capabilities, requirements, and challenges facing workforce development for health security.

Table 1 provides a brief description of some of the key categories of health security professionals, as defined by WHO's Benchmarks for International Health Regulations (IHR) Capacities (2019).[3] In addition, there is an increasing recognition of the importance of community health workers (CHWs) as part of the health security workforce. Likewise, infrastructure developed to support health security functions, such as public health Emergency Operations Centers (EOCs), will comprise of staff from a variety of professional backgrounds (public relations, logistics, operations, etc.). In these ways, WHO explicitly defines multisectorality as a crucial aspect of an effective health security workforce and also acknowledges its alignment with healthcare and health service delivery.

In this way, the personnel that support health security functions may also have responsibilities within other facets of the healthcare system, highlighting the importance of considering health workforce development holistically. However, some components of the health security workforce may align with human resource requirements in other sectors, such as animal health. Figure 1 provides a visual demonstration of how the components of a health security workforce, as defined by the requirements to achieve compliance with IHR, complement the healthcare workforce, as well as selected components of the animal health workforce. While most health security workforce efforts focus on domestic capacity building, it should be noted that a strong health security workforce may also serve to support regional or even international public health actions, such as emergency response.

The human resource requirements for emergency response capabilities are also closely aligned with health security workforce needs, and vice versa; the health system has also been recognized as a useful basis upon which to implement public health aspects of disaster risk reduction and management.[4] Emergency responders, particularly those trained within an incident management system (IMS), may be able to transfer their expertise to assist with public health emergencies. However, it may be more effective to ensure that public health personnel have an understanding of national-level disaster and emergency response plans, protocols, and systems, which will facilitate coordination and communication in the event of a complex emergency that spans multiple sectors, including health. The establishment and operationalization of a public health EOC, using an IMS or similar management structure, is one way to establish a functional emergency workforce within the health sector that is also capable of working cross-sectorally. Across the health security workforce, personnel can be trained to provide "surge" support, for example during an epidemic response when

[1] WHO, 2010. Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies. Section 2. Health workforce. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/healthinfo/systems/WHO_MBHSS_2010_full_web.pdf

[2] WHO, 2016. Health workforce requirements for universal health coverage and the Sustainable Development Goals. Background paper No. 1 to the Global Strategy on Human Resources for Health. Accessed on August 13th, 2020 at 16:00hrs. URL: https://apps.who.int/iris/bitstream/handle/10665/250330/9789241511407-eng.pdf

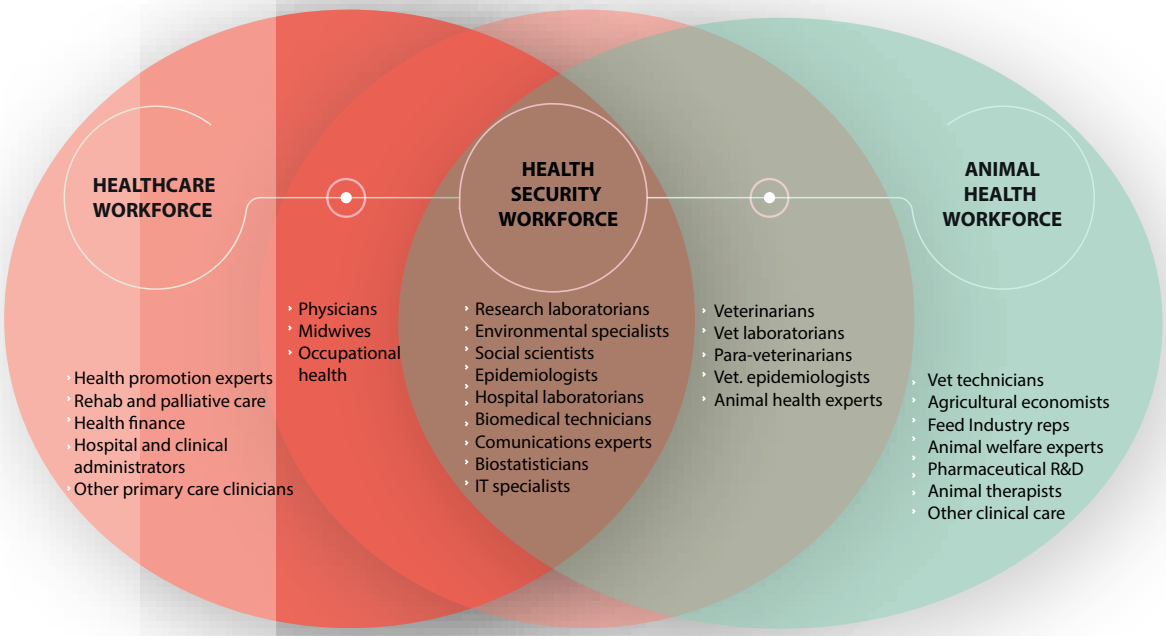
[3] WHO, 2019. WHO Benchmarks for International Health Regulations (IHR) Capacities. Accessed on August 13th, 2020 at 16:00hrs. URL: https://extranet.who.int/sph/docs/file/3406

[4] Olu et al., 2018. What should the African health workforce know about disasters? Proposed competencies for strengthening public health disaster risk management education in Africa. BMC Medical Education 18:60. Accessed on August 13th, 2020 at 16:00hrs. URL: https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-018-1163-9

Table 1: Description of the professions contained in the WHO Benchmark's definition of a health security workforce

PROFESSION	ROLE
Midwife	Assistance with childbirth, and increasingly, pre- and post-natal care and delivery of reproductive health services
Physician	Concerned with promoting, maintaining, or restoring health; many physicians specialize in one or more areas of practice. Specialties most aligned with health security include infectious disease, internal medicine, and emergency medicine.
Epidemiologist	Scientists (sometimes physicians) who study diseases within populations of people; Field epidemiologists, who investigate and respond to potential disease outbreaks, are considered a key health security workforce component to achieve IHR.
Environmental specialist	Scientists who study the impact of populations on the environment, and vice versa
Social scientist	An expert in the study of human society, and its personal relationships; includes disciplines such as anthropology, demography, and economics, and sub-disciplines within
Communications personnel	Experts at developing and disseminating information, within an organization, between organizations, or to the public/other stakeholders
Occupational health personnel	Practitioners dealing with the prevention and treatment of job-related injuries
Laboratory scientists/ technician	Scientists or skilled workers that perform diagnostic tests and other technical tasks in medical or scientific laboratories
Biostatistician	Statisticians that specialize in collecting and examining data related to living things; within the context of health security, this usually means biomedical or epidemiological data.
IT specialist	Experts on the implementation, monitoring and/or maintenance of IT systems
Biomedical technician	Specialists in the calibration, maintenance and repair of the medical machinery used in healthcare facilities or biomedical laboratories
Veterinarian	Physicians trained in the prevention and treatment of diseases, disorders, and injuries in non-human animals
Animal health professional	Broad category covering a variety of professionals that support the prevention and management of diseases and disorders in non-human animals, including promoting animal welfare
Para-veterinarian	Professionals who have not trained as full veterinarians, but have completed sufficient training to assist veterinarians in the performance of their tasks, and to carry out some procedures independently within the context of an animal health system
Veterinary epidemiologist	Epidemiologists who specialize in studying diseases affecting animals, or veterinarians with epidemiological training; can also include specializations such as field epidemiology, as described above

Figure 1. Schematic showing overlap and alignment of healthcare workforce, health security workforce, and animal health workforce professions



Note: all the components designated under health security workforce are those listed in the WHO Benchmarks. The components for the healthcare workforce and animal health workforce are not intended to be comprehensive, but rather examples to illustrate professional areas that may be distinct from specific health security workforce needs.

additional personnel need to be deployed to active transmission zones in the country. Staff who receive training in emergency response procedures moreover constitute a valuable resource between emergencies, since they can fulfill other roles during this time, and thus contribute overall to system resilience. The linkages between health workforce capabilities and emergency response actions was highlighted as a critical lesson learned, on both the national and global levels, after the 2014 West Africa Ebola outbreak.[5] However, greater attention is needed on understanding the role of the health workforce as a whole during emergencies, and on improving linkages between these sectors before, during, and in the aftermath of emergencies.[6]

Workforce development is an area of health systems strengthening with many long-standing challenges, particularly related to planning and sustainability. A summary of key challenges is provided in Table 2. While these challenges reflect the health workforce as a whole, each also directly impacts health security workforce development. Indeed, some of these issues may be even more

Cuba's emergency medical assistance [7,8,9]

Cuba is a small, middle-income island nation in the Caribbean which has some of the highest health indicators in the Americas region. Having prioritized medical education since the 1960s, it has one of the highest densities of physicians in the world. Medical assistance has long been a key export for Cuba, in return for political good-will and, in some cases, cash. In 2016, over 50,000 Cuban doctors were serving in 67 countries. Crucially, its health workforce is also trained to support emergency response, including for epidemics. In 2014, during the West Africa Ebola outbreak, over 250 Cuban doctors, nurses and other health professionals provided direct care to affected populations in Guinea, Liberia, and Sierra Leone. However, more recently, Cuba has come under criticism for its overseas medical assistance, with some reports suggesting the incentives to serve overseas are resulting in shortages at home, and that the doctors serving abroad are sometimes forced to do so in highly dangerous settings.

[5] WHO, 2015. Global health emergency workforce. 68th World Health Assembly, provisional agenda item 16.1. Accessed on August 13th, 2020 at 16:00hrs. URL: http://apps.who.int/gb/ebwha/pdf_files/WHA68/A68_27-en.pdf?ua=1

[6] WHO, 2016. Global strategy on human resources for health: workforce 2030. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/pub_globstrathrh-2030/en/.

[7] Chaple & Mercer, 2017. The Cuban Response to the Ebola Epidemic in West Africa: Lessons in Solidarity. International Journal of Health Services 47(1): 134-149. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ncbi.nlm.nih.gov/pubmed/27956578

[8] BBC, 2019. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.bbc.com/news/uk-48214513

[9] González et al., 2016. International Medical Collaboration: Lessons from Cuba. Children (Basel) 3(4): 20. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.mdpi.com/2227-9067/3/4/20

exacerbated in the non-health sectors in which strong human resources are required for health security. The outcome of these challenges is that there remains an acute shortage of health workers on a global level. Shortages affect countries across the income spectrum, but are particularly acute in LMICs. In 2013, the global needs-based shortage of specifically health care workers was estimated to be over 17 million, with the most acute gaps in South-East Asia and Africa.[10] Of more concern, efforts to address these shortfalls and increase recruitment in the health workforce are falling short; WHO estimates a projected shortfall of 18 million health workers by 2030, predominantly in low- and middle-income countries.[11]

Table 2: Summary of key challenges for workforce development[12]

CHALLENGE	DESCRIPTION
Urban/rural disparities	Health workers disproportionately live in urban areas, leaving rural areas underserved. Personnel and services representing other aspects of health and health security are also predominantly based in cities, such as laboratory services. These distribution imbalances also reflect, and can exacerbate, skill imbalances.[13]
Migration	LMICs disproportionately lose skilled health workers to higher-paying jobs in richer countries. This represents a loss of investment if their country of origin financed their education.
Skill matching	Training programs in LMICs, often developed by or adapted from high-income countries, may produce well-qualified graduates but still lacking the skills to meet the needs or priorities of the country.[14]
Retention	Low retention rates are influenced by opportunities to migrate, among other factors. Lack of perceived opportunities for career advancement, or continuing education, along with comparably poor salaries in the (public) health sector versus other sectors, can contribute to low retention rates.
Siloed approaches	Efforts to address health workforce deficits are often focused on vertical disease programs, or on only one aspect of workforce development (such as training). While these efforts may appear to be low-hanging fruit, and thus opportunities to rapidly increase capacity, such stand-alone interventions are unlikely to be highly effective, nor sustainable.
Leadership and planning	Related to the challenges of attempting siloed solutions, efforts to address workforce development often takes place in the absence of substantial and inter-sectoral planning efforts guided by appropriate and strong leadership. These deficits perpetuate workforce shortcomings by failing to think strategically, involve all necessary stakeholders, and plan sufficiently far ahead to ensure long-term needs are met.
Financing	Funding for workforce development is often provided by international donors, and used for specific, stand-alone projects. In the long-term, funding for workforce development and sustainment must come from national budgets, and thus built into the strategic planning process. The inefficient use of existing finances also contributes to the problem and can be addressed through more careful consideration of how funds are used.

[10] WHO, 2016. Health workforce requirements for universal health coverage and the Sustainable Development Goals. Background paper No. 1 to the Global Strategy on Human Resources for Health. Accessed on August 13th, 2020 at 16:00hrs. URL: https://apps.who.int/iris/bitstream/handle/10665/250330/9789241511407-eng.pdf

[11] WHO, n.d. Health workforce. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/health-topics/health-workforce#tab=tab_1

[12] Global Health Workforce Alliance, 2013. Global Health Workforce Crisis, Key Messages – 2013. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/workforcealliance/media/KeyMessages_3GF.pdf

[13] Chen, 2010. Striking the right balance: health workforce retention in remote and rural areas. Bulletin of the World Health Organization 88(1): 1. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/bulletin/volumes/88/5/10-078477.pdf?ua=1

[14] Africa Working Group of the Joint Learning Initiative on Human Resources for Health and Development, 2006. The Health Workforce in Africa: Challenges and Prospects. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/workforcealliance/documents/HRH_Africa_JLIreport.pdf?ua=1

Livestock sector retirement crisis: Guinea[15]

Guinea possesses a well-trained and effective cadre of veterinarians working in the livestock sector, which has contributed to the ease with which the government has embraced the One Health concept within the context of strengthening health security. However, the livestock sector is facing a retirement crisis; in 2012, the OIE Performance of Veterinary Services (PVS) Gap Analysis process revealed that 80% of the Ministry of Livestock's veterinarians would be facing mandatory retirement in the next five years. Guinea has a high-quality veterinary training institute, the Institut Supérieur de Sciences et Médécines Vétérinaires, which was engaged via the PVS process to ensure that graduates are well-prepared, and motivated, to enter the public sector. Unfortunately, success has been limited, as the emerging veterinary private sector in Guinea, as well as opportunities in much higher paying non-governmental organizations as well as overseas, are still preventing sufficient recruitment into the Ministry of Livestock.

Lesson learned: Cameroon versus Ghana[16]

In the 1980s, Cameroon and Ghana underwent government reform processes under their respective Structural Adjustment Programs. In both cases, one objective was to streamline what was perceived to be bloated public sectors, by suspending recruitment, enforcing retirement ages, and otherwise reducing the number of civil service positions. In Cameroon, salaries for public sector health workers were reduced and incentives eliminated; between 1993-1999, the health sector budget more than halved as a proportion of the national budget. The public sector health workforce became highly de-motivated, and service quality suffered. In Ghana, conversely, despite some of the same approaches to government reform, incentives were retained and service quality emphasized. As such, although migration of skilled professionals remained a challenge, Ghana managed to maintain a well-motivated health workforce.

SUMMARY

- Human resources are a critical building block for health systems.
- The health security workforce is defined as explicitly multisectoral and aligned with, although distinct from, clinical or healthcare workforces.
- Health workforce shortages are a major global challenge, and forecasted to worsen unless immediate investments are made.
- The health security workforce may be doubly affected by workforce shortages, given corresponding workforce shortages in the animal health sector, and other relevant non-health sectors.

Global initiatives related to workforce development

The WHO Global strategy on human resources for health: Workforce 2030 (2016)[17] outlines key considerations for countries and also objectives and global milestones for 2020 and 2030 with respect to human resources for health, with an emphasis on health workforce requirements for achieving universal access to health care, and linked to the Sustainable Development Goals (SDGs). Although health security is only cited in the final Strategy in relation to the impact of the health workforce on emergency preparedness and response, a draft report by the Secretariat noted that developing a strong global health security workforce, as a "robust front-line defense" against health threats, is one of the "triple returns" of investing in the health workforce, along with social and economic benefits and improved health outcomes.[18] The SDGs describe health workforce requirements directly only in indicator 3.C.1 (Health worker density and distribution) and indirectly in 3.1.2 (Proportion of births attended by skilled health personnel), and also underpin effective implementation of numerous other targets.[19] Although a full assessment of workforce development for achieving Universal Health Coverage (UHC) and the SDGs is beyond the scope of this document, it is important to emphasize once again that a health security workforce is intrinsically linked to individual health security, which is in turn a product of universal access to health care and quality health services.[20]

[15] OIE, 2012. Analyse des Ecarts PVS : Rapport. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/PVS_GapAnalysisReport-Guinea.pdf

[16] Liese et al., 2003. Background Paper. The Human Resource Crisis in Health Services in Sub-Saharan Africa. Accessed on August 13th, 2020 at 16:00hrs. URL: http://documents.worldbank.org/curated/en/146661468767966818/310436360_20050276022409/additional/269620The0Human0Resource0Crisis.pdf

[17] WHO, 2016. Global strategy on human resources for health: workforce 2030. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/pub_globstrath-rh-2030/en/

[18] WHO, 2016. Health workforce and services. Draft global health strategy on human resources for health: workforce 2030. Report by the Secretariat. 69th World Health Assembly. Accessed on August 13th, 2020 at 16:00hrs. URL: http://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_38-en.pdf

[19] WHO, 2016. Health workforce requirements for universal health coverage and the Sustainable Development Goals. Human Resources for Health Observer – Issue No. 17. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/health-observer17/en/

[20] The Lancet, 2016. No health workforce, no global health security. The Lancet 387(10033): 2063. Accessed on August 13th, 2020 at 16:00hrs. URL: https://doi.org/10.1016/S0140-6736(16)30598-0

The International Health Regulations 2005 (IHR) consider human resources a core capacity requirement for countries being able to detect, assess, report and respond to potential public health emergencies of international concern. The State Party self-assessment annual reporting tool (SPAR), a mandatory reporting component of the IHR Monitoring and Evaluation Framework (IHR MEF), includes an indicator related to the mapping and availability of a multisectoral workforce for prevention, detection, preparedness and response to potential public health events of international concern, although the specific elements of the multisectoral workforce are not defined.[21] The Joint External Evaluation (JEE) tool, a voluntary component of the IHR MEF, includes requirements for a multisectoral workforce strategy; sufficient human resources necessary to implement IHR; existence of in-service training; and trained field epidemiologists.[22]

Table 3: Summary of JEE Indicators under the "Human resources (animal and human)" technical area (D.4.)

JEE INDICATOR	LEVEL 2: LIMITED CAPACITY	LEVEL 3: DEVELOPED CAPACITY	LEVEL 4: DEMONSTRATED CAPACITY	LEVEL 5: SUSTAINABLE CAPACITY
D.4.1. An up-to-date multisectoral workforce strategy is in place	A **strategy to develop health care workforce** exists but **does not include all relevant sectors of public health professions**[23]	A **multisectoral public health workforce strategy exists**, but is not regularly reviewed, updated or implemented consistently	A **public health workforce strategy has been adopted and implemented** consistently, and is reviewed, tracked and reported on annually	**Public health workforce retention is tracked** and plans are in place to provide continuous education, as well as retain and promote a qualified workforce
D.4.2. Human resources are available to effectively implement IHR	**Appropriate human resources are available at national level** for epidemic preparedness and control	**Appropriate human resources are available in relevant sectors** and at **national and intermediate** levels	**Human resources are available as required in relevant sectors and at relevant levels of the public health system**	Country has capacity to **send and receive multidisciplinary personnel within the country** (shifting resources) and **internationally** to assist other countries
D.4.3. In-service trainings are available	**Ad hoc trainings** are available **for various professions/ cadres** through disease specific programmes or targeted initiatives	**Regular trainings**, including One Health approach for zoonotic diseases, **are available for various professions/cadres** through disease-specific programmes or targeted initiatives	**Training plans are developed** and **regular trainings** are conducted by professional bodies or relevant institutions/units to establish **skills and competency standards** for the workforce at the national level	**In-service trainings are regularly conducted at national and subnational levels**, and professional bodies or relevant institutions/units regularly review and update training offers
D.4.4. FETP[24] or other applied epidemiology training program is in place	**No FETP or applied epidemiology training programme is established** within the country at the national level, but staff **participate in a programme hosted in another country** through an existing agreement (at any level)	**One level of FETP** (basic, intermediate, or advanced) or comparable applied epidemiology training programme is **in place in the country or in another country** through an existing agreement	**Two levels of FETP** (basic, intermediate and/or advanced) or comparable applied epidemiology training programme(s) are in **place in the country or in another country** through an existing agreement	**Three levels of FETP** (basic, intermediate and advanced) or comparable applied epidemiology training programme(s) are **in place in the country or in another country** through an existing agreement, with **sustainable national funding**

[21] WHO, 2018. State Party self-assessment annual reporting tool. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/ihr/publications/WHO-WHE-CPI-2018.16/en/

[22] WHO, 2018. Joint External Evaluation tool (JEE tool) – second edition. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/ihr/publications/WHO_HSE_GCR_2018_2/en/

[23] i.e. epidemiologists, social scientists, IT specialists, veterinarians/livestock specialists and community health workers

[24] FETP = Field Epidemiology Training Program.

Table 3 presents the JEE's human resources indicators in more detail; level 4 in the JEE framework corresponds to meeting IHR compliance requirements.

Overall, the majority of technical areas in the JEE reference training and personnel, thus underscoring the foundational importance of the workforce to implementation of IHR. An additional table describing how workforce development intersects with other JEE technical areas is provided in Appendix 1.

WHO's Benchmarks provide guidance on how to move towards higher capacity levels; a summary is provided in Appendix 2.

On a regional level, each WHO region has developed one or more health workforce strategies or frameworks in the past decade, though with varying areas of emphasis and with locally relevant indicators.[25, 26, 27, 28, 29] Rather than having a stand-alone strategy, the Pan American Health Organization (PAHO) addresses human resources for health as part of its overall strategic plan, though still based on approaches outlined by the 2005 Toronto Call to Action.[30, 31] While generally more focused on healthcare needs, health service delivery, and achieving UHC, these regional strategies nevertheless also impact efforts to strengthen the health security workforce, to the extent that they outline health workforce competencies, personnel targets, or other measures in ways that may cross-cut with health security. It should also be noted that other regional strategies, for example on specific topic areas that may intersect with health security, may also have workforce components. For example, the Africa Regional Strategy for Disaster Risk Reduction calls for improved training around risk reduction principles; the WHO Regional Office for Africa (WHO/AFRO) has assisted in supporting implementation of these capacity building principles in the health sector, in support of the multisectoral strategy.[32]

PLANNING AND DEVELOPING A WORKFORCE STRATEGY

This section describes some of the key considerations for designing a health workforce strategy, particularly within the context of strengthening the health security workforce and with an emphasis on the opportunities for external partners and donors to support the process of planning and development. WHO provides a number of tools and guides for human resources for health, via their

SUMMARY

- WHO's JEE and Benchmarks documents provide the most detailed and comprehensive guidelines for meeting health security workforce requirements, as defined by the IHR.
- Regional health workforce strategies are generally more focused on UHC and healthcare workforce needs, but may also influence regionally-appropriate approaches to building health security workforce capacities, as can regional strategies in other health security-related sectors.

[25] WHO AFRO, 2013. Road map for scaling up the human resources for health: For improved service delivery in the African Region 2012-2025. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.afro.who.int/sites/default/files/2017-06/road-map-hr.pdf

[26] WHO SEARO, 2007. Regional strategic plan for health workforce development in the South-East Asia Region. Accessed on August 13th, 2020 at 16:00hrs. URL: https://apps.who.int/iris/handle/10665/205831

[27] WHO EMRO, 2017. Framework for Action on Health Workforce Development in the Eastern Mediterranean Region 2017-2030. Accessed on August 13th, 2020 at 16:00hrs. URL: http://www.emro.who.int/health-workforce/highlights/framework-for-action-on-health-workforce-development.html

[28] WHO WPRO, 2012. Human resources for health: Action framework for the Western Pacific Region (2011-2015). Accessed on August 13th, 2020 at 16:00hrs. URL: http://www.wpro.who.int/hrh/documents/HRH_Action_Framework.pdf

[29] WHO EURO, 2017. EUR/RC67/R5 Towards a sustainable health workforce in the WHO European Region: framework for action. Accessed on August 13th, 2020 at 16:00hrs. URL: http://www.euro.who.int/__data/assets/pdf_file/0006/349143/67rs05e_HRH_170891.pdf

[30] PAHO, 2014. Strategic Plan of the Pan American Health Organization 2014-2019. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.paho.org/hq/dmdocuments/2017/paho-strategic-plan-eng-2014-2019.pdf

[31] PAHO, 2005. Toronto Call to Action. 2006-2015. Towards a decade of Human Resources in Health for the Americas. Accessed on August 13th, 2020 at 16:00hrs. URL: http://docplayer.net/15663241-Toronto-call-to-action-2006-2015-towards-a-decade-of-human-resources-inhealth-for-the-americas.html

[32] Olu et al., 2018. What should the African health workforce know about disasters? Proposed competencies for strengthening public health disaster risk management education in Africa. BMC Medical Education 18:60. Accessed on August 13th, 2020 at 16:00hrs. URL: https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-018-1163-9

website,[33] particularly for more operational aspects of workforce development planning and human resources management.

Strategic and financial planning

A cornerstone of an effective and sustainable approach to building workforce capacity is ensuring that an evidence-based strategy is in place. This holds true for health workforce development, as well as any additional capabilities required to address all health security needs. Despite the emphasis on workforce development championed by WHO over the past decade, countries have been slow to develop effective, comprehensive, and budgeted strategic plans for their human resources for health. In Africa, for example, despite an agreement by Ministers of Health to establish national health workforce strategic plans by the end of 2014, only 72% had a strategy or plan of action in place in 2015, and these varied in scope and quality.[34] Factors reported to have contributed to the lack of success of health workforce strategic planning in the previous decade included lack of investment in the planning process; unavailability of or unfamiliarity with planning tools; insufficient engagement of stakeholders; lack of advocacy for securing resources for implementation; and lack of appropriate data on which to base strategic decisions.[35]

The basic workforce planning model, which applies across all sectors, focuses on analyses of two key factors: supply and demand. Analysis of one or both of these factors can then allow for derivation of gaps, and correspondingly, possible solutions. Methodologies for projecting health workforce needs have been developed that focus on each of these, as well as those that take an integrated approach across both factors. Overall, multiple models exist with little consensus among health workforce policy makers and governance experts as to which should be used in what contexts.[36] It is also likely that many of the models, developed for richer countries, will be less applicable to LMIC settings, particularly in cases where fewer or less accurate data are available that are required for parameterization of the models, and so should be utilized with caution.

Establishing a robust and useful strategic plan for health workforce development requires strong governmental leadership across implicated sectors. In addition to the Ministry of Health, ministries with responsibilities for finance, education, workers' rights, and others must be engaged. With respect specifically to the health security workforce, the animal and environmental health sectors must also be included, along with defense, law enforcement, border control, and national disaster management authorities. With this diversity of stakeholders, reaching consensus can be onerous but is nevertheless important for achieving buy-in from all necessary actors. Demonstrating the value-added of a clear, robust, and well thought out workforce strategy to each involved sector is an important step. Advocacy, both within the government and as provided by external implementers and donors, has been highlighted as a key requirement for ensuring meaningful engagement with all stakeholders and for providing evidence of the value of investing in workforce development. When national workforce strategies call for new training programs or other mechanisms to address identified priorities, these programs should be institutionalized within ministries to demonstrate national ownership and facilitate long-term sustainability.[37]

A strategic plan is only as useful as its ability to be successfully implemented, which requires resources.Health workforce is a substantial component to overall health budgets; the WHO estimates that worldwide, almost half of the health budget is allocated to human resources.[39]

Planning Indonesia's field epidemiology training program (FETP)[38]

Indonesia established a training program for field epidemiologists in 1982. However, reductions in funding led to decreased involvement by the Ministry of Health. The program became siloed in the university sector. In 2007, as part of an overall strategy to address public health workforce needs, a multisectoral team evaluated the program and used the outcomes to develop a five-year workplan. Funding was lobbied from donors to support both quality improvement to the program as well as the establishment of a Secretariat to guide implementation of the workplan and advocate for future funding. Additional policy elements that were incorporated into the relaunched FETP were a national decree establishing the program as a formal part of the national workforce strategy; socialization of the importance of epidemiologists and definition of minimal professional standards; and a Memorandum of Understanding between the Ministry of Health and universities, to solidify the cross-sectoral partnership. This example highlights the critical importance of building strong linkages between the health sector, universities, and international agencies, within the framework of national policies, to ensure a robust and sustainable long-term program.

[33] WHO, nd. Human resources for health (HRH) tools and guidelines. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/tools/planning/en/

[34] Afriyie et al., 2019. The state of strategic plans for the health workforce in Africa. BMC Global Health 4:e001115. Accessed on August 13th, 2020 at 16:00hrs. URL: http://dx.doi.org/10.1136/bmjgh-2018-001115

[35] Nyoni et al., 2006. Policies and plans for human resources for health: Guidelines for countries in the WHO African Region. WHO Regional Office for Africa. Brazzaville, 57pp. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/workforcealliance/knowledge/toolkit/15.pdf

[36] Lopes et al., 2015. Handling health workforce planning with care: where do we stand? Human Resources for Health 13:38. doi: 10.1186/s12960-015-0028-0. Accessed on August 13th, 2020 at 16:00hrs.

[37] Jones et al., 2017. Building Global Epidemiology and Response Capacity with Field Epidemiology Training Programs. Emerging Infectious Diseases 23(Suppl1): S158-S165. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5711325/

[38] Kandun et al., 2010. Strengthening Indonesia's Field Epidemiology Training Programme to address International Health Regulations requirements. Bulletin of the World Health Organization 88(3): 211-215. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2828784/

[39] WHO, 2018. A Labour Market Approach to Investing in the Health and Social Workforce to achieve the SDGs. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/labour-market/HLMAleaflet2018.pdf?ua=1

Given the centrality of the health workforce to all aspects of the health system, this is not surprising. Financial planning, and specifically budgeting, should be intrinsically linked to the strategic planning process. As the example from Indonesia shows, explicitly creating structures within the training programs with the responsibility to advocate for and secure future funding can be an important element for success and sustainability. Countries that have undergone the JEE should be able to include financial planning for workforce development as part of the process for developing a costed National Action Plan for Health Security (NAPHS); aligning with this larger government process may be one way to ensure the multisectoral engagement necessary for effective health security workforce planning, and could also reduce opportunity costs.

It is worth highlighting that among the health systems building blocks, human resources often corresponds to the largest proportion of recurring costs, which makes it a challenging area for donor investment and support. Salaries are the major component to the annual recurring costs for the health workforce. Donors may gravitate towards individual training opportunities, which can be attributed as start-up costs, even though in most cases training must be recurrent and regular to be effective. Financial planning for workforce development therefore has to take into account the long-term costs of sustaining personnel, as well as shorter-term development costs. Particularly with respect to the health security workforce, financial planning must also account for emergency funding sources to support deployment of surge personnel in the event of a crisis. Alignment of workforce planning for health security with that for disaster and emergency services can therefore potentially provide dual benefits to both sectors, through greater efficiency of human resource allocation in the event of a crisis.

Defining workforce requirements

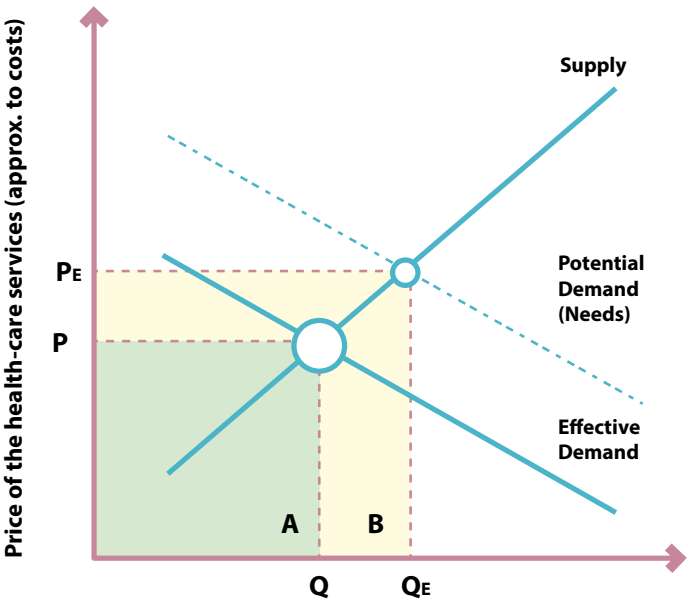
Defining workforce requirements focuses primarily on the "demand" side of workforce strategic planning. While WHO has defined certain targets with respect to density of clinical health workers as well as of trained field epidemiologists, specifically to support health security requirements,[40, 41] these targets may not be realistic for all countries to attain in the short term. Perhaps of greater long-term concern, some research has suggested the targets may be too conservative, and even higher densities of health workers actually needed in LMICs to address workforce needs.[42] Given these factors, capacity strengthening efforts centered around workforce development should instead look more pragmatically at where the needs are greatest, and what approaches will be most effective in sustainable meeting those priorities. In this way, countries can also define their own targets, tailored to their specific context.

When considering workforce requirements as part of a strategic planning process, it is critical to assess current gaps as well as anticipate future needs. Such forecasting can be challenging, but is necessary to take into account the time required for training new cohorts of health workers, and will impact costs (Figure 2).

Assessing existing capabilities

Assessment of existing capabilities predominantly considers the "supply" side of workforce planning. Specifically, it assesses the quantity, quality, and motivations of the current workforce, and the extent to which this matches with the needs previously identified. Motivating factors for the health workforce can include considerations of the number of hours they are willing to work, geographic preferences, and salary expectations, among others. The scope and extent of who is considered among the

Figure 2: Law of supply and demand with respect to the health workforce, taking into consideration likely future needs



Source: Lopes et al., 2015

[40] The targets developed by WHO for implementation of UHC, the SDGs, and IHR are a 4.45 doctors, nurses and midwives per 1,000 population for operational routine services, plus 30% surge capacity. The optimal target for surveillance is one trained (field) epidemiologist (or equivalent) per 200,000 population who can systematically cooperate to meet relevant IHR and PVS core competencies. One trained epidemiologist is needed per rapid response team.

[41] WHO, 2019. WHO Benchmarks for International Health Regulations (IHR) Capacities. Accessed on August 13th, 2020 at 16:00hrs. URL: https://extranet.who.int/sph/docs/file/3406

[42] Stenberg et al., 2019. Guide posts for investment in primary health care and projected resource needs in 67 low-income and middle-income countries. The Lancet Global Health 7(11): PE1500-1510. Accessed on August 13th, 2020 at 16:00hrs. URL: https://doi.org/10.1016/S2214-109X(19)30416-4

health workforce will not only inform the assessment of existing capabilities, but potentially identify opportunities for task shifting or areas where minimal investment or retraining might have a substantial impact on addressing gaps. Community health workers and traditional healers, for example, have successfully been trained to assist in aspects of surveillance, thus greatly enlarging the health security workforce and bolstering the reach of the health system, without the need for time-consuming and expensive recruitment and training of new public sector health officials.

Approaches to assessing the current workforce should include an analysis of Ministry of Health employment records, complemented by observational analyses of personnel in their place of work, to detect rates of absenteeism and other misalignments of official records with reality. Training records are a valuable resource for assessing how up to date staff are in necessary trainings, or if they have received sufficient training in the first place. The JEE tool specifically requires that records are available of training provided at the national level, or that they are made available from a partner. These records therefore assist in future assessment of workforce capabilities, since the training record is kept as part of the strategy, while also advancing compliance with IHR through meeting the specific JEE indicator.

Plague in Uganda[43, 44]

Plague is endemic in northwestern Uganda, and results in a high fatality rate if patients are not treated promptly with antibiotics. It is also highly infectious, particularly in its pneumonic presentation, and as such is a disease of health security concern, prompting increased investment in efforts to rapidly identify, diagnose, and respond to potential new cases. In this rural region, most villages lack formally trained nurses or doctors, and health facilities can be many kilometers away. The Uganda Virus Research Institute, in collaboration with the US CDC, launched an initiative in 2009 to train traditional healers and medicine men in rural villages to identify the early signs and symptoms of plague. These patients were then referred to health clinics where they could receive formal diagnosis and, if needed, treatment. By 2013, the network consisted of over 40 traditional healers, who collectively had referred over 150 patients to health clinics. One such referral was credited with preventing the transmission of pneumonic plague in a village, demonstrating the impact of empowering traditional health workers to participate in surveillance activities.

Education, qualifications and competencies

An important aspect of matching supply and demand as part of the workforce strategy development process is determining what level of training is required by the different categories of workers within the health workforce. Each country's workforce composition should be tailored to its needs, requiring a balance of health workers spanning the required capabilities to meet national, and international, targets. For health security, these capabilities will require consideration of educational and training pathways, and qualifications, outside of the health sector, and encompassing computer science, animal health, environment, law enforcement, social scientists, laboratory science, and others. How each category of worker's scope of practice is defined with respect to their qualifications will have regulatory implications for licensing and other formal aspects of professional recognition. Regulating tasks and competencies, rather than specific professional titles, can help ensure appropriate skillsets exist in the right areas of the workforce without being overly beholden to specific training pathways or qualifications. This may be particularly relevant for countries that do not have sufficient training opportunities in their own country to develop specific categories of worker (i.e. medical doctor), and thus where it may be helpful to allow certain responsibilities to be handled by another category, such as an epidemiologist or nurse, depending on the function. Regional partnerships, whereby another country's qualifications are recognized, or other initiatives to share health educational resources across borders, is another option.

One challenge facing countries when defining scopes of practice as well as regulations of tasks and competencies is the general lack of consensus globally on the overall balance of competencies required for the public health workforce. This is particularly acute with respect to health security. Regional and global training programs,

Expanding workforce flexibility[45]

Regulatory restrictions, for example by professional boundaries, can exacerbate the mismatch between health system needs and the available workforce, by failing to utilize existing trained health workers to their full potential. A number of principles have been proposed to enhance workforce flexibility and address this issue, largely related to the scope of practice of health workers. Specific examples include regulation of tasks and competencies, rather than professional titles; enabling and encouraging practitioners to work to their full scope of practice; and allowing delegation of tasks (task shifting) where appropriate.

[43] Forrester et al., 2017. Patterns of Human Plague in Uganda, 2008-2016. Emerging Infectious Diseases 23(9): PMC5572884. Accessed on August 13th, 2020 at 16:00hrs. doi: 10.3201/eid2309.170789

[44] NPR, 2013. Spiritual Healers Keep Watch for Plague in Uganda. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.npr.org/sections/health-shots/2013/11/18/245958192/spiritual-healers-keep-watch-for-plague-in-uganda

[45] Nancarrow, 2015. Six principles to enhance workforce flexibility. Human Resources for Health 13(9). Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/1478-4491-13-9

Evolution of nursing scope of practice to address HIV/AIDS[46]

The HIV/AIDS epidemic is often credited as the world's first formally recognized health security threat. The rapid increase in the number of infected patients meant that addressing the scope and complexity of testing, counseling, and caring for HIV/AIDS patients became a complex medical task. In many countries, nurses provided the majority of care to HIV/AIDS patients, and often found themselves performing tasks that were outside their formal scope of practice, such as community outreach, psychological support, and even debt management. In response, efforts were made both to expand the scope of nursing practice in some cases, as well as incorporate these new tasks and competencies into new specialty practice areas, such as "HIV Specialist Nurses", to acknowledge how the nursing landscape was evolving with respect to the emerging health security threat of HIV/AIDS.

such as the FETP, are one model of a generalized framework with common elements that has been successfully translated between countries and yet retains certain common measures and targets with respect to learning outcomes. See the sub-section below on FETPs for further details. Other specific disciplines within health security may also have their own regional or global programs for certification; while these programs are helpful in terms of standardizing competencies and creating a community of practice for health security professionals,[47] an overemphasis on certification, rather than competency-based assessments of scope of practice and responsibilities, may detract from addressing urgent workforce needs with existing well-trained personnel.

Recruitment and retention

A critical aspect of health workforce development, which should be emphasized in the strategic planning process and encapsulated in the strategy itself, relates to how to bring new health workers on board to meet the identified needs (recruitment) and ensure that trained health workers remain within the sector (retention).

Referring back to Table 1, recruitment strategies that look specifically at encouraging applications from rural communities and other underserved areas can not only address mismatch but also encourage retention, through assigning these individuals, once trained, back to their home communities. Decentralization of recruitment can also help reward individuals who have provided auxiliary service, through extension or community health programs, for example, by giving them preferential access to new civil service jobs; in contrast, if these new civil service positions are given to new recruits without the same level of local applied experience, selected at the central level, it can be demotivating and result in decreased retention of CHWs, extension workers, and other health volunteers, many of whom may provide the majority of health service – and even health security functions such as early warning – in rural areas.[48]

Factors that positively impact retention include recognition of work, opportunities for continued education and/or career development, and good leadership. Some evidence suggests that continual, on-the-job training may be more effective at reducing attrition than off-site remote one-off training opportunities, and important consideration for prospective donors in workforce development.[49] Table 4 provides a summary of policy options available to support recruitment and retention, as well as address other potential imbalances in the workforce. It should be emphasized that planning for retention is explicitly cited in the definition of level 5 capacity for Human Resources indicator D.4.1 in the JEE. Factors influencing retention will vary extensively by country, requiring a contextual approach to identifying and addressing retention.

Brain drain is a major source of health workforce inequalities and, when the public sector has supported the education or training of emigrants, a substantial loss of investment. While in some cases benefits of migration of skilled health workers have been noted, for example through provision of remittances, these advantages are primarily economic in nature rather than of direct positive impact to the health workforce in the country of origin.[50] The majority of health workers trained in LMICs migrate to just four countries: the United States, United Kingdom, Australia and Canada. Retention

[46] Tunnicliff et al., 2013. The contribution of the HIV specialist nurse to HIV care: a scoping review. Journal of Clinical Nursing 22 (23-24): 3349-3360. Accessed on August 13th, 2020 at 16:00hrs. URL: http://dx.doi.org/10.1111/jocn.12369

[47] One example is International Federation of Biosafety Association's certifications for biosafety professionals Accessed on August 13th, 2020 at 16:00hrs. URL: https://internationalbiosafety.org/certification/prepare-and-apply-for-an-exam/

[48] van de Pas et al., 2019. Health workforce development and retention in Guinea: a policy analysis post-Ebola. Human Resources for Health 17:63. Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-019-0400-6

[49] Ledikwe et al., 2013. Establishing a health information workforce: Innovation for low- and middle-income countries. Human Resources for Health 11: 35. Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/1478-4491-11-35

[50] Cheng, 2009. The Philippine's health worker exodus. The Lancet 373(9658): 111-112. Doi: https://doi.org/10.1016/S0140-6736(09)60022-2. Accessed on August 13th, 2020 at 16:00hrs.

Table 4: Summary of policy options to support addressing health workforce needs[51, 52, 53]

FIELD/SECTOR	POLICY OPTION
Education	• Increase numbers of new students (may require hiring new educators) • Recruit foreign graduates • Recognize existing qualifications and learning • Improve curriculum content • Accredit existing training programs • Establish opportunities for continuing education • Provide management training to facilitate internal quality improvement
Regulatory	• Recognize overseas qualifications • Introduce temporary employment regulations (particularly for addressing short-term needs) • Subsidize education in return for service • Expand scope of practice for existing workers and regulate tasks/competencies, not professional titles • Broaden definitions of health workers (i.e. include CHW and other local volunteers) • Increase transparency of recruitment and retention policies • Decentralize recruitment and provide pathways for CHWs and extension workers to gain civil service positions • Explicitly consider gender in recruitment and retention policies
Financial	• Increase trainee stipends • Raise salaries for health workers • Provide other non-salary benefits • Introduce incentives for the return of skilled migrants • Establish fair and transparent retirement policies
Professional and personal support	• Ensure safe and supportive working environment • Provide family leave and other benefits to workers with dependents • Career development programs • Public recognition measures (i.e. awards)

(and recruitment) strategies should explicitly take into account the motivating factors behind migration in the country, and develop appropriate incentives or other measures accordingly.

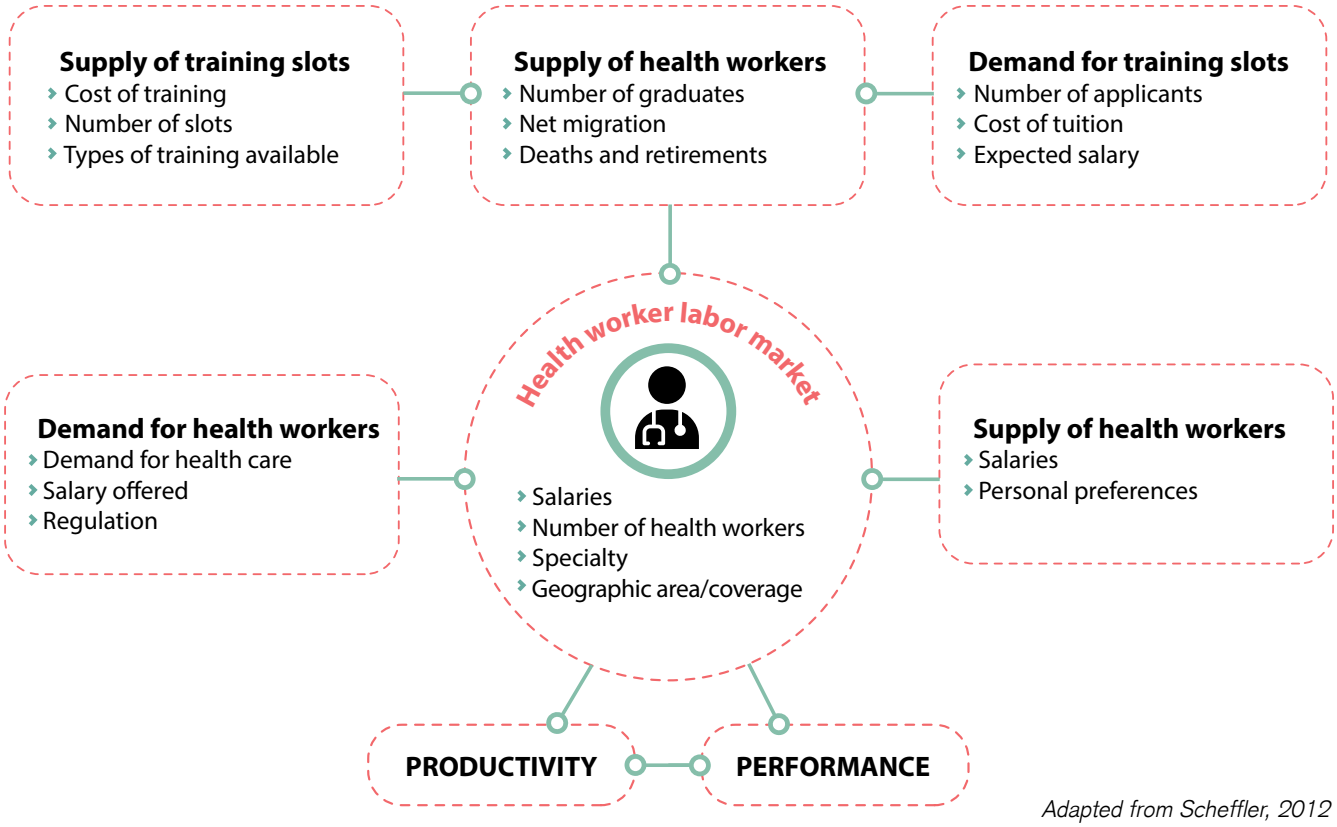
Labor market analysis is one tool that can assist with current and future workforce planning. The basic structure of a labor market factors in supply and demand as a means to assess the pool of available workers, while taking into account their expectations and personnel preferences, with respect to evaluation of performance and productivity (Figure 3). Additional layers of complexity can be added, for example across different categories of health workers and incorporating the private as well as the public sector.[54] An important benefit of using a labor market analysis for health workforce planning is that it can also reveal potential impacts on other aspects of the economy, through its holistic analysis of supply and demand and other labor market trends.

[51] Lopes et al., 2015. Handling health workforce planning with care: where do we stand? Human Resources for Health 13:38. doi: 10.1186/s12960-015-0028-0. Accessed on August 13th, 2020 at 16:00hrs.

[52] van de Pas et al., 2019. Health workforce development and retention in Guinea: a policy analysis post-Ebola. Human Resources for Health 17:63. Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-019-0400-6.

[53] Ayanore et al., 2019. Towards Resilient Health Systems in Sub-Saharan Africa: A Systematic Review of the English Language Literature on Health Workforce, Surveillance, and Health Governance Issues for Health Systems Strengthening. Annals of Global Health 85(1): 113. doi: 10.5334/aogh.2514 . Accessed on August 13th, 2020 at 16:00hrs.

Figure 3 - Schematic of the structure of the health worker labor market



Adapted from Scheffler, 2012

Within the structure of the health labor market, and health workforce overall, it is important to remember that every country will have a unique balance between categories of health workers, as well as with respect to the roles of the public and private sector (which in turn will be influenced by the extent to which government authorities provide oversight of the private sector). As noted above, in many countries, the health workforce may also contain non-formally trained health workers, such as traditional healers, who may also need to be included in a labor market analysis.

Gender

Gender is an overlooked although increasingly recognized critical consideration when addressing health workforce development. On a global level, women make up 70% of the health workforce but a minority of full-time positions, and receive on average 28% less pay.[55] Roles and responsibilities throughout the health workforce may be unintentionally gender-biased, as may also be existing approaches for recruitment and retention of personnel. Research shows numerous benefits to improving gender equity across the labor workforce as a whole, and given the existing disparities in the health sector, there may be correspondingly large benefits to addressing gender disparities in the health workforce.[56] However, there remains a dearth of data on gender-responsive policies for health workforce development.[57] These factors make it crucial that gender is explicitly taken into account when developing the overall workforce strategy, including an appropriate monitoring and evaluation framework in order to improve the evidence-base for approaches to advance gender equity in the health workforce.

[54] Scheffler, 2012. The Labour market for human resources for health in low- and middle-income countries. Human Resources for Health Observer, Issue 11. World Health Organization, Geneva. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/Observer11_WEB.pdf

[55] WHO, 2019. Gender equity in the health workforce: Analysis of 104 countries. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/gender_equity-health_workforce_analysis/en/.

[56] WHO, 2019. Delivered by Women, Led by Men: A Gender and Equity Analysis of the Global Health and Social Workforce. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/health-observer24/en/

[57] Gupta, 2019. Research to support evidence-informed decisions on optimizing gender equity in health workforce policy and planning. Human Resources for Health 17:46. Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-019-0380-6

SUMMARY

- Implementation of successful and sustainable health security workforce development requires extensive multisectoral coordination and strategic planning.
- Strategic planning should explicitly consider the resources required for implementation.
- Financial planning for workforce development must take into account recurring costs, such as salaries and continuing education, as well as one-off training costs.
- The fundamental components of workforce strategic planning are assessing the "supply" (the available workforce and potential for training new human resources) and the "demand" (what workforce requirements are needed to achieve target health outcomes).
- Task shifting and evolving scopes of practice present opportunities for matching supply and demand with minimum additional investment.
- Labor market analysis is a tool that can assist with assessing both supply and demand, while accounting for other critical factors such as educational pathways, recruitment, and retention.
- Gender is a critical consideration in workforce development, and must be included within strategic planning efforts.

WORKFORCE DEVELOPMENT IN ACTION

This section takes the principles outlined in the previous sections, and provides concrete examples for how workforce development is achieved. It will cover some of the primary training programs that exist to support workforce development in key areas, such as field epidemiolgy.

Training tools and techniques

Training is a fundamental aspect of workforce development. Within universities, ensuring that curricula are up to date and meet workforce needs in terms of the developed competencies and learning outcomes is critical for domestic development of skilled workers. Other innovations may also be important to consider, such as including community input in the development and assessment of training activities, using peer-review as part of competency assessment, and focusing more on hands-on demonstration of skills and case studies than traditional exam-based evaluation.[58] Distance learning may also be a technique to consider, particularly for continuing education in rural areas; this can utilize printed materials, but also more innovative means of delivery, such as radio or, increasingly, via mobile phone (SMS or internet) or other information and communication technology (ICT). Monitoring and evaluation is important for assessing impact; successful training programs should consider opportunities for scaling up, to maximise that impact across the health system.[59]

ICT for workforce development [60, 61, 62]

The penetration of information and communication technologies is continuing at a rapid rate, including in lower-income countries. In June 2019 alone, over half a billion Africans accessed the internet. E-learning tools are therefore a promising means of training and re-training health workers throughout the health system, using a variety of platforms. These programs have been shown to be effective even at community-level for improving knowledge and attitudes to epidemic-prone diseases. In addition to formal instruction, connecting health workers through electronic networks, including social media can help with retention and transference of knowledge.

Particularly for tertiary level education and subsequent training, adult learning techniques should be at the core of all learning materials. Training materials, and instructors, should also take into account the four essential elements of learning: motivation, reinforcement, retention, and transference.

Promoting professional associations can be a positive way to

[58] The Africa Working Group of the Joint Learning Initiative on Human Resources for Health and Development, 2006. The health workforce in Africa: challenges and prospects. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/workforcealliance/knowledge/resources/africawglearning/en/

[59] WHO, 2008. Scaling Up, Saving Lives. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/workforcealliance/documents/Global_Health_FINAL_REPORT.pdf?ua=1

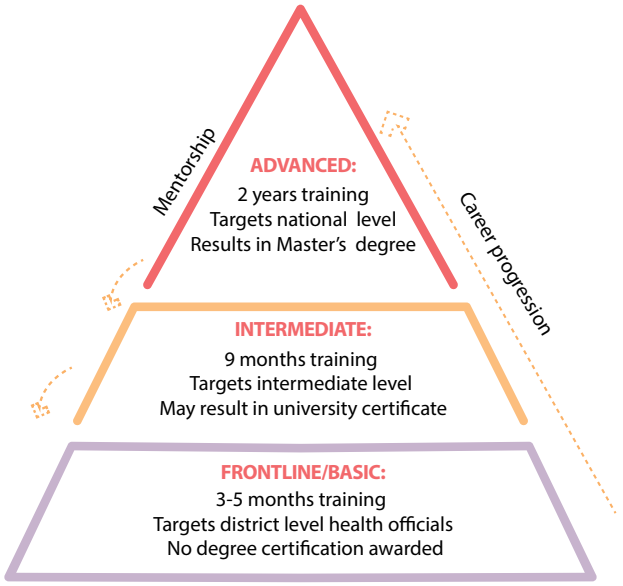
[60] Campbell, 2019. Last Month, Over Half-a-Billion Africans Accessed the Internet. Council on Foreign Relations. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.cfr.org/blog/last-month-over-half-billion-africans-accessed-internet

[61] Bollinger et al., 2013. Leveraging information technology to bridge the health workforce gap. Bulletin of the World Health Organization 91: 890-891. Doi: 10.2471/BLT.13.118737. Accessed on August 13th, 2020 at 16:00hrs.

[62] Otu et al., 2016. Using an mHealth tutorial application to change knowledge and attitude of frontline health workers to Ebola virus disease in Nigeria: a before-and-after study. Human Resources for Health 12(14):5. doi: 10.1186/s12960-016-0100-4. Accessed on August 13th, 2020 at 16:00hrs.

promote high quality of practice.[63] National Public Health Institutes (NPHI) and national (or regional) centers for disease control and prevention can be a useful resource for training programs and other support to national workforce development. For example, the Africa Centers for Disease Control (Africa CDC) recently launched an Institute for Workforce Development, which will provide support to 55 member NPHI on workforce development, as well as offering training programs in specific subjects relavent to health and health security such as public health surveillance, AMR, proposal writing, and leadership and management.[64] The inclusion of these latter two programs highlights the increasing recognition of the importance of non-technical training to support workforce development, and ensure sustainability of health systems. The European Center for Disease Control likewise contributes to workforce development across member states, and has an online training platform to support workforce development specifically for disease control and prevention.[65]

Figure 4 - Pyramid schematic of the FETP system



Field Epidemiology Training Program

While a vast array of individual training programs serve to support health workforce development, the most widely known and integral for health security functions is the Field Epidemiology Training Program (FETP).[66] The FETP is modeled on the US CDC's Epidemic Intelligence Service, and consists of in-service training with an emphasis on supporting surveillance and outbreak investigation and response. Indicator D.4.4 of the JEE references training programs for field epidemiology, and specifically cites FETP. Originally developed as a 2-year program leading to a masters qualification (usually Master of Public Health (MPH)), since 2000 there was recognition of a need to develop shorter-term, simplified trainings to address health security workforce needs at the intermediate and district levels. This need was brought into sharp focus once again during the 2014 West Africa Ebola virus disease outbreak. Currently, there are three "tiers" of FETP training: Frontline (or Basic), Intermediate, and Advanced (Figure 4).[67, 68] An accreditation process exists for FETPs, implemented through the Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET). Accreditation allows for individual FETPs to demonstrate alignment with global standards.[69]

The FETP model, although designed around a shared in-service training approach, with an emphasis on fieldwork over classroom instruction, can nevertheless be adapted to country needs. While the primary recruitment base for FETP trainees is human health (medical doctors, epidemiologists, and in some cases nurses), in some settings, other health security professionals have been added into FETP training cohorts, such as veterinarians and laboratorians: Nigeria and Kenya are examples.[70] Implementation of FETPs moreover does not only occur at the national level, but can also be achieved through regional collaborations, either as a precursor to national programs, due to conflict or other instability in one or more countries, or in recognition that the individual countries would struggle to sustain a national program. For example, trainees from Syria and the Palestinian territories have participated in the Jordan FETP. [71]

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[63] McQuide et al., 2007. Strengthening Health Professional Associations. Capacity Project: knowledge sharing – technical brief 8. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/workforcealliance/knowledge/toolkit/27/en/

[64] IANPHI, 2019. IANPHI Insider, Issue #3. Accessed on August 13th, 2020 at 16:00hrs. URL: https://mailchi.mp/ianphi/ianphiinsider_jan2019-3407017

[65] ECDC, n.d. Training needs and strategy. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ecdc.europa.eu/en/training-programmes/training-public-health-professionals/strategy

[66] Note that in some countries, the program contains a laboratory element, and thus the acronym is FELTP.

[67] Andre et al., 2017. Frontline Field Epidemiology Training Programs as a Strategy to Improve Disease Surveillance and Response. Emerging Infectious Diseases 23(Suppl 1): S166-S173. Accessed on August 13th, 2020 at 16:00hrs. URL: https://wwwnc.cdc.gov/eid/article/23/13/17-0803_article

[68] López and Cáceres, 2008. Central America Field Epidemiology Training Program (CA FETP): a pathway to sustainable public health capacity development. Human Resources for Health 6:27. Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/1478-4491-6-27

[69] TEPHINET, n.d. Accreditation. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.tephinet.org/accreditation

[70] Nguku et al., 2014. Training and Service in Public Health, Nigeria Field Epidemiology and Laboratory Training, 2008 – 2014. Pan African Medical Journal 18 (Suppl 1): 2. Accessed on August 13th, 2020 at 16:00hrs. URL: https://pubmed.ncbi.nlm.nih.gov/25328621/

Transition of Central America FETP[72]

The Central America FETP (CA FETP) was established in 2000 with funds from USAID, as part of the Post-Hurricanes George and Mitch Reconstruction Project. Implemented in five countries in Central America, it was the first program to recognize the importance of designing a curriculum specifically for district-level health workers via the "basic" tier of training. Since 2006, due to a recognition that the regional model was no longer financially viable, the program is devolving into several national FETPs, financed by the national governments with full ownership by the respective Ministries of Health.

National ownership of the FETP is an important marker for effectiveness and sustainability, as are appropriate partnerships. Ensuring strong and formalized linkages with the university or universities providing the certificate or degree is critical. Moreover, it helps to build institutional capacity within the higher education sector; having a recognized and valued certificate or degree is often a strong motivating factor for trainees to participate in the program. The training content and approaches developed within the context of the FETP can also be used to inform course content in other educational and training initiatives. For example, in Kenya, the FETP collaborated with the University of Nairobi to offer an elective in Field Epidemiology, consisting of a 10-week practicum field placement. The integration of field epidemiology into the existing medical curriculum allowed the opportunity for medical students to broaden their awareness of public health as a career option, and strengthened the connectivity between healthcare services and health security efforts.[73]

Ghana Field Epidemiology and Laboratory Training Program (FELTP)[74]

In Ghana, the recognized need for trained epidemiologists resulted in the Ministry of Health requesting that the University of Ghana establish a one-year MPH program in the mid 1990s. However, the lack of explicit link with the Ministry, including engagement in developing the training curriculum, meant that graduates did not meet the Ministry's expectations. This was particularly reflected in the lack of skills in gathering and analyzing surveillance data, highlighted as a need in 2003 in the wake of the global severe acute respiratory syndrome (SARS) crisis. In response, the University of Ghana, in collaboration with the Ministry of Health and the US CDC, launched an FELTP program. Instead of an MPH, trainees were awarded an MPhil in Applied Epidemiology and Disease Control, a more prestigious degree. However, material from the FELTP curriculum was later integrated back into the MPH program, thus improving its quality, and resulting in a one-year alternative to the longer MPhil course.

There are, of course, challenges with developing and implementing FETPs, as well as known shortcomings. For example, the emphasis of the FETP approach is explicitly on disease surveillance and response, rather than on other technical aspects of health security, such as case management. To date, there has been little effort to broaden the FETP to additional social science sectors, such as anthropology, despite the known importance of cultural and social awareness on the efficacy of core aspects of field epidemiology, such as contact tracing and other response measures. Financial sustainability is likely the single most substantial challenge facing national FETPs in LMICs. In sub-Saharan Africa, many of the successful FETPs are sustained through vertical disease funding for HIV/AIDS (largely the US President's Emergency Plan for AIDS Relief (PEPFAR)) or polio. More recently, funding provided for the 2014 West Africa Ebola response led to an expansion of FETP frontline programs throughout West Africa. As those appropriations come to an end, there is a crucial need to identify longer-term sources of financial support, including from within the national budgets themselves. Related to financial sustainability, FETPs must ensure a viable and attractive career path for graduates. One means of achieving this can be through linking government positions and advancement to progression through the FETP tiers (or equivalent training programs);[75] demonstrating professional satisfaction and high retention of graduates may similarly be useful in attracting donors to support the FETP. NPHIs, currently the focus of substantial capacity strengthening efforts from the Africa CDC, may prove to be an ideal career location for FETP graduates, with the emphasis on supporting a wide range of public health functions, including data analysis and research.[76]

Multisectoral Capacity Strengthening and One Health

As described clearly in the JEE and WHO Benchmarks, strong

[71] Al Nsour et al., 2018. Jordan Field Epidemiology Training Program: Critical Role in National and Regional Capacity Building. JMIR Medical Education 4(1): e12. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5917079/

[72] López and Cáceres, 2008. Central America Field Epidemiology Training Program (CA FETP): a pathway to sustainable public health capacity development. Human Resources for Health 6:27. Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/1478-4491-6-27

[73] Arvelo et al., 2015. Establishing a field epidemiology elective for medical students in Kenya: A strategy for increasing public health awareness and workforce capacity. Journal of Epidemiology and Global Health 5(1): 33-39. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.sciencedirect.com/science/article/pii/S2210600614001002

[74] Wurapa et al., 2011. One Health concept for strengthening public health surveillance and response through Field Epidemiology and Laboratory training in Ghana. Pan African Medical Journal 10(Suppl1):6. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ajol.info/index.php/pamj/article/view/76189

[75] Nsubuga et al., 2011. Field Epidemiology and Laboratory Training Programs in sub-Saharan Africa from 2004 to 2010: need, the process, and prospects. Pan African Medical Journal 10:24. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3224071/

[76] Africa CDC, 2017. Africa Centres for Disease Control and Prevention Strategic Plan 2017-2021. Accessed on August 13th, 2020 at 16:00hrs. URL: https://africacdc.org/download/africa-cdc-strategic-plan-2017-2021/

national and global health security requires a skilled but also highly multidisciplinary workforce. As such, efforts to develop a robust health security workforce cannot rely only on building capacity in the diverse areas of practice that support IHR implementation, but also ensure that they work effectively together.

Kenya's Zoonotic Disease Unit

In 2006, with global fears surrounding H5N1 at their height, the government of Kenya established a multisectoral committee to enhance preparedness efforts for zoonotic diseases. These preparedness efforts were immediately tested by the devasting 2006-2007 outbreak of Rift Valley Fever (RVF), which resulted in an estimated 700 human cases, many fewer than the 27,500 human cases suspected in the earlier 1996-1997 RVF outbreak. The new channels for coordination between the implicated sectors were largely credited with the improved response. This success led to the establishment of a Memorandum of Understanding between the Ministries of Health and Agriculture, Livestock, and Fisheries, and then, in 2012, of the launch of the Zoonotic Disease Unit (ZDU), a specialized entity shared between the two Ministries and responsible for joint surveillance, investigation, and response to zoonotic disease outbreaks. Linked closely to Kenya's FELTP, the ZDU is staffed by trained veterinary, public health, and medical epidemiologists, and since the devolution of Kenya's constitution in 2013, has worked to establish a corresponding ZDUs at the country level.

There can be challenges to ensuring multisectoral coordination for workforce development, for example when different disciplines within health security are not awarded the same level of recognition. In many countries, veterinary training is not seen to attain the same high standard as medical training, which has prevented veterinarians from being integrated into FETPs in some settings. Likewise, despite the clear importance of the laboratory sector as part of the health security workforce, few FETPs explicitly include an "L" (laboratory) track, and even among those that have, some have since been discontinued. Reasons for this include lack of clarity over the role of the laboratory in field epidemiology (perhaps pointing to deeper challenges in promoting linkages between surveillance and laboratory networks), a lack of a standardized curriculum for the laboratory element (in contrast to the more traditional epidemiological portions of the curriculum), and reduced funding (necessitating prioritization of perceived "core" elements of field epidemiological training).[77]

Community-based surveillance

While this topic is covered in more depth in the Surveillance Knowledge Product, it is important to note here the increasing recognition of how CHWs can be used for "task shifting" health security functions. These incluce direct involvement in disease notification related activities, but also more generally in promoting community awareness of health security threats and corresponding surveillance and response efforts. These efforts can assist in building trust and understanding between communities and the formal health sector. These are lessons that have been learned from successful disaster and emergency response; the International Committee of the Red Cross (ICRC) has long utilized a strong base of volunteers within its national Red Cross and Red Crescent societies to assist with emergency response efforts. As seen with the 2014 West Africa Ebola outbreak, these volunteers became an indispensable part of the health security workforce, particularly with respect to conducting safe and dignified burials.[78] As noted above, these types of experienced volunteers and CHWs may then be a useful base for recruitment into the civil service, particularly to bolster human resources in rural and otherwise underrepresented populations, as long as they can be provided with the appropriate training.

A significant gap with respect to promoting CHWs and volunteers as a useful part of the health security workforce relates to the consistency and availability of training materials and guidelines. While many individual training programs and curricula have been developed, to date there have been few attempts to consolidate and harmonize all of these available materials. Similarly, although there have been recent important developments in terms of developing robust approaches for designing and implementing community-based surveillance programs,[79] for example, there remains an opportunity to develop a robust community of practice for community-based health security efforts, and particularly for the CHWs and volunteers who form the foundation of those systems.[80]

Monitoring and Evaluation

As with any capacity strengthening effort, establishing a robust

[77] Gatei et al., 2018. Field Epidemiology and Laboratory Training Program, Where is the L-Track? Frontiers in Public Health 6:264. Doi: 10.3389/fpubh.2018.00264. Accessed on August 13th, 2020 at 16:00hrs.

[78] Tiffany et al., 2017. Estimating the number of secondary Ebola cases resulting from an unsafe burial and risk factors for transmission during the West Africa Ebola epidemic. PLoS Neglected Tropical Diseases 11(6): e0005491. Accessed on August 13th, 2020 at 16:00hrs. URL: https://doi.org/10.1371/journal.pntd.0005491

[79] IFRC, 2017. Community-based surveillance: guiding principles. Accessed on August 13th, 2020 at 16:00hrs. URL: https://media.ifrc.org/ifrc/document/community-based-surveillance-guiding-principles/

[80] Technical Contributors to the June 2018 WHO meeting, 2019. Euro Surveill. 24(2): 1800681. doi: 10.2807/1560-7917.ES.2019.24.2.1800681. Accessed on August 13th, 2020 at 16:00hrs.

monitoring and evaluation (M&E) framework is critical for improving performance and ensuring that health workforce strategic objectives are met.

The M&E facilitates continuous and effective monitoring of progress towards meeting workforce strategic objectives, as outlined in the workforce strategic plan and implemented via the workforce development approaches. Resources are available to assist with defining appropriate metrics and indicators, although there remains a challenge in distinguishing the needs and anticipated outcomes for health security specifically, versus more generally for UHC and other health needs.[81] Given the substantial overlap between the workforce needs for UHC, the SDGs, and health security, funders should be aware of the overlap and explicitly encourage synergies within respective monitoring and evaluation frameworks, to leverage investments for maximum impact across multiple strategic endeavors.

More generally, monitoring and evaluation for workforce development tends to focus on the training programs that form the core of workforce development; rather than the overall impacts on the health system. For example, evaluations of FETPs have focused on curriculum content, career progression of graduates, and participation in surveillance and response activities, rather than directly on measures of how the existence of the program may have directly impacted timeliness of detection and response to outbreaks. In some cases, FETP graduates have directly influenced surveillance systems, for example by using their training and expertise to facilitate real-time reporting of priority health issues.[82] However, these success stories are largely anecdotal in nature, rather than formally integrated into the evaluation framework. This is a shortcoming, and one which must be addressed in the future.

WHAT ELSE TO KEEP IN MIND

As referenced throughout this document, the lack of clear divisions between the workforce required for quality healthcare, achieving UHC, and health security can be a challenge, particularly when health workforce strategies are siloed or there is poor coordination between these aspects of the health sector. For example, a recent research article on evaluating the health workforce in Guinea post-Ebola failed to mention the newly established FETP-Frontline program at all, despite its creation being a direct result of identified workforce needs as a result of the epidemic.[83] However, these distinctions can also serve as an opportunity for improved advocacy on how each can be leveraged in support of the other, for a holistically strong health workforce. Emergency personnel can be a resource to both the healthcare sector and

Summary

- Numerous tools and techniques exist to support health security workforce development, including innovations with distance learning and ICT.
- The Field Epidemiology Training Program (FETP) represents a critical global resource for health security workforce development, and presents a replicable model for capacity building to meet IHR requirements.
- National ownership and multisectoral coordination are hallmarks of successful FETPs, and successful health security workforce development training initiatives overall.
- Community health workers and traditional healers are increasingly recognized as a core component of the health security workforce.
- Efforts to engage and train CHWs should be culturally sensitive and mindful of the risk of overburdening individuals, particularly as the use of CHWs becomes more common across the health system as a whole.
- Monitoring and evaluation of workforce development is critical in order to track progress towards strategic targets, but should also seek to measure health security impact where possible.

[81] WHO AFRO, 2013. Road map for scaling up the human resources for health: For improved service delivery in the African Region 2012-2025. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.afro.who.int/sites/default/files/2017-06/road-map-hr.pdf

[82] Jones et al., 2017. Building Global Epidemiology and Response Capacity with Field Epidemiology Training Programs. Emerging Infectious Diseases 23(Suppl 1): S158-S165. doi: 10.3201/eid2313.170509. Accessed on August 13th, 2020 at 16:00hrs.

[83] Van de Pas et al., 2019. Health workforce development and retention in Guinea : a policy analysis post-Ebola. Human Resources for Health 17:63. Accessed on August 13th, 2020 at 16:00hrs. URL: https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-019-0400-6

during health security emergencies. It is particularly important for health security workforce strategies to consider other sectors such as veterinary services and law enforcement, but equally, there needs to be harmonization with other social and economic development strategies.[84]

Sustainability, and the risk of brain drain, is a key consideration for workforce development. Strategies must be considered, and employed, to retain qualified and trained personnel, in appropriate positions. There is therefore a strong implication of funding. Ministries and other involved government authorities need to ensure appropriate incentives and remuneration for public sector staff, including opportunities for advancement. Designating certain positions as requiring an FETP qualification, for example, can be both a motivating factor for personnel to complete the training, and also enhance sustainability of the program by providing a clear career pathway for graduates.[85] Overall, this emphasizes again the critical importance of long-term strategic workforce planning, without overlooking planning to meet short- and medium-term workforce needs, incorporating financial planning for all aspects of workforce recruitment, development and retention.

ADDITIONAL RESOURCES

WHO, Human resources for health (HRH) tools and guidelines. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/tools/planning/en/

WHO, 2019. Gender equity in the health workforce: Analysis of 104 countries. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/gender_equity-health_workforce_analysis/en/

WHO Regional Office for South-East Asia (SEARO), 2011. Training module on development of health workforce strategic plans. WHO Regional Office for South-East Asia. Accessed on August 13th, 2020 at 16:00hrs. URL: https://apps.who.int/iris/handle/10665/206028

WHO AFRO, 2013. Road map for scaling up the human resources for health: For improved service delivery in the African Region 2012-2025. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.afro.who.int/sites/default/files/2017-06/road-map-hr.pdf

Scheffler, 2012. The Labour market for human resources for health in low-and middle-income countries. Human Resources for Health Observer, Issue 11. World Health Organization, Geneva. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/Observer11_WEB.pdf

Summary

- The overlap and intersections between UHC, the SDGs, and health security present an opportunity for synergies and improved advocacy for health workforce development overall.
- Strategic planning for health security workforce development needs to take into account short-, medium- and long-term objectives in order to be effective and sustainable.

[84] WHO, 2010. Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies. Section 2. Health workforce. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/healthinfo/systems/WHO_MBHSS_2010_section2_web.pdf?ua=1.

[85] Jones et al., 2017. Building Global Epidemiology and Response Capacity with Field Epidemiology Training Programs. Emerging Infectious Diseases 23(Suppl1): S158-S165. Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5711325/

APPENDIX 1: JEE TECHNICAL AREAS REFERENCING TRAINING

Table summarizing technical areas (other than Human Resources) that reference training

TECHNICAL AREA	INDICATOR(S)	SUMMARY
Antimicrobial resistance	P.3.1; P.3.3	Training on antimicrobial resistance (AMR) as part of multisectoral coordination; infection prevention and control practices include training and continued education
Biosafety and biosecurity	P.6.1; P.6.2	Training on shipment of specimens; ensuring biosafety and biosecurity training programs are in place and provided to staff
National laboratory system	D.1.2	Training in place for laboratory workers to use specimen referral system
Reporting	D.3.1	Availability of training materials on reporting procedures, especially for the IHR National Focal Point
Emergency preparedness	R.1.2	Contains training as part of the definition of emergency preparedness measures, as well as a key aspect of preparedness plans
Emergency response operations	R.2.1; R.2.2	Health sector training on emergency operations procedures, including IMS, and training of surge staff; training of EOC staff (and surge EOC staff)
Linking public health and security authorities	R.3.1	Engagement of public health and security authorities in a joint training program, incorporating information sharing processes and joint investigations/responses
Medical countermeasures and personnel deployment	R.4.2	Training programs for national emergency medical teams, including training criteria and standards
Risk communication	R.5.1; R.5.4	Training provided to risk communication personnel on responding to local hazards; training of social mobilization and community engagement teams, including volunteers
Radiation emergencies	RE.1	Training programs available to emergency responders in country versus abroad

APPENDIX 2: WHO BENCHMARKS FOR HUMAN RESOURCES

Summary of Level 3, 4, and 5 WHO Benchmarks to meet IHR requirements for Human Resources[86]

BENCHMARK	LEVEL 3	LEVEL 4	LEVEL 5
Benchmark 10.1: An up-to-date, multisectoral workforce strategy is in place	• Develop protocols, standard operating procedures (SOPs) and technical guidelines to ensure regular review and update of the multisectoral workforce strategy • Develop minimum standards for animal (domestic and wildlife), environmental and human health staffing levels • Document a separate workforce strategy for human resources for the animal and environmental health sectors, if not already included as part of the public health workforce strategy • Create appropriate job classification and job description for health workers at all levels of the relevant ministries, and clear career ladder • Establish a national case for investment in human resources for health as a vital component of the SDGs, UHC and universal access to healthcare[87] • Conduct advocacy to implement the strategy to relevant stake-holders, including ministries of health, finance, planning and administration/civil service	• Monitor and evaluate the implementation of the multisectoral workforce strategy to track progress and barriers • Document how the national public health workforce is financed within the country[88] • Develop a strategic framework to nationally prioritize resources and investments in One Health workforce development • Map and align investment in human resources for health with the current and future needs of the population and health systems to address shortages and enhance distribution of health workers, to enable maximum improvements in health outcomes, social welfare, employment creation and economic growth[89] • Document and disseminate annual reports of the multisectoral workforce strategic plan which is completed and has been implemented consistently	• Adopt, review and revise strategy regularly • Establish national health workforce registries of competent and practicing staff, and collect key performance indicators in both the public and private sectors, disaggregated by age, sex, ethnic or linguistic group, and place of employment • Incorporate within the workforce strategy appropriate incentive packages and strategies to attract, train and retain experts for any workforce specialties to meet national and subnational needs through domestically trained health workers • Establish a national (and subnational where relevant) continuing professional education programme for professionals

[86] WHO, 2019. WHO Benchmarks for International Health Regulations (IHR) Capacities. Accessed on August 13th, 2020 at 16:00hrs. URL: https://extranet.who.int/sph/docs/file/3406

[87] Per objective 3.59 of WHO's Global strategy on human resources for health (2016). Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/globstrathrh-2030/en/

[88] Per objective 2.38 of WHO's Global strategy on human resources for health (2016). Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/globstrathrh-2030/en/

[89] Per objective 2 of WHO's Global strategy on human resources for health (2016). Accessed on August 13th, 2020 at 16:00hrs. URL: https://www.who.int/hrh/resources/globstrathrh-2030/en/

BENCHMARK	LEVEL 3	LEVEL 4	LEVEL 5
Benchmark 10.2: Human resources are available to effectively implement IHR	• Develop a human resources for health unit in the human and animal health sectors that can monitor policies and plans to increase the multisector animal and human health workforce, and to promote the recruitment and reten-tion of qualified multidisciplinary staff • Develop a database of in-country multidisciplinary subject matter experts relevant to IHR • Map relevant public health multidisciplinary workforce and review curriculum, with universities and partners, for all IHR human resource requirements • Develop continuing professional education programmes, in priority One Health disciplines, at the national and subnational levels within the strategic framework that also tracks workforce retention and performance • Establish terms of reference and job descriptions for intermediate level rapid response teams and public health officer in-charge of outbreak preparedness and response • Train or recruit human resources for the implementation of IHR capacities for all relevant sectors at the national level	• Expand the multisectoral strategic workforce plan nationwide to the subnational level • Implement the multisectoral strategic workforce plan consistently at the national, and subnational levels, with regular reviews to track progress and barriers, and at least annual updates • Mobilize resources to ensure each local level has some capacity for epidemiology, case management, laboratory services, One Health, and others as needed • Develop and implement SOPs on how professionals at the national and subnational levels communicate during an infectious disease outbreak • Establish a database of human resources in all relevant sectors and levels of the public health system that can provide multidisciplinary health personnel during public health emergencies with SOPs for updating and maintaining it	• Review national preparedness and response plans as well as legal and regulatory frameworks and establish protocols, SOPs, technical guidelines and toolkits to send and receive multidisciplinary health personnel during public health emergencies • Review the implementation plan of sending and receiving multidisciplinary health personnel in at least one event response. If there is no response in the previous year, then develop and conduct a simulation exercise to test the capacity • Identify regional and international (such as Global Outbreak Alert and Response Network) partners for multidisciplinary health personnel and establish partnerships or formal agreements with them

BENCHMARK	LEVEL 3	LEVEL 4	LEVEL 5
Benchmark 10.3: In-service trainings are available	• Develop and implement a continuing professional education programme that includes outbreak preparedness and control, for at least one group of professionals, such as public health officers, surveillance officers, nurses, midwives, general medical practitioners, veterinarians, para-veterinarians • Develop and implement at least at the national level shortin-service trainings on surveillance, outbreak preparedness and response for specific cadres	• Implement at national and subnational levels short-/ long-term in-service training programmes to help expand the number of qualified public health professionals within the country with health security functions • Implement at national and subnational levels short in-service trainings on surveillance, outbreak preparedness, response, incident command system and risk communication for specific cadres • Recruit specialists as part of IHR implementation at the next recruitment to strengthen human resources • Explore and implement measures to organize and finance specialization and continuous professional education in public health, including epidemiology, laboratory, animal and environmental health	• Document the review of implementation of short-/ long-term in-service training programmes • Guarantee trained staff and resources for all IHR relevant emergencies/hazards • Continue and expand in-service training and retention programmes for specialized health personnel involved in IHR implementation in difficult to access areas • Monitor the median number of years that public health personnel have been on staff rolls within the ministry and/or national institutes and post a list of current staff, staff turnover and number of staff attending in-service training • Expand current public health and field epidemiology training programmes to include aspects such as refresher courses and a sustainable methodology and process to provide continuous and regular education for field epidemiology staff

BENCHMARK	LEVEL 3	LEVEL 4	LEVEL 5
Benchmark 10.4: Field epidemiology training programme or other applied epidemiology training programme is in place	• Convene a field or applied epidemiology technical working group and establish goals for programme staffing • Develop a strategic plan for development of field or applied epidemiology program • Establish an advisory committee to maintain broad-based support from stakeholders and partners • Identify a sustainable funding mechanism for field or applied epidemiology • Develop course curriculum, maintain scientific excellence in training, monitoring and evaluating trainees, and consult on epidemiological methods • Designate field supervisors and mentors for field or applied epidemiology and prepare guidelines, training and SOPs for mentorship and supervision • Disseminate field or applied epidemiology training materials, protocols, SOPs and toolkits • Establish accreditation mechanisms for health training institutes • Conduct recruitment and selection of candidates for training including consideration for participation of veterinarians in the epidemiology training programme • Track field or applied epidemiology capacity in the country including graduates and positions after training • Establish a partnership with other countries in the region to share epidemiology training programme graduates during emergency events • Ensure availability of at least one trained epidemiologist per one million population	• Implement two levels of field or applied epidemiology including the basic, intermediate and/or advanced level at designated sites that comprise trainees from human and animal health professionals • Integrate a trained epidemiologist into core public health competencies • Map field or applied epidemiology capacity at intermediate level/district and track to inform updates to the national public health workforce strategy • Ensure availability of at least one trained epidemiologist per 500,000 population	• Monitor and evaluate the performance of the epidemiology workforce within healthcare systems including veterinary services • Conduct engagement meetings with the health ministry, agriculture ministry, partners and stakeholders to strengthen options for field placements, and to sustain funding for epidemiology training programme management • Implement epidemiology training tracks for relevant career tracks • Expand epidemiology training programmes into three levels of training programmes with career tracks established for graduates in additional jurisdictions • Secure sustainable funding for epidemiology training programmes and career tracks and pursue accreditation • Ensure availability of at least one trained epidemiologist per 200,000 population • Establish alumni association for epidemiology graduates (all levels)

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