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Dimensions of health workforce performance: a scoping review

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ABSTRACT

Introduction: *The World Health Report 2006* defined ‘availability’, ‘competence’, ‘responsiveness’ and ‘productivity’ as the key dimensions of the health workforce (HWF) performance framework. Since then, new goals have been set to address population health needs by optimizing HWF performance and quality. The aim of this scoping review is to identify aspects of HWF performance dimensions that have emerged since the 2006 publication.

Methods: A scoping review of the literature was performed to establish the knowledge base on HWF performance via the latest available evidence. The web search was conducted on the Science and MEDLINE databases, with Scholar citations from the *World Health Report 2006*.

Results: The literature reveals new thematic areas in HWF performance that were not explicit in the 2006 framework, eg the role of retention and recruitment policies on HWF availability and broadening competence by incorporating HW cultural background, attitudes and values alongside technical skills. Concepts related to HWF responsiveness have expanded to include job quality and work environment. A shift in productivity emphasises the role of technologies in enhancing clinical practice and overall system efficiency. Last, recurring aspects of performance were related to pay schemes and such contextual factors as the role of communities and regulatory frameworks.

Conclusions: This review lays the groundwork for a revised perspective on HWF performance, transitioning from separate dimensions to a more integrated approach. It highlights the importance of expanding the availability dimension to emphasise the role of personal and career development and alignment with individual values. Knowledge, technical skills, attitudes, behaviours, beliefs and cultural background all influence competence. Responsiveness is seen through a lens valuing health worker well-being. Conceptually, productivity is broadened to reflect a more nuanced understanding of efficiency, recognizing the role of technology, how work environment and teams impact performance, and the significance of remuneration, including financial and non-financial incentives and other contextual factors.

JEL codes: I18, J08, J24, J24

Key words: performance, productivity, retention, health workforce, health

1. INTRODUCTION

Suboptimal performance and productivity in the health system and their influence on health worker (HW) performance is a major barrier to delivering effective health services. Health workforce (HWF) shortages and poor performance increase inequities in populations' access to health services, affecting public health, economic growth, and development. Moreover, the consequences of COVID-19 on health systems, along with the impact of government budget deficit on health investments, are yet to be seen. This will impact HWF performance and the Sustainable Development Goals set for the 2030 United Nations agenda. Understanding how the scientific debate currently evolves around dimensions of HWF performance is critical for providing new insight into analysing and developing effective policy interventions.

The World Health Report 2006 [2] describes a well-performing workforce as “one that works in ways that are responsive, fair, and efficient to achieve the best health outcomes possible, given available resources and circumstances” [2]. The report identifies four dimensions of HWF performance:

- **Availability** refers to the distribution and attendance of existing health workers in terms of time and space.
- **Competence** refers to the combination of technical knowledge, skills and behaviours.
- **Responsiveness** refers to the extent to which people are treated decently, regardless of whether their health improves or who they are.
- **Productivity** refers to producing the most effective health services and health outcomes possible, given the existing stock of health workers, and reducing waste of staff time or skills.

The *Global Strategy on Human Resources for Health: Workforce 2030* (2016) emphasises the need to optimise both HWF performance and quality and the use of evidence-based approaches [1]. It proposes an integrated package of policy options to improve performance and equitable HWF distribution. Measures within this package encompass job security, a manageable workload, supportive supervision and organisational management, continuing education and professional development opportunities, enhanced career development pathways, family and lifestyle incentives, housing and education allowances and grants, adequate facilities and working tools, and measures to improve occupational health and safety. The package also includes creating a work environment free of any type of violence, discrimination and harassment. Additionally, it emphasises the importance of supportive feedback and collaborative practices for problem-solving.

Moving forward, the WHO *Working for Health* progression model (2022) provides a stepwise pathway for investing in HW education, skills, employment, and safeguards/protection—all of which are elements affecting HWF performance [3].

Other models have identified linkages and interactions between each of the WHO dimensions of HWF performance. For example, Sonderegger et al. [4] developed a logic model that is operationalised in a

visual platform to highlight linkages and factors affecting HWF strategies aimed at improving clinical quality, responsiveness, efficiency and coverage.

This paper provides a scoping review of the literature, building upon the definition of HWF performance dimensions contained in the *World Health Report 2006* [2]. The aim is to identify and integrate key themes that complement the definitions outlined in the WHO 2006 framework. This contributes to improving the analysis and understanding of HW performance and informing policy design, strategies and interventions that optimise the health workforce.

2. METHODS

The scoping review was operationalised based on Arksey and O'Malley's [5] five-stage approach: (1) identifying the research question; (2) identifying relevant studies; (3) selection of studies; (4) data-charting; and (5) collating, summarising and reporting results. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram and extension checklist for scoping review [6, 7] are reported in Supplementary material A.

2.1 Identifying the research question

The review was guided by the following research question: What is known from the existing literature about HWF 'availability', 'competence', 'productivity', and 'responsiveness'? Are there additional elements to be considered?

2.2 Identifying relevant studies

To identify a suitable search strategy, an initial crude search of the published literature reviews was performed on *Google Scholar* (GS) on titles containing the terms: 'health', 'workforce', 'performance' and 'interventions'. A set of key pilot studies was identified and integrated with evidence provided by WHO HWF experts.

A list of relevant keywords was extracted from the pilot studies and integrated with terms from the International Standard Classification of Occupations (ISCO) categories for health professionals and health associate professionals (Categories 22 and 32, respectively) by the International Labour Organisation (ILO) [8]. Furthermore, GS citations of the *World Health Report 2006* were scrutinised, searching for studies referring to all four performance dimensions. A detailed account of the search strategies is illustrated in Supplementary Material A, Tables S2–3.

A literature search was conducted on the Web of Science (WoS) online database by Clarivate, MEDLINE (accessed from WoS) and Google Scholar (GS). The search sought studies published between 2006 and December 2021 and was restricted to articles written in English and Spanish. Abstracts, books, books chapters and conference proceedings were excluded. Furthermore, GS citations from the *World Health Report 2006* were scrutinised, searching for studies referring to all four performance dimensions. An account of the search strategies is illustrated in Supplementary Material A, Tables S2–3.

7.2 Selection of studies

To identify relevant studies, we first screened titles and abstracts and then conducted a full-text review.

- *Titles and abstracts screening*

We screened titles and abstracts using an open-source, state-of-the art, active-learning algorithm (ASReview) to ensure that the search strategy identified relevant studies in a time-efficient manner [9]. The machine learning algorithm was trained, based on the set of pre-identified pilot studies.

The algorithm presented one title and abstract at a time. One reviewer labelled the study as 1 for relevant and 0 for irrelevant. By performing this process recursively, the active learning algorithm became more efficient by presenting articles in order of relevance.

According to the evidence published, screening between 8% and 33% of the initial sample will find 95% of all eligible studies [9]. In this study, a total of 1,386 studies were screened, which corresponds to 10% of the initial sample (n=10,386; Supplementary Material A).

To ensure that no relevant articles were left out, two reviewers used Excel and a set of pre-identified codes to conduct a manual screening of the titles not selected by the algorithm.

- *Full-text screening*

We read the full text of 212 eligible studies, excluding 108 that covered general aspects of performance or lacked a clear, causal or conceptual relation with the HWF performance dimensions defined in the WHO framework. Studies were excluded if they adopted a macroeconomic perspective (eg, those that addressed the topic from a perspective of health system or society), rather than analysing the topic from the point of view of individual health workers, teams or operating facilities. Studies focusing on health professionals other than those defined under the ISCO-ILO Categories 2232 were also excluded, as well as studies whose full text could not be found. Although a formal quality appraisal was not performed, some studies were excluded if they lacked a basic explanation of methods and materials, which rendered their quality level too low. The study selection process (PRISMA) is illustrated in Supplementary A Figure 1. This process resulted in 104 included studies.

7.3 Extracting the data

This stage pertains to extracting relevant aspects and information from the included studies. We used a 'descriptive-analytical' method with a uniform data-charting form in Excel (Supplementary Material, Table S4).

1.1. Collating, summarizing and reporting results

In this stage, we built a thematic framework to systemise the information in the literature, rather than synthesise the evidence from the included studies. First, we defined performance outputs as aspects of HWF practice showing a causal effect on HWF performance. Outputs were identified by examining the explanatory variables in quantitative studies, as well as themes and hypotheses in qualitative

studies. Performance outcomes were defined as the mediated effects of HWF practice on population health.

Second, performance outputs were grouped based on thematic commonalities to determine their association with dimensions from the 2006 WHO framework. This helped to identify emerging elements of performance, trends, and research gaps (Supplementary A Figure S2) following discussions in consultation with WHO HRH experts.

3. RESULTS

This scoping literature review includes 104 studies. Of these, 42 are descriptive studies (eg, using small-scale surveys, focus group discussions and case studies), 26 are literature reviews, and 16 are analytical observational studies (ie, cross-sectional, correlational, hypothesis-testing cohort studies), among others.

The studies spanned diverse economic contexts, with 42% in high-income regions, 20% in lower-middle-income, and 12% in upper-middle-income areas. Sub-Saharan Africa comprised 24% of these studies, with mixed-income regions accounting for 23%. Other significant locations included Europe & Central Asia, East Asia & Pacific, and North America (Table 2 – Supplementary material B).

The evidence covers a broad range of healthcare settings, including 30 studies on primary care (ie, general practice [GP], community pharmacy and dental), 36 on secondary care (hospitals, emergency units and behavioural care) and 36 being a mix of different healthcare settings.

Frequently reported health programmes include sexual, reproductive and maternal health; oral health (n=7); cardiovascular diseases; malaria; and mental health.

Our search identified 9 studies that examined the availability dimension; 13, competence; 19, productivity; and 24, responsiveness. A further 38 studies evaluated multiple performance dimensions, including combinations like availability and responsiveness (9 studies) and competence and responsiveness (7 studies).

7.4 Availability

This dimension refers to the availability of health workers in terms of time and space, encompassing distribution and attendance of existing personnel (WHO, 2006).

The main aspects in this dimension were identified by studies with a focus on **recruitment, attraction, retention** and **turnover**.

Most studies in this group were conducted in the context of rural or remote areas where personal and living factors—such as opportunities for family members to access quality services like schooling, housing and transportation—were among the main determinants affecting their attractiveness to health professionals [10–24]. Establishing connections with local cultures (eg, faith-based or political) and community involvement were also highlighted as important factors to increase availability. Work-

related factors—such as workplace conditions, relationships with colleagues and work equipment—also influence HWF availability [11, 13, 25–27].

Other aspects of HWF availability were discussed by studies assessing health workers' behaviours in terms of **attitudes, motivation, job preferences** and **satisfaction**.

Strategies to increase HWF recruitment and retention in the health sector included financial incentives (ie, remuneration and performance-based financing) as well as non-financial incentives like offering career development opportunities and training [13, 26, 28, 29]. Other interventions focused on improving quality of management vis-à-vis HWF and patient empowerment [30].

Availability outputs and the impact of interventions were measured in terms of quantity (eg, number of staff and ratio to populations) as well as distribution (with specific reference to rural areas). Other studies highlighted availability measures in terms of staff turnover, attendance and absentee rate, and waiting time [17, 31–33].

To summarise, the main factors influencing HWF availability (Table 1) can be categorised as follows:

- Factors related to **job and career development**, including professional development opportunities such as Continuing Professional Development (CPD) and an emphasis on career possibilities during recruitment: incentives like tailored rewards and performance-based premiums; and aspects of job satisfaction like perceived quality of provision of health care in rural areas
- Factors related to **living and working conditions** encompass living and family aspects such as the provision of basic government housing, formal education opportunities, allowances for children's education, a rural lifestyle and closeness to family; working conditions include the availability of equipment and medicine at health facilities, the presence of multidisciplinary teams, choice of work location and initiatives to enhance performance at the facility level, such as community health committees
- Factors related to **community and practice support** encompass the value of operating in a cross-cultural environment, gaining trust from the community, personal preferences such as the affinity for a rural lifestyle, understanding of local culture and cost of living; practice support includes managerial aspects like communication with supervisors (ie, reflected in effective workload management to avoid burnout) and a positive supervision culture including work considerations like altruism and patient engagement

Table 1. Factors enabling HWF availability

Main factors	Description	References
Job and career development	<ul style="list-style-type: none"> • Continuing professional development (CPD) emphasising career possibilities during recruitment, improving career development and opportunities, especially in rural services, avoiding a one-size-fits-all approach • Incentives (attraction and retention): tailored incentives based on type of tasks (eg, repetitive tasks); performance-related premiums (performance-based financing); quality assurance training; and increasing monitoring, work-life balance and good working conditions • Job satisfaction: Perceived quality of care in rural areas via improved working conditions, living conditions, professional development opportunities and remuneration 	[10, 12, 16, 18, 20, 21, 27, 28, 34, 35]
Living and working conditions in the health facility	<ul style="list-style-type: none"> • Living and family conditions: Provision of basic government housing, provision of formal education opportunities, allowance for children education, Lifestyle (eg, rural), closeness to family • Equipment: availability of equipment and medicine at the health facility • Team (multidisciplinary) • Choice of work location • Measuring performance at the facility level, community health committees, and training 	[13, 15, 17–19, 21, 28, 32, 36–38]
Community and practice support	<ul style="list-style-type: none"> • Management: Improving communication with manager, facilitating adjustment to work, not feeling overwhelmed, positive supervision culture, workload, type of work (eg, altruism, direct individual patient, practice with advanced work roles), supportive manager, clinical mentorship, equitable availability of resources • Cross-cultural environment, community trust • Personal factors (eg, attracted to rural lifestyle, low costs of living, knowledge of culture; eg, origins) 	[15, 21, 24, 32, 34–36]

7.5 Competence

Competence refers to the knowledge, capacity, and skills required to provide quality care (WHO, 2006).

First, studies concerned with competence in terms of **education and training** shared a common theme, the acquisition of clinical and practical skills and experience, of which **digital health skills is one of these main skills**. Knowledge acquisition is crucial, alongside an understanding of the overall clinical process and application of knowledge to individual tasks.

The evidence highlighted the importance of information technology (IT) training as part of curricula, as well as involvement of health personnel in the development of IT solutions in geared towards optimising their use [28, 39, 40]. Further, in low- and middle-income countries (LMICs), the integration of digital health into healthcare systems is not sufficiently recognised; and there is a notable shortage of health professionals skilled in generating and using health data. This underscores the need for comprehensive digital health curricula to equip HWs with competencies like IT literacy, digital communication, and implementation skills [41, 42]. Improving digital health and IT skills contributes to both performance and productivity by integrating electronic health records, thus reducing processes and errors.

Second, while there was a clear emphasis on adherence to guidelines, competence was also linked to both **technical and clinical abilities**, as well as their operational and systemic understandings of tasks (eg, day-to-day execution of tasks) [26, 43, 44]. Studies emphasised that competence can be improved by providing job aid tools, regulating accreditation systems, admission and recruitment policies, work environment, supervisory mechanisms and clear delineation of roles and responsibilities [4, 30, 38]. It also highlighted the importance of prioritising competency-based recruitment, orientation and regular performance evaluations. This includes mentoring strategies, feedback, and emphasising the role of diverse actors and stakeholders in shaping HWF competencies.

These factors also influence health workers' motivation, job satisfaction and, ultimately, the quality and responsiveness of healthcare systems—and thus, the availability dimension [16, 28, 45, 46]. Higher perceived levels of competence also were found to positively impact both attitude and performance [26, 43].

The main factors influencing HWF competence were summarised in Table 2 as the following:

- Factors related to **education and training**, with digital health and IT skills: The literature focused on data management, eHealth solution awareness and roles related to data collection, interpretation and dissemination at both service-health worker and facility-based supervisor levels
- Factors related to the environment where HWs practice their **knowledge, skills and abilities** emphasise the importance of organising the work in the facility (teams), the

capacity to use their competencies and the scope of practice that HWs are allowed to use in the organisation (since this could limit the use of their competencies), highlighting the significance of improving diagnostic skills and ensuring the availability of requisite equipment; furthermore, the working environment should facilitate adherence to and compliance with evidence-based practices, emphasising elements of self-efficacy, job satisfaction and technical expertise

- Factors related to **behaviours and attitudes** include the inclination towards broadening competencies through knowledge-seeking behaviour, cumulative work experience and emphasis on refining both communication and clinical skills; regular performance evaluations and mentoring strategies influence such behaviours

Table 2. Factors enabling HWF competence

Main factors	Description	References
Education and training	<ul style="list-style-type: none"> • Emphasise continuous education and training (ie, on sexual and reproductive health service components like partograph and emergency contraceptives) • Digital health skills and IT competence: Improving the IT skills of the healthcare workforce, including data management and awareness of eHealth solutions; service provider and facility-based supervisor roles focus on data collection, interpretation and dissemination; improving digital health and IT skills contributes to both performance and productivity by integrating electronic health records, thus reducing processes and errors 	[14, 39, 42, 47–50]
Knowledge, skills and abilities	<ul style="list-style-type: none"> • Technical competence: Emphasis on technical skill-building, knowledge enhancement, training in new guidelines and improving diagnostic skills and equipment availability • Compliance with evidence-based practices focusing on self-efficacy, job satisfaction and technical knowledge • Comprehensive health workforce planning and forecasting, along with strategies for education, evaluation, certification, and recertification 	[14, 47, 48, 51, 52]
Behaviours and attitudes	<ul style="list-style-type: none"> • Professional role and competence: Adopt attitude towards expanding professional roles measured by perceived competence level, frequency of performing clinical skills and workplace factors. Include knowledge-seeking behaviour and accumulated work experience. Also, enhance communication and clinical skills • Regular performance evaluations and mentoring strategies, including feedback, audits, peer-modelling and "training trainers" techniques 	[43, 44, 48, 53–55]

7.6 Responsiveness

This dimension refers to the extent of treating people decently, regardless of whether their health improves or who they are (WHO, 2006).

Responsiveness can be defined in terms of how health systems meet expectations revolving around treatment of people [4].

The evidence indicates the importance of how health workers' recognition from the community is important for their motivation, including the role of health worker team–patient relationships and the impact of health workers' mental health and well-being on responsiveness [67, 90, 91]. Studies examined HWs **behaviours, attitude, motivation and leadership** [91–98] as well as their perceived levels of **organisational justice, proactive management, teamwork and work environment/systems response** [95, 99, 100]. This shows the interrelation of responsiveness with other HW performance dimensions.

The importance of payment strategies was underlined—specifically as low income, together with high workload, are seen as obstacles to HW responsiveness. Additional barriers to responsiveness include the absence of effective monitoring systems and meritocracy, favouritism, unrealistic goals, ineffective communication, incentives opportunity cost and resistance from the community [101].

The key factors impacting HWF responsiveness, as outlined in Table 3, include the following:

- **Motivational factors** driven by professional norms, like the aspiration to enhance patients' health, impact HWF responsiveness. These include such **community and organisational elements** as recognition, appreciation, teamwork, confidence-boosting supervision and ensuring the well-being and protection of health workers and their families
- **Promoting an equitable work atmosphere**, characterised by organisational justice and access to critical equipment and tools, was also highlighted; key elements include the quality of management in promoting a supportive and open environment as well as training, with an emphasis on stakeholder involvement and access to essential skills and feedback opportunities

Table 3. Factors enabling HWF responsiveness

Main factors	Description	References
Motivational factors	<ul style="list-style-type: none"> • Professional norms: Desire to improve health enhancing self-knowledge, and the intrinsic satisfaction of patient recovery as a reward. Emphasis on safeguarding the health of workers and their families • Community (including team): Recognition and appreciation from the community, teamwork, confidence-building supervision, problem-solving leadership. The shared sense of responsibility and collaboration within the team, coupled with mutual learning and skill exchange, as well as the guiding and mentoring role of the supervisor • Protection and well-being: Promotion of mental health awareness, the importance of networking, and the provision of incentives within organisations; addressing perceived procedural and distributive injustices and ensuring worker protection 	[56, 77] [74, 90, 95, 100, 102–107]
Work environment	<ul style="list-style-type: none"> • Fairness: Organisational justice, a supportive atmosphere, access to essential equipment and tools; perception of fairness in hospital management regarding incentives • Management: Positive management practices, teamwork, appropriate compensation and timely feedback; proactive quality assurance managers, engaged medical specialists and consistent data infrastructure; advocating for an open, supportive environment, conducting needs analysis and regular supervision with timely feedback • Training: Access to necessary training, skills, external support and opportunities for feedback and evaluation; involving stakeholders and providing access to essential training and skills • System response and facility amenities 	[80, 92, 94–96, 108–112]
Remuneration and incentives	<ul style="list-style-type: none"> • Payment methods: Fee-for-service enhances patient satisfaction and care quality, while salary payments control costs and ensure appropriate care; professional qualifications additionally motivate workers 	[62, 78, 91, 99, 113, 114]

7.7 Productivity

This dimension refers to the extent of producing the maximum effective health services and health outcomes possible, given the existing stock of health workers—thus reducing waste of staff time or skills. Productivity of health workers is determined by the different levers of the previous dimensions: eg, the setting in which they work, their level of motivation, work organisation and other resources available.

The evidence suggests a move towards an efficient and improved use of resources with productivity performance metrics [30, 56–58]. Interventions included **in-kind and financial incentives** related to the use of standard **performance metrics** [29, 59–65]. Incentives are given in addition to fixed wages; therefore, the importance of first understanding whether health workers are being paid properly is fundamental. The effective implementation of pay-for-performance programmes is often contingent upon the alignment of established targets with professional values and perceptions [59, 66, 67]. However, concerns about performance indicators emerge in their potential for manipulation (ie, gaming) and for creating tension between team members, as well as the risk of getting involved in tick-boxing activities that may result in decreased quality of care [59].

Additionally, the productivity of health workers was emphasised by the efficient use of **budgets, errors minimisation, task delegation and IT interventions** [68–73].

Factors that are becoming explicit to enhancing HWF productivity, as delineated in Table 4, include the following:

- a. **Team configuration and task structuring:** Optimal team setups are defined by clear role assignments and impactful leadership; the structure of tasks is informed by key performance metrics and is augmented by satisfactory incentives
- b. **Technological integration** plays pivotal roles in optimising task distribution, ensuring patient safety, and fostering organisational productivity: emphasis is not merely on conventional IT solutions but extends to telemedicine, social media tools and real-time communication platforms that bridge gaps and enable more agile patient care
- c. **An organised work** environment is conducive of high productivity levels, determined by the harmonious balance of the number and organisation of tasks and the scope of operations; essential elements also encompass supportive supervision, supply of equipment (eg, medicines and materials) and mutual respect within communities

Table 4. Factors enabling HWF productivity

Main factors	Description	References
Team and leadership	<ul style="list-style-type: none"> • Optimal team size, clear roles definition, interdependent activities • Leadership by professional (professional hybrids) with sector-specific knowledge have a positive impact on quality outcomes but a less positive one on financial efficiency; including health professionals in program development is beneficial to ensure that teams benefit from hands-on experience • Absenteeism directly affects productivity due to worker absence; presenteeism can have a detrimental effect on overall work quality, team dynamics and the health of the individual 	[56, 59, 69, 74–76]
Use of technologies	<ul style="list-style-type: none"> • Telemedicine enhances task delegation and improves safety • Social media can increase productivity in organisations, especially during crisis situations like the COVID-19 pandemic 	[72, 73, 77–79]
Work organisation	<ul style="list-style-type: none"> • Task organisation: Use of key performance metrics (ie, quality targets improve patient care processes, alignment with professional values and intrinsic motivation); emphasise use of key performance indicators and support to facilitate their implementation; recognising the role of satisfactory incentives perceived as enhancing task organisation • Workload: Number of tasks, organisation and catchment area determined by the number and geographical spread of households to whom community health workers cater • Presenteeism can have a detrimental effect on overall work quality, team dynamics and the health of the individual 	[59, 60, 80–89]

4. DISCUSSION

This section brings together the elements affecting health workers' performance. The evidence allows us to identify elements complementary to the dimensions in the 2006 WHO Framework. The findings also allow us to advance in terms of policy design by incorporating these elements into our analysis of HW performance.

This review has identified emerging factors affecting HW performance since publishing the 2006 WHO framework. Some of these elements were implicit in that framework, and we felt the need to include them explicitly. The findings also allow us to advance in policy design by incorporating these elements to the analysis of HW performance (Table 5).

Next, we outline these key elements that we identified through the evidence contained in the review.

- 1. Broadening the availability dimension:** The literature shows that availability encompasses not just the distribution and attendance of existing health workers, but also shows the role of retention and attraction policies—therefore requiring us to explicitly include policies contributing to retaining health workers and tackle factors affecting their attraction and recruitment, mainly job and career development, living and working conditions, and community and practice support.
- 2. Broadening the competence dimension:** Education has been an important component in most interventions. Thus, providing adequate education and training was analysed to update current clinical practice, prepare the introduction of new technologies and strengthen teamwork and communication. Studies highlight that the process of healthcare delivery is not a linear application of HWF technical skills and competencies acquired in their professional training and education; rather, health professionals' cultural background (ie, professional values, attitudes, beliefs and norms) and clinical competence both play a significant role in the delivery of quality care. Subsequently, the competence dimension should include not only the skills and technical knowledge that HWF acquire during their pre-service training, but also the 'tacit' knowledge they gather with professional experience, ie, competency-based education approaches.
- 3. Shifts in productivity:** The productivity of health workers is influenced by various factors from other dimensions, such as the HWs' work environment, motivation levels, organisational structure of their work and availability of resources. Productivity defines the relationship between health workers/teams and health services, given a certain number of resources and HWF characteristics. Productive work is also the result of the efficient use of financial and technological resources. However, there is also the need to shift the perception of productivity resulting from a direct translation of inputs into outputs and to include the role that individuals and organisations play as economic actors within complex systems. Aspects such as budgeting, performance metrics and use of

electronic health data as a support for patient-informed decisions are all key components of the modern performance framework.

4. **Systems of support in the environment:** Responsive services are the result of a quality job environment. Professional context is a crucial component of high-quality services, with HWFs feeling recognised in their needs and valued in their role. A relevant aspect for the achievement of responsive jobs is played by dynamics within **multidisciplinary teams**. This review puts forward a variety of findings and aspects related to teamwork, all of which are important determinants of HW performance. Determinants of a quality environment include effective communication with patients, interprofessional collaboration, workload, and workers' health and wellbeing status.
5. **Remuneration:** A recurring aspect of performance is decent payment for health workers. Adequate wages paid on time, financial and in-kind incentives, and overall components of remuneration in addition to salary (ie, fee-for-service, capitation, performance-based payments, private practice, informal income and non-medical income-generating activities). This comprehensive approach is crucial for understanding the factors driving the diverse income structures and their consequences on motivation and performance.
6. **Contextual factors:** Several contextual factors affect health workers' performance. One aspect is related to the role of HWs in the **community** in which they operate. It is fundamental to recognise the positioning of health facilities in the surrounding cultural environment—especially the role of rural communities—and how this affects performance.

Our findings indicate that the dimensions defined in the 2006 framework include elements that are complementary to one another but also exhibit significant overlap, as illustrated in Supplementary B Figure S1.

Table 5. Broader dimensions of health workforce performance

Description (2006)		Broadening the dimensions
Availability	Availability in terms of space and time: it encompasses distribution and attendance of existing workers	Attraction, retention, and recruitment practices, job and career development, living and working conditions and practice support
Competence	Encompasses the combination of technical knowledge, skills, and behaviours	<ul style="list-style-type: none"> • Education and training • Knowledge, skills and competencies • Cultural beliefs, behaviour and attitudes
Responsiveness	People are treated decently, regardless of whether their	Health workers are recognised in their role and motivated while meeting their professional values. There is a focus on HW-team-patient relations, taking into consideration health workers' mental health and well-being

	health improves or who they are	
Productivity	Producing the maximum effective health services and health outcomes possible given the existing stock of health workers; reducing waste of staff time or skills	Productivity of health workers is determined by the different levers of the other dimensions: it is a measure of efficiency and looks at how different resource inputs are combined to achieve the maximum health benefit in complex systems; further research should focus on how to integrate technical, productive and allocative efficiency to the labour market in the health sector
Emerging and explicit levers		
Remuneration		Salary, financial and non-financial compensation, and incentives—as well as benefits (eg, family plans, transports, opportunities for career development)
Systems of support and environment		The quality of infrastructures, availability of equipment, commodities, guidelines, tools, budgets, and the organisation within the organisation's upper levels (managerial support, national regulations, rights, safety, and comparison with other facilities); positioning health workers' action within their community; the role of professional values and guidelines Multidisciplinary teams
Contextual factors		Cultural environment

7.8 Limitations

This study is conceptual in nature. Although bias in the literature selection was minimised by employing a systematic approach, the authors acknowledge several drawbacks associated with the literature review methodology. These include the literature sampling criteria and its dependency on expert opinion for inclusion and exclusion in the content analysis, which—although executed with rigour—remains the authors' subjective interpretation. Given the primary goal of expanding the supply of knowledge on current performance dimensions (WHO, 2006), a large set of keywords was employed, resulting in a substantial number of initial publications. The screening and selection of titles and abstracts were optimised by using a machine-learning algorithm that allowed the researcher to perform the screening in a time-efficient manner, while still selecting the most relevant studies. However, additional evidence could be identified by tailoring the search to specific aspects of performance or to HW types or geographical contexts. Another limitation is that, although the search was conducted for articles in both English and Spanish, the literature included in this study was written only in English, which somewhat limits its generalizability.

5. CONCLUSION

This review shows consistency in the levers of the 2006 WHO performance framework. The evidence advocates for a shift from viewing the four dimensions of HWF performance as separate entities, towards a more integrated approach that reflects the evolving role of health workers within complex health systems. This transition is evident in the need for the availability dimension to incorporate retention and attraction strategies that transcend material incentives, emphasising the significance of personal and career development opportunities. Findings show that appropriate salaries are needed before designing incentives.

Performance should consider the role of the individual HW within the team and society, as well as an alignment with personal values. Similarly, the competence dimension evolves beyond the acquisition of skills to encompass a holistic process of knowledge gain (including experimental learning), technical skills, attitudes and behaviours—as well as beliefs and cultural background. Performance should also be supported by modern and effective management systems.

Responsiveness extends past the basic decency of acknowledging the importance of HWs' role in society. It additionally means acknowledging the importance of recognising their vulnerabilities—which were particularly highlighted by the impact of COVID-19 on health workers' mental health.

Productivity, in turn, should not be narrowly defined as the conversion of inputs to outputs. It must also embrace a broader interpretation of efficiency that includes integrating health workers into the system. This means leveraging technology to support this role, while concurrently ensuring that the adoption of such technologies does not exacerbate existing disparities in access. Productivity is a measure of efficiency and one possible way of measuring performance. Both performance and productivity are influenced by a variety of individual and systemic factors. Evidence suggests broadening the dimensions of performance and productivity and including these elements explicitly in policy development. This comprehensive approach underscores the need for policies and practices that reflect the intricate interplay between these dimensions, recognising the dynamic role of health workers in delivering effective healthcare in an ever-changing global health landscape.

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7. DECLARATIONS

7.1 Ethics approval and consent to participate

Not applicable

7.2 Authors' contributions

All authors contribute to writing of the manuscript. JPB wrote and GF wrote the first draft of the paper and interpreted the preliminary findings. AS, PZ and LC contributed to the global perspective and to the interpretation of the final findings. All authors read and approved the final manuscript.

7.3 Competing interests

The views expressed in this article are those of the authors alone and do not represent the views of WHO.

7.4 Research ethics approval

This study does not involve human participants

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