Global nurse shortages - the facts, the impact and action for change

Preferred short title

Global nursing shortages – action for change

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ABSTRACT

Introduction

Nurses comprise half the global health workforce. A nine million shortage estimated in 2014 is predicted to decrease by two million by 2030 but disproportionality effect regions such as Africa. This scoping review investigated: what is known about current nurse workforces and shortages and what can be done to forestall such shortages?

Sources of data

Published documents from international organisations with remits for nursing workforces, published reviews with forward citation and key author searches.

Areas of agreement

Addressing nurse shortages requires a data informed, country specific model of the routes of supply and demand. It requires evidence informed policy and resource allocation at national, subnational and organisation levels.

Areas of controversy

The definition in law, type of education, levels and scope of practice of nurses varies between countries raising questions of factors and evidence underpinning such variation. Most policy solutions proposed by international bodies draws on data and research about the medical workforce and applies that to nurses, despite the different demographic profile, the work, the career options, the remuneration and the status.

Growing points

Demand for nurses is increasing in all countries. Better workforce planning in nursing is crucial to reduce health inequalities and ensure sustainable health systems

Areas timely for developing research.

Research is needed on: the nursing workforce in low income countries and in rural and remote areas; on the impact of scope of practice and task-shifting changes; on the impact over time of implementing system wide policies as well as raising the profile of nursing.

KEY WORDS:

Nursing, workforce, shortages, labour market supply and demand, scoping review, evidence gap

Introduction

Achieving population health, universal health coverage (UHC) and equitable access to health care is dependent on having a health workforce that is of sufficient capacity, capability and quality to meet epidemiological challenges and changing demand[1]. The World Health Organisation (WHO) predicts increased global demand for health and social care staff with the creation of 40 million new jobs by 2030. [2] Professionally educated nurses are numerically the largest professional group in most countries and comprise about half the global healthcare workforce. [2] In 2014, WHO and the World Bank calculated a global shortage of nine million nurses and midwives. They predicted this will reduce by 2030 to 7.6 million but it will have a disproportionate impact on regions such as Africa. [3] This scoping review [4] addressed the questions: what is known about the current nursing workforce, how are shortages calculated and why do shortages of nurses arise , what can be done to forestall such shortages in a national and global context, and where are the evidence gaps?

A scoping review maps out the breadth of issues, identifying areas for policy and research.[4] The review has drawn on: the publications of international organisations with remits for health workforce (WHO, Office of Economic Co-operation and Development[OECD]) and nursing (International Council of Nurses,[ICN]); reviews concerned with nursing workforce and shortages identified through database searches (SCOPUS , Medline, CINAHL 1-1-2008- 1-12-2018); and follow up of cited literature and key authors. The review excluded literature concerned with midwives and nurse-midwifes.

The current nursing workforce – what do we know?

WHO estimated 21 million nurses/midwives [2] globally in 2014, although there are variations in definition and deployment, which we explain later in this section. Despite the 2008 global financial crisis the number of nurses has grown in many countries [5]. The absolute numbers range from over 3 million nurses in large countries such China, India and the United States to under 5,000 in smaller countries such as Guinea, Iceland and Jamaica[3]. Many countries however have very little data on the distribution, types or trends of their nursing workforce which contrasts with information held about the medical workforce [2].

Nurse shortages have to be considered in the context of international variation in health system development, size of the economy, the population size as well the presence of other key health professionals, the most important of which is medicine. The international variation in ratio of nurses to population and doctors is illustrated in table 1.

Table 1 Examples of variation by country in ratios of nurses to population and to doctors in 2017 or nearest year data available

Country	Ratio of nurses to 1,000 population	Ratio of nurses to 1 doctor
Norway	17.5	3.9
Germany	12.9	3.2
Australia	11.6	3.3
Japan	11.0	4.6
USA	11.1	4.1
UK	7.9	2.8
Brazil	7.4	0.8
Philippines	6.0	5.2
Poland	5.2	2.2
China	2.3	1.3
Thailand	2.1	5.3
Turkey	1.9	1.2
India	1.4	1.9
South Africa	1.2	1.4
Papua New Guinea	0.6	9.7
Pakistan	0.6	0.7

Data compiled from four OECD sources [5,41,42,43] :

The figures in table 1 however mask some fundamental variations as to who counts as a nurse; not all countries have legislation to protect the title and education level of 'nurse' [6]. Registered nurse (RN) academic levels also vary; for example, in Europe RN education is at diploma level in seven countries e.g. Luxembourg but at degree level in others e.g. United Kingdom (UK) [7]. Some countries regulate multiple levels of nurse, such as practical nurses and advanced practice nurses. Regulated practical nurses have different names: enrolled nurse (Zambia), licensed practical nurses (US), nurse assistant (Ghana), and nurse associate (UK). Advanced practice roles are those in which RNs, with additional training, undertake diagnostic and treatment roles traditionally the domain of the doctors. Like practical nurses these are variously named: nurse clinician (Botswana), nurse officer (Lesotho), nurse practitioner (US). Advanced practice roles and education are not always regulated, for example as in the UK [8]. Some countries also have nurse anaesthetists who are licensed to provide general and regional anaesthesia independently. Countries which have nurse anaesthetists include: Sweden, [9], the US which has over 42,000 [10]; and Ghana where, regulated by the General Medical Council, there are 14 nurse anaesthetists to every 1 doctor anaesthesiologist [11] . The scope of practice of nurses also varies. For example in some countries RNs have legal authority to prescribe pharmaceutical drugs independently although there are differences as to which nurses (on registration or with additional education) and which classes of drugs[12]. The extent of the scope of practice and advanced practice roles in any country reflects historical and contemporary issues including shortages or mal-distribution of doctors as well as support or otherwise from medical professional bodies.

Four further points are relevant in considering the global nursing workforce and shortages. Firstly, 90% of nurses are women [2]. Even in countries where there have been active programmes to increase the recruitment of men, such as the US, less than 10% are male [13]. Secondly, in most countries the majority of nurses earn less than the average wage of

that country[2]. There is some evidence that male nurses on average earn more than female nurses [13] and that nurses from minority ethnic backgrounds earn less and are under-represented in senior grades than those of majority ethnic origin (see for example evidence from England [14]). Thirdly, the majority of nurses are employed within hospitals (see table 2) despite broader international policy aims of strengthening primary care. Lastly, the majority of nurses are salaried employees although in a few countries some practice as independent, self-employed professionals as in the infirmiers liberales in France (see table 2) [15]. Taking into account these similarities and variations in the education, deployment and scope of practice of nurses, we turn now to consider shortages of nurses and the causes.

Table 2: Nurse employment in different sectors from five exemplar high income countries in 2018 or nearest year.

	Australia	**England***	**France**	**Japan**	**US**
Employment sector			Percentage		
Hospitals	63	77	65	60	61
Ambulatory healthcare services/community health services	10	23	17**	24	18
Nursing home and residential care facilities	11	Not available	Not available	7	7
Other	16	Not available	8	9	8

Data Sources US Bureau of Labor Statistics [44], Australian Health Workforce [45], NHS Digital England [46], Japan Nursing Association [47], Ministère des Solidarités et de la Santé [48].

*National Health Service only, ** Infirmiers liberale in primary care.

How are shortages calculated and why do shortages of nurses arise?

Calculating shortages

Definitions of 'shortages' in workforce are policy contingent and vary between health care systems. Criteria of *hard to fill vacancies* or trends in *volume of current vacant posts* are often used to describe health systems experiencing financial and demand pressures[16]. The latter measure is used currently in the National Health Service (NHS) in England and has been reported to have an upward trend over the previous three years [17]. A more prosaic definition of national shortages is whether RNs are on a government's occupation shortage list for inward migration, as they are for Australia [18] and the UK [19] but not for the US [20], at the time of writing.

In contrast there are those definitions of shortages which flow from staff planning projections. These calculate any gap between the numbers of nurses required (demand for) against the future number available to work (the supply). One such example is from WHO and the World Bank in which shortages are defined as lower than the minimum number of doctors and nurses per head of population required to achieve population health targets. [3] The targets in this case being 12 of the infectious disease, child and maternal health and non-communicable health specified in the Sustainable Development Goals [3]. Using national data, WHO/World Bank estimated the 7.6 million global shortfall by 2030 with disproportionate impact on Africa and low income countries. However, many health care systems have other developments beyond minimum targets which create demand for nurses but few have undertaken nurse staffing

planning projections at a national level. Only five of 31 high-income OECD member countries have modelled their demand for and supply of nurses to 2025. Of the five, four (Australia, Canada, Ireland, UK) predicted shortages and one, the US, predicted a surplus of qualified nurses [21].

Models of supply of and demand for nurses

WHO offers a system wide model for the supply and stock of all types of health professionals [2]. We have adapted the model to focus specifically on the supply and availability of qualified nurses (figure 1). This illustrates the inflows and outflows to the pipeline of supply, to the pool of registered nurses and to stock of nurses available for employment as nurses. The model applies at national and sub-national levels, where other patterns become more evident such as internal migration from rural to urban areas. All countries face similar problems in the supply of nurses and other health professionals in remote and rural areas [22]. There are some countries, which have an oversupply of nurses e.g. Philippines as part of "export" model – whereby working age women (often with children) enter other countries as migrants and work in the health system, sending money home to support their families [23] .

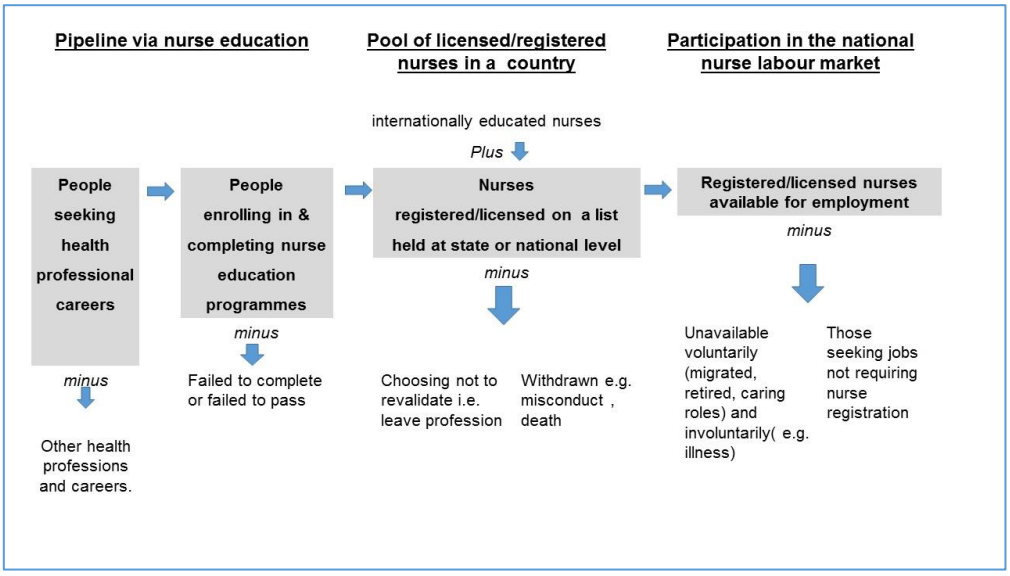

Figure 1: Model of the supply of nurses able and willing to participate in a national nurse labour market (adapted from WHO [2])

Shortages occur when demand for nurses outstrips the numbers of nurses available for employment. An overarching factor influencing demand is the economy; for example vacant nurse posts were frozen following the 2008 global financial crisis in countries such as Iceland [6] and Kenya [24]. Many factors influence the demand for nurses and we offer a model of these in Figure 2. However, the extent of the demand for nurses is country and time specific. For example there was increased demand in Thailand in the late eighties when a strong economy was the catalyst for the growth in private hospitals [25] and currently in the US where state legislation specifies the ratio of RNs to in-patients [26]. The volume of internationally educated nurses in a country maybe an indicator of a shortfall against demand or may be the custom and practice for the supply of nurses. For example the Netherlands has had less than 1% foreign trained nurses in its workforce consistently over the past 15 years while others such as the UK, Australia and New Zealand have consistently had over 14% in the same period [5].

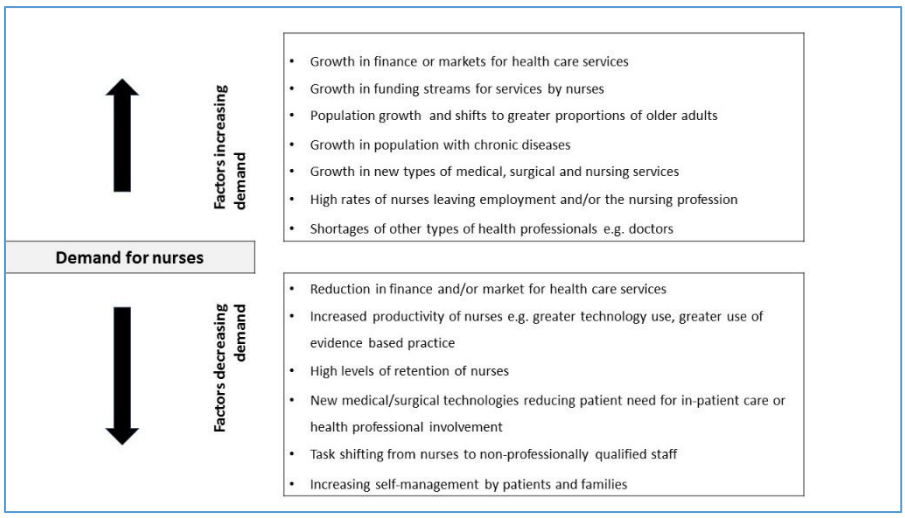

Figure 2 Model of factors increasing and decreasing the demand for nurses

What attracts nurses to jobs and why do they leave?

The state of the wider labour market influences nurses' choices about their employment. One consequence of high levels of demand or shortages is that the nurses have choices in jobs within their own country and also abroad. An RN qualification is an international passport to work (albeit with rules as to transferability). Classic economic theory argues that income level is the most significant factor in attracting (pulling) or pushing individuals from one job to another and from one job market to another. However, others have argued that the individual's decision about a job is taken not just on the wage level but is based on the perceived *net* advantage or disadvantage of multiple factors associated with a job [27]. The types of factors influential in this decision making include:

- *Individual*: skills and interests, career plans, caring/family responsibilities, financial responsibilities,
- *Job characteristics*: remuneration, other financial benefits (e.g. health insurance , pension), hours and pattern of working, type and volume of work, physical and/or emotional intensity of work , variety of work , team working, level of responsibility/autonomy, clinical and managerial support, professional support,
- *Organisation*: clinical and employer reputation, type (e.g. private, public), size of organisation, size of specialties within an organisation, infrastructure to support employees (e.g. child care facilities, meal and social facilities), access to professional and career development activities and/or funding for these,
- *Location*: urban, sub-urban, rural, proximity to family and/or other services such as schools for children.

Factors that attract nurses to remote and rural jobs illustrate the types of net assessment made. A systematic review investigating the decisions of newly qualified nurses taking up remote or rural posts found that at a personal level they had backgrounds of being educated in such areas and having family and/or spouses already in such areas. At an organisational level financial incentives were reported as important (such as student education loan repayment, health insurance and higher wage potential) but just as important was the presence of peer support and a good working environment [28]. However it is of note that there is very limited evidence concerning recruitment and retention of nurses to remote and rural posts (most evidence concerns doctors) and what there is

derives from a few high income countries (Australia, Canada and US) [29]. Reviews of evidence as to why nurses migrate to other countries also illustrate the multiplicity of factors in decision making [30] including:

- *Macro and meso level factors in the home country with the perceived converse in the country of destination*: weak economy, political instability and/or civil unrest, unemployment of nurses, low status of nurses, poor working conditions, few opportunities for nurses for career progression,
- *Personnel level factors*: desire for different cultural, life and/or health system experience, perceived opportunity for better financial rewards, perceived opportunity for improved quality of life for family and children, following already established partner or family network in the destination country, opportunity for career advancement and/or education.

Trying to understand why nurses leave and what retains nurses in their jobs has been a perennial question; the first Lancet Commission into shortages of nurses in the UK was published in 1933 [31] . Innumerable literature reviews on the subject in the intervening years demonstrate the interlocking range of factors at individual, organisational and the broader socio-economic level [32]. A recent umbrella review of systematic reviews investigating the determinants of nurse turnover (leaving their jobs) in high income countries reported that most studies focused on *individual* factors influencing *intention to leave* i.e. plans rather than actual leaving [33]. Most of the evidence reported was at the individual level; high levels of stress and burnout, job dissatisfaction and low commitment was associated with intention to leave. The few studies looking at intentions to remain found this had a strong association with good supervisor support [33]. However, there was an absence of studies that considered the interplay of factors at multiple levels (e.g. individual, job characteristics, organisational characteristics, and the wider labour market) on actual leaving rates of RNs or on any subgroups, such as those with caring responsibilities[33]. The International Council of Nurses has also noted there is a paucity of evidence which has considered turnover and retention of nurses in low income countries[34]. We turn now to consider the evidence for action to solve the shortages and mal-distribution.

How can nurse shortages be reduced?

The WHO calls for greater investment in all human resources for health and advocates for policy attention across the system of production, regulation and employment [2]. Most commentators on nursing shortages make similar arguments; that policy attention needs to be paid to all elements (known as policy bundles) and avoid policy making that relies on oversimplified linear thinking. The evidence to support this comes from high and low income countries where programmes that focused only on increasing the numbers entering nurse training, have failed to make an impact on increasing numbers entering the workplace or reducing gaps in priority areas with a history of shortages. Subsequent analysis has identified multiple reasons for this failure including: insufficient infrastructure for clinical education, weak regulation of education standards and few posts to apply for; see for example the review from Sub-Saharan African countries [35.]. This is not to argue that increasing numbers entering nurse training is inappropriate, but should be seen as one lever amongst a policy bundle, including for example retention measures. England and the US provide interesting comparisons, in that one (England) has reduced nurse training numbers over the past fifteen years, has significant numbers of vacancies and plans to rely on internationally trained nurses over the next few years; while

the other (the US) has significantly increased nurse graduates over the past 15 years and does not count nursing as a shortage occupation[36].

Drawing on commentaries and WHO strategic direction statements for strengthening the nursing and midwifery contribution table 5 describes policy actions to scale up and sustain the nursing workforce at different levels of the health care system.

	At the macro/meso level (national and sub-national)	At the micro level (organisation , service and team)
Policies addressing the pipeline via nurse education, including:	Promotion of a positive image of nursing as a career for men and women,	Support of employees such as assistants or auxiliaries for workplace training to become RNs
	Building strategic partnerships between education and clinical organisations,	Development nurse education infrastructure in clinical settings
	Attracting and retaining RNs (and other types of specialities and levels) to work as academic (faculty) staff ,	Attracting and retaining RNs (and other types of specialities and levels) to work as clinical educators of nurses in training ,
	Fair and proportionate financial support for students in nurse education	Sponsorship and/or financial support/ maintenance grants for student nurses
	Agreed educational standards for nurse curricula and nurse educators with quality assurance mechanisms overseen by a regulatory body.	Sharing good practice of standard setting between education providers and health organisations
Policies addressing the pool of registered or licensed nurses:	Legislative frameworks for the regulation of the title registered nurse (and other levels)	Good human resource management policies and practice which include registration checking and due process for dealing with those whose practice does not meet agreed standards
	Agreement of capable regulatory bodies, with strong linkages to education institutions,	Strategic partnership arrangements in place between regulators, education providers and health care organisations to ensure quality assurance
	Adherence to the WHO Code of practice on the International Recruitment of Health Personnel and WHO resolution to reduce reliance on foreign trained nurses and others,	Adherence to the WHO Code of practice on the International Recruitment of Health Personnel
	Regulation of re-validation of registration and routes for nurses whose registration has lapsed to re-register	Support to RNs for continuing professional development in order to meet re-validation requirements
Policies addressing the participation and retention of nurses in the labour market	Legislation, regulation and assurance mechanisms of public and private health care providers to ensure clinical effective, safe services and working environments	Compliance with legislation and quality standards for clinically effective, safe and supportive working environments.
	Frameworks to guide RN salary scales and benefits linked to career progression	Attractive salary scales and other benefits e.g. access to affordable housing
	Frameworks to support good human resource management practices and equality standards by provider organisations	Good human resource management policies and practice
	Equality and diversity policies setting workplace opportunity standards	Create positive work environments that maximize the health, safety and well-being of nurses and improve and/or sustain their motivation
	Interprofessional standards for collaborative and teamwork practice	Support for multi-professional teams in which RNs are able to work to the full extent of their scope of practice
	Frameworks to support recruitment and retention of nurses to underserved areas	Support to continuing professional development and routes for career progression
	Routes to support nurses to re-enter the nursing workforce	Support nurses to re-enter the nursing workforce

Table 3 Exemplars of policy areas to address improved supply, retention and productivity of nurses

The policy solutions have to attend to the demand as well as the supply side i.e. to increase RN productivity (for example working to the full extent of their license, task shifting to assistants, using technologies and community health workers) as well as to produce more and retain more RNs. However, documented evaluations of the impact of the implementation of policy bundles on the nursing workforce are rare not least because of the inter-sectoral nature of enactment and the relatively long period between policy decisions, implementation and outcome. Even where there are evaluations of implementation of policy actions to address shortages, such as the WHO strategy for remote and rural areas, these focus on the medical profession not nurses [37].

At the micro level (organisation /service delivery level) good human resource management practices are known to reduce the rates of voluntary turnover in all industries [38]. An umbrella systematic review considered interventions to reduce turnover rates of nurses (i.e. to retain them in their posts) in high-income countries [39] This review found relatively weak evidence for most interventions but there was strong evidence of positive impact for transition programmes and support for newly qualified nurses [39]. There was also evidence that nurse manager leadership styles that were perceived as encouraging work group cohesion were also effective in reducing turnover [39]. Positive working environments are those that not only ensure the nurses well-being but sustain or increase their motivation in their work. There is some evidence that many RNs (like many physicians) in high income countries consider that they are not working to the full scope of their training and are undertaking work that could be undertaken by others [36]. However, task shifting, shifts in jurisdiction and changes in skill-mixes in teams raises questions of adequate preparation, patient safety and cost effectiveness – all of which require consideration within specific contexts. For example, a growing body of evidence in high-income countries demonstrates a relationship between RN staffing levels and patient safety in acute in-patient hospital settings. Recent research on in-patient hospital care in the UK demonstrates that lower RN staffing and higher levels of admissions per RN are associated with increased risk of death during an admission to hospital and that use of nursing assistants does not compensate for reduced RN staffing [40]. There are significant gaps in evidence for the most effect ways of increasing RN productivity as well as attracting and retaining RNs in the workplace which requires attention to be given to the macro and overarching issues in every health system.

Gap analysis

The first major gap is in relation to nursing workforce planning. Workforce planning at a national level is an inexact science and is often absent for nursing, which is in contrast with medical manpower planning. To plan for solutions you need to understand the scale of the problem, which in the case of nursing, is limited by the significant evidence gaps. For example, at the national level, nursing workforce data is often incomplete and based on historical activity rather than projections. The 2016 WHO resolution on human resources for health urges all countries to have health workforce-related

planning mechanisms and has introduced national health workforce accounts with core indicators, including ratio of nurses to population, for annual submission to the WHO Secretariat [1]. However, this could be considered the minimum requirement for benchmarking rather than proactively modelling the future demand for nurses, the availability and supply of nurses and planning to meet the gap or shortfall. This then flags the next gap - the evidence to base the planning decisions on.

The second major gap is the evidence informing policy decisions about interventions that work to attract, equitably distribute, retain and sustain a nursing workforce against the requirements of any health care system. It is noteworthy that the WHO guidance for scaling up and retaining all health care professionals [2] is predominantly evidenced from studies of doctors, thus further emphasising this gap in the evidence. The demographic profile, status, education, career options, and remuneration levels for these two professions are very different and assumptions that evidence from one professionally is automatically applicable and relevant to the other is contestable and at worst misleading.

Overlaying these gaps in knowledge there is an issue, common across many countries as noted by WHO [2], that the profession of nursing has not been valued and given the policy attention congruent with its scale. Having a weak voice and influence in national and international health workforce policy development has inevitable consequences, which in this context means that fewer levers are available to address shortages and action is slow. At the time of writing, there is a global WHO sponsored campaign called Nursing Now (2018-2020) (https://www.nursingnow.org/) which supports country specific campaigns and activities to raise the profile of the nursing profession, develop leaders for governments and to make change at a systems level. This is involving nurses in policy making, particularly with regard to increasing and retaining the nursing workforce. The response to, and impact of, these calls for country specific campaigns is yet to be evaluated.

Concluding comment

This review has demonstrated that that the nature and size of the professionally qualified nurse workforce is shaped by the societal context of individual countries – political choices which influence decisions about resource allocation to health systems, demographics (labour market pressures on working age, particularly of women), image of nursing and its positional power in relation to medicine, demands for care/health and social inequalities. Understanding nursing shortages and acting on them requires attention to the gaps in knowledge and evidence but also the wider societal context of nursing.

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