

Global nephrology workforce: gaps and opportunities toward a sustainable kidney care system



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The health workforce is the cornerstone of any health care system. An adequately trained and sufficiently staffed workforce is essential to reach universal health coverage. In particular, a nephrology workforce is critical to meet the growing worldwide burden of kidney disease. Despite some attempts, the global nephrology workforce and training capacity remains widely unknown. This multinational cross-sectional survey was part of the Global

Kidney Health Atlas project, a new initiative administered by the International Society of Nephrology (ISN). The objective of this study was to address the existing global nephrology workforce and training capacity. The questionnaire was administered online, and all data were analyzed and presented by ISN regions and World Bank country classification. Overall, 125 United Nations member states responded to the entire survey, with 121 countries responding to survey questions pertaining to the nephrology workforce. The global nephrologist density was 8.83 per million population (PMP); high-income countries reported a nephrologist density of 28.52 PMP compared with 0.31 PMP in low-income countries. Similarly, the global nephrologist trainee density was 1.87 PMP;

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high-income countries reported a 30 times greater nephrology trainee density than low-income countries (6.03 PMP vs. 0.18 PMP). Countries reported a shortage in all care providers in nephrology. A nephrology training program existed in 79% of countries, ranging from 97% in high-income countries to 41% in low-income countries. In countries with a training program, the majority (86%) of programs were 2 to 4 years, and the most common training structure (56%) was following general internal medicine. We found significant variation in the global density of nephrologists and nephrology trainees and shortages in all care providers in nephrology; the gap was more prominent in low-income countries, particularly in African and South Asian ISN regions. These findings point to significant gaps in the current nephrology workforce and opportunities for countries and regions to develop and maintain a sustainable workforce.

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Health workforce, in general, is the cornerstone of a country's health care system.¹ Countries cannot reach universal health coverage² and sustainable development goals³ without an investment in human resources. To achieve that, countries need adequate numbers of qualified workforce members delivering and managing their health care system. A nephrology workforce in particular is critical to meet the growing worldwide burden of kidney disease^{4–6} and its risk factors, such as diabetes,⁷ obesity,⁸ and an aging population,⁹ and the increasing demand of renal replacement therapy (RRT) and kidney care in both high-income and low-income countries.¹⁰ Indeed, nephrologist caseload was found to be associated with mortality of dialysis patients.¹¹ Various studies have already examined the state of the nephrology workforce, highlighting the gaps and deficiencies in workforce availability and quality.^{12–18} In 1 review of the global nephrology workforce, Sharif *et al.*¹² identified multiple factors responsible for the global shortage in the nephrology workforce and suggested a detailed and comprehensive nephrology workforce planning that is backed by government policy and legislation to ensure effective delivery and sustainability of kidney disease care. Another study that examined kidney care structures across 17 European countries identified limited workforce capacity, among many others, as a common barrier to the care of people with non-dialysis-dependent chronic kidney disease (CKD).¹³

The objective of this cross-sectional survey that was part of the Global Kidney Health Atlas (GKHA) project, a new initiative to assess kidney care in all world regions administered under the umbrella of the International Society of

Nephrology (ISN), was to comprehensively examine the existing nephrology workforce in the form of the number of nephrologists and nephrology trainees; nephrology training capacity in terms of availability, duration, and structure; and the perceived shortages in health care providers pertaining to nephrology across all 10 ISN regions¹⁹ and 2014 World Bank country classification²⁰ as low-, lower-middle-, upper-middle-, and high-income nations, based on the World Health Organization (WHO) building blocks.²¹

Results

Response rate. Responses were received from a total of 125 of 130 UN member states (96% response rate) across 10 ISN regions, and 121 countries answered survey questions pertaining to nephrology workforce. Further details on the response rate and population coverage of the survey have been described elsewhere.²²

Global density of nephrologists. Overall, the density of nephrologists reported was 8.83 per million population (PMP) (Table 1, Figure 1a). There was considerable variation in density of nephrologists among World Bank income groups and ISN region countries. High-income countries had the highest nephrologist density (28.52 PMP), followed by upper-middle-income (7.23 PMP), lower-middle-income (2.38 PMP), and low income (0.31 PMP) countries (Table 1). Of the 10 countries with the lowest nephrologist density, 9 belonged to the Africa ISN region, and sub-Saharan Africa specifically. Yemen, in the Middle East ISN region, was the exception (Figure 1b). In contrast, the countries with the highest nephrologist density were from different ISN regions. Japan (North and East Asia region) reported the highest density, followed by Lithuania (Eastern and Central Europe region), Taiwan (North and East Asia region), Greece (Western Europe region), Uruguay (Latin America region), Spain (Western Europe region), Slovenia (Eastern and Central Europe region), Argentina (Latin America region), Germany (Western Europe region) and Oman (Middle East region) (Figure 1b).

Overall, countries in the Africa ISN region reported a low density (3.64 PMP) of nephrologists (Table 1). The lowest numbers were reported from sub-Saharan countries, namely Malawi (0.06 PMP), Mozambique (0.08 PMP), and Ethiopia (0.09 PMP). On the other hand, the highest numbers were reported from North African countries, namely Egypt (21.65 PMP), Tunisia (16.31 PMP), Libya (12.48 PMP), and Algeria (11.38 PMP) (Supplementary Figure S1).

Eastern and Central European countries reported a high density (16.33 PMP) of nephrologists (Table 1). However, there was wide variation in nephrologist density among the countries in the region. Turkey (6.30 PMP), Moldova (9.02 PMP), and Macedonia (9.54 PMP) reported the lowest densities of nephrologists, while Lithuania (69.34 PMP) and Slovenia (40.33 PMP) reported the highest, a difference of 63.04 between each end of the spectrum (Supplementary Figure S1).

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