

**Beyond equality:  
*the feminization of the global health  
workforce and its impact on wage  
conditions of health professions***

**Geordan Shannon  
Nicole Minckas  
Des Tan  
Hassan Haghparast-Bidgoli  
Neha Batura  
Jenevieve Mannell**

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Institute for Global Health, UCL,  
30 Guildford Street, London WC1N 1EH

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Geordan Shannon, Nicole Minckas, Des Tan, Hassan Haghparast-Bidgoli, Neha Batura, Jenevieve Mannell

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Economics for Global Health and Development (EGHD) Research Group  
Institute for Global Health  
University College London  
30 Guildford Street, London WC1N 1EH  
Tel: +44 (0)20 7905 2299  
Web: [www.ighe.org](http://www.ighe.org)

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## **Abstract**

### **Background**

The global health workforce is feminizing. With increasing calls for gender equality in global health, a discussion is long overdue about the ramifications of a feminized global health workforce. In this article, we ask: does feminization of the health workforce lead to deterioration of wage conditions? We aimed to explore gender trends (the 'feminization' of the global health workforce) and examine if and how these trends are associated with changing wage conditions over time.

### **Methods**

We performed an exploratory, time series analysis of gender disaggregated data from the *WageIndicator* dataset. We used panel data to explore trends in gender participation and remuneration over time, in an attempt to extend current understandings of gender trends in the global health workforce and their impact on the perceived value of the health workforce itself. We analyzed a sample of 25 countries over 9 years between 2006 and 2014, containing 970,894 individuals, of which 48,282 participants were employed in 37 health occupations.

### **Findings**

The health workforce is feminizing, particularly in lower- and upper-middle income countries. This was associated with a wage gap of 26% to 36% less than men, which increased over time. In lower- and upper-middle income countries, an increasing proportion of women in the health workforce was associated with an increasing gender wage gap and decreasing gross hourly wage relative to the national reported average.

### **Interpretation**

These results, if a true reflection of the global health workforce, have significant implications for health policy and planning and highlight tensions between current, purely economic, framing of health workforce dynamics and the need for a gender critique of these dynamics. They also indicate the need for a more nuanced approach to health workforce planning that is gender sensitive, specific to countries' levels of development, and considers specific health occupations.

### **Keywords**

Gender, gender equality, health workforce, global health, wage conditions

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## 1. Background

The global health workforce is feminizing. Women comprise approximately 75% of the health workforce,<sup>1</sup> and over 90% of nursing and midwifery professions.<sup>2</sup> About 55% of UK medical students are female<sup>3</sup> and, in Europe, women physicians outnumber men.<sup>4</sup> However, this feminization is occurring unequally. Women tend to belong to lower cadres of health workers.<sup>1,5</sup> At higher professional levels, women are under-represented in positions of leadership<sup>6</sup> and earn less than men.<sup>1,2</sup> Women are over-represented in unskilled and unpaid work<sup>5</sup> and they are more likely to participate in labor markets when the time-cost of unpaid care is reduced.<sup>7</sup>

With increasing calls for gender equality in global health, a discussion about the ramifications of a feminized global health workforce is long overdue. In this article, we ask: does feminization of the health workforce lead to deterioration of wage conditions overall? With a predicted shortfall of over 18 million health workers by 2030 to achieve universal health coverage (UHC), investing in human resources for health is an international priority.<sup>8</sup> However, gender has been a missing dimension in human resource policy and health sector reform.<sup>9,10</sup> Accordingly, we must widen our understanding of health workforce dynamics and the gender inequalities that exist within it. There is a need, beyond examining cross-sectional differences in women's representation in healthcare professions, to examine the dynamics of women and men in the global health workforce *over time*.

One way to explore workforce trends, including perceived professional value, is through wage data. Wages are widely regarded as a factor that influence job satisfaction and may drive the "...migration of healthcare professionals within and across countries."<sup>11</sup> Further, wages are a major component of government health expenditure.<sup>12</sup> In the general labor force, occupations with a greater proportion of women pay less on average than those with a greater proportion of men.<sup>13</sup> In healthcare, a cross-sectional analysis of 16 occupations demonstrated that a 1% increase in the proportion of women in a certain occupation was associated with a 8% decrease in wage rank compared to other healthcare occupations.<sup>14</sup> However, there is a paucity of research on gender trends in the global health workforce over time and what this would mean for healthcare wages.

A possible reason for this evidence gap is the lack of internationally comparable, updated wage data that are gender-disaggregated and contain sufficiently detailed information about health sector occupations and their corresponding wages. Many countries have limited ability to report healthcare wages due to infrastructural barriers.<sup>11</sup> International Labor Office (ILO)

and Organization for Economic Cooperation and Development (OECD) data often report highly-aggregated occupational levels or do not present gender-disaggregated.<sup>14</sup> Owing to these limitations, critical, evidence-based discussions about dynamics of women in the global health workforce over time and whether these trends affect wage conditions are limited.

In this article, we explore if feminization of the health workforce leads to deterioration of wage conditions. We aim to explore gender trends (the ‘feminization’ of the global health workforce) and examine if and how these trends are associated with changing wage conditions over time. We perform an exploratory time series analysis of gender disaggregated data from the *WageIndicator* dataset between 2006 and 2014. Our proposed strategy builds from the methodology proposed by Tijdens et al., who extracted age, gender, education, occupation and salary data over 20 countries and presented a pooled analysis.<sup>14</sup> Here, we use exploratory, time series analysis to examine trends in gender participation and remuneration over time, to extend our understandings of gender trends in the global health workforce and its impact on the perceived value of the health workforce itself.

## 2. Methods

### 2.1 Data

*WageIndicator* is a Dutch online platform containing information about national labor markets, including salary checks, labor laws, and minimum wage information. The website is visited over 200,000 times per month by students, job-seekers, employees and self-employed persons around the world.<sup>14,15</sup> Visitors to the site participate in a voluntary questionnaire regarding their occupation and wages. Around 5% of visitors – more than 1 million individuals – have completed the survey. The questionnaire is comparable across countries, presented in the national language(s) and adapted to local contexts.<sup>14</sup> Survey questions, presented in detail by Tijdens et al., contain information on gender, sociodemographic characteristics, country, occupation, wages, and other work-related details.<sup>14</sup> We were granted access to data for free for the purpose of academic research from the IZA, Germany, at <http://idsc.iza.org/?page=27&stid=1025>.<sup>16</sup>

Use of web survey data such as *WageIndicator* is not without its challenges. However, to our knowledge, *WageIndicator* data is currently the only resource that contains both sex-disaggregated data, and sufficiently detailed information about health sector occupations and wages.

We included countries that contained information from over 1000 participants and excluded countries that had more than five consecutive years of missing data, or countries that demonstrated significant attrition (>80% per year) in survey response over time. We narrowed our timeframe between 2006 and 2014 due to poor survey response before 2006. This provided a sample of 25 countries over 9 years, containing 1,789,216 observations. After dropping survey participants with incomplete or missing survey responses, the sample had 970,894 observations (Table 1). Given the restricted size of the dataset, and to reduce sampling error due to small sample sizes in some country-year cells, we grouped countries by their World Bank classification,<sup>17</sup> for 2017 levels, according to GNI per capita and report results based on these groups.

Previous studies show that *WageIndicator* data deviated from national reference samples over gender, age and level of education.<sup>18</sup> We applied a simple proportional weighting by country to adjust our data to ILO global Economically Active Population Estimates and Projections (EAPEP) distributions of age and gender.<sup>19</sup>

## **2.2 Defining health workers**

We defined health occupations according to the WHO Global Atlas of the Health Workforce international classification of health workers, based on certain 4-digit identifying codes derived from the International Standard Classification of Occupations, 2008 revision (ISCO-08).<sup>20</sup> The self-identified occupations reported by *WageIndicator* are coded according to ISCO-08 classifications. The survey asks participants to self-identify their occupation in a three-step process, allowing a search for about 1700 occupations in the database.<sup>14</sup> This process has yielded accurate results that have been validated internationally.<sup>21</sup>

We examined 37 occupations, coded to the 4-digit ISCO-08 level, and categorized health workers into 15 professional groups (Table 2). Restricting the analysis to health occupations resulted in 79,633 remaining observations, of which 48,282 reported wage data.

**Table 1: Summary of country groupings according to World Bank income classification, 2017**

Country	Number of survey participants	
	Total workforce (n)	Health workforce (n)
<b>Lower-middle Income Countries (LMIC): GNI per capita \$1,006 TO \$3,955</b>		
Angola	924	35
India	31382	377
Indonesia	16703	315
Ukraine	34803	1,567
Vietnam	4055	14
<b>Sub-total</b>	<b>87,867</b>	<b>2,308</b>
<b>Upper-middle income countries (UMIC): GNI per capita \$3,956 TO \$12,235</b>		
Argentina	56,212	1735
Azerbaijan	3,460	93
Belarus	46,849	1,663
Brazil	74,160	2,907
Colombia	7,614	392
Kazakhstan	23,194	676
Mexico	26,111	762
Paraguay	4,475	96
Russian Federation	14,262	632
South Africa	35,856	774
<b>Sub-total</b>	<b>292,193</b>	<b>9,730</b>
<b>High Income Countries (HIC): GNI per capita \$12,236 or more</b>		
Belgium	41,050	2,901
Chile	9,413	439
Czech Republic	18,695	1,117
Finland	29,184	2,233
Germany	185,498	12,465
Hungary	13,972	640
Netherlands	207,929	12,227
Spain	29,637	1,319
United Kingdom	46,393	2,233
United States	9,063	670
<b>Sub-total</b>	<b>590,834</b>	<b>36,244</b>
<b>Total</b>	<b>970,894</b>	<b>48,282</b>

**Table 2: Health occupation groupings by ISCO-08 4-digit classification system**

<p><b>1. Health service managers</b>  1342 Health services manager  1343 Aged care services manager</p> <p><b>2. Medical doctors</b>  2211 Generalist medical practitioners  2212 Specialist medical practitioners</p> <p><b>3. Nursing and midwifery professionals</b>  2221 Nursing professionals  2222 Midwifery professionals</p> <p><b>4. Traditional and complementary medicine professionals</b>  2230 Traditional and complementary medicine professionals  3230 Traditional and complementary medicine associate professionals</p> <p><b>5. Paramedical practitioners</b>  2240 Paramedical practitioners</p> <p><b>6. Dentists</b>  2261 Dentists</p> <p><b>7. Pharmacists</b>  2262 Pharmacists</p> <p><b>8. Allied health staff</b>  2263 Environmental and occupational health and hygiene professionals  2264 Physiotherapists  2265 Dieticians and nutritionists  2266 Audiologists and speech therapists  2267 Optometrists and ophthalmic opticians  2269 Health professionals not elsewhere classified</p>	<p><b>9. Medical and pharmaceutical technicians</b>  3211 Medical imaging and therapeutic equipment technicians  3212 Medical and pathology laboratory technicians  3213 Pharmaceutical technicians and assistants  3214 Medical and dental prosthetic technicians</p> <p><b>10. Nursing and midwifery associate professionals</b>  3221 Nursing associate professionals  3222 Midwifery associate professionals</p> <p><b>11. Community Health Workers</b>  3253 Community health workers</p> <p><b>12. Other health associate professionals</b>  3251 Dental assistants and therapists  3254 Dispensing opticians  3255 Physiotherapy technicians and assistants  3256 Medical assistants  3257 Environmental and occupational health inspectors and associates  3258 Ambulance workers  3259 Health associate professionals not elsewhere classified</p> <p><b>13. Counselling and social work</b>  2635 Counselling and social work</p> <p><b>14. Administration and medical records</b>  3344 Medical secretary  3252 Medical records and health information technicians</p> <p><b>15. Carers in health services</b>  5321 Health care assistants  5322 Home-based personal care workers  5329 Personal care workers in health services not elsewhere classified</p>
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## 2.3 Health worker wages

*WageIndicator* data contains information on self-reported wages, transformed to gross reported wages per hour, converted to an international dollar using a purchasing power parity (PPP) conversion factor for each country. PPP is calculated based on an exchange rate that compares and equalises a basket of goods and services between countries.<sup>11</sup> We excluded the top and bottom 0.05% of observations (n=80), as these may be outliers due to erroneous self-reported responses.

We calculated the *Gender Wage Gap* (GWG) as the difference between average gross hourly earnings of men and average gross hourly earnings of women expressed as a percentage of average gross hourly earnings of men.<sup>22</sup> This was calculated by country group and year, over the general and the health workforce.

To explore the relationship between healthcare wages and average national wages (the perceived value of healthcare professions reflected by occupation-specific wages relative to national trends), we calculated the average national wage, defined as the mean reported salary of all survey participants (healthcare and non-healthcare professions) by country and year. We then calculated the ratio between the individual health occupation-specific reported wage and the average national wage, grouped by the 15 occupational categories and countries. We define this as the Healthcare occupation Wage Ratio (HcWR).

## 2.4 Analysis

We performed an exploratory, descriptive analysis of country groups by year between 2006 and 2014. We explored gender trends in participation, remuneration and the association between the proportion of women in the health workforce and health worker wages by occupational group. To examine gender trends in participation, we calculated the unadjusted *Gender Ratio* (GR, proportion of women workers compared to total workers) by country group and year, and presented this by the general workforce and the health workforce. To understand gender trends in remuneration, we presented GWGs in health occupations over time, also grouped by country and year. To examine the impact of workforce feminization, we explored the following between the GR and: i) average health worker wages by country and occupation group; ii) health worker GWGs by occupation; and iii) HcWR.

We performed our analysis on Python and Stata 15.

### 3. Results

The final dataset contained information from a total of 970,894 individuals from 25 countries, including 48,282 participants employed over 37 health occupations, over 9 years. There was a gender balance of 43.4% men and 56.6% women (Supplementary Table). Female participation in the survey varied from 35.6% in Angola (corresponding to 64.4% male participation) to 83.3% in India (corresponding to 16.7% male participation). Reported ages ranged from 7 to 81 years, with the majority of participants focused between 20 and 39 years.

GR trends in the general and health workforce are presented in Figure 1. In the general workforce, GRs ranged from 0.20 in LMICs in 2006 to 0.54 in UMICs 2014. In MICs, GRs increased over time: in LMICs, they increased from 0.20 in 2006 to 0.41 in 2014; in UMICs, they increased from 0.40 in 2006 to 0.54 in 2014. However, in HICs, gender ratios remained relatively constant, dropping from 0.47 in 2006 to 0.43 in 2014. GRs were higher in the health workforce than the general workforce and were also increasing. HICs demonstrated a high baseline GR which increased slightly from 0.73 to 0.77. The most striking increase was noted in middle income countries: LMICs demonstrated a GR increase from 0.5 to 0.65 (with a nadir of 0.36 in 2009), and UMICs increased from 0.52 to 0.71 between 2006 and 2014.

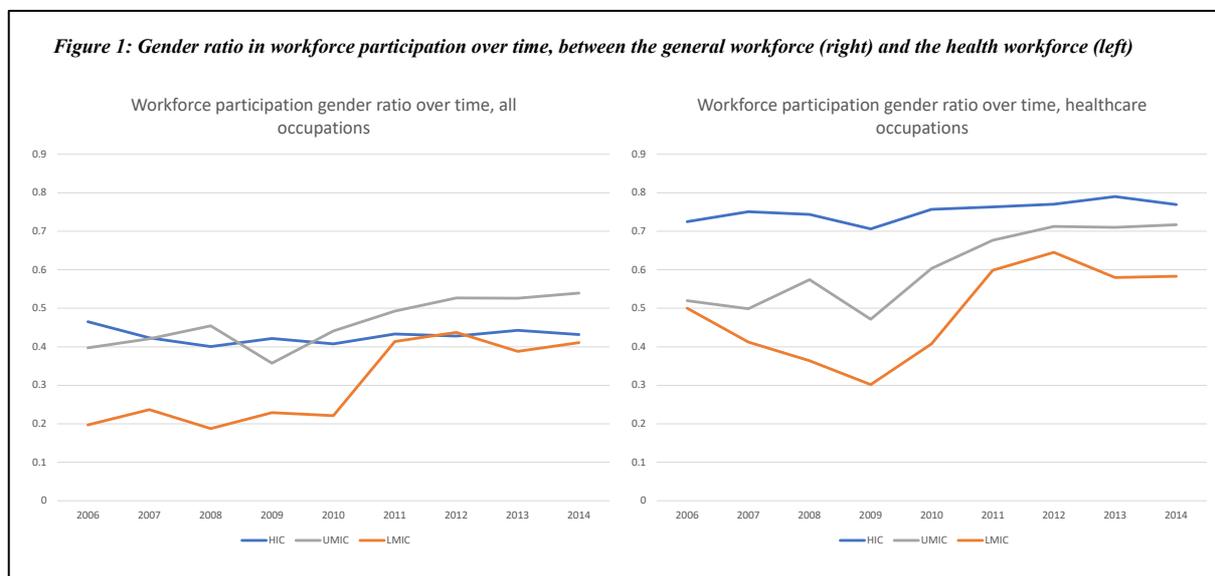
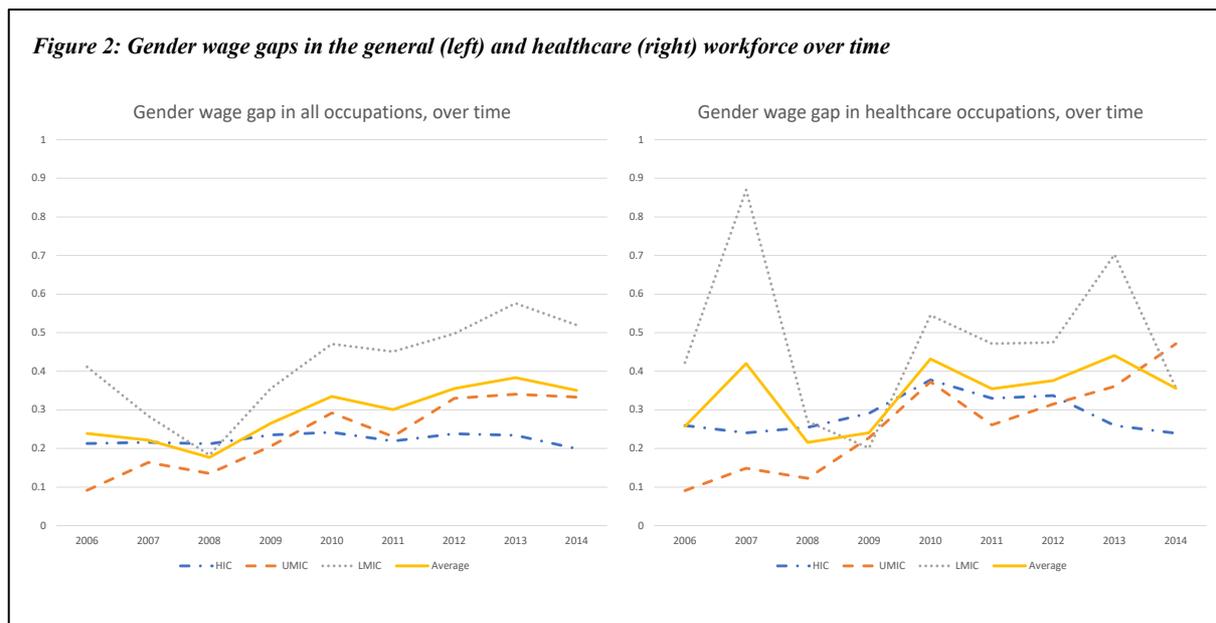


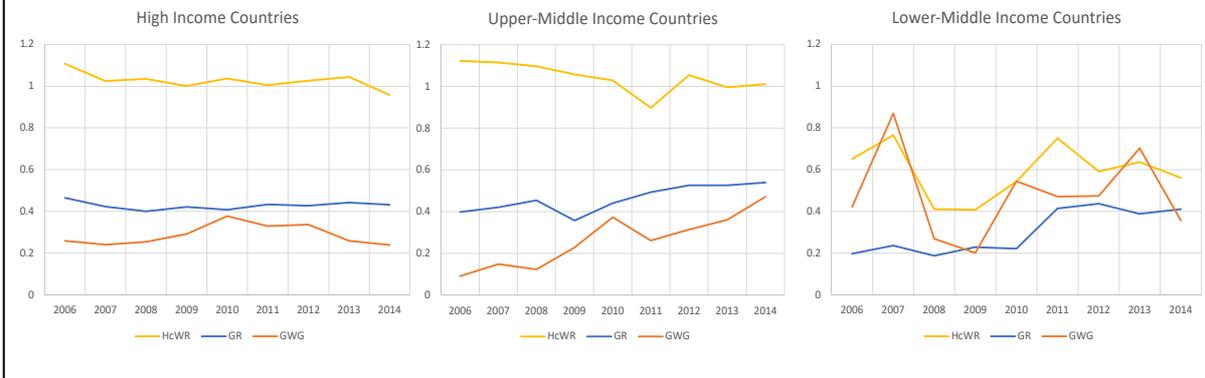
Figure 2 presents trends in the GWG in the general and healthcare workforce over time. In the general workforce, the average GWG increased between 2006 and 2014 from 0.24 to 0.35, reflecting a large and increasing GWG in LMICs (from 0.41 in 2006 to 0.52 in 2014) and a moderate but increasing GWG in UMICs (changing from 0.09 in 2006 to 0.33 in 2014). In HICs, the GWG remained relatively constant, between 0.21 in 2006 and 0.20 in 2014. In the

health workforce, the average GWG increased from 0.26 in 2006 to 0.36 in 2014. Whilst in HICs the GWG remained constant, declining slightly from 0.26 to 0.24 between 2006 and 2014, there was a notable increase in the GWG in UMICs, from 0.09 in 2006 to 0.47 in 2014. In LMICs the GWG was higher but decreased from 0.42 in 2006 to 0.36 in 2014. There was greater variation in the results from LMICs in healthcare wage gaps, possibly reflecting the smaller sample size.



An increasing GR in the health workforce was associated with minor increases in the average wage of healthcare staff over time in HICs and UMICs (21.4 to 25.3, and 15.7 to 15.9 PPP dollars per hour, respectively), but it was associated with a decrease in average healthcare wages in LMICs (from 13.2 to 7.5 PPP dollars per hour between 2006 and 2014). Furthermore, in LMICs and UMICs, increasing GR and GWGs in the health workforce were associated with a decreasing HcWR over time (Figure 3). In HICs, the HcWR decreased over time, whilst the GR and GWG remained relatively constant.

**Figure 3: Trends in gender ratio (GR), gender wage gap (GWG), and healthcare occupation wage ratio (HcWR) in healthcare over time, by high, upper-middle, and lower-middle income countries**



## 4. Discussion

We utilized *WageIndicator* data as an exploratory means to gain insight into health workforce participation and remuneration trends from a gender perspective. By calculating trends in GR and GWG between the general workforce and the health workforce over 25 countries, we were able to explore the impact of the changing health workforce composition on wages from a gender perspective.

We found that the health workforce is feminizing, particularly in LMICs and UMICs. This finding is consistent with current reports.<sup>23,24</sup> In general, gender trends in the health workforce mirrored general workforce trends, but women comprised a larger share of the health workforce compared to the general workforce. There were proportionally more women in health occupations in most years and country groups, with up to 77% of the health workforce consisting of women in HICs in 2014.

There was a large wage gap between men and women in the general and health workforce. On average, women were paid 24% to 35% less than men in the general workforce, and 26% to 36% less than men in the health workforce. Whilst this gap remained constant in HICs, the gender wage gap in LMICs and UMICs increased over time: women were being paid relatively less than men, and that this gap was widening. So, as more women entered the health workforce, they received a worse deal than their male counterparts.

Although increasing proportions of women in the health workforce were associated with minor increases in the average wage of healthcare staff over time in HICs and UMICs, it was

associated with a stark decrease in average healthcare wages in LMICs. In LMICs and UMICs - but not HICs – increasing proportions of women in the health workforce were associated with an increasing wage gap and decreasing salary relative to the national reported average. This is consistent with the cross-sectional analysis reported by Tidjens et al. who reported increasing proportions of women over selected health occupations were associated with decreasing wage rank.<sup>14</sup>

These results, if a true reflection of the health workforce, have significant implications for health policy and planning, and specifically for the development, organization and management of human resources for health. The findings require greater interrogation, bringing together economic and feminist perspectives. They also point to the fact that we need a more nuanced approach to health workforce planning, that is gender sensitive, specific to countries' levels of development, and considers specific health occupations. In the following section, we will grapple with these issues further.

#### **4.1 Macroeconomics and feminism: critiquing health workforce trends from a gender perspective**

A possible explanation of our findings is that increasing GRs may be associated with a larger size of the overall health workforce, and, as a greater total number of people enter the paid health workforce, they are paid proportionally less. An expanding health workforce, necessary to sustain health systems and reach UHC targets, may confront financing challenges such as public health expenditure caps or wage bill ceilings in the public healthcare workforce.<sup>11,25</sup> Data shows that the size of the health workforce is increasing in many countries around the world.<sup>26,27</sup> In our dataset, however, we observed a relatively steady number of participants reporting health employment between 2006 and 2014, although this may not necessarily be representative of the current trends and instead may be limited by the online self-reporting process by countries as reported in the methods section above.

Our results suggest that, as the health workforce feminizes, wage inequality increases. In other words, women in the health workforce in general receive lower hourly pay than their male counterparts and thus may be perceived as being able to do 'more for less.' This establishes a perverse economic incentive whereby increasing the number of women in the health workforce may be a 'good buy,' keeping the overall health wage bill down. Unless we dissect this trend with a feminist or gender lens, this tension may not be recognized. Feminist

economists have long argued that markets are socially-embedded and therefore gendered social systems.<sup>28</sup> The feminization of the health workforce is evidence of how wage inequality is not just about fairness but leads to both unequal power and unequal opportunities for women.<sup>29,30</sup> A feminized health workforce with increasingly lower wages leaves the disproportionate number of women working in health with less economic power. It also changes the status of the health sector in society, further devaluing care work economically and emphasizing the social norm that care work is women's work. Ensuring that women have equal pay for equal work is insufficient to address these concerns.

## 4.2 Limitations

*WageIndicator* data facilitated an exploratory analysis of health workforce trends using a gender lens. This is the only dataset that we could identify that provided necessary information on the gender composition of the health workforce as well as self-reported wage data. Despite the ability to collect data in a low-cost, rapid and continuous manner, web surveys are limited by the representativeness of the collected data with respect to the population of interest.<sup>31,14</sup> Due to the lack of sampling frame, web survey data reports information from a specific subpopulation: those with internet access, visiting the specific website, and who chose to complete the survey. Thus, web surveys are susceptible to self-selection and reporting bias.<sup>31</sup> Data limitations have plagued health workforce research, especially in low- and middle-income countries.<sup>11</sup> Sourcing accurate wage information is difficult; even ILO wage estimates must sometimes rely on self-reported information derived from household surveys.<sup>32</sup> So, whilst *WageIndicator* survey data is imperfect, it is a novel way of gaining insights into health workforce dynamics from a gender perspective in the absence of comprehensive and sufficiently disaggregated data. Given this gap, the Health Workforce Department of the WHO, in collaboration with the ILO, is currently compiling gender disaggregated wage data, and have plans to publish and make public their findings.<sup>33</sup>

In this survey, we were unable to quantify unpaid health labor, such as caregiving. Women are known to comprise the majority of unpaid healthcare workers.<sup>5,22,34</sup> By failing to recognize the unpaid health workforce, we further silence the voices of those – mainly women – who are not a part of the formal health economy. Furthermore, we tend to define the health work in fixed and stylized categories which may not capture the multiple or blurred roles women occupy in the health and care economy.<sup>5</sup> Although we were not able to address these limitations in the body of the research, we do recognize this as a necessary and urgent area of research and policy development.

### **4.3 Looking forward**

The call for UHC in SDG 3.8 has significant implications for health workforce policy and planning. Modelled estimates predict a shortfall of around 18 million health workers needed to meet the objective of UHC.<sup>24</sup> Dealing with expanding health workforce needs is no small feat. As Lauer and colleagues explain, sustainable financing for health workers is achievable in most low-income and lower-middle income countries, through progressive fiscal policies and reprioritization of domestic expenditure.<sup>12</sup> Health worker wages comprise a major proportion of public health expenditure, and must be of central concern when planning to realize the objective of 'health for all.'<sup>11,12</sup> However, demonstrated above, this analysis cannot be gender-blind, because a feminizing health workforce has implications for wages which translates into significant ramifications for health financing.

Going forward, this data may serve as a novel foundation for econometric modelling to identify future health workforce needs from a gender perspective and highlight inequalities that require rectification through policy initiatives. We may also look to combine evidence from the health and general labor force. For example, we know that investing health workers leads to economic growth.<sup>26</sup> We also know that macroeconomic gains are possible when women are able to develop their full labor market potential.<sup>35</sup> So, investing in women through a gender equitable health workforce constitutes a double-win.

## **5. Conclusion**

This study is the first to our knowledge that attempts to explore international trends of health workforce feminization over time and its implication on health workforce wage conditions. Our approach brings together a descriptive analysis of gender trends in the global health workforce (and wages) over time with a conceptual discussion on the implications of our results from macroeconomic and feminist perspectives. Our findings suggest that the health workforce is feminizing, that women are paid less than men for the same work, and that the gender wage gap is increasing, especially in lower- and upper-middle income countries. In order for future health workforce policy and planning to be as effective and equitable as possible, we highlight the need for a high-level discussion on gender dynamics and the global health workforce pairing an economics and critical feminist analysis.

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