A SCOPING REVIEW ON ESTIMATING THE NURSING MODELS FOR SAFE AND EFFECTIVE PRIMARY HEALTHCARE

Authors

Lesley Dornan[1] Esther Beck[1] Hilary Thompson[1] Muhammad Salman Butt[1] Deborah Muldrew[1] Lisa Hanna-Trainor[1] Evelyn Walton[1] Amber McCloughlin[2]

1. Ulster University
2. Public Health Agency

Introduction

Primary Health Care is a whole society led approach to effectively organise and strengthen national health systems to deliver efficient services to improve health and wellbeing (World Health Organisation 2025). This includes the integration of health services across the life span, addressing the broader determinants of health through policy and action and the empowerment of individuals, families and communities to take charge of their own health. The 1978 World Health Organisation (WHO) Alma Mater placed primary care at the forefront of care with physicians, nurses, midwives and allied health professionals providing integrated and functional services to respond to community needs (WHO 1978). Primary Health Care maximises health and wellbeing through the prioritisation of people's needs and preferences across the care continuum from health promotion to diagnosis, treatment and rehabilitation (WHO & UNICEF 2022). Primary care is implemented through a broad multi-sectoral approach and can be impacted by wider socio-economic and demographic factors that can affect both individual, community and population health (Browne et al 2012). However, with the continued global uncertainty and budget constraints experts have highlighted that service providers are being asked to increase productivity with reductions in available resources (Kings Fund 2025). It is crucial that service providers find ways to maximise care through innovative approaches and understanding demand and capacity within the care delivery process (NHS England 2024).

General practice is central to the delivery of primary health care services and serves as a first point of contact in the healthcare system providing both access to tertiary care and holistic health care (Bi & Liu 2023). However, the expansion of services, increased clientele, demand and complexity of care and the evolution of the understanding of health at a wider population level have created substantial service pressures. NHS statistics estimated that 28.4 million appointments were delivered by GP Practices and Primary Care Networks in December 2024 and an additional 840,000 appointments were recorded within the Primary Care Network appointment systems with 46% of appointments given the same day they were booked (NHS Digital 2024). Within these 44.7% were carried out by a GP and 19.6% were provided by nurses. However, in England the widening of the multi-disciplinary team within primary care is providing an opportunity for practices to draw on the expertise from a wide range of team members including physician associates, nursing associates, paramedics, pharmacists and link workers (Baird et al 2022). While not all these roles are available in Primary Care in Northern Ireland regional policy initiatives i.e. the Health and Wellbeing 2026 – delivering together strategy promotes the implementation of multi-disciplinary teams which is in accordance with the regional policy model. This is particularly relevant in Northern Ireland as Primary Care is the bedrock of the health and social care system and provides around 95% of the care people need during their lifespan. General Practitioners and multi-disciplinary primary care

teams play a key role in improving population health and wellbeing as well as developing and delivering care pathways and services to meet population health needs (Department of Health 2016).

Within this changing environment General Practice Nurses (GPN's) are central to the delivery of primary healthcare and hold a unique role and value (Sonnet, NHS England and NHS Improvement 2021). This report in 2021 highlighted that GPN's are leading the way in primary practice as they work inter-professionally as experts in their fields. The Sonnet study showcased GPN's as a workforce of highly skilled, confident and resourceful professionals who work independently with high levels of autonomy and authority to deliver expert care to patients. The research illustrated that GPN's create value across leadership, networking and partnerships, strategic prevention as well as improved diversity of access and skilled specialist delivery of care and indicates a significant return of investment. An updated report in 2024 (Sonnet & NHS England 2024) noted that while many GPN's frequently work effectively their professional support and learning needs require further development to allow them to reach their full potential (Sonnet & NHS England 2024). GPN's are highly competent and resourceful and are essential to the running of primary healthcare, but this is not well recognised. Recommendations to date to achieve this recognition included the improvement of remuneration and further empowerment of career progression for GPN's as well as a review of nurses' workloads and involvement in non-clinical activity such as leadership activities. However, it is evident that further research is needed into the role of the GPN to establish the breadth of their contribution.

As a result of this report and the Nursing and Midwifery Task Group Report (Department of Health 2020, 2023) there was a recognition that the contribution of nurses to population health needs to be further recognised, particularly within primary care. These reports, in conjunction to the current pressures on General Practice across the United Kingdom (UK) have led to a literature search which will inform workforce planning In Northern Ireland. This may in turn lead to a review of roles which are crucial to meeting the needs of the population, reducing health inequalities and delivering care for people closer to home to relieve system pressures.

The GPN "Now and the Future" Framework (PHA 2016) positioned GPN's as core members of the primary healthcare (PHC) team but emphasised the need for nursing staff to have the correct skills and education to enable them to fulfil their role in population health, disease management and health promotion across the life course. This requires workforce planning, an effective career pathway and professional and practice development opportunities. This led to the development of a Northern Ireland Career Pathway for General Practice Nursing in Northern Ireland (NIPEC 2019). This framework included the nursing and support roles below:

- Senior Nursing Assistants
- Treatment Room Nurse
- General Practice Nurse
- Senior General Practice Nurse
- Advanced Nurse Practitioner

Core competencies within each of the roles included clinical practice, education and learning, research and evidence-based practice and leadership and management. However, there is also a wider change of workforce skills being introduced through the implementation of the additional

roles such as pharmacists, physician associates and paramedics who are increasingly moving into primary care (Baird et al 2022).

A seminal General Practice Nursing Workforce Review in 2016 highlighted the complexity of the role and the need for further training was needed to allow this specialist role to evolve (Public Health Agency 2016). The review demonstrated that 63% of GPN's were over the age of 50 with only 16% holding a specialist qualification and 22% who were registered as nurse prescribers. However, Primary Care nursing workforce data is not collated consistently or regionally in Northern Ireland. A recent a workforce census showed that 45% of the registrant nursing workforce employed by General Practices were eligible to retire demonstrating the need for urgent action and succession planning (Public Health Agency 2024). The Delivering Care: Nurse Staffing Policy Framework was implemented in 2014 with Phase 7: Primary Care subsequently commissioned and approved by the Chief Nursing Officer (Nursing and Midwifery Council 2020). While this made recommendations for the ratio of GPN to patients it was situated at a specific point in time and following COVID and the cost of living crisis which has significantly impacted on the health and wellbeing of communities and populations it may be argued that this needs to be further reviewed in light of the refreshed Delivering Care framework. In addition, further considerations are required given the on-going review and updating of the Health and Social Care Workforce Strategy 2026 (Department of Health 2018) which established ambitious goals for a workforce in keeping with the requirements of a transformed health and social care system in Northern Ireland.

In preparation of further workforce planning and the delivery of primary care services work is now in progress to review the role of nurses in general practice. These roles informed the development of search terms for a Scoping Review of the workforce profile of general practice nursing over the last ten years. A scoping review was considered to be the most appropriate methodology as it allowed the exploration of a wide variety of sources across health and nursing literature as well as grey literature sources. Scoping reviews allow for a wide range of evidence including study designs and contextual factors and may act as a synthesis to set future research priorities (Khalil et al 2025). This scoping review was conducted using the Joanna Briggs Institute (JBI) framework for evidence synthesis and this report has been presented using the JBI framework (Peters et al 2021).

Review question

Developed in conjunction with the Public Health Agency and an expert advisory panel (see Appendix 1) the research team defined the following research questions for the scoping review:

1) What is the workforce profile of general practice nursing in GP practices within the last ten years?
2) What is the evidence relating to the registrant/regulated and non-registrant and non-regulated primary care nursing staffing to patient ranges/ratios for safe and effective healthcare?
3) What are the key characteristics of models used i.e. staff, qualifications, experience, teamwork composite and funding?

4) What is the evidence for modelling how change in primary care nursing workforce-to-patient ratios could affect nursing workload and healthcare quality?

Inclusion criteria

The population, concept and context strategy proposed by the Joanna Briggs Institute (JBI) was implemented to formulate the research question (Peters et al 2020a).

- Participants: The primary focus of this study is registrant/regulated and non-registrant and non-regulated primary care nursing staffing
- Concept: Nurse staffing, skills mix, and modelling nursing-to-patient ratio and their impact on quality, healthcare and population health outcomes, and workload
- Context: Studies involving primary care-based healthcare centres, general practice surgeries and integrated general practice settings, except Out of Hours Services. Inclusion of studies pre and post COVID.

This review was conducted in accordance with an *a priori* protocol which was agreed and reviewed by an expert panel (see Appendix 1). The proposed scoping review was conducted in accordance with the JBI methodology for scoping reviews (Peters et al 2021).

Methods

Preliminary Searches

A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews and *JBI Evidence Synthesis* was conducted and no current or underway systematic reviews or scoping reviews on the topic were identified. The **objective** of this scoping review was to **map the evidence of the workforce profile of primary care nurses aligned to general practice and models to guide staff ratio decision making in practice** at a global level which will inform future workforce planning in Northern Ireland. Based on the finding and the roles identified in the Career Pathway for GPN's search terms were developed in line with the review question.

Search strategy

The search strategy aimed to locate both published and unpublished studies. A three-step search strategy was utilized in this review. Studies published in the English language change as appropriate were included. Studies published since 2015 were included to ensure that the research studies identified will be as contemporary as possible while including some of the history of research and policy changes in this field.

Using a systematic process the following databases were searched: Medline (Ovid), Embase, Cumulative Index to Nursing and Allied Health Literature Plus, Scopus, and Web of Science. The search strategy combined Medical Subject Headings (MeSH) terms (and relevant keywords) and the Boolean operators "AND" and "OR" for search strings. Searches were completed across a ten-year timeframe to allow for research and policy developments following on from the 2016 reports above. Terms were developed by the review team with support from an information science specialist and an expert panel. The search strategy consisted of the following concepts: Nurse staffing and workload, skill mix and staff ratio and modelling nursing staff to patient ratio. The search terms and MeSH terms have been collated in Table 1 below. A decision was made by the research team following consultation with the expert panel to include all studies from a global context with a focus on but not excluding those from high income or universal healthcare services.

Table 1: MeSH & Key words

Concept	Key words
General Practice:	"General Practice" OR "Primary Care" AND "Staffing*," OR "Nurse Staffing*" OR "Skill Mix*" OR ""Staff Ratio*" OR "Nursing workload*," OR "Nurse-patient ratio" Or triage nurses
Generalist:	"General practice nurse" OR "primary care nurse" OR "general practice healthcare assistant" OR "practice nurse" or "treatment room nurse" OR "advanced nurse practitioner/consultant"
Context:	"General practice surgery" OR "health care centre" OR "integrated hub" OR "primary care hub" OR "General Practice Or health and care centres OR Family practices OR health and social care centres OR primary care centre

Types of sources

This scoping review considered both experimental and quasi-experimental study designs including randomized controlled trials, non-randomized controlled trials, before and after studies and interrupted time-series studies. In addition, analytical observational studies including prospective and retrospective cohort studies, case-control studies and analytical cross-sectional studies were considered for inclusion. This review also considered descriptive observational study designs including case series, individual case reports and descriptive cross-sectional studies for inclusion.

Qualitative studies that focused on qualitative data including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative description, action research and feminist research were also reviewed. In addition, systematic reviews that met the inclusion criteria were considered, depending on the research question. Opinion papers, editorials and commentaries were excluded due to potential risk bias. Grey literature which comprised of policy documents, organisational audit reports, research reports, dissertations and theses, pilot studies and conference proceedings were all searched and reviewed. Internet search engine Google Scholar was also searched with the aim of identifying relevant unpublished studies, government reports, and conference abstracts (Aromataris & Riitano 2014).

Study/Source of evidence selection

Database searches were completed by one reviewer (SB) in November 2024 and rerun in February 2025 with assistance by the University Librarian (KM). A total of 365 titles were identified with a total of 353 included for title and abstract review. Following review, a total of 25 papers were selected for full text review with 21 studies included in the final review (see Appendix 2 Prisma Flow Diagram)

Grey literature sources (Google Scholar, TRIP, OpenGrey, ProQuest Global Dissertations & Theses, National Institute Health and Care Excellence (NICE), Clinical Trials.gov, Royal College Nursing (RCN), Kings Fund, Guideline Central, and the Queen's Nursing Institute were searched between the 3rd and 15th April 2025 for variations of key words. In total, 22 articles were retrieved for review. Following full text review, four were included in the final review.

The full text of selected citations was assessed in detail against the inclusion criteria by three independent reviewers (LD, EB, DM). Reasons for exclusion of sources of evidence at full text that do not meet the inclusion criteria were recorded. Disagreements that arose between the reviewers at each stage of the selection process were resolved through discussion. The results of the search and the study inclusion process can be found in the PRISMA flow diagram (see Appendix 2).

Rigour

To enhance rigour in approaches and decision making several steps were undertaken. Firstly, the full protocol was reviewed in detail by several key policy makers and experts in the area. This ensured that the team were utilising the correct search terms and allowed for consensus to be reached on inclusion and exclusion criteria.

Secondly, a rigorous approach was undertaken in terms of the searches carried out with the academic databases. Three researchers (LD, EB, SB) independently screened all record titles and

abstracts against the pre-specified eligibility criteria. Retrieved documents deemed to meet the inclusion criteria went forward for full-text review. Full text review was undertaken by 2 researchers (LD, EB). The same researchers conducted full-text article review independently. Disagreements were resolved by consensus, and when required involved a third member of the team (EW).

Thirdly, the grey literature searches also included 2 independent researchers searching the literature as outlined above (DM, HT). Consensus was reached by the full team in terms of inclusion in the overall review.

Data extraction

Data was extracted from papers included in the scoping review by three independent reviewers (LD, EB and DM) using a data extraction tool developed by the reviewers (see Table 1). The data extracted included 1) author, 2) year, 3) country/location, 4) study aim and objectives, 5) study design, 6) participant characteristics, 7) data collection method, 8) data analysis 9) key findings, 10) limitations and 11) emerging concepts. Once completed the data extraction table was reviewed by DM. Selected studies identified through the grey literature search were included with the same data extraction tool and process.

A total of 25 articles were included in the review. As the aim for this review was to scope and map the evidence related to the workforce profile of general practice nurses and models of care full critical appraisal was not completed. However, limitations were identified during the data extraction process and were considered.

Information on the structure of the various models of care, was extracted with a view to group care models into categories. Key elements of the intervention such as information relating to service delivery, referral process, the composition of the intervention workforce team and objectives of the care model were examined. Organisational components such as underpinning policy and funding arrangements have also been reported where relevant. Patient-related (i.e. characteristics of the patient populations who access the care model), system-related and implementation related outcomes have also been extracted. Findings related to the scalability of effective models, attending to implementation and economic requirements when relevant have also been reported.

Data analysis and presentation

Once data extraction was completed all data was reviewed by three reviewers (LD, EB and DM). Themes were then identified and collated by one reviewer (LD) into a thematic table (see Appendix 4). Key themes and subthemes are presented below. Findings were linked back to the key review questions with a focus on workforce profiles in primary health care and models identified to deliver

care. A narrative summary of the themes has been included below.

Findings

The aim of this review was to identify the workforce profile of General Practice Nurses in primary health care and key characteristics of models used to plan and deliver workforce planning and quality of patient care.

A total of 25 studies were identified for inclusion in the review. This included 21 papers from databases searches and 4 from the grey literature. The overarching theme was Models and Practice, and two key themes were identified with subthemes. The presentation of the themes and sub themes are presented below.

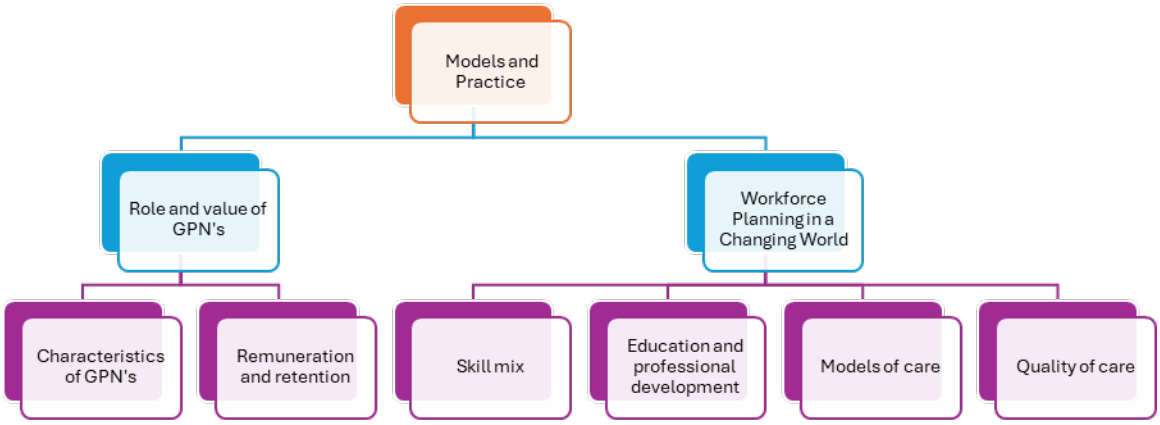

Figure 1: Review Themes

Role and Values of General Practice Nurses (GPN's)

Within this theme there were two sub themes. These were Characteristics of GPN's working in primary care and Remuneration and Retention of staff.

Characteristics of GPN's.

A total of six studies discussed the workforce characteristics of GPN's within the delivery of primary care (Igumbor et al 2016; Lane et al 2017; Halcomb et al 2019; Martin-Misener et al 2020; Hewitt et al 2021; Leary and Punshon 2024). Across the studies there was recognition of the focus on clinical and patient care with the inclusion of health promotion and preventative care being a key element

of the role of the GPN. Many nurses working in general practice are employed in part time positions and often feel undervalued and consider that their roles remain underutilised. Role creep was identified as an issue due in part due to ambiguity around roles and responsibilities within the wider changing primary care teams. Increasing administration and non-core functions also emerged with time spent with patients considered a key part of the role.

Within a study in New Zealand (Hewitt et al 2021) it was found that there were 54,456 nurses active on the register with a higher percentage of nurses predominantly New Zealand trained. The findings suggest that the majority of GPN's were older, female and a higher percentage worked part time. Noted to be less ethnically diverse GPN's are increasingly primary care orientated as they take on expanded roles and responsibilities to deliver services for their populations. Lane et al (2017) explored the roles for Primary Care Health Organisations (PCHO's) to support the Primary Care workforce through a Delphi consensus process. Participants reached agreement on five key roles for workforce planning to optimise nursing in general practice. These included matching workforce size and skills to population needs, facilitating leadership opportunities and the integration of general practice into other primary care services to support inter-disciplinary care. They also highlighted the advanced nursing roles as crucial within care. However, Leary and Punshon (2024) noted that with the changing workforce profile GPN's were frequently left to complete work initiated by other Allied Health Professionals (AHP). This was due in part to the expertise of GPN's in the delivery of care in a primary care setting and due to some clinical tasks being outside the AHP's skill set.

Remuneration and Retention

A total of four studies highlighted remuneration as an issue within PHC (Freund et al 2015; Halcomb et al 2016; Mohammed et al 2018; Russell et al 2022). Within these studies there was recognition that PCHO's play an important role in the development of staff including GPN's. An older study (Freund et al 2015) found that GPN's were the primary non-physician health professionals working in general practice, but this included registered nurses, Primary Healthcare Nurse Practitioners, Nurse Consultants and Advanced Nurse Practitioners. While shifting from task delegation to team approaches is a global trend it is limited by traditional concepts and reimbursement within these roles. Halcomb et al (2016) suggested that rates of pay are significantly lower in general practice than in other areas of primary care and most participants within the study had not had a pay increase in five years. It was also highlighted that workplace pressures and calculation of staffing ratios may have an impact on staff retention. The combination of lower remuneration and workplace pressures may lead to the sense of being undervalued, as highlighted above.

Workforce Planning in a Changing World

It was evident across the sub themes in this review service delivery in primary care is increasingly challenging. It was noted that service delivery within primary care is in a state of flux, with challenges and opportunities for change and innovation are often combined with workload pressures and expectations.

Within this theme there was a total of four sub themes. These were Skill Mix; Education and Professional Development; Models of Care and Quality of Care.

Skill Mix

A total of nine studies addressed the concept of skill mix within primary care (Lane et al 2017; Maiers et al 2018; Meyers 2018; Mohamed et al 2018; Josi & De Pietro 2019 ; Freund et al 2021: Spooner et al 2022; Franceti et al 2022 and Gibson et al 2023).

While a number of these studies are older there was evidence within the data of the change of roles and the impact of this on skill mix and the delivery of care. As highlighted above Lane et al (2017) noted the need for matching workforce size and skills to population needs. Maier et al (2018) suggest that skill mix needed further consideration. The authors found that only three countries (Netherlands, Canada and the US) included Nurse Practitioners or Physician Associates in their workforce planning while in other countries skill mix was considered but not integrated. Compared to physician only models, multi-professional models resulted in lower physician manpower projections. However, there was a weakness in the accuracy of data on substitution, and it was highlighted that models needed to adapt to reflect the changing skill mix and the integration of the new roles to establish a people-centred workforce. Freund et al (2021) argued that the global trend of shifting from a task orientated approach to a wider skill mix required clear definition of roles to avoid ambiguity as this may support access and accountability in care. Josi and De Pietro (2019) examined the number of physicians to non-physician roles within general practice in Switzerland and found that while nearly 50% have established non-physician professional roles only 25% integrate staff with advanced roles. The introduction of a wide range of practitioners requires significant changes in the organisational structure of practices (Spooner et al 2022; Baird et al 2022). Primary Care Networks are still in the early stages of development and lack a clear vision for the structure and organisation required for effective integration of wide skill mix of non-physician roles within primary care. Baird et al (2022) argued that many PCN's do not have a shared team identity and this impacts both the deployment of staff within a supportive environment. Within this study it was highlighted that a lack of agreement of the requirements of the diverse roles and the contribution to care are not clearly understood and there is ambiguity around the roles which contributes to the skill mix discourse. Calculations of staffing ratios showed in a simulation that Doctors were less workload stressed than nurses although there were variations between practices (Mohammed et al 2018). Processes of the redistribution of tasks between health professionals are complex. In one study increases of GP's and nurses was positively associated with changes in practice activity and outcomes, but the introduction of other new roles was negatively associated with patient satisfaction (Franceti et al 2022). Staffing calculations within a study in the US (Meyers et al 2018) suggested that primary care practices need a mix of staff with between 37 staff members at a cost of $45 per patient per month per 10,000 to 52 staff at $64 per patient per month to care for the same population level. There were variations between rural, urban and areas of high social need which need to be considered.

There needs to be further consideration of skill mix changes, but effective processes need to be in place to establish a people-centred workforce to meet population needs (Maier et al 2018). Motivating factors for skill mixes within the workforce from the perspective of practice managers included a better match between patient needs and practitioners' skills, the increase to overall appointment time and service delivery and the release of GP time. Within this research pharmacists and physician associates were most commonly employed with preference for direct employment through primary care networks while GP practices preferred direct employment of GP's, Advanced Nurse Practitioners and practice nurses. It was considered that ideal staff mix comprised of over 70% of GP's and nurses. This sub theme reflects the changing workforce within primary care and considerations which need to be further explored.

Education and Professional Development

Education emerged as a key sub theme within the practice element of this study through the upskilling of the workforce. A total of six studies (Walker et al 2015; Mundy et al 2021; Mann et al 2022; King et al 2023; Robertson et al 2023 and Weir 2015) explored education and professional development within a wide range of roles from healthcare assistants to Advanced Nurse Practitioners. It was evident within the literature that education was valued across the spectrum of roles. Weir (2015) noted that an evaluated educational programme provided healthcare assistants (HCA's) with foundations for good practice, thus improving the skill mix, service delivery and delegation of tasks by practice nurses. However, as the role of HCA's has not been fully standardised across different settings further local agreements are needed alongside strategic guidance to ensure good practice. A further study (Robertson et al 2023) identified three key themes which included the cost/benefit ratio and incentives to developing HCA's, the need for trainee support capacity within practice and facilitating the skills and scope of practice. This varied across practices leading to challenges for HCA's gaining the required competencies and uncertainties in understanding the safe scope of practice.

An evaluation of a speciality training programme in the United Kingdom (Mann et al 2022) demonstrated that the course offered deep learning of the role of GPN's leading to more confident and independent nurses who were able to contribute effectively to patient care. The authors argued that further investment in the education of GPN's is needed to develop the workforce. Mundy and Pow (2021) evaluating an Advanced Nurse Practitioners programme discovered that motivation for taking the course was diverse but improving patient care and reducing the number of visits to different health care professionals was significant for participants. A key finding was the concept that shared responsibility for patient care created shared learning opportunities across the disciplines and offered further professional development. It was evident across the studies that education and development was beneficial, but that further consideration of the processes was needed.

Models of Care

While this theme was central to the aim and objectives of this review there was limited literature on specific models being implemented. Only two studies addressed specific models both of which were older (Walker et al 2015; Ablard et al 2017). Walker et al (2015) explored three models of primary care using different skill mixes which were responsive and adaptable to local need. These were a small semi-rural practice owned by the GP and Registered Nurse in the practice. This practice adopted an entrepreneurial approach which allowed the GPN's to develop their own scope of practice through additional education. The second model was a more traditional GP owned practice with practice nurses supporting GP care. It included nurse led clinics, mobile services and nurse led phone lines for prescriptions. The third model included in the study was a mid-sized urban practice with salaried GP's and nurses. This model included extensive liaison with wider health and non-health services and clear delineation of scopes of practice. Within this model health promotion, health literacy and primary care were central, and nurses were recognised as a vital resource. Ablard et al (2017) examined an alternative model of care with GP surgeries co-located within Emergency Departments. Within this study there was limited information on the role of the nurse, but it demonstrated a modelling of GP services to the population. Three distinct models of co-location were included but all were impacted by the lack of GP's and limited out of hours services. Two key factors influencing sustainability were facilitating GP's to work as distinct practitioners within a hospital environment and the need for effective triaging arrangements to be established to ensure

appropriate referrals to GP services. However, the consensus was that this model could be beneficial if used effectively.

Quality of Care

Within this sub theme it was notable that only two studies identified the concept of quality of care. These were Ammi et al (2017) and Franceti et al (2022). These studies suggested that a key indicator of patient experience and quality of care was the collaboration between health professionals (Ammi et al 2017). The results showed that nurse staffing alone did not impact on patient satisfaction or quality of care, but different types of nursing roles facilitated accessibility of care. This may inform the provision of care through inter-professional primary care teams, particularly with increased skill mixes within nursing teams. Franceti et al (2022) found that the introduction of new roles within primary care negatively impacted on patient satisfaction. The introduction of new roles to support GP's does not have a straightforward effect on quality of care or patient satisfaction. This was due in part to the complex adaptation process required to manage the skill mixes within primary care which may also influence patient care. The authors suggest caution in the implementation of policies encouraging the employment of diverse roles within primary care.

Discussion

The aim of this review was to examine the workforce profile of general practice nursing in GP practices within the last ten years, explore the evidence relating to registrant and non-registrant staff and staffing ratios and analyse the key characteristics of models implemented. This included staff, qualifications, experience and funding. The final objective was to examine the evidence of how modelling changes primary care nursing workforce to patient ratios and how this may influence nursing workload and healthcare quality.

It was evident from the review that there is a dearth of comprehensive and robust research examining the critical components of workforce planning and service delivery related to general practice nursing. The studies identified were diverse but there was a notable lack of identified limitations across many of the studies. The findings suggested this sphere of practice is complex and at times disparate. Reviewed studies did not include specific numbers or ratios with the exception of Myers (2018) who referenced a ratio per 100, 000 but did not distinguish between staff make up and specific skill mix. As such it may be challenging to transfer this to UK systems. Gibson (2023) did suggest that GP's and nurses should make up 70% of the workforce but again there was limited differentiation between nursing roles within general practice.

The theme the Role and Values of GPN's highlighted both the characteristics and some of the challenges of GPN's. The findings suggest a highly skilled workforce which is well established in both clinical practice and health promotion activities. However, the review also illustrates some evidence of a sense of being undervalued with an aging and part time workforce. A recent interview with the Royal College of Nursing (Ford 2024) highlighted that general practice nursing is in a precarious position and this is reflected to some degree in the literature in this review. However, fair pay, ring fenced funding and greater leadership opportunities are top priorities for the Royal College of Nursing and it must also be highlighted that there are now increasing opportunities for education and professional development through a more clearly defined career pathway, including Northern Ireland (NIPEC 2019).

This review demonstrated that education and professional development was valued by all spheres of regulated and un-regulated staff, not just GPN's, and that there seemed to be a commitment to improving patient care through inter-professional education. Inter-professional education and practice are crucial when seeking to respond to the growing demand for primary and preventative care services (Fowler et al 2020). In addition, there is a need for further opportunities for inter-professional learning with non-regulated staff which would allow further understanding of the scopes of practice. A recent scoping review of inter-professional learning highlighted the positive impact with significant improvements in role clarity, teamwork dynamics and communication which may lead to improved quality of care (Patel et al 2025). A further consideration which emerged from this review is the need for an improved clarity of the scopes of practice between regulated and non-regulated staff. This may help to address the issue of delegation of tasks and who is responsible within their role as noted in the characteristics of GPNs theme. With this in mind, it is crucial to highlight the need for a more integrated approach to the development of a national career pathway with the United Kingdom to support the development of nursing pathways leading to improved patient care. This may negate the risk of ambiguity and lack of consistency in education and professional practice across the devolved nations. It would also address some of the concerns noted within the review around the increasing ambiguity of roles and would potentially provide an increased sense of value of the highly skilled workforce nurses offer within general practice nursing across the diverse roles. This would also support the development of core competencies in clinical practice, leadership, research and evaluation and education (NIPEC 2019).

Findings related to remuneration and retention are identified as a challenge within the review. However, it must be noted that these are global studies. Within the UK NHS England introduced General Practice pay transparency processes which were updated in 2025 and include those who are employed by the contractor (NHS England 2025). It was clear that the range of contracts and employment structures were also dependent on the types of models of care implemented and these remain complex across urban, rural and low-income settings. Details of funding for practice nurses are expected to be added to the Additional Role Reimbursement Scheme in primary care in England but given the devolved nature of service delivery it remains to be seen how this may be implemented in other regions (Anderson 2025). It may be argued that the introduction of new roles into primary care have not yet been fully evaluated or universally understood or accepted (Baird et al 2022).

These findings are set against the backdrop of uncertainty with a recent white paper which emphasized the workforce recruitment issues within general practice (Cogora 2025). This report notes that morale is low among practice nurses and the ARRS approach has compounded the sense that nurses have been excluded from discussions around service provision, despite being central to primary care in partnership with GPs for years. This also links to the sense of being undervalued that emerged from the data. It is critical that the role of GPN's within primary care is recognised and protected to reduce the risk of the erosion of the scope of practice for nurses. That said, within this review, while the changing workforce was apparent in primary care there appeared to be an openness within the studies towards inter-professional learning and development which gives hope for future practice.

The identified theme Workforce Planning in a Changing World reflects the challenges of this process with the range and complexity of skill mixes, maintaining patient care and facilitating ongoing education and professional development of the skills and expertise of GPN's within a more diverse workforce. The WHO defines quality healthcare as effective, evidence-based care and safe care

which is people centred (WHO 2025). This care should also be integrated and equitable with clear national leadership, sub-national support and local leadership. It was notable that there was a lack of studies analysing the impact of the changes of the workforce on the quality of patient care. From our review, only two studies were identified although other studies alluded to this factor it was not a central focus.

While there were gaps within the sub theme related to models there was evidence of innovative practice which would be valuable to further explore, particularly within the integration of GP services and Emergency Department sites. This offers an alternative way of attempting to address the pressures on both ED's and GP practices with increased referral process and partnership building but there were again limited considerations of specific nursing roles. Further research and evaluation is needed into these initiatives and models as well as the development of future models to establish effectiveness. It would also be beneficial to explore the role of GP Nurses within these diverse settings and populations and their contribution to primary care.

Recommendations

Based on the findings of the review these recommendations have been made in conjunction with the advisory group. These are:

1) To share and further explore best practice models for Primary Care Nursing by working collaboratively with nursing and other stakeholders across the devolved nations of the United Kingdom and the Republic of Ireland.
2) Additional research is required into the contribution of Primary Care Nursing with a focus on the quality of care provided as well as the economic value within the UK context
3) Strengthen the contribution of professional leadership and educational development within primary care nursing to maximise the delivery of care and address population health needs

Acknowledgements

The authors would like to acknowledge the contributions of Kelly Coogan subject librarian at Ulster University and the Expert Panel: Paul Labourne (Nursing Officer for Primary Care, Welsh Government), Dr Crystal Oldman (CEO Queens Institute of Community Nursing), Paul Vaughn (National Deputy Director – Community Nursing and Primary Care Nursing, NHS England,), Steph Lawrence (CEO Queens Institute of Community Nursing), Linzi McIlroy, (Senior Nurse Professional Practice, Royal College of Nursing, Belfast), Marie Courtney (Professional Development Officer for General Practice, HSE South West/FSS an lardheiscirt), Kathy Kenmuir (professional Nurse Advisor for Primary Care Directorate, Scotland).

Funding

This Scoping Review was commissioned by the Primary Care Nursing Steering Group and funded by the Public Health Agency, Northern Ireland to inform any future primary care nursing workforce planning in General Practice Nursing.

Declarations and Conflict of Interest

The authors declare no conflict of interest. The review was funded by the Public Health Agency. Amber McCloughlin works for the Public Health Agency as the General Practice Nurse Lead and guided the study but was not involved in the selection or analysis of the studies or the review findings. The work was completed independently by the Ulster University Review team with consultation with Amber McCloughlin and the wider Advisory Committee.

Author contributions

Dr Lesley Dornan was lead author on this review, led on the development of the protocol and the search strategy. She participated in the review and selection of titles and abstracts, collation and selection of the full texts, completed the data extraction, thematic analysis and wrote the review in collaboration with Dr Esther Beck. Dr Beck reviewed the titles and abstracts, full texts, data extraction and thematic analysis and collaborated in the writing of the review. Dr Salman Butt completed the database searches and the Prisma Chart with Dr Dornan and Dr Beck. Dr Deborah Muldrew and Hilary Thompson completed and recorded all grey literature searches. Dr Muldrew completed the data extraction for the grey literature searches and reviewed and re-formatted the data extraction table for inclusion in the report. Dr Lisa Hanna-Trainor reviewed the final draft of the report as well as supporting the recording and storage of the data and studies. Hilary Thompson and Amber McCloughlin liaised with the Expert Panel during the design of the protocol and recorded feedback. Evelyn Watson provided guidance and expertise in her role a Lecturer in General Practice Nursing. The Expert Advisory Panel reviewed the Scoping Review protocol and provided guidance for amendments of the recommendations applying to a UK wide perspective.

Data Extraction Table

Author	Date	Title	Location and setting	Aim and objectives	Study Design	Participant characteristics	Data collection method	Data analysis	Key findings - staff ratios, funding, models, QOC	Limitations
Lane et al	2017	Advancing general practice in Australia: roles and responsibilities of primary healthcare organisations	Five states and territories In Australia	To delineate appropriate nursing roles in primary healthcare to support increased numbers and enhanced responsibilities of GPNs	Two round Delphi consensus process with literature review and key Informants	Mostly General ractice Nurses or Primary Health Care organisation staff. Included government and professional organisations, educators, researchers, policy makers and clinicians	Advisory committee to guide study. Data collected through online surveys informed by literature review and key informant interviews	Descriptive analysis and content analysis	Limited career pathways. Primary Health Care organisations play an important role in development of GPN in Australia. Key findings are: Matching workforce size and skills to population needs: Facilitating leadership opportunities. Providing education and access – including Universities Facilitating integration of GPN with other primary care services to support interdisciplinary care .5. Promoting	None noted

									advanced nursing roles	
Hewitt et al	2021	Understanding the general practice nursing workforce in New Zealand: an overview of characteristics 2015-19	New Zealand (NZ) 'Workforce	Describe the characteristics of nurses in NZ in general practice and compare to all NZ nurses	Quantitative analysis of two workforce profiles	Nurse practitioners (NP), Practice Nurses (PN), Registered nurses (RN) and enrolled nurses (EN) working between March 2015 - 2019. Also included area of practice as practice nursing (APPN); nurses selecting an area of practice as Primary Health Care (APPHC) and all nurses (AN)	Used NCNZ workforce profiles of NP, RN and EN cohorts active in workforce. Defined by practice.	Chi squared tests to assess differences between APPHC and APPN subgroups and AN. Changes in characteristics analysed. sess 26.	54.456 nurses active on NZ register. Both sub-groups less ethnically diverse and more likely to be part time. Predominantly female. Higher % of APPN were >55 years but <34% in APPHC which may indicate greater acceptability of PNH term to younger population. Within timeframe number of APPN's fell by 9.1% but APPHC's nose by 41.5%. Predominantly NZ trained but low numbers of men in PHC. Percentage of Māori and Pacific nurses higher in APPHC	Ambiguity of terminology and inability to track individuals meant unable to identify characteristics such as prescribing authority, regionality or rurality

Maier et al	2018	Health workforce planning: which countries include nurse practitioners and physician assistants and to what effect?	Cross country comparison including Australia, Canada, Finland, Ireland, the Netherlands, New Zealand, the UK and US	To assess if and how new professions (NP and PA's) included Within workforce planning. This includes: 1. If and how countries with new professions integrate roles into workforce planning 2. the extent to which substitution is covered 3. Implications for policy and practice	Cross country comparative design using descriptive and case-based analyses. This included: 1. ID of countries with NFYs and PA's 2.. cross country comparative review of workforce planning based on a literature review 3. In depth case-based analysis to assess differences in physician only vs multiprofessional approaches .4. review of policy documents	Physicians, NPS and PA's across 8 countries	Scoping literature review of workforce planning models. In depth case based analyses of work force projections. Review of policy documents	Cross country comparative design with descriptive data and case based analysis with extraction of data to assess physician only vs multi-Professional	Three countries (Netherlands, Canada and US) included NP's or PA's partially or fully into workforce planning. In Canada NP's partly included in Ontario's needs-based projection but only as one parameter. In other countries no evidence that NP's or PA's were included but relevance of considering skill mix changes was highlighted. Compared with physician only models multi-professional models resulted in lower physician manpower projections esp in PHC. Few countries have integrated NP's or PA's into workforce planning to date. Weakness of multi-professional models was	None noted

									accuracy of data on substitution and impact on policy was limited. Models need to adapt as skill mix of healthcare workforce changes. To establish a people centred workforce countries should improve their workforce data and population needs but also evaluate integration of new professional roles into their workforce planning.	
Weir	2015	Effect of a training programme on the work of GP-based HCA's	United Kingdom	Explore how Healthcare Assistants (HCA's) in primary care and to investigate the impact of education on individual/career development. To examine the effect on general practice team	Mixed methods through concurrent nested approach	18 respondents from whole population sample from 106 GP surgeries. This included 8 HCA's, 4 PMS and 6 Practice Managers.	On line self administered survey with total 20 questions with conditional branching depending on responses. Qualitative questions embedded.	Descriptive analysis with bar charts and tables. Thematic an analysis of qualitative responses.	Educational programme provided HCA staff with foundation for good practice. Beneficial for skill mix and service delivery and increased practice nurse confidence in delegation of tasks. This included new task allocation and	None noted

				in terms of service delivery.					improved service delivery. PN 's agree trained HCA's impacted positively on their own role. With improved skill mix and delegation. However. role of HCA's not standardised and needs further local agreement and strategic guidance on scope of practice of HCA's.	

Walker et al	2015	Nursing roles and responsibilities In general practice: three case studies	New Zealand	To describe the different configurations of health professional skill mix in three dissimilar PCP': their inter and intra-professional collaborations and communication and the potential of expanded nursing scopes and roles to improve patient access.	Document review, observation and interviews With key stakeholders. Multiphase, integrative, qualitative and skill mix framework analysis.	Each case study included up to 8 participants including Registered Nurses (RNs), Nurse Practitioners (NPs), Enrolled Nurses (ENs), Primary Care Practice Assistants (PCPAs), General Practitioners (GPs), Practice managers and admin staff.	Document analysis and observation of practice processes and standing orders, job descriptions and policies. Included patient rolls and demographics, clinical staffing (positions and numbers of FTE's, hours of work, key roles): patient journey, allocation and flow and inter-professional work-ng arrangements.	Integrated picture of each case. Each dataset combined and compared to identify similarities, differences and perspectives From team work used to systematically compare findings related to nursing skill mix across cases	Three models of primary care provision using different skill mix and innovations were apparent. Illustrated considerable flexibility and responsiveness to local need and circumstances. Model 1: Small semi-rural practice owned by GP and RN. Co-ownership business model with entrepreneurial and philosophical stance to problem solving allowed family specialist RN's to develop scope of practice through additional education. Positive attitude to change contributed to this. All practitioners had clear understanding of role and how that contributed to patient care and service delivery.	None noted

									Includes 2 GP's, 2 RN's and 1 PCPA Model 2: Traditional GP owned practice with PN's supporting GP's and nurse led clinics. Large practice in small town owned by 6 GP's. Includes 11 GP's, 12 RN's inc x1 mobile, x1 Occupational health and 1 Supported to Nurse Entry to Practice scheme (NEtP) nurse, 2 EN's (1 mobile) and 1 HCA. Includes EN led wound clinic, Occ health and mobile services and nurse led phone line for prescriptions. Model 3: Mid-size urban Non-Governmental Organisation (NGO) managed practice with salaried GP's and nurses (part of three practice organisation). Includes 1 NP, 4	

									GP's, 9 RN's inc community RN, Disease State Management RN and outreach practice nurse, 6 practice nurses. Extended liaison with wider health and non-health services. Clear differences between roles and practices and all RN's understood scopes of practice. Nurses from each scope felt education was sufficient and necessary for the way they work. Health promotion, health literacy and primary healthcare all considered as cornerstone to optimised and efficient healthcare service. Nurses recognised as vital resource.	

Freund etal	2015	Skill mix. roles and remuneration in the primary care workforce: Who are the healthcare professionals in the primary care teams across the world?	US, Canada, Australia, England, Germany and the Netherlands	Provide an overview of education, tasks and remuneration of nurses and other primary care team members in 6 Organisation for Economic Co-operation and Development (OECD) countries	Comparison of skill mix through expert renew.	Primary care workforce includes NPs or PA's, RN's and other clinical staff.	Classification of skill mix and discussion by expert panel.	Classification through a framework of team organisation across care continuum.	Nurses are mainly non-physician health professionals. Number of allied health professionals and support workers increasing in primary care including medical assistants. Includes RN's NPs Primary Healthcare Nurse Practitioners. ANP. Nurse consultant. Shifting from task delegation to team care is a global trend but limited by traditional role concepts, legal frameworks and reimbursement streams with wide range of models across all settings. Clear definition of roles may optimally share responsibility for patient care and skill mix changes may support access to care and quality of	None noted

									care. Accountability for patient care may be best shared across different members if sufficient training provided. Learning from global experiences may allow for change at policy level and through research.	
Josi & De Pietro	2019	Skill mix In Swiss primary care group practices - a nationwide online survey	Switzerland	To provide insights into the current composition, educational background and autonomy of these new professional roles primary care	Descriptive exploratory study	240 group practices with nurses, physiotherapists, occupational therapists, medical assistants and dieticians	Online survey in German, Italian and French. Six - sixteen questions included depending on responses. Forward and back translation included.	Imported to STATA and Excel. Descriptive analysis for key variables including number of medical and nonmedical personnel, educational degrees, occupancy rates and advanced roles with advanced competencies	Response rate 43% from 65% of total cantons. Number of Drs ranged from 1-49 per practice. 150 HR's working in practices but 55 did not employ any tertiary level HR's. Nurses were employed in 21 practices with 43 nurses in total. Physiotherapists were employed in 21 practices with 78 professionals. Dieticians employed in 29 practices with total of 34 and OTS only had three in three practices. While nearly 50% have	None noted

									established non-physicians professionals only 25% integrate the staff with advanced roles. In comparison with other countries there is scope to extend and broaden role of non-physician professionals in Switzerland.	
Halcombe and Ashley	2019	Are Australian General Practice Nurses underutilised? An examination of Current roles and task satisfaction.	Australia	To describe the trends in general practice nurse clinical activities, the extent to which GPN's use their knowledge and skills and their satisfaction with the GPN role	Within larger mixed methods study this was a national cross sectional survey	1166 PHCN's responded with 950 employed in general practice.	Cross sectional survey within mixed methods study	SPSS 21. Descriptive analysis to examine demographic and professional data. Task data compared to Australian Medicare Local Alliance data using Pearson's chi-squared test of contingencies.	1413 responses with 1166 complete responses. 950 worked in general practice while other 216 worked In other primary care settings. Half of participants over 50 years old and most were predominantly experienced nurses with 80% having for more than 11 years. 73% said focus of job was patient care within specialised area of practice. 28.8% stated worked to full extent of knowledge and	None noted

									skills and 67% more likely to report this with no post graduate qualification. Participants reported undertaking activities related to health promotion and chronic disease management more now than previously. Identified a desire to spend same or less time on admin and more time of health promotion, patient education and assessment. Nearly half felt they could do more and don't use skills to maximum effect. Nurses in GP practice regularly undertake health promotion but remain underutilised. Working to full scope of practice will increase job satisfaction, retention and	

									improve health outcomes.	
Ablard et al	2017	Primary care services co-located with Emergency Departments across a UK region	Yorkshire and Humber,United Kingdom	To create a typology of co-located primary ca re services in operation across Yorkshire and Humber and identify early barriers and facilitators to implementation and sustainability	Pragmatic service evaluation	Thirteen ED's completed the survey. Interviews completed across 5 sites with 4 ED consultants, one ED nurse and 3 Gps.	Mixed methods survey and semistructured Interviews designed to ascertain characteristics of primary care services in operation within or alongside ED's in the region.	Thematic analysis through NVivo QSR Int 10 software used to help structure the analysis. Interpreted through framework analysis. No detail of statistical analysis.	Limited information on role of nurse but contributes to modelling of GP/PC modelling of services. Three distinct co-located primary care service models identified. These were Primary Care services embedded within ED; Co-located Urgent Care Centre and GP out of hours. Within co-located models had limited out of hours and hampered by lack of GP's. Third model was more	None noted

									established but no free flow from ED to the services. Two factors influencing sustainability were: 1. Facilitating GP's to work as distinct practitioners in hospital environment so they can add value to low-acuity patients. 2. Ensure effective triaging arrangements established to ensure appropriate patients are referred to GP's. Four themes emerged: justification/ratio anle for service; level of integration. triage and referral processes; sustainability GP's can add to skill mix within ED environment if used effectively.	

Halcomb et al	2016	Employment conditions of Australian primary health care nurses	Australia	To describe the employment characteristics of Australian PHC nurses, including employment patterns and remuneration considerations.	Mixed methods study	Members and networks of the APNA, Australian Nursing and Midwifery Federation, Australian College of Nursing and other key stakeholders and national nursing organisations. 1166 PHC nurses were included. 950 were from GP and .216 from other PHC areas. **Same sample as paper above but focus on remuneration.**	Mixed methods study with national survey and interviews to explore capacity within PHC nursing.	SPSS v21. Descriptive analysis and independent T-test to compare GPN's ang other PHC nurses hourly rates of pay. Hierarchical multiple regress used to asses# Remuneration in PHC and GP settings continue to lag behind acute sector. To attract ability of area of work (GP or other PFC). punger skilled staff urgent need to review pay and conditions within PHC. Nurses Chi-squared tests to compare GPN's and working within PHC need to	Most nurses in General practice and many employed part time. Rates of pay significantly more than those employed in other PHC settings. Most respondents had not had pay increase within last five years. Considerable differences noted in allowances between those in GP practices and other PHC settings.	None noted

								better negotiate employment conditions and other PHC nurse entitlements		

Ammi et al	2017	The influence of registered nurses and nurse practitioners on patient experience with primary care: results from the Canadian QUALIco-pc study.	Ten provinces in Canada	To examine the association between different dimensions of nurses activity and patient experience with primary care. Objectives include: 1. Examine the key dimensions of accessibility and appropriateness among all types of patients visiting primary care clinics 2. Investigate the mechanisms by which nurses can affect patient experiences by exploring the influence of different types of nurses (family RN's, specialised	Cross sectional Canadian survey data from a 34 country study	Participants included practices, providers and patients across 34 countries but tis study focused on ten provinces in Canada.	Cross sectional Canadian survey data from the international Quality and Costs of Primary Care study. Included data derived from questions in the Family Physician survey, Practice survey and Patient Experience survey.	Regression analysis to explore the association between patient experience and role of nurses in PC. Calculation of marginal effects at representative values of physicians and other nurses staffing.	One of most important predictors of patient experience is collaboration between health professionals. Results suggested that nurse staffing alone (in FTE numbers) made little difference. Different types of nurses influence different accessibility and association between patient experience and nurse staffing dependent on number of physicians within the clinic. These results may inform policy makers on how to strengthen primary care provision through the adaptation of inter-professional primary care teams.	Focus of survey was on experiences with a physician so some restrictions may be in place. Most measures used in primary care surveys are physician centric so work is needed to capture patient experiences with a more diverse workforce. Nurse variables used were reported by physicians, not nurses so may introduce bias. QUALICO-PC doesn't collect information on number of patients per clinic so this factor may

				RN's and NP's), their collaboration with physicians and other nurses and autonomy of practice.						influence patient experience. Patient experiences are self-reported which may increase reporting bias. QUALICO-PC survey had a low response rate so may not be representative of the overall population. Results are correlational and patients may select clinics based on knowledge of staffing level.

Igumbor et al	2016	Assessment of activities performed by clinical nurse practitioners and implications for staffing and patient care at primary healthcare level in South Africa	One district of Western Cape, South Africa	To establish the amount of time clinical nurse practitioners (CPN's) in one district of the Western Cape spend on clinical services and the implications for staffing and skills mix in order to deliver quality patient care.	Descriptive cross-sectional study	Purposive sampling across 15 clinics providing primary healthcare services in 5 sub-districts. Sites included day centres, fixed clinics and mobile clinics. Facilities were grouped by staff complement, composition and resources i.e pharmacists giving curative medication, professional nurses delivering promotive and preventative services and triage staff. Also grouped as package of services delivered in facilities.	Data included frequency of activities, time CPN's spent on each activity in fixed and mobile clinics.	Consolidated and analysed using STATA v 11.0. Frequency and regression analysis included.	Results are based on 1410 activities measured across 15 nurses for 134.25 hours. Time spent on clinical activities was associated with the number of CPN's in the facilities. CPN's in fixed facilities spend approx 13 minutes with each patient whereas CPN's in mobile clinics spent 3 minutes. Fixed clinic nurses also spent more time on non-core functions than core functions, more time with patients and saw fewer patients. Two strategies were identified: task shifting and adjustments on health worker deployment as ways to address staffing and skills mix.	Small sample size (n=15) with only 1 CNP per clinic, 2-4 facilities per sub-district and disproportionate number of fixed clinics so inferences may be general. Study was cross sectional but data was only collected at one time point so cannot establish causality or temporality. CNP's were aware they were being observed by other CNP's which may increase bias. Activities observed on the day may not include all activities. There may have been factors

										associated with productivity i.e. burnout, knowledge and skills etc.
Spooner et al	2022	Processes supporting effective skill-mix implementation on general practice: A qualitative study	England	An examination of two general practices in England operate with increasingly diverse groups of practitioners	Mixed methods with interpretivist qualitative study with individual interviews, observation, patient surveys and focus groups.	5 GP practices with mixed workforces. Researchers spent 6 weeks in each practice. Included 125 surveys, Number of interviews unclear	Data collection included interviews with wide range of staff (not focused on nurses) .	Categorisation of data, coding and thematic analysis. Narrative case descriptions, synthesis of observational and interview data. Focus on patient journeys.	Introduction of wide range of practitioners required significant changes in how practices deal with patients requesting treatment which are not always straightforward. Matching of patients with practitioners requires effective categorisation of health patients problems and practitioners capabilities.	Two main limitations: Exploration in detail of the operational maturity was unachievable due to recruitment issues. This study reveals part of a lengthier process for patients and practices when skill mix increases. It seems likely that an additional

									Processes of redistribution of tasks from GP's to non-GP practitioners are complex. It is unclear under the PCN contracts how the fine grained adjustments will be made for practitioners working across multiple practices.	consequence of increasing skill mix may be a reduction in continuity of care, impacting patient health outcomes.
Russell et al	2022	What can general practice learn from primary care nurses' and healthcare assistants' experiences of the COVID-19 pandemic? A qualitative study.	Midlands, South East and South West England.	To explore primary care nurses' and healthcare assistants' experiences and perceptions of general practice, and the changes made to it, during the pandemic.	Exploratory qualitative study	Any HCA, nursing associate, practice nurse of ANP working in English general practice during COVID-19 were eligible. Participants included Practice nurses (n=12), HCA's (n=7), ANP's (n=4) and nursing associates (n=1).	Semi-structured interviews	Thematic analysis through implementation of Braun and Clarke codebook.	Three main themes identified: Difficult changes - describes dramatic changes made to delivery of care at onset of pandemic creating confusion and anxiety. Dealing with Change: negative emotions linked to wider contextual factors inc risk of infection, PPE and govt guidance and friction with Drs. Opportunity for improvement:	None noted

									highlighted certain changes i.e increased use of telehealth which participants felt could be adopted long term. GP practices should learn from the pandemic and nurture the clinical role and resilience of nurses and HCA's in the 'new normal'/ Improving channels if communication and inter-professional collaboration could help realise their potential within the PCT.	

Mann et al	2022	An ethnographic evaluation of a speciality training pathway for general practice nursing in the UK	7 sites in the Uk	Evaluate the implementation and impact of the GPN speciality training programme as currently no standardised training pathway or entry route for GPN's. The objectives were to understand, describe and evaluate: 1. The implementation of the 'proof of concept' training scheme 2. The learning undertaken during the training 3. The impact of the training scheme on individual nurses.	Qualitative ethnographic evaluation	Included GPN's teaching staff, GP's, GPN mentors, Practice Managers and Commissioners. 10 site visits to 7 different geographical areas with 3 sites receiving multiple visits. This included 44 one to one interviews and five focus groups and 56 sources (some involved in more than one data collection point).	Observations and interviews during site visits to training providers, practice sites and stakeholder meetings with documentary analysis.	Thematic analysis using NVivo and Kirkpatrick framework for course evaluation.	Evidence of learning from at every level of Kirkpatricks framework. The course offered opportunities for deep learning for GPN's and comprehensive pathway to GPN practices. Practices benefited from confident independent nurses who were able to contribute to patient care, practice safely and also contribute to longer term plans i.e research, workforce development and mentoring. GP's need to invest in developing a workforce of GPN's and there are significant benefits from a training pathway.	None noted

Mundy & Pow	2021	General practice nurses' experiences of participation in an advance nursing practice education programme	One University in Scotland	Gain an understanding of the educational experiences of nurses employed in general practice who were undertaking a masters' degree in advanced clinical practice. Identification of facilitators and barriers to participation were considered key to enhance provision on the programme.	Exploratory qualitative study	Purposive sampling with nurses who were students enrolled on the MSc programme supported by GP practices.	Individual face to face semi-structured interviews (n=5)	Thematic analysis through implementation of Braun and Clarke framework	Motivation for taking the course was complex and diverse but included improving the patient experience by reducing the potential for multiple visits to see different health professionals. Shared responsibility for patient care creates opportunities for learning. Facilitators for learning included foundation level education in history taking and clinical examinations, finance and supportive network and mentorship. Barriers included pressure of work and a lack of clarity about roles and training needs. There is a need for a national education	The study took place in one group of GP employed nurses undertaking ANP education at one University and so are not generalisable. Potential bias as first author was module lead and had professional interest and relationship with the participants. Managed through reflexivity but still present.

									standard and it is recommended that the NMC lead on defining ANP practitioners in GP programme learning outcomes. The overall aim of ANP programmes in to enhance the experience for future nurses to encourage recruitment and transform the nursing workforce.	
Martin-Misener et al	2020	The mosaic of primary care nurses in rural and remote Canada: results from a national survey	Canada	To examine the practice context and responsibilities of PC nurses in rural and remote Canada	Analysis of a cross sectional survey	Total of 3,822 out of 9,622 eligible respondents (40% response rate. Sub sample was classified through questions related to staff nurses, NP's, clinical nurse specialists and managers. Places of employment included nursing stations, community health centres, physicians offices/family practice teams, NP led clinics, MDT primary healthcare clinics.	Analysis of cross sectional survey	Data analyses included SPSS 24. Descriptive analysis, Chi-square and Z-test for proportions. For between group comparisons multi-variate analyses of variance using Wilk's criterion.	192 identified that PC was only practice focus. For 111 had more than one focus. More PC only nurses had graduate education were employed in larger communities and experienced higher job resources and lower job demands. Fewer PC-only followed protocols and decision support tools, dispensed medication and	Small number of respondents from Quebec. Inclusion from three areas may have diluted results. No definition of area of practice so some nurses may have been unclear of what PC was and impacted over or under reporting.

									provided emergency services. More PC-only ordered advanced diagnostic tests/imaging and fewer PC-only nurses performed and interpreted lab tests and imaging on site. The contribution of rural and remote nursing workforce to PC are invisible by contemporary characterisations of PC workplaces limiting evaluation and improvement efforts.	

Roberts on et al	2023	Primary care trainee nursing associates in England: a qualitative study of higher education institution perspectives	Five HEI's in England	To explore higher (University) education institution perspectives on the development and implementation of trainee nursing associates in the primary care workforce	Part of a larger qualitative study of HEI perspectives on the trainee NA programme. Used a descriptive exploratory qualitative framework within an interpretive framework. Implicit within this is NA's are working within a Trust or GP sector	Staff from 5 HEI's included in the study (n=27). Participants included senior management/leadership, teaching fellow, lecturers, clinical educator and Associate Professors.	Semi-structured interview schedule which included three questions related to trainer NA's from the private, independent and voluntary sector including primary care. What are the main motivations for commencing NA training in the Private, Independent and Voluntary Organisation sector? • What are the main training concerns or challenges for trainee NAs from this sector? • How has	Reflexive and iterative analysis with combined approach of framework analysis and thematic analysis. Extracted into Quirkos software. Data was coded and categorised into four elements.	Three key themes emerged. 1. Understanding the NA role and requirements - less understanding in PC and cost/benefit and incentives to develop NA's 2. Trainee support in primary care - from employers and system support and capacity 3. Skills and scope of practice - Level of skill, difficulty in obtaining skills, role substitution and exploitation or blurring i.e. In the GP surgery they)trainees) have phlebotomy skills, are able to run diabetes clinics and other clinics and give injections, take ECG's. Evident that a more limited understanding of	Data collection limited to 5 HEI's so may not reflect all the issues occurring within developing and delivering an NA programme. Primary care only formed one aspect of the larger study with limited emphasis on this in the interview schedule. But multi-nature aspect of the study moves beyond most studies in this area.

							the HEI had to adapt to meet the needs of trainee NAs from this sector?		the NA programme requirements can lead to difficulties in accessing correct support for trainees in PC. This can create challenges for NA's gaining the required competencies and uncertainty in understanding a safe scope of practice.	
Gibson et al	2023	General practice managers' motivations for skill mix in primary care: Results from a cross sectional survey in England	All GP practices in England (although some may have opted out of mailing list and not received the invitation	To investigate factors that motivate GP practices decisions to employ new roles and the role of financial incentives. To explore future intentions to employ new roles and practice managers ideal	Online cross sectional survey exploring non-medical roles. These were ANP's specialist nurses, HCA's, PA's, paramedic and pharmacists. These represented a mix of staff found in GP practices prior to the ARRS	All GP practices in England were eligible to participate. Invitations were sent out by email via a practices Local Clinical Research Network but some have may opted out of the email list. Responses were submitted by practice managers (n=1261) with a total of 1205 complete practice responses (96%0.	Cross sectional online survey .	Stata 15.1. Mean and standard deviations. Inverse probability to reduce bias and logic regression.	Three most commonly selected motivating factors were 1. to achieve a better match between patient needs and what the practitioners can deliver 2. to increase overall appointment availability 3. to release GP time Employment of	None noted

				hypothetical workforce.	scheme, have been linked to financial incentives from earlier policy initiatives, offer additional services or can be funded through PCN's.				pharmacists and PA's were most commonly supported by additional funding. PM's preferred accessing new non-medical roles through a PCN but clear preference for direct employment of additional GP's, ANP's or practice nurses. Ideal practice would comprise of over 70% GP's and nurses containing on average fewer GP's than the current workforce.	
King et al	2023	Training and development experiences of nursing associate trainees based in primary care across England: a qualitative study	England	To explore the experiences and career development opportunities for trainee nursing associates based in primary care	Qualitative exploratory design	Trainee nursing associates based in primary care across England	Semi structured interviews with three researchers undertaking the interviews. Five HEI's were situated across North West (n=1), Yorkshire (n=2) ,	Thematic analysis by two experienced researchers with 6 step process following Braun and Clarke framework.	Four key themes emerged. These were: 1. NA's training provides a valuable opportunity for career progression 2. Trainees were frustrated by the emphasis on secondary care in both academic content and	Despite geographical diversity the study does not comment on variation of regions. There was also a lack of diversity of ethnicity and gender which may restrict some views

							Midland (n=1) and South East (n=1).		portfolio requirements 3. NA trainees experienced inconsistency in support from managers and assessors 4. There were a number of constraints including to learning opportunities including the opportunity to progress to become registered nurses Educators should consider adjustments to the curriculum and recognise the resources for effective delivery of the programme.	and experiences.

Franceti et al	2022	Skill-mix change and outcomes in primary care: Longitudinal analysis of general practices in England 2015 - 2019	England	An examination of the skill mix change for primary care outcomes using a large representative longitudinal dataset and analysing a broad set of outcomes at patient, practice and health system level	Longitudinal analysis of practice level workforce data	Included 38 categories of staff including 5 GP categories, 8 nurse categories, 16 direct patient care categories and 9 admin categories.	Practice level workforce data from NHS Digital using the practice level General Practice Workforce Datasets.	Followed a conceptual framework to decompose quality of primary care into two main dimensions (accessibility and effectiveness) and three sub components (health care systems, patient-centred care processes and consequences of care. Used fixed effect and first difference regressions to model changes in staff composition and outcomes, adjusting for practice and population factors.	Employment increased across all four staff groups over time with largest increase in for HCP's and smallest for nurses who experienced a 3.5% growth. Increases in numbers of GP's and nurses were positively associated with changes in practice activity and outcomes. The introduction of new roles was negatively associated with patient satisfaction. All staff categories were associated with higher health system costs. Introduction of new roles to support GP's does not have a straightforward effect on quality or patient satisfaction and problems can arise with complex	None noted

									adaptation required to adjust practice organisation or from novelty of roles to patients. The finding suggest caution in implementation of policies encouraging more employment of diverse professional roles in PC.	
Grey Literature										
Meyers et al	2018	Workforce configurations to provide high-quality, comprehensive primary care: a mixed-method exploration of staffing for four types of primary care practices.	USA	To explore the team configurations and associated costs required to deliver high-quality, comprehensive primary care.	Mixed methods and consensus building	Expert input from nationally recognized experts of primary care research	Data extracted by 73 primary care practices in the US from peer reviewed and grey literature, combined with findings from eight case studies and expert panel input to develop a conceptual framework and translate this into the number and	Translated functions into FTE staffing requirements for a practice serving a panel of 10,000 adults then revised models to reflect divergent needs of practices serving varying patient populations. Labor and overhead	A primary care practice needs a mix of 37 team members, including 8 primary care providers (PCPs), at a cost of $45 per patient per month (PPPM), to provide comprehensive primary care to 10,000 actively managed adults. A practice requires a team of 52 staff (including 12 PCPs) at $64 PPPM to care for 10,000 adults with a high	Study not based on empirical data, preventing confidence intervals from being used. Models do not account for costs associated with transformation towards this model

							type of staff needed	costs associated with each model were estimated.	proportion of older patients, and 50 staff (with 10 PCPs) at $56 PPPM for 10,000 with high social needs. In rural areas, a practice needs 22 team members (with 4 PCPs) at $46 PPPM to serve a panel of 5000 adults.	
Mohamed et al	2018	An estimation of staffing requirements in primary care in Oman using the workload indicators of staffing needs method	Oman	To develop national staffing norms to ensure adequate numbers, appropriate skills mix and equitable distribution of health professionals in primary health care (PHC)	Workload indicators of staffing needs (WISN) method.	Use of 2014 data from the health information system and the human resources management information system to develop staffing norms using the WISN method	Types of PHC services itemized (promotive, preventive, curative, and rehabilitative and support services). The health service activities of doctors, nurses, dentists, pharmacists, assistant pharmacists and laboratory technicians were listed, the activity standards (defined as	Norms set based on the national average for the activity standards, then simulated norms in Muscat governorate, which has 32% of the population.	Calculation of staffing ratios for GP's and staff for PHC's providing core and specialist services. The simulation showed that Drs were less workload stressed than nurses (WISN ratio of 0.66 for nurses vs WISN ratio of 1.02 for Drs although there were variations between health centres. Additional parameters may be needed in future usage of the calculation	Estimates used to calculate the required staffing were linked to the package and pattern of health services provided to the current population which may not be transferable to future populations. This will require frequent adjustments in future use.

							the time necessary to perform an activity to acceptable professional standards in the local circumstances) and standard workloads (the amount of work within a health service component that one health worker can do in a year) were set and calculated manually.		once health service mapping and human resources profiles in each governorate is completed.	
Leary and Punshon (Queens Nursing Institute)	2024	ARRS Workforce Impact Survey. The impact of the introduction of the Additional Roles Reimbursement Scheme (ARRS) on the General Practice	England	To complete a workforce assessment impact survey to examine the impact of the introduction of additional roles reimbursement scheme on GPN	Cross sectional survey	GPN's across England. The survey was sent to 900 GPN's with 531 responses (60%).	Online cross sectional survey with 21 questions	Data analysis included descriptive statistics and content analysis of free text	Introduction of ARRS was a major workforce change with little or no consultation despite the impact on their workload. Inequitable pay and conditions were reported with ARRS colleagues on higher pay and	None noted

		Nursing workforce in England.		workforce in England.					more access to professional development. Work/care previously delivered by GP's and GPN's was shifted to ARRS colleagues but not completed due to being outside the scope of practice, skills and knowledge as well as unfamiliarity with primary care. This left care incomplete which was then left to GPN's to teach or complete the work. ARRS's roles contributed positively to distribution of work and quality of care when used in context of professional expertise. Introduction of ARRS roles seemed to be based less on need and more on availability of funding. Role creep and burden of supervision	

									was a recurring theme, esp for NA's and trainees. Perception of devaluing of GPN role was recurring themewith low morale.	
Baird et al	2022	Integrating additional roles into primary care networks	England	To explore the successful implementation and integration of the ARRS roles within general practice.	Qualitative exploratory study	Pharmacists, physiotherapists, link workers and paramedics as well as stakeholders from relevant national bodies and PCN clinical directors	Focus groups and interviews	Descriptive analysis with MAXQDA 2020 plus. Coding reviewed and synthesised into themes and an overarching framework.	Two overarching themes: Primary care network's ability to successfully integrate additional roles and; The fundamental needs of staff in ARRS roles. ARRS requires significant and complex change across general practice. PCN's are in early stages of development and lack a clear shared vision and buy in for ARRS roles. Many PCN's do not have a shared team identity and this impacts deployment in a	

									supportive environment. Lack of agreement over requirements of job and if the roles are primarily to deliver PCN contract or undertake core work of General Practice. Contribution of ARRS's to general practice are not universally understood despite guidance and road maps. There is ambiguity among some GP's regarding understanding of what multi-disciplinary working would mean for their roles and practice both clinically and from a business perspective. The cultural change requires considerable organisational development, leadership and service redesign and this has not	

									been available to PCN's or individual practices. Support (including clinical supervision, managerial and HR) is key to effective integration of ARRS's. Uncertainty around funding also a barrier. A clear shared vision for an MDT model of care, comprehensive package of support and focus on sustainability needed with leadership and management skills embedded in all GP specialist training.	

References

Ref list SR

Ablard, S. O'Keefe, C. Ramlakhan, S. et al. (2017) Primary care services co-located with emergency departments across a UK region: early views on their development. *Emergency Medical Journal*. 34(10): 672-676.

Ammi, M. Ambrose, S. Hogg, B. and Wog, S. (2017) The influence of registered nurses and nurse practitioners on patient experience with primary care: results from yje Canadian QUALICO-PC study. *Health Policy*. 121: 1215-1224.

Anderson, M. (2025) Funding for ARRS general practice nurse roles outlined. *Nurse in Practice* *Funding for ARRS general practice nurse roles outlined | Nursing in Practice* (accessed 15/04/25).

Baird, B. Lamming, L. Bhatt, R. Beech, J. & Dale, V. (2022) *Integrating additional roles into primary care networks*. London: Kings Fund.

Bi, Y. & Liu, Y. (2023) GP's in UK: From health gatekeepers in primary care to health agents in primary healthcare. *Risk Management and Healthcare Policy*. 16: 1929-1939.

Browne, A.J. Varcoe, C.M. Wong, S.T. Smye, V.L. Lavoie, J. Littlejohn, D. et al. (2012) Closing the health equity gap: evidence-based strategies for primary health care organizations. International Journal of Equity Health.11(1):59.

Cogora (2025) Cogora General Practice Workforce White Paper. 1737554486-cogora-general-practice-workforce-white-paper-2025.pdf (accessed 16/04/25).

Department of Health (2016) Health and Wellbeing 2026: Delivering together. health-and-wellbeing-2026-delivering-together (accessed 14/05/25).

Department of Health (2018) Health and Social Care Workforce Strategy 2026. Health and Social Care Workforce Strategy 2026 | Department of Health (accessed 09/05/25).

Ford, M. (2024) RCN's new primary care lead promises renewed focus on GPN's. RCN's new primary care lead promises 'renewed focus' on GPNs | Nursing in Practice (accessed 15/04/25).

Francetic, I. Gibson, J. Spooner, S. Checkland, K. & Sutton, M. (2022) Skill-mix change and outcomes in primary care: longitutinal analysis of general practice in England 2015-2019. *Social Science & Medicine*. 115224.

Freund, T. Everett, C. Griffiths, P. Hudon, C. Naccarella, L. and Laurent, M. (2015) Skill mix, roles and remuneration in the primary care workforce: who are the healthcare professionals in the primary care teams across the world. *International Journal of Nursing Studies*. 52: 727-743.

Fowler, T. Garr, D. Di Pietro Mager, N. and Stanley, J, (2020) *Enhancing primary care and preventative services through inter-professional practice and education*. Isreal Journal of Health Policy Research. 9:12.

Gibson, J. McBride, A. Checkland, K. Goff, M. Hann, M. et al (2023) General practice managers' motivations for skill mix change in primary care: Results from a cross-sectional survey in England. *Journal of Health Services Research and Policy*. 28(1): 5-13.

Halcomb, E. and Ashley, C. (2019) Are Australian general practice nurses underutilised? An examination of current roles and task satisfaction. *Collegian*. 522-527.

Halcomb, E. Ahsley, C. James, S. and Smyth, E. (2018) Employment conditions of Australian primary health care nurses. *Collegian*. 65-71.

Hewitt, S. Sheridan, N. Hoarer, K. and Mills, J. (2021). Understanding the general practice nursing workforce in New Zealand: an overview of characteristics 2015-19. *Australian Journal of Primary Care*. 27: 22-29.

Igumbor, J. Davids, A. Nieuwoudt, C. Lee, J. and Roomaney, R. (2016) Assessment of activities performed by clinical nurse practitioners and implications for staffing and patient care at primary health care level in South Africa. *Curationis*. 39(1):8 pages.

Josi, R. and De Pietro, C. (2019) Skill mix in Swiss primary care group practices – a nationwide online survey. *BMC Family Practice*. 20:39.

Khalil, H. Jia, R. Moraes, E. Munn, Z. Alexander, L. Peters, M. et al. (2025) Scoping reviews and their role in identifying research priorities. *Journal of Clinical Epidemiology*. 181: 111712.

King, R. Laker, S. Alden, S. Ryan, T. Wood, E. et al (2023) Training and Development experiences of nursing associate trainees based in primary care across England: a qualitative study. *Primary Health Care Research and Development*. 24(e32): 1-7.

Kings Fund (2025) NHS Priorities for 2025/26: our expert insights. NHS Priorities For 2025/26: Our Insights | The King's Fund (accessed 14/04/25).

Lane, R. Halcomb, E. McKenna, L. Zwar, N. Naccarella, L. et al (2017) Advancing general practice nursing in Australia: roles and responsibilities of primary healthcare organisations. *Australian Health Review*. 41: 127-132.

Leary, A. Punshon, G. Hack, A. Bushe, D. and Oldman, C. (2024) The impact of the introduction of the additional roles reimbursement scheme on the general practice nursing workforce in England. *Journal of Primary Care and Community Health*. 15: 1-10.

Maier, C. Batenburg, R. Birch, S. Zander, B. Elliot, R. and Busse, R. (2018) Health workforce planning: which countries include nurse practitioners and physician assistants and to what effect? *Health Policy*. 122: 1085-1092.

Mann, C. Boyd, M. Davis, H. Beardmore, G. and Hinsliff-Smith, K. (2022) An ethnographic study if a speciality training pathway for general practice nursing in the UK. *Nurse Education in Practice*. 62: 103347.

Martin-Misener, R. Penz, K. Macleod, M. Stewart, N. Wilson, E. et al (2020) The mosaic of primary care nurses in rural and remote Canada: results from a national survey. *Healthcare Policy*. 15(3): 63-75.

Mohamed, N. Al-Qasmi, A. Al-Lamki, S. Bayoumi, M. and Al-Hinai, A. (2018). An estimation of staffing requirements in primary care in Oman using the Workload Indicators of Staffing Needs Method. *Eastern Mediterranean Health Journal*. 24 (9): 823- 829.

Mundy, J. and Pow, J. (2021) General Practice nurses' experiences of participation in an advanced nursing practice education programme. *British Journal of Nursing*. 30(16): 964-969.

Myers, D. LeRoy, L. Bailit, M. Schaefer, J. Wagner, E. and Zhan, C. (2018) Workforce considerations to provide high-quality, comprehensive primary care: a mixed-method exploration of staffing for four types of primary care practices. *Journal of General Internal Medicine*. 33 (10): 1774-1779.

National Health England (2024) How to Align Capacity with Demand in General Practice. NHS England » How to align capacity with demand in general practice (accessed 14/05/25).

National Health Service Digital (2024) Appointments in General Practice-Series. Appointments in General Practice, December 2024 - NHS England Digital (accessed 25/3/25).

Northern Ireland Practice and Education Council for Nursing and Midwifery (2019) *Career Pathway for General Practice Nursing in Northern Ireland*. Belfast: NIPEC.

Nursing and Midwifery Council (2020) Nursing and Midwifery Task Group (NMTG) Report and Recommendations. Nursing and Midwifery Task Group (NMTG) Report and Recommendations | Department of Health (accessed 09/05/25).

Patel, H. Perry, S. Badu, E. Mwangi, F. Onifade, O. et al (2025) *A scoping review of inter-professional education in healthcare: evaluating competency development, educational outcomes and challenges*. BMC Medical Education. 25: 409.

Peters, M. Marnie, C. Tricco, A. Polluck, D. Munn, Z. et al (2021) Updated methodological guidance for the conduct of scoping reviews. *JBI Evidence Implementation*. 19(1): 3-10.

Public Health Agency (2016) *Northern Ireland General Practice Nursing Workforce Survey Report 2016*. Public Health Agency.

Public Health Agency (2024) *Primary Care Nursing: Workforce census report 14th February 2024*. Public Health Agency.

Public Health Agency, Royal College of Nursing et al (2016) *General Practice Nursing: "Now and the Future" – A Framework for Northern Ireland*. PHA.

Robertson, S. King, R. Taylor, B. Laker, S. Wood, E. et al (2023) Primary care trainee associates in England: a qualitative study of higher education institution perspectives. *Primary Health Care Research and Development* 24 (e3): 1-8.

Robinson, T. Govan, L. Bradley, C. and Rossiter, R. (2023) *Transforming health care delivery: the role of primary healthcare nurses in rural and remote Australia*. Australian Journal of Rural Health, 32: 592-596.

Russell, A. de Wildt, G. Grut, M. Greenfield, S. and Clarke, J. (2022) What can general practice learn from primary care nurses' and healthcare assistants' experiences of the COVID-19 pandemic? A qualitative study. *BMJ Open*. 12:e055955.

Sonnet Impact, NHS England & NHS Improvement (2021) *Leading the Way: the role and value of nurses in general practice in England*. Leading-the-way_The-role-and-value-of-nurses-in-general-practice-in-England-2021_Publication-version.pdf (accessed 21/01/25).

Spooner, S. McDermott, I. Goff, M. Hodgson, D. McBride, A. and Checkland, K. (2022) Processes supporting effective skill-mix implementation in general practice: A qualitative study. *Journal of Health Services Research and Policy*. 27(4): 269-277.

Walker, L. Clendon, J. and Nelson, K. (2015) Nursing roles and responsibilities in general practice: three case studies. *Journal of Primary Healthcare*. 7(3): 236-243.

Weir, J. (2015) Effect of a training programme on the work of GP-based HCA's. *Practice Nursing*. 26 (7): 351-355.

World Health Organisation (2025) Primary Health Care. Primary health care (accessed 12/04/25)

World Health Organisation (2025) Quality of Care. Quality of care (accessed 14/04/25)

World Health Organisation and UNICEF (2022) Primary healthcare measurement framework and indicators: monitoring health systems through a primary health care lens. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF). Licence:CC BY-NC-SA 3.0 IGO.

World Health Organisation (1978) The Declaration of Alma-Ata. WH_1988_Aug-Sep_p16-17_eng.pdf (accessed 12/01/25)

Appendices

Appendix I: Scoping Review Protocol

Appendix II: Prisma Tool

Appendix 1

A SCOPING REVIEW ON ESTIMATING THE NURSING MODELS FOR SAFE AND EFFECTIVE PRIMARY HEALTHCARE

Dr Lesley Dornan (UU)
Dr Esther Beck (UU)
Hilary Thompson (UU)
Dr Muhammad Salman Butt (UU)
Dr Deborah Muldrew (UU)
Evelyn Walton (UU)
Amber McCloughlin (PHA)

INTRODUCTION AND BACKGROUND

SECTION 1: KNOWLEDGE & UNDERSTANDING OF BRIEF

Primary Health Care (PHC) is a government-society approach to health, empowering individuals, and communities through multisectoral policy and public health functions as the core of integrated health services (1,2). PHC involves clinicians providing integrated, accessible healthcare services, addressing personal health needs, fostering patient partnerships, and practising within family and community contexts (3). A PHC approach maximises health and well-being distribution by prioritizing people's needs and preferences early in the care continuum, from health promotion to diagnosis, treatment, rehabilitation and people's everyday environments (4). PHC follows a broader multisystem approach and can be influenced by socioeconomic and demographic conditions that influence individual and population health (5). Effective PHC ensures equitable access to health services, addressing barriers such as gender, race, education, mental health, co-morbidities, socioeconomic status, and housing (5,6). These factors could affect the vulnerable population and individuals in need of primary health care services (5).

General practice is a crucial component of primary health care in the UK and NHS statistics reveal that general practice staff handled over 336 million appointments in 2023 (7). The selection of nursing staff and their skill mix should be based on education, practical training, skills, and experience, as studies have shown it improves healthcare outcomes (8). Primary care and general practice are evolving to meet complex community needs, necessitating novel approaches and multi-professional teams in both areas.

Primary care nurses aligned to general practice have wide and varied roles. As the brief does not require an appraisal of specific model outcomes and there is a lack of research synthesis in this area, a scoping review methodology is proposed (Munn et al 2018). To date there is no regionally consistent approach to mapping or collating data for the Primary Care Workforce in Northern Ireland. The **aim** of this scoping review is to map the evidence of the workforce profile of primary care nurses aligned to general practice and models to guide staff ratio decision making in practice at a global level which will inform future workforce planning in Northern Ireland.

SECTION 2: METHODOLOGY

Study design

This protocol will follow guidelines proposed by the Joanna Briggs Institute methodological guidelines for scoping reviews (Peters et al 2020a&b). A scoping review comprises of the following steps (1) identifying the research question(s), (2) defining eligibility, (3) selecting eligible studies, (4) charting data and (5) collating, summarising and reporting results. The review will be conducted in accordance with the PRISMA extension for Scoping Reviews (PRISMA-ScR) (Tricco et al 2018).

Research questions

The population, concept and context strategy proposed by the Joanna Briggs Institute (JBI) has been used to formulate the research question (Peters et al 2020a). In this review, the population will be registrant/regulated and non-registrant/non-regulated primary care nursing, the concept will be to examine the evidence on staffing ratios and the context will be primary care (general practice) nursing workforce. Guided by the brief, the research team has defined research questions for the scoping review:

1) What is the workforce profile of general practice nursing in GP practices within the last ten years?
2) What is the evidence relating to the registrant/regulated and non-registrant and non-regulated primary care nursing staffing to patient ranges/ratios for safe and effective healthcare?
3) What are the key characteristics of models used i.e. staff, qualifications, experience, teamwork composite and funding?
4) What is the evidence for modelling how change in primary care nursing workforce-to-patient ratios could affect nursing workload and healthcare quality?

Eligibility criteria

Included studies will be restricted to those published from the year 2015 onwards, and in English. This cut off period will be applied to ensure that the research studies identified will be as contemporary as possible while including some of the history of research and policy changes in this field.

This scoping review will include studies that describe how nurse staffing, skills mix, and modelling nursing-to-patient ratio in healthcare settings affect quality, healthcare and population health outcomes, and workload in primary care within general practice within a global context. This review will include aims to cover a broad spectrum of designs (quantitative, qualitative and mixed methods) which will be considered for inclusion. These include, but are not limited to randomised controlled, observational, quasi-experimental, hybrid, phenomenological and feasibility studies, among others. Grey literature will comprise policy documents, organisational audit reports, research reports, dissertations and theses, pilot studies and conference proceedings. Studies involving primary care-based healthcare centres, general practice surgeries and integrated general practice settings. Non-English studies and abstracts without associated full texts will be excluded from the review. Studies that do not contain original data, such as review articles, meta-analysis, editorials, or opinion articles and presentations will be excluded, but reference lists will be checked to identify potential additional studies. Opinion papers, editorials and commentaries were excluded due to potential risk bias.

Search Strategy

The following databases will be searched: Medline (Ovid), Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL) plus, Scopus, and Web of Science. The search strategy will combine Medical Subject Headings (MeSH) terms (and relevant synonyms) and the Boolean operators "AND" and "OR" for search strings. Terms have been and will be further developed by the review team with support from an information science specialist and an expert panel. The search strategy will consist of the following concepts: Nurse staffing and workload, skill mix and staff ratio and modelling nursing staff to patient ratio. For example, the search terms and MeSH terms included, see table 1.

Table 1: MeSH & Key words

Concept	Key words
General Practice:	"General Practice" OR "Primary Care" AND "Staffing*," OR "Nurse Staffing*" OR "Skill Mix*" OR ""Staff Ratio*" OR "Nursing workload*," OR "Nurse-patient ratio" Or triage nurses
Generalist:	"General practice nurse" OR "primary care nurse" OR "general practice healthcare assistant" OR "practice nurse" or "treatment room nurse" OR "specialist nurse" OR "nurse practitioner" OR "nurse consultant" OR "associate nurse" OR "advanced nurse practitioner"
Context:	"General practice surgery" OR "health care centre" OR "integrated hub" OR "primary care hub" OR "General Practice Or health and care centres OR Family practices OR health and social care centres OR primary care centre

This review will include grey literature, as we recognise that organisations may have reported on their model of care but may not have published their work in peer-reviewed journals. Grey literature will be sought using the following sites Open-Grey, Trip, Guideline Central, ClinicalTrials.gov, ProQuest Global Dissertations & Theses, Conference Proceedings in Science and Social Science & Humanities and the National Institute for Health and Care and Excellence website. Internet search engine Google Scholar will also be searched with the aim of identifying relevant unpublished studies, government reports, and conference abstracts (Aromataris & Riitano 2014).

Selection of sources of evidence

Records identified from academic databases, grey literature and hand searching will be uploaded in an online review software. Duplicate records will be removed. Five researchers (SB, LD, EB HT and DM) will independently screen all record titles and abstracts against the pre-specified eligibility criteria. Any retrieved documents deemed to meet the inclusion criteria will go forward for full-text review. Full-text article review will also be conducted independently by review team. Any disagreements will be resolved by consensus. For articles excluded during full-text screening, a reason for exclusion will be documented. The study selection process will be documented in a PRISMA flow diagram. The bibliography of included studies, and other relevant studies will be screened for additional studies. The eligibility criteria will be pretested on a sample of abstracts to ensure that relevant evidence sources are captured.

Critical appraisal of individual sources of evidence

Due to the heterogeneity of the studies, assessment of the methodological quality of included studies is not a requirement of scoping reviews (Peters et al 2020a).

Data extraction and charting

Data extraction, termed data charting in scoping reviews, aims to provide a descriptive summary of results that align with the review questions (Peters et al 2020b). A standardised template will be developed in Excel. For each data source generic data items such as (1) the publication title, (2) date of publication, (3) authors, (4) country (location of study), (5) study aims and objectives, (6) study design, (7) study setting, (8) study population, (9) study data collection method, (10) data analysis method will be reported, 11) key findings. Specific data related to the reviews aims will also be reported. Information on the structure of the various models of care, will be extracted with a view to group care models into categories. Key elements of the intervention such as information relating to the what the admitting service was, referral process, the composition of the intervention workforce team and objectives of the care model will be extracted. Organisational components such as underpinning policy and funding arrangements will also be reported. Patient-related (i.e. characteristics of the patient populations who access the care model) system-related and implementation related outcomes will also be extracted. Findings related to the scalability of effective models, attending to implementation and economic requirements will also be reported.

Data synthesis

The scoping review results will be synthesized into a narrative summary which aligns with study aim and review questions, which will be thematically sorted based on these criteria. Quantitative data of included articles will be summarized and if appropriate presented in tabular form. A narrative summary will accompany the tabulated results and describe how the results relate to the model(s) of care. Suggestions for future research based on the study findings will also be summarised.

Ethics and dissemination

As a secondary analysis, this study does not require ethical approval, however, to enhance rigour the protocol will be reviewed by experts in primary healthcare and nursing. It is envisaged that the outcome of this synthesis will provide a comprehensive understanding on nursing workforce staff and estimating the primary care nurse to patient ratio.

Hence it aims to provide meaningful knowledge to inform future service development in this field. Once the study is complete the findings will be disseminated through a report to the funder and Department of Health, research papers in peer-reviewed journals, presentations at relevant conferences and documentation for professional organisations and stakeholders.

Work Plan

Table 2: Gantt Chart

Activities	Oct	Nov	Dec	Jan	Feb - May	June - July
Preliminary work:						
Liaison with funders to agree protocol, subject librarian and expert peer review.						
Project start date:						
Conduct initial searches and pilot protocol						
Complete searches and remove duplication						
Screen titles and abstracts						
Data extraction						
Synthesis & Analysis						
Report writing: Report submission						
Project end date:						
Dissemination						

References

1. The declaration of Alma-Ata. World Health 1988 Aug-Sep 16-17 [Internet]. 1988; Available from: https://iris.who.int/handle/10665/52703

2. World Health Organization, United Nations Children's Fund (UNICEF). A vision for primary health care in the 21st century: towards universal health coverage and the Sustainable Development Goals [Internet]. Geneva: World Health Organization; 2018. Available from: https://iris.who.int/handle/10665/328065

3. Committee on Implementing High-Quality Primary Care, Board on Health Care Services, Health and Medicine Division, National Academies of Sciences, Engineering, and Medicine. Implementing High-Quality Primary Care: Rebuilding the Foundation of Health Care [Internet]. McCauley L, Phillips RL, Meisnere M, Robinson SK, editors. Washington, D.C.: National Academies Press; 2021 [cited 2024 Jul 25]. Available from: https://www.nap.edu/catalog/25983

4. Primary health care measurement framework and indicators: monitoring health systems through a primary health care lens. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF), 2022. Licence:CC BY-NC-SA 3.0 IGO.

5. Browne AJ, Varcoe CM, Wong ST, Smye VL, Lavoie J, Littlejohn D, et al. Closing the health equity gap: evidence-based strategies for primary health care organizations. Int J Equity Health. 2012;11(1):59.

6. Starfield B. Toward international primary care reform. Can Med Assoc J. 2009 May 26;180(11):1091–2.

7. NHS Digital, "Appointments in General Practice-Series", May 2024 (accessed 25 July 2024).

8. Dabney, B. W., & Kalisch, B. J. (2015). Nurse Staffing Levels and Patient-Reported Missed Nursing Care. *Journal of nursing care quality*, *30*(4), 306–312. https://doi.org/10.1097/NCQ.0000000000000123

PRISMA 2009 Flow Diagram