

A scoping review: Strategic workforce planning in health and social care

A scoping review carried out by the Workforce Observatory, University of Bradford. April 4th 2022.

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Executive Summary

Aim

This aim of this scoping review was to undertake a detailed review of the pertinent literature examining strategic workforce planning in the health and social care sectors. The scoping review was tasked to address the following three questions:

1. How is strategic health and social care workforce planning currently undertaken?
2. What models, methods, and tools are available for supporting strategic health and social care workforce planning?
3. What are the most effective methods for strategic health and social care workforce planning?

Methods

The scoping review utilised the five-stage scoping review framework proposed by Arksey and O'Malley (2005). This includes identifying the research question; identifying relevant studies; study selection; charting the data and collating, summarizing, and reporting the results. The search included a range of databases and key search terms included "workforce" OR "human resource*" OR "personnel" OR "staff*". Relevant documents were selected through initially screening titles and abstracts, followed by full text screening of potentially relevant documents.

Results

The search returned 6105 unique references. Based on title and abstract screening, 654 were identified as potentially relevant. Screening of full texts resulted in 115 items of literature being included in the synthesis. Both national and international literature covers strategic workforce planning, with all continents represented, but with a preponderance from high income nations. The emphasis in the literature is mainly on the healthcare workforce, with few items on social care. Medical and dental workforces are the predominate groups covered in the literature, although nursing and midwifery are also discussed. Other health and social care workers are less represented. A variety of categories of workforce planning methods are noted in the literature that range from determining the workforce using supply and demand, practitioner to population ratios, needs based approach, the utilisation of methods such as horizon scanning, modelling, and scenario planning, together with mathematical and statistical modelling. Several of the articles and websites include specific workforce planning models that are nationally and internationally recognised, e.g., the workload indicators of staffing needs (WISN), Star model and the Six Step Methodology. These models provide a series of steps to help with workforce planning and tend to take a more strategic view of the process. Some of the literature considers patient safety and quality in relation to safe staffing numbers and patient acuity. The health and social care policies reviewed include broad actions to address workforce planning, staff shortages or future service developments and advocate a mixture of developing new roles, different ways of working, flexibility, greater integrated working and enhanced used of digital technology. However, the policies generally do not include workforce models or guidance about how to achieve these measures. Overall, there is an absence in the literature of studies that evaluate what are the most effective methods for strategic health and social care planning.

Recommendations

The literature suggests the need for the implementation of a strategic approach to workforce planning, utilising a needs-based approach, including horizon scanning and scenarios. This could involve adoption of a recognised workforce planning model that incorporates the strategic elements required for workforce planning and a 'one workforce' approach across health and social care.

Contents

Executive Summary	2
Tables and Figures	4
Glossary	5
1. Introduction	1
1.2 Workforce Planning in the Health and Social Care Sector	1
2. Methods	3
3. Results	8
3.1 Policy drivers	8
3.1.1 2010-2019	8
3.1.2 2019-2022	9
3.1.3 Post COVID	9
3.2 Summary of the literature.....	11
3.2.1 Types and sources of literature	11
3.2.2 Groups of the health and social care workforce represented	11
3.2.3 Types of care workforce needs and services	13
3.2.4 Categories of strategic workforce planning research	14
3.3 Approaches to strategic workforce planning in health and social care: models, methods, and tools	15
3.3.1 Workforce Supply.....	16
3.3.2 Workforce Demand.....	17
3.3.3 Population needs approaches	18
3.3.4 Illustrations of named workforce models and datasets	19
3.4 Effectiveness of strategic workforce planning methods	20
3.5 Challenges for strategic health and social care workforce planning	20
3.6 Access, safety and quality considerations	21
4. Summary and recommendations	22
4.1 Recommendations	22
References	24
Appendix 1 Key health and social care policy drivers.....	30
Appendix 2 Inclusion/Exclusion Screening Algorithm for Workforce Observatory Scoping Review	31
Appendix 3 Inclusion and Exclusion Criteria Full Texts.....	33
Appendix 4 Examples of Workforce Planning Models	34

Tables and Figures

Table 1	Preliminary search strategy	3
Table 2	Preliminary search results	4
Table 3	Google Searches	4
Table 4	Additional Documents	5
Table 5	Key Policies reviewed	8
Table 6	Dimensions of workforce planning methods	16
Figure One	Department of Health and Social Care Structure	2
Figure Two	Integrated Care Systems	2
Figure Three	PRISMA diagram	6

Glossary

- **Demand-based approach** focuses on the current and future demand for health/social care workers. The main drivers are: 1) demography; 2) mortality/morbidity (or epidemiology); 3) health service utilisation (or health care needs in approaches that use a broader approach to measuring demand); 4) different health service delivery models (which may influence workforce requirements in primary care, hospitals and long-term care); and 5) economic growth and related growth in health spending (which will influence the ability to pay for health services from public or private sources). Source: OECD (2013:19)
- **Horizon scanning** is used to undertake a systematic exploration of the likely future developments, driving forces, and potential issues that could influence the workforce. Source: CfWI (2014:7)
- **Needs-based approach** extends the demand-based approach by additionally considering epidemiological and social-cultural factors and explores likely changes in population needs for health and social services and the workforce required. Source: WHO (2010:6)
- **Scenario Planning** involves a description of possible future situations including the paths of development that may lead to it. Source: CfWI (2014)
- **Strategic workforce planning** is the process of balancing labour supply (skills) against the demand (numbers needed) at least one year into the future. It includes analysing the current workforce, determining future workforce needs, identifying the gap between the present and the future, and implementing solutions so that an organisation can accomplish its mission, goals, and strategic plan. It is about getting the right number of people with the right skills employed in the right place at the right time, at the right cost and on the right contract to deliver an organisation's short and long-term objectives. Workforce planning can enable sustainable performance for an organisation through better decision-making about the future people needs of the business. Source: CIPD (2021:1)
- **Supply-based approach** is the current and future supply of workers measured using the 'stock-flow' approach. The supply side and 'inflows' includes the numbers of new entrants into the health/social workforce; the capacity to produce/train more, fewer or different types of health/social care workers in the future and recruit them into the health/social services industry and the 'outflows' (exits) the loss rates through retirement, emigration, death, or pre-retirement leaving. The stock of health/social care workers can be measured in headcounts or full-time equivalents (FTE). Source: OECD (2013:19).
- **Systems Dynamics (SD)** is a computer simulation modeling approach used to understand complex dynamic systems and how the different parts relate to each other, such as health/social care systems. The SD approach allows the relationships between different factors (cause, effect, impact, outcomes) to be explored over different time periods and geographical areas. The models created include a "stock" (is a quantity that either grows or depletes over time) and a "flow" (it is what drives the increase/ decrease and incorporate feedback loops). Source: (OECD, 2013).

1. Introduction

Workforce planning is essential for the sustainability of health and social care systems and is about getting the right number of people, with the right skills, employed in the right place, at the right time, doing the right thing (CIPD, 2021:1). This report presents the results from a scoping review of the literature that examines strategic workforce planning in health and social care sectors.

Aim

To perform a scoping review to answer the following three questions:

1. How is strategic health and social care workforce planning currently undertaken?
2. What models, methods, and tools are available for supporting strategic health and social care workforce planning?
3. What are the most effective methods for strategic health and social care workforce planning?

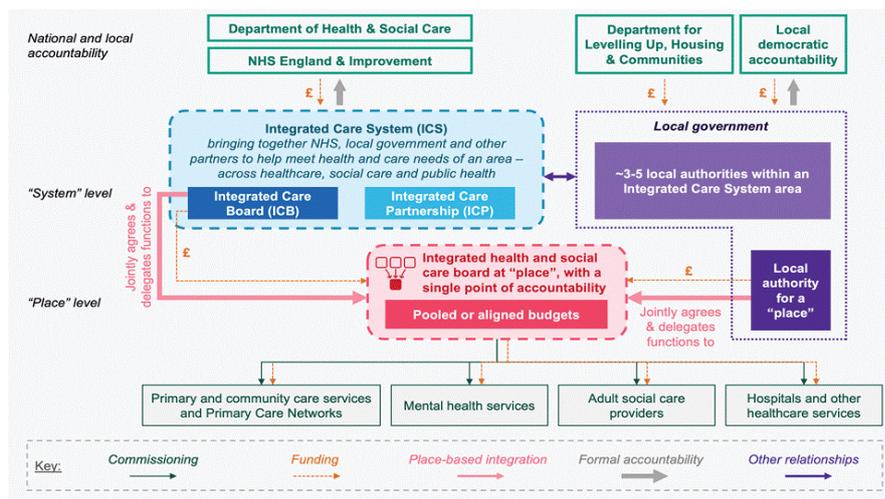
1.2 Workforce Planning in the Health and Social Care Sector

Health and social care workforce planning is a contentious issue. The *NHS Long Term Plan* (NHS England, 2019a: 78) notes that ‘over the past decade, workforce growth has not kept up with need’. Similar workforce shortages are experienced in social care (Kings Fund, 2018). The House of Commons Health and Social Care Committee (2021: 40) observed, ‘the need for better workforce planning’. While NHS England (2019a:79) commented that, ‘NHS workforce planning will always be complex and never an exact science, whether led nationally, regionally, or locally. But we must ensure plans work locally and add up nationally. Workforce plans need to be highly adaptive over the next ten years, and attentive to both the detail and the wider context’.

Both the *NHS Long Term Plan* (NHS England, 2019a:78) and the White Paper *Health and social care integration: joining up care for people, places, and populations* (DHSC, 2022a: 51) argue that workforce planning has been, ‘disjointed at a national and local level and there is a lack of clarity about the responsibilities of national and local bodies. Planning is often carried out in isolation, meaning that social care providers and local authorities frequently compete with the NHS, or each other, to attract and retain staff’. To address these issues, Health Education England (HEE) is working with its partners and reviewing the long-term strategic trends for the health and social care workforce (House of Commons, 2021:26). The Long-Term Strategic Framework for Health and Social Care Workforce Planning will review, renew and update HEEs [Framework 15](#). The new HEE framework, due 2022, will include both health and social care, and regulated professionals working in social care, such as social workers and nurses.

To assist with strategic workforce planning, the workforce accountability report will clarify the roles and responsibilities of national, regional, and local organisations delivering strategic workforce planning in England (DHSC, 2022a: 51). See Figure One for the structure of the NHS.

Figure One: Department of Health and Social Care Organizational Structure

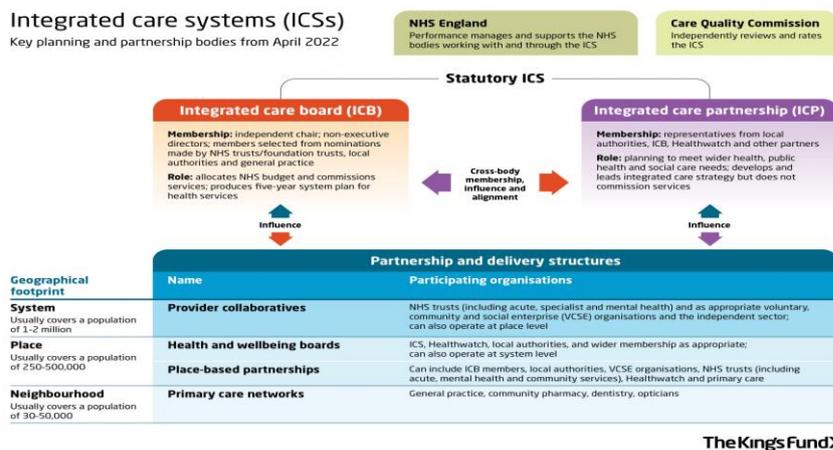


Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055687/joining-up-care-for-people-places-and-populations-web-accessible.pdf

At a national level the aim is for a strategic joined-up approach to people planning, with a National NHS People Board developing a People Plan and with responsibility for professional regulation, credentialing, pay and prescribing rights (NHS England, 2019b:58). Regionally the alignment of NHS England/NHS Improvement (NHSE/I) and Health Education England will enable these organisations to have a comprehensive view of the workforce requirements and priorities across each region.

The aim is that Integrated Care Systems (ICS), within a national framework, will develop and oversee population-based workforce planning for local health services (NHS England, 2019b: 59). ICSs will work with partners to lead place-based workforce planning and transformation, foster strong local partnership, undertake workforce planning in the short to medium and long term strategically (NHS England, 2019b:56). Figure Two illustrates the current organisational structure for ICSs.

Figure Two: Integrated Care Systems



Source: Kings Fund <https://www.kingsfund.org.uk/audio-video/integrated-care-systems-health-and-care-bill#&gid=1&pid=1>. Accessed 27th March 2022

Skills for Care is the strategic workforce development and planning body for adult social care in England, working with employers, Government, and partners. Their role is to respond and adapt to the emerging trends and needs within social care (Skills for Care 2021). The Adult Social Care Workforce Data Set (ASC-WDS) collects information about the size and structure of the adult social care sector, types of care services provided, the workforce, including retention, demographics, pay rates and qualifications, both by job role and employment status (Skills for Care 2021: 24; Skills for Care 2022). Councils working with providers and other partners will work to plan the health and social needs of the population and develop a local workforce plan. The White Paper, *People at the Heart of Adult Social Care* (DHSC 2022b:68) notes that, as part of supporting and developing the workforce, policies will be aimed at creating ‘a well-trained and developed workforce, healthy and supported workforce and sustainable and recognised workforce’. See Appendix One for some of the key health and social care policy drivers.

2. Methods

Scoping reviews are noted as suitable for evidence synthesis, clarification of concepts and identifying opportunities for and approach to further research (Pollock et al. 2021). The five-stage framework proposed by Arksey and O’Malley’ (2005) was utilised in this scoping review initially to scaffold the review team’s approach and ensure consistency. Arksey and O’Malley’s (2005) five stages include:

1. Identifying the research question
2. Identifying relevant studies
3. Study selection
4. Charting the data
5. Collating, summarizing and reporting the results.

In addition, other scoping approaches were scrutinised. The Joanna Briggs’ *Institute Manual for Evidence Synthesis* (Peters et al. 2020) has been utilised subsequently to expand the review team’s approach. Open Science Framework (<https://osf.io/>) and Figshare (<https://figshare.com/>) were searched for registered scoping reviews on strategic workforce planning but none were identified.

Initially appropriate health and management academic literature databases were identified in December 2021. These are detailed in Table 1 below. Preliminary searches were run in each of the chosen identified academic databases using the search terms noted in Table 1 below.

Table 1: Preliminary search strategy

Database (title and abstract)	Business Source Premier, CINAHL, Embase, Medline, ProQuest, Scopus, Health Management Information Consortium
Date range	01/01/2005 to date (12/2021)
Language	English
Strategy	#1 AND #2
#1	(“workforce” OR “human resource*” OR “personnel” OR “staff*” OR “manpower” OR “labour”) N3 (“planning” OR “demand” OR “supply” OR “modelling”)
#2	“healthcare” OR “social care” OR “domiciliary care” OR “community care” OR “residential care” OR “primary care” OR “secondary care” OR “tertiary care” OR “hospital*” OR “general practi*” OR “ambulance service*”
Limits (where database allows)	Abstract available

The preliminary search results obtained are presented in Table 2 below. The database ProQuest was discarded following the preliminary searching due to the large number (10 000+) of items retrieved and the time available for completing the scoping review. EndNote was used to manage the review's bibliography sourced from database searching.

Table 2: Preliminary search results

Database	Number of references identified
Business Source Premier	2031
CINAHL	1005
Embase	1703
Health Management Information Consortium	38
Medline	1806
ProQuest	10 000+
Scopus	2993

In total 6894 references were identified from refined searches in the remaining six databases identified above. Following de-duplication, the title/abstract of 6105 references were screened by nine reviewers using the algorithm presented in Appendix 2. This yielded 654 references that were subsequently divided between two reviewers for full text retrieval and screening utilising inclusion and exclusion criteria against the full text. The inclusion and exclusion criteria utilised in the full text screening are presented in Appendix 3.

A quality check of the screening of the full texts of 40 references was carried out to ensure each of the reviewers' screening of the full texts was consistent. There were 9 full texts where the reviewers had initial discrepancies in outcome: to include or exclude the reference. Following application of inclusion/exclusion criteria, 173 references with full texts were identified to be included for data extraction. Owing to time constraints upon data extraction and analysis, included full texts were re-screened by both initial reviewers with the result the included literature was reduced to 74 items for data extraction and analysis.

In addition to literature retrieved and scrutinised from academic databases supplementary literature searching was carried out with two Google searches and hand searching reference lists from previously identified references and reviewers' personal libraries. Details of the two Google searches run are presented in Table 3 below.

Table 3: Google searches

Search string	Number of references screened	Number and type of potentially relevant items	Number of included items
"strategic workforce planning" health	40	10 documents 5 websites	14
"strategic workforce planning" "social care"	40	4 documents	0

Grey literature retrieved and included from hand searching reference lists of full texts from searching academic databases and reviewers' personal libraries incorporated policy documents and significant

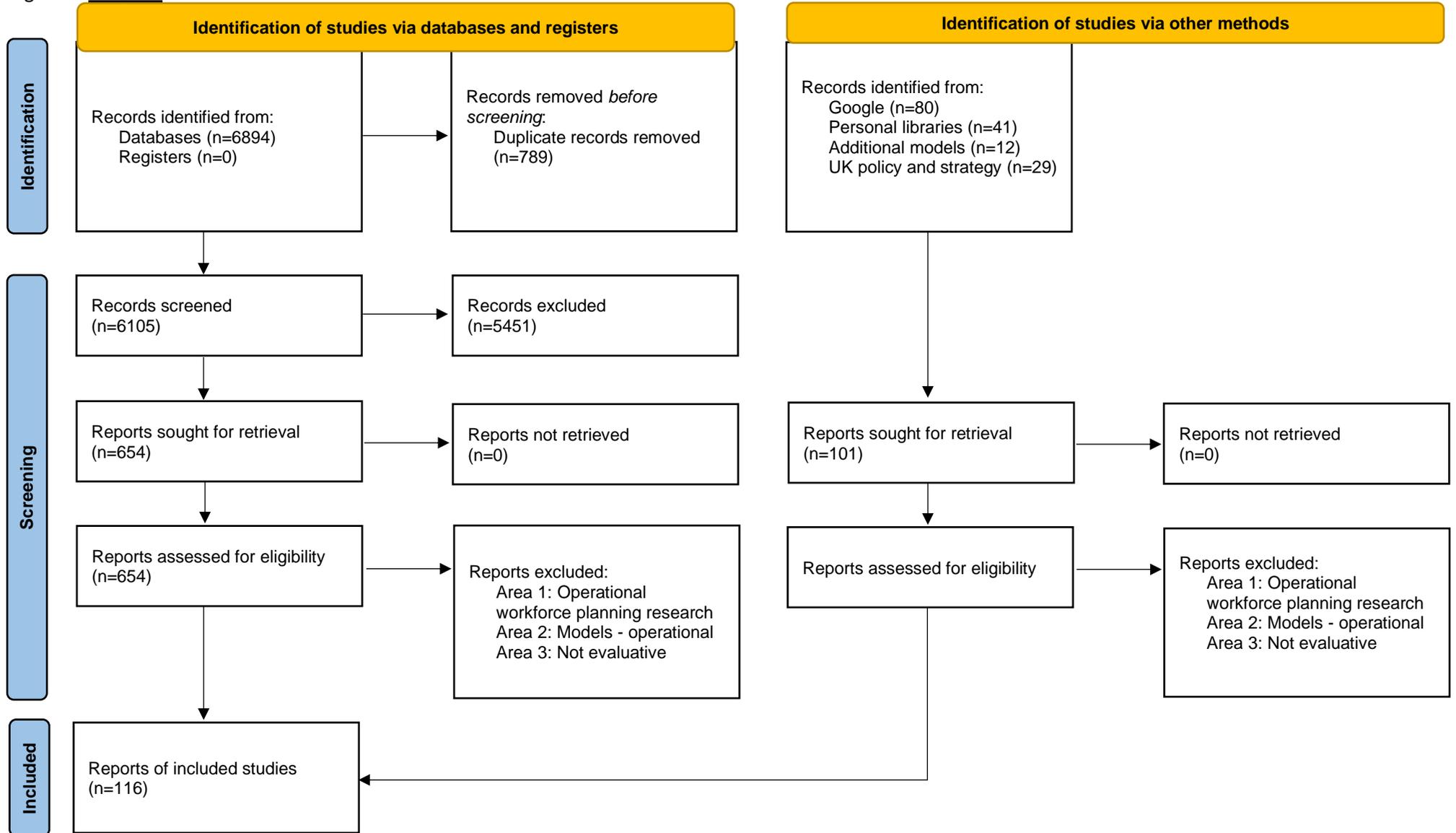
reports from national and international organisations such as The King’s Fund, The Nuffield Trust, The Health Foundation, the World Health Organisation (WHO) and the Organisation for Economic Co-operation and Development (OECD). In addition, strategic workforce planning models utilised locally or received from reviewers’ professional contacts were also incorporated. UK policy and strategy documents of direct relevance to strategic workforce planning in health and social care across the UK and in West Yorkshire from reviewers’ personal libraries were also collated and included. Table 4 below presents details of the additional searches included to provide a comprehensive characterisation of the evidence that informs strategic workforce planning in health and social care. The reviewers met regularly to review progress, undertake spot quality checks, and discuss findings.

Table 4: Additional documents

Source of literature	Number of items
Google searches	14
Additional literature from reviewers’ personal libraries	11
Additional workforce planning models from reviewers’ personal libraries	11
Additional UK policy and strategy documents	6

A summary of the section process for literature inclusion is presented in the following PRISMA diagram.

Diagram 3 PRISMA



Data extraction from included literature was undertaken as an iterative process. Categories for data extraction were agreed across the review team. These included:

- i) Lead author
- ii) Date of publication
- iii) Title
- iv) Inclusion code (title/abstract screening code)
- v) Country of study
- vi) Aim/purpose
- vii) Study population/data
- viii) Methodology
- ix) Findings/outcomes including models
- x) Nature/quality
- xi) Relevance for review questions

For items such as 'think-tank' reports, policy and strategy documents, categories of data extraction were used as 'best-fit'.

Data extraction from included literature was completed utilising an Excel spreadsheet and the agreed categories as detailed above. The review team met regularly to review and discuss key themes arising from data extraction. Key themes within each of the areas of interest (see 1., 2. and 3. below) derived from the three questions driving the scoping review were identified and utilised to commence data analysis:

1. Strategic workforce planning in health and social care
2. Models and methodologies for strategic workforce planning in health and social care
3. Most effective methods for strategic workforce planning in health and social care

Whilst no patients or members of the public have been involved in designing the protocol of this scoping review, the review team reports regularly to the wider Workforce Observatory project team where there is Patient and Public Involvement (PPI) representation and scrutiny of work undertaken by the Workforce Observatory.

3. Results

This section presents the findings from the scoping review. We begin by giving an overview of the policy literature, to provide the policy context for what follows. We then give a summary of the remaining literature reviewed in terms of types and sources, groups of the health and social care workforce represented, types of care workforce needs and services, and categories of strategic workforce planning research. We then consider the approaches to strategic workforce planning in health and social care, methods, models, and tools used and the challenges for strategic workforce planning. We conclude by discussing access, safety and quality considerations that emerged in the literature.

3.1 Policy drivers

The scoping review identified six key policy documents that are influencing health and social care workforce planning and these will be briefly discussed to illustrate the key themes (Table 5). It is important to note that other human resource (HR) policy documents have been issued over the last ten years, which contain similar workforce themes or provide further detail, for example, the *People Plan 2020/21 - action for us all* (NHS England and NHS Improvement 2020). The reviewed policy documents outline government workforce priorities, but do not necessarily provide suggestions as to how these issues will be addressed.

Table 5 Key policies reviewed

2014	Horizon 2035: Health and care workforce futures Progress update
2019	Interim NHS People Plan (June)
2021	The future of NHS human resources and organisational development
2021	The state of the adult social care sector and workforce in England 2021
2022	Health and social care integration: joining up care for people, places and populations
2022	Delivery plan for tackling the COVID-19 backlog of elective care

To assist with the discussion, it is helpful to consider that workforce planning has been influenced by three periods that coincide with Government White Papers or key policy documents and events:

2010-2019	Equity and Excellence: Liberating the NHS- delivery of this agenda
2019-2022	NHS Long Term Plan and Interim People Plan
2022-present	Post COVID - Integration and innovation: working together to improve health and social care for all

3.1.1 2010-2019

The White Paper *Equity and Excellence: Liberating the NHS* (DH 2010) introduced substantial changes to the delivery of health and social care services and created new structures such as clinical commissioning groups and the Sustainable Transformation Partnership, the precursor of ICSs. Workforce Planning was spearheaded by the Centre for Workforce Intelligence (CfWI), formed in 2010, a national organisation delivering workforce planning advice and requirements for health, public health, and social care in England. In 2016, the functions of the CfWI were transferred to the Department of Health and Health Education England.

The CfWI (2014) report entitled *Horizon 2035: Health and care workforce futures- progress update* included detailed scenario scanning and models of different services /staff to identify what factors

may influence the future demand and supply of skills in health, social care, and public health and to use this modelling to support the Department of Health's long-term strategic vision for the workforce in England. CfWI (2015) produced the *Robust Workforce Planning Framework*. Common workforce themes emerging from the scenarios analysis include modifying skill mixes, changing workforces' responsibilities around demand management, and the changing the role of the private sector (CfWI 2014:6). The report noted three areas for workforce planning that are consistent themes in subsequent human resource policy documents:

1. *Defining the health and care system*- the context of the workforce sectors; their size, structure and how they can be understood together
2. *Generating scenarios* to identify the crucial forces shaping the current and future workforce system and what influences the future demand and supply for health, social care, and public health
3. *Modelling demand and supply*; the current demand and supply of the health, social care and public health workforce

3.1.2 2019-2022

The publication of the *NHS Long-Term Plan* (NHS England 2019a) resulted in a series of human resource policies and included *the Interim NHS People Plan* (NHS England 2019b). This outlined the contribution of the workforce to delivering the NHS Long-Term plan based on five drivers (NHS England 2019b: 3).

1. Making the NHS the best place to work and employer of choice
2. Improving the leadership culture with a focus on good leadership
3. Addressing urgent workforce shortages in nursing
4. Delivering 21st Century care, including the need to grow the overall workforce, transform the workforce, skill mix, new types of roles and diverse ways of working, increased flexible working, utilising technology, and scientific innovation to transform care
5. A new operating model for workforce, including collaborative working, clarity for workforce planning locally, regionally, and nationally, with more people planning activities undertaken by local ICSs.

3.1.3 Post COVID

NHS England and NHS Improvement (NHSE/I 2021) issued *The future of NHS human resources and organisational development*. This report outlined the health and social care workforce planning issues to be considered Post- COVID going forward and identified key targets. These were based on scenario planning of the workforce noting:

The NHS of 2030 will be fundamentally different from the service we work in today – as set out in the NHS Long Term Plan. The world of work is changing at a pace never imagined, with growing evidence of links between staff wellbeing, care quality and retention. This is evolving alongside digital technologies, automating tasks, remote working and new advances based on artificial intelligence. Meanwhile, existing ways of working, models of care and organisational boundaries are being transformed, as the NHS adapts to the changing needs and expectations of our population (NHSE/I,2021a:6).

The term 'the people profession' is used in the policy document to capture the entire workforce and refers to people at every level across the NHS, including human resources (HR), organisational development (OD) and workforce departments, who alongside managers and trade unions contribute to and improve our NHS people's working experiences' (NHSE/I 2021: 7). Scenario planning identified the following issues:

- Trends in health care – rise in patient demand with comorbidities;
- Workforce supply challenges are expected to continue as demand rises;
- The need for joined up and integrated care services;
- Increased technology and innovation;
- Workforce demographics changing with an older workforce;
- More flexible and agile ways of working;

To address these issues a series of actions were included in the report (NHSE/I 2021: 15). For example, actions focus on professional standards, professional development, and training, increasing the diversity of the workforce, quality and standards, use of digital tools, staff health and wellbeing. The specific targets for workforce planning were shaped by the NHSE/I (2021:29-30) premise that, 'Workforce planning needs to be rooted in understanding of the future health and care needs of the population at local, system and national level. This understanding can be used to drive workforce, service, and financial planning'. There are five detailed actions for workforce planning:

1. Systems need to lead comprehensive 'planning for the future': developing workforce plans, based on service planning, to meet population health needs with clear actions for meeting the plans through new ways of working and growing the workforce
2. DHSC, HEE and NHS England and NHS Improvement national and regional teams will work together to support further development of workforce planning capacity and capability.
3. Organisations and systems need to ensure that planning for the future, including workforce planning, is digitally enabled and draws on more robust and timely data.
4. Organisations and systems need to support people to work differently and more flexibly to support action to deliver care to patients in new and different ways.
5. Organisations and systems should continue to lead action to address local supply issues, using the benefit of scale wherever possible and innovative approaches that broaden access to roles for the local community.

Skills for Care publish an annual report *The State of the adult social care sector and Workforce in England* (Skills for Care 2021) that provides an overview of the social care sector and detailed information on the workforce composition but does not include any workforce models. The report stresses the following problems facing social care: staff sickness and burnout; recruiting and retaining staff; a move in demand from care homes to domiciliary that was COVID related. These problems were compounded by, at that point, compulsory vaccinations for care home staff and new immigration rules/travel restrictions that meant international workers were unable to come to the UK for care worker jobs (Skills for Care, 2021: 11). As part of the analysis, forecasts show that if the adult social care workforce is to grow proportionally to the projected number of people aged 65 and over in the population between 2020 and 2035, an increase of 29% (490,000 extra jobs) would be required by 2035 (Skills for Care 2021:21).

The White Paper *Health and Social care integration: joining up care for people, places, and populations* (DHSC 2022a:48) outlines how workforce planning will be undertaken drawing on previous human resource policies. In summary, some of the areas focused on are strengthening the role of workforce planning at ICS and local levels, tackling barriers to workforce integration, extending flexible working, recruitment of staff, greater health and social care workforce integration and collaborative working, training, providing staff well-being and support.

The final policy document noted in the literature review was the NHS England and NHS Improvement (2022) *Delivery Plan for tackling the COVID-19 backlog of elective care*. This report highlights the impact of the pandemic across the health service and the increasing waiting lists due to postponed elective care (NHSE/I 2022: 2). Consequently, a series of actions and principles are outlined that highlight the need to transform services, harness the potential of data and technology, and expand the workforce and physical capacity. The implications for workforce planning mirror previous human resource initiatives with the emphasis on systematically training, recruiting, and retaining staff, more flexible and remote working and the development of new skills and roles (NHSE/I 2022:14). At the same time, measures to expand the workforce by encouraging trained staff to return to work, international recruitment drives and the use of digital technology to support and free up staff are being employed.

This brief review of current health and social care policy documents highlights several strategic workforces planning issues:

- Supply problems with staff across the health and social care sectors regionally and nationally;
- The need for strategic workforce planning, capacity, and capability to meet population needs;
- The development of new roles;
- The need for increased flexible and agile ways of working;
- Developing workforce planning to take account of new ways and different ways of working;
- Reliance on international recruitment for staff;
- The need for integrated and collaborative working across health and social care sectors and a 'one workforce' approach; and
- The expansion of digital technology to support service delivery.

3.2 Summary of the literature

3.2.1 Types and sources of literature

Most, 74 of 115 items, of the literature were generated from searching and retrieving records within academic databases. This majority was further supplemented by records, a total of 24 items, reviewers had identified of significance from within their personal libraries, hand searching for items of note within the reference lists of records retrieved, from academic databases or additional Google searches. Policy and strategy documents (6 items) were limited to those from the United Kingdom (UK) and published in the last two years particularly, with a focus on health and social care workforce integration.

Most literature reviewed (80 of 115 items) was dated 2015-2022. This is not to suggest prior to 2015 there was limited consideration of strategic workforce planning in health and social care in the UK or internationally, rather the reviewers have prioritised policy and strategy documents and models produced since 2015 and these have increased the number of items of literature produced since 2015. This said, it should also be noted several of the most salient publications from the World Health Organization (2010) and the Organisation for Economic Cooperation and Development (2013) were produced prior to 2015.

An international perspective within the academic literature on strategic workforce planning in health and social care is evident in the literature from databases, with all continents represented. It is noticeable however that most literature from academic databases has been produced from developed/high-income countries in Europe, the UK, Australasia, and North America.

3.2.2 Groups of the health and social care workforce represented

The medical and dental workforces are most heavily represented within the literature with 28 items. All other categories of workers are represented in a further 29 items of the literature. There is a wide

range of medical specialties represented including psychiatry, neurosurgery, public health, endocrinology, cardiac surgery, neurology, pathology, hepatology, ophthalmology, and rheumatology. The concern for the supply of the general practitioner (GP) workforce is not only in the UK (Abel et al. 2020) but also in the Netherlands (Van Greuningen et al. 2012) and Australia (Laurence and Karnon, 2017) and is specifically commented on.

Three items of literature focus on the role of advanced practitioners and this is typically in the context of the redesign of work with the introduction of nurses and allied health professional who have undertaken advanced training in order to fill gaps in medical rotas (Maier et al. 2018; Streeter et al. 2017; Health Resources and Services Administration 2019).

The registered nursing workforce was the focus of 14 items. It is noted within the UK there is an enduring shortage of the nursing workforce (The Health Foundation 2019 a, b). A shortage in the nursing workforce is also identified by Lavieri et al. (2009) who discuss the value of modelling the supply requirements of the nursing workforce in British Columbia, Canada over a twenty-year horizon and the increasing demand for nursing services. The more recent work of Chung et al. (2021) explains the gap between demand for nursing manpower and supply in cancer care in Taiwan will peak in 2027. Globally there is a growing concern due to shortages in the nursing workforce, should nursing care in general as well as in specific situations continue to be provided in extant ways.

Birthrate Plus, a key methodology to plan the midwifery workforce in the UK (Ball et al. 2010a) and in China (Yao et al. 2016), dominates the literature regarding the midwifery workforce. Ball et al. (2010b) and Yao et al. (2016) note if women in labour are to receive one-to-one care there is a necessity to increase the midwifery workforce as currently there is a deficit. Both items do note the importance of strategic planning that directly considers patient acuity as well as the contribution of support workers within midwifery services.

Paramedics and allied health professionals are not well represented within the literature with just two items. Vile et al.'s (2016) work examines the value of workforce planning to identify service capacity building opportunities within emergency medical services in Wales. Bam et al. (2021) explore a novel framework that utilises radiographer workload as a means to determine staff requirements at practice level.

Unregistered healthcare workers are poorly represented (two items) and as contributors to specific disciplines only. For example, the work of Somerville et al. (2015) notes how allied health assistants in Victoria, Australia may be better utilised to develop the capacity of the allied health professionals. Teusner et al.'s (2016) work notes oral health therapists, dental hygienists and dental therapists in Australia make up approximately 20 per cent of the dental workforce and yet there is limited consideration for the nature of their practice and capacity enhancement within workforce modelling for dental services.

Most of the small number of items of literature (four of five items) retrieved and interrogated in relation to the social care workforce come from the UK's Skills for Care (2021). Literature for social care specifically for children is not represented within in the review's literature. It is also of note that adult social care in England employs approximately 1.54 million people, more than the National Health Service's 1.3 million, with social care increasingly provided by independent organisations (Skills for Care, 2021). Adult social care is proportionally underrepresented within the literature of the review.

There is a single reference to the contribution of voluntary labour within the literature of the review. Dol et al. (2020) note the importance of empowering mothers around the world in the care of their newborn and young children, particularly recognising the supply-demand gap globally and the importance of innovation in service provision to address staffing deficits.

3.2.3 Types of care workforce needs and services

A generic discussion of the health care workforce is addressed within 31 items of literature whereas only five items of the review focus on the social care workforce and notably the adult social care workforce. One item only, the work of Spetz et al. (2015), discusses the utilisation of long-term care in the United States (US), noting the differences in long-term care use by ethnicity and the potential impacts of the move to non-institutional care. Spetz et al.'s (2015) notes the need to recruit and retain long-term care workers in the US.

In-patient health care provision, notably acute care provision, is discussed by Schofield and Earnest (2006) as demand for bed-days in Australia's public hospitals, noting an anticipated increase of between 70% and 130% by 2050 due to population ageing. Ball (2020: 5) notes the impact of safe staffing policies following the Francis inquiry in the UK into substandard care provided at Mid Staffordshire NHS Foundation Trust, with particular consideration for nursing staff numbers, concluding that such policies have impacted on the growth of nursing roles but there is still an enduring 'shortage of nurses to fill vacancies.' Blank et al. (2017) highlight the importance of utilising productivity growth from a Dutch hospital perspective to shape healthcare policy that drives both care quality as well as cost efficiency.

Specialist community-based health care and its workforce is limited to three references (Taghavi et al. 2021; Segal et al. 2018; Penny and Fennah, 2020). Taghavi et al. (2021) discuss a novel methodology using operations research, notably linear programming to predict/forecast the multi-disciplinary team requirements (of nurses, physicians and social workers) in Nova Scotia, Canada, for community-based specialist palliative care services to 2038. They note the positive impacts the expansion of generalist primary care services would have on specialist palliative care provision, advising that at present community-based specialist palliative care services require a 64% staffing increase to provide care aligned to the national standards. Segal et al.'s (2018) work utilised a needs-based model to identify a current deficit of 947 people and AU\$126 million, five times the current provision for tertiary-level community mental health care for infants, children, and adolescents in South Australia.

Deficits with the strategic planning of the GP workforce are notable in the literature from international perspectives (Asamani et al. 2021; Mabunda 2021; Laurence and Karon, 2016; Teljeur 2010; Koichubekov 2021). The importance of an integrated approach is apparent in the work of Laurence and Karon (2016; 2017) and Laurence et al (2018) who provide a perspective on workforce planning for general practice in South Australia noting the importance of considering population needs as well as provider supply parameters. Simkin et al. (2021), who outline a Canadian view, note that a strategic workforce for general practice must include regional health needs consideration as well as supply. In the UK, The Health Foundation's (2019a: 1) findings identify, 'serious staffing issues in general practice', calling urgently for attention to increase those entering specialty training as a GP.

Whilst the health service demands internationally of ageing populations and the increased burden of chronic disease are noted (OECD 2013) there are limited examples of specific consideration (Tomblin Murphy et al., 2013; Gallagher et al., 2010) within the literature with respect to how older adults' health services will meet such needs. Tomblin Murphy et al.'s (2013) work examines home and long-term care provision in Nova Scotia, calling on policy makers to consider the type of service required, previously identified as a competency-based approach to workforce planning, to reflect the emphasis upon services that meet population/patient requirements rather than those of the provider and policy responsiveness. Segal and Leach's (2011) note the importance of workforce planning that espouses the delivery of best-practice care in the management of chronic disease.

3.2.4 Categories of strategic workforce planning research

Most research, 37 items of literature, within strategic workforce planning presents modelling/methodological, programming development and back-testing enquiry. There is a wide range of models/methodologies represented within the literature and these are discussed in more detail in later sections of this report. This section introduces the key research approaches utilised in strategic workforce planning in health and social care.

Primary survey data along with the use of existing datasets are commonly utilised research approaches used globally to generate health practitioner-to-population ratios data. Most commonly within the literature practitioner-to-population ratios have been utilised for research into specific medical roles supply. For example, the work of Looi et al. (2021) describes psychiatrist supply within the Australasian context. However, Looi et al. (2021) also note whilst ratios are helpful rudimentary measures of provision, needs-based approaches and service utilisation are essential to improve workforce planning approaches. Reulen et al. (2009) describe the neurosurgical workforce in multiple European nations, noting great variation in neurosurgeon per population ratios. Reulen et al. (2009) also note the importance of considering those entering neurosurgical training and the need to tailor the supply resource to required supply growth. Scheffer et al.'s (2020) comparative analysis of the supply of physicians and specialist training in Brazil and Spain explores the impact of increased training places for the growth in density of physicians in Brazil and Spain. Ranta et al.'s (2015) work examining the neurologist workforce of New Zealand notes the importance of considering productivity as well as the nature of service demand alongside practitioner-to-population ratios. Whilst practitioner-to-population ratios are helpful elements of strategic workforce planning approaches from supply perspectives, more expansive, nuanced, approaches which enable practitioner stock flow (inflows and outflows), productivity and provider practice patterns offer opportunities, say Simkin et al. (2021) in the context of primary care, to provide integrated, multi-disciplinary, needs-based workforce planning that may also promote equitable healthcare access at the regional level.

Action research by Panzera et al. (2016) within the context of a case study in Queensland notes the value of a participatory approach to health workforce planning, emphasising the importance of local contributions that respond to the community's specific health needs. Regional level health workforce planning is most effective if approaches utilised have flexibility to accommodate specific context details. Mabunda et al.'s (2021) case study examined the use of the World Health Organisation's Indicators of Staffing Needs (WISN) tool for health workforce planning in India, South Africa and Peru noted limitations on its use owing to financial, infrastructure and technical challenges specifically in relation to data availability. Batenburg's (2015) work examining the characteristics of health workforce planning of thirty-five European countries notes health workforce planning is highly contextual, countries invest in health workforce planning variably, showing countries with larger health labour markets, nationalised health services, and robust primary care tend to prioritise health workforce planning. Batenburg (2015) notes health workforce planning may be measured by data to monitor capacities and dynamics of the workforce, by the institutions that define the labour market's regulation and the models to calculate the current and future supply-demand.

The use of interviews, either with individuals or as focus groups to promote stakeholder consultation in workforce planning as well as workforce planning research, was commonplace in the literature (Wranik 2008; Somerville et al. 2018; Yasutake et al. 2020). Often interviews were combined with secondary research for example in the form of literature reviews, document and data analysis (Stordeur and Leonard, 2010; von Eitzen-Strassel et al. 2014; Dejaco 2018).

3.3 Approaches to strategic workforce planning in health and social care: models, methods, and tools

The literature reveals that health and social care workforce planning is complex and that various models and approaches are utilised; this section will consider these. This section starts by considering what is meant by 'strategic' workforce planning in the context of health and social before continuing to focus on a range of models and methodologies.

Monitor (2014) notes strategic workforce planning entails two-to-five-year targets, alignment to long-term business strategies, their personnel, their qualifications and skills needed, with a focus on the quality and size of the workforce. By comparison, Wranik's (2008: 33) typology of health human resource planning divides these into the micro-level: considered at the provider level, and macro-level: approaches that are global and 'top down'.

Numerous planning models and methods are utilised globally to determine the health and social care workforce required (OECD 2013). Many approaches to workforce planning are based on supply and demand, balancing labour supply (skills) against the demand (staff numbers needed). Strategic workforce planning also includes analysing the current workforce, determining future workforce needs, identifying the gap between the present and the future and a strategic workforce plan (Kings Fund, 2018).

Strategic workforce planning can also use modelling of a workforce, mathematical or statistical approaches such as logistic regression analysis, simulation, system dynamics, stochastic analysis, and linear programmes. Methods such as horizon scanning, forecasting or scenario planning are used to identify future workforce requirements and may include skill mix appraisal, role redesign, developing new roles and new ways of working to promote flexibility and agility.

Birch et al. (2020) argue that needs-based approaches that consider efficiency and financial value in strategic health workforce planning must gain increased traction. Both the health needs methods and the service demand methods are more complex forms of workforce planning. These approaches consider the likely changes in population needs for health services, based on demographic and epidemiological data, and use this to workforce plan. The complex approaches to strategic workforce planning tend also to include different methods that aim to capture a comprehensive picture of the workforce. An example of this is the Centre for Workforce Intelligence's (2014) workforce planning model that utilises horizon scanning, scenario generation, workforce modelling and policy analysis to model supply and demand. The CfWI (2014:8) note, 'workforce modelling is to project demand and supply for a range of plausible futures, as described by the scenarios. Further modelling is then conducted to determine the robustness of policy options for achieving a sustainable balance of demand and supply.'

The WHO (2010) notes workforce planning tools make projections based on human resources for health dynamics, requirements, supply, workload, staff development and movement. The WHO (2010: 8) categorise tools into six approaches: workload indicators of staffing needs, trend analysis, regression analysis, meta-analysis, econometric analysis, and simple models for consideration of other health aspects. The literature identified studies that adopt a more strategic/long term approach to workforce planning. For example, Ansah, et al. (2015) used plausible future scenarios analysis and scoped to 2040 in order to determine the requirements for and supply of ophthalmologists for Singapore. Other workforce studies concentrate on operational/tactical workforce planning in terms of the number of staff needed and when. Vile et al. (2016) mathematically models emergency medical workforce capacity utilising operational data.

Table 6 provides an overview of the key dimensions of workforce planning methods including attributes of models and approaches identified in the literature review and the frequency with which those attributes were identified. Specific dimensions of models and approaches (supply, demand and population needs) are further discussed in the narrative following Table 6. This section concludes by briefly presenting specific strategic workforce planning models utilised commonly internationally and nationally within the UK.

Table 6: Dimensions of workforce planning methods

Dimensions of workforce planning and methods	Frequency in literature	
Workforce design	25	Supply
Number of trainees	19	
New roles	20	
Skill mix	29	
Patient dependency-acuity	3	
Workforce supply	77	
Population needs	32	Demand
Needs based approach	15	
Demographics	12	
Workforce demand	56	
Workforce modelling	46	System approaches
Forecasting / horizon scanning	41	
Systems dynamics model	12	
Simulation model	13	
Logistic regression	3	
Linear programming	4	
Descriptive statistics	2	
Feedback loops	1	
Back testing	1	
Stochastic	4	
Scenarios	21	
Mathematical modelling	13	
Policy	14	
Total	463	

3.3.1 Workforce Supply

Workforce supply is driven by three key dimensions: trainees, the existing workforce and mobility (The Health Foundation, 2019a). A range of mathematical models focused on provider supply are represented in the literature of the review and used to determine supply. Examples of these include practitioner or micro-level, supply focused approaches (Vigersky et al. 2014, Whole Systems Partnership 2022a,b, Health Resources and Service Administration 2019, HRSA in Streeter et al.,2017; WISN in Mabunda et al. 2021). The aim of these different methods and workforce projections is to understand what the expected supply of human resources is and whether it matches the requirements/numbers of staff needed to deliver health and social care services

3.3.2 Workforce Demand

Workforce-to-population ratio methods are used to determine future numbers of health workers required based on proposed thresholds for workforce density and workload. For example, Looi et al (2021) used this approach to describe and determine the psychiatry workforce. The World Health Organization (WHO, 2010) suggest that the WISN method is a simple approach based on a health worker's workload, with activity (time) standards applied for each workload component however key variables, such as population growth, the type and scale of required future health services provision and the associated workforce are not considered.

Workforce demand projections strive to determine the staff requirement to deliver anticipated health and social care services. Some studies (Blank, et al 2017, Panzera et al. 2016) use demographic and/or epidemiological data of the population and disease prevalence/incidence to determine how these trends may influence workforce planning in terms of the type and number of staff required, training and education needs (both now and for the future), skills for different professions, skill mix and new roles. Lopes et al (2018) used demographic/population analysis, together with stochastic (random distribution analysis) agent-based simulation models to forecast the supply of physicians and the impact of existing demographic projections on the demand for future healthcare services and physicians' numbers. Birthrate Plus® (Ball and Washbrook 2010a) models midwifery numbers, skill mix and deployment to inform decision making about safe and sustainable services. Birthrate Plus® calculates the ratio of clinical midwives to births for any given maternity unit together with other factors to calculate midwives required.

Teusner et al. (2016) model and statistically describe the nature of practice activity within South Australian dental services to determine the nature of service provision. Macro-level workforce planning is illustrated by the work of Schofield et al. (2006) who developed a trends model utilising demographic data, such as ageing and population growth over time as well as non-demographic data such as policy impacts, approaches to treatment and novel technologies to project demand for hospital care in Australia from 2005 to 2050.

In Table 7 the findings show that some of the articles/websites reviewed also included scenario planning, simulation models or horizon scanning/forecasting to aid strategic workforce planning. Examples of these more nuanced, complex approaches, for example simulation modelling, are represented within the literature (Van Greuningen et al. 2012; Laurence and Karon, 2016; Laurence and Karon, 2017). Van Greuningen et al.'s (2012) work applies the Dutch simulation model for workforce planning to predict the GP workforce in The Netherlands. This study utilises a more comprehensive approach to strategic workforce planning given its inclusion of multiple supply and demand elements organised into discrete sections of the model as well as the utilisation of a variety of datasets to populate the modelling.

Several of the studies (Lopes et al.,2018, Laurence and Karon,2016) utilise various statistical or mathematical modelling to assist with workforce planning; often used in conjunction with scenario planning or forecast planning. Examples of these include practitioner or micro-level, supply focused models (Vigersky et al. 2014, Whole Systems Partnership 2022 a,b, Health Resources and Service Administration 2019, HRSA in Streeter et al.2017; WISN in Mabunda et al. 2021). Thongsukdee and Weerawat (2020) describe an agent-based modelling approach using mathematical statements to calculate physician levels in Thailand and to demonstrate regional variation. Teusner et al. (2016) model and statistically describe the nature of practice activity within South Australian dental services.

Simulation models use predictive modelling to illustrate what will happen because of process changes or external factors, while Systems dynamics (SD) uses differential equation-based models in terms of stocks (e.g., of material resources, knowledge, people, money), flows between these stocks, and information that determines the values of the flow. Vanderby et al.'s (2014:1325) study used SD to model the future of the Canadian cardiac surgery workforce. The model included both provider supply and population demand components and incorporated feedback loops to demonstrate the effects of shortage on provider productivity. This approach provides health care planners with insights into the effect time, population demographics, enrolment and productivity decisions have on the health system. The SD model includes both the demand and supply components; the former based on the demographic composition of the population, while the latter incorporates both currently practicing providers and those in training, as well as the current and anticipated productivity of each. This is then used to inform workforce planning. An example of the application of SD is Chung et al.'s (2021) study that used SD modelling to predict the workforce required for cancer patients for the next 10 years, and to predict nursing workforce numbers.

3.3.3 Population needs approaches

A needs-based method uses population health needs as the basis for workforce planning rather than the levels of health service utilisation, service targets, health facilities or simple population ratios (Asamani et al, 2021). An example that illustrates this method is Gallagher et al.'s (2010) study of the skill-mix of dental teams required to meet the future need and demand of older people in England until 2028. This was accomplished by using a three stage computer model that developed demand for dental care, workforce supply and skill-mix. This was combined with population demography markers for oral health, patient attendance and treatment rates-based on NHS activity data. The workforce supply was analysed to produce a range of estimates for the current/future workforce and staff skill-mix competencies examined and input optimisation model. Five future scenarios were run from 'no skill-mix' through to 'maximum skill-mix' in the dental team, and the outputs compare. Gallagher et al.'s (2010) study shows a complex approach to strategic workforce planning that captures the broader issues that may affect a future workforce and identifies the gaps that need to be considered when developing and training a current workforce.

Birch et al. (2021) advocate an integrated needs-based framework, noting that many approaches fail to unite workforce, service configuration and funding considerations. They note it is especially important that approaches also consider provider productivity (number of patients served per unit of time) as well as practice style (skills utilised in providing care to the same type of patient). Dejaco et al.'s (2018) Europe-wide study in the context of workforce requirement studies in rheumatology identified ten essential points to consider:

1. Integrate supply, demand and need;
2. Provide projections over a period of 5-15 years;
3. Not assume a balance between supply and need;
4. Include several data sources and include uncertainty analyses;
5. Regularly updated;
6. Patient needs based on prevalence and referral rates of disease managed rheumatologists as well as time needed per patient;
7. Future demographics, socio-cultural characteristics of the population and disease patterns;
8. Show work outside of the rheumatology patient care;
9. Demographic composition of rheumatologists;
10. Include medical developments including new technologies, medication, artificial intelligence and e-health on supply and demand.

It is clear effective strategic workforce planning in health and social care is multi-faceted whether at the level of the workforce generally or a specific health specialty.

3.3.4 Illustrations of named workforce models and datasets

Several of the articles and websites reviewed included specific workforce planning models that are nationally and internationally recognised (See Appendix 4 for other models).

The World Health Organization's (WHO, 2010) Workload Indicators of Staffing Needs (WISN) is a software tool, which is frequently cited, that was developed for setting activity (time) standards for health personnel and translating these into workloads as a rational method of setting staffing levels in health services around the world.

The review's literature also presents a variety of health workforce planning approaches advocated for use nationally in the UK (Health Education England N.d.; Whole Systems Partnership 2022) and regionally (South West Yorkshire Partnership NHS Foundation Trust 2022). Health Education England's Star (N.d) offers a directory of products and resources to health workforce planning and regional and local levels. Health Education England's Star (N.d) workforce model and Skills for Health Six Step Methodology (2021) both provide a series of steps to help with workforce planning and tend to take a more strategic view of the process. For example, the Star (N.d) model considers the categories workforce, supply, upskilling, new roles, new ways of working, and leadership; for each of these dimensions there is detailed steps/advice for workforce planning. The Six Step Methodology (Skills for Health, 2021) involves: defining the plan; mapping the service change; defining the required workforce; understanding workforce availability; developing an action plan; and implementing, monitoring, and revising. These facets of the Star and Six Step Methodology resonate with workforce planning consideration within *We Are the NHS: People Plan 2020/21* (NHSE/I 2020) that anticipates future health workforces will work innovatively, through embracing technological advancement, role redesign and flexibility.

Increasingly workforce planning approaches that integrate health and social care are emerging. In 2014, the Centre for Workforce Intelligence issued their strategy document delineating horizon scanning to support the Department of Health's long-term strategic vision for health, social care and public health workforce in England. More recently Health Education England (2018) launched a web-based application called Workforce Repository and Planning Tool (WRaPT) which has two components: a workforce repository for data collation and a scenario modelling arm for forecasting workforce needs based on changed activity levels (Kanagaratnam, et al 2019).

In the literature reviewed, limitations with the various workforce approaches and models employed are mentioned. The WHO (2010) noted that in many countries, planning and implementation of health workforce strategies have had limited success due to several factors, including: insufficient attention to the planning process (how the plan was prepared); lack of access to and use of planning methods and tools suitable for addressing the challenges; lack of appropriate and accurate data and information such as that related to workforce supply, deployment, staff retention and attrition, staff productivity, service needs and outputs, and the private health sector; low levels of involvement of stakeholders in the planning process; and insufficient advocacy to attract resources for implementation.

While, with the exception of WISN and WRaPT, the review identified few examples of technology to support strategic workforce planning, we did come across a dashboard developed by KMPG for the Northern Care Alliance (KPMG, 2021). This provides visualisation of system-wide workforce data, at multiple levels of granularity, and supports analysis of the impact of different scenarios.

3.4 Effectiveness of strategic workforce planning methods

The literature identified few items that considered effectiveness of strategic workforce planning methods. Panzera et al.'s (2016) study noted that regional health workforce planning is most effective if the approaches utilised have flexibility to accommodate specific context details. However, this is not an evaluation of effectiveness. Tomblin Murphy (2012) notes that an analytical framework for workforce planning, using a simulation model, allows policy makers to evaluate the effectiveness of different determinants of supply and requirements as methods to address nursing shortages. Wranik (2008) found that a classification of human resource models is necessary to standardise the evaluation of the effectiveness of various HHR approaches in terms of improving access to care and health outcomes. Although these items consider effectiveness, it is not necessarily in relation to whether health and social care workforce planning methods are effective.

Two evaluations that were identified were by Van Greuningen et al. (2012, 2013). In the first of these (Van Greuningen et al., 2012), they applied six criteria developed to evaluate models that are designed for policy objectives (qualitative plausibility, quantitative plausibility, broad correspondence with the results of empirical studies, good match with recent data, good simulation characteristics, and suitability for the analysis in question) to evaluate their workforce planning model applied to the example of Dutch GPs. In the second, they undertook a retrospective assessment of the accuracy of their GP workforce projections (Van Greuningen et al., 2013).

Other data on effectiveness, although not peer-reviewed and not independent, come in the form of case studies of particular models. The WRaPT website provides a series of case studies (Health Education England, 2018). Impacts appear to include identification of missing information and activity data that did not fully reflect the level of activity being undertaken, visualisation of baseline data providing a system wide view of the neonatal and cardiology workforces to inform decisions around new and different ways of working and pathway redesign, and demonstrating the efficacy of a new model of care.

3.5 Challenges for strategic health and social care workforce planning

The scoping review identified several challenges with strategic workforce planning that are highlighted in the national and international literature. One of the main challenges is the lack of evaluation in the literature of what are the most effective methods for health and social care workforce planning, as described above.

Another challenge appears to be a lack of software tools to support workforce planning. UK attendees at a KPMG workshop about their dashboard (largely HR managers) reported that 85% did not have an effective strategic workforce plan in place, 74% did not have the tools and capacity to predict staff numbers, and 98% would benefit from a strategic workforce planning tool (KMPG, 2021).

Another challenge relates to access to timely data as the basis for strategic workforce planning, as already noted above. For example, the WRaPT case studies point to the need for additional data collection and issues of missing data (Health Education England, 2018).

The lack of a strategic approach to whole system workforce planning and the emphasis on operational issues is another challenge. The review noted that the strategic planning models mainly consider the medical or GP workforce to the exclusion of other health and social care professions; this does not promote integrated or collaborative working across sectors. Equally, workforce planning models that focus solely on workforce supply or demand and do not consider a needs-based approach may exclude vital elements of workforce planning that can have long term consequences in terms of staff having the right skills and working in the right place.

Government policy often shapes workforce planning (six items reviewed) with the thrust being, making the NHS the best place to work, improving leadership, addressing workforce shortages in nursing, growing the workforce, transforming the workforce, skill mix, new types of roles and working, increased flexible working, utilising technology, and scientific innovation to transform care and collaborative working. However, there is a lack of guidance or robust workforce mechanisms in these policies to deliver this agenda and there is a potential for disjointed workforce planning with health and social care adopting different approaches.

3.6 Access, safety and quality considerations

Despite the growing concern for shortages within the health workforce internationally (Kroezen et al. 2018) and the supply-demand gap, ensuring access to safe care by care providers/commissioners for an ageing population with growing morbidity is most challenging yet fundamental (OECD 2013). The shortage of health and social care staff within statutory health and social care services in the UK is noted (NHSE/I 2021). A sufficient health and social care workforce to provide accessible, safe care across patient acuity levels is essential (The Health Foundation 2019a).

The Health Foundation (2019a) contend that the supply of health and social care professionals is derived from three sources: to educate/train new staff, support those who have left to return and international recruitment. However, growing both the health and the social care workforce is not a quick or sole solution (The Health Foundation 2019a). Alternative means of addressing the shortfall in workforce supply is essential if access to care, and care that is safe, is to be achieved (Kings Fund, 2018).

An examination of how health and social care services are configured, with attention to the nature of work, the skills required to perform work and the re-distribution of work to different personnel contributes to the sufficiency of the health workforce and delivery of a service. In Ball's (2020) consideration of safe staffing policies, particularly in the context of nursing staff she notes tasks traditionally performed by registered nursing staff have increasingly been undertaken by unregistered clinical support workers. Role development and substitution contributes to improved access to health services. The *Interim NHS People Plan* (NHS 2019b) notes the UK nursing shortfall and identifies the importance of supporting entry routes to registered nursing practice via nursing associate roles; in essence a new role as well as means to support nursing staff supply inflow. Devolved care to new roles is described in the research of Streeter et al. (2017) who note the contribute of nurse practitioners and physician assistants to ameliorate the shortage of primary care physicians in the United States. Teusner et al. (2016: 15) examine the role of oral health therapists, dental hygienists and dental therapists in Australia to, 'supply (dental) services under alternate workforce composition'.

There is no literature identified by the review that suggests role substitution and re-design of work necessarily negatively impacts safety and quality of care. Tomblin Murphy et al's (2011) analysis of Ontario's acute-care hospital nursing inputs and patient outcomes notes greater intensity of nursing inputs is associated with shorter lengths of stay for patients. However, this is not associated with poorer patient outcomes for given parameters of the research. Teusner et al. (2016) note robust appraisal of skill mix in the context of population needs is essential to support such alternate workforce composition. However, changes to the workforce composition must be considered against feasibility, practicality, notably scope of practice (if applicable), and desirability. Ranta et al.'s (2015: 38) research into New Zealand's neurologist workforce notes should the supply-demand gap for neurologists endure, a 'general push to devolve specialist care to generalist services' has been viewed as acceptable as a means to improve access and utilisation of neurological care.

Access to safe care is not uniform across ethnicities. Pepler and Martell's (2019) study in Canada advocates the use of indigenous models of care in workforce planning as well as better representation of indigenous professionals and indigenous partnerships. Spetz et al. (2015: 936) also note variation in use of long-term care in the United States by ethnicity. General workforce modelling approaches are also noted not to recognise regional complexities, both within and between nations. For example, Mabunda et al. (2020) highlight the challenges experienced in the implementation of the WISN (WHO, 2010) approach across three different nations of variable wealth and health/social care provision. The OECD (2013) contends that few countries utilise workforce planning approaches that recognise variable geographical distribution of health care providers within nations.

4. Summary and recommendations

This scoping review was tasked to address three questions. To accomplish this task a detailed and rigorous scoping of the literature was undertaken to provide evidence-based results.

1. How is strategic health and social care workforce planning currently undertaken?

We have outlined the current recommended approaches for health and social care workforce planning at national, regional, and local ICS level for health. Similarly, the workforce planning approaches used in social care are discussed. The White Paper *Health and social care integration: joining up care for people, places, and populations* (DHSC, 2022a) stress the need for an integrated health and social care and 'one workforce' approach. However, there was a lack of empirical evidence describing how strategic workforce planning happens in practice.

2. What models, methods, and tools are available for supporting strategic health and social care workforce planning?

We have presented various workforce planning models and approaches available for supporting health and social care workforce planning. The findings show an array of workforce models that range from determining the workforce using supply and demand, practitioner to population ratios, needs based approach, the utilisation of methods such as horizon scanning, modelling, and scenario planning, together with mathematical and statistical modelling. Several articles and websites include specific workforce planning models that are nationally and internationally recognised. For example, WISN, Star model and the Six Step Methodology provide a series of steps to help with workforce planning. However, there are limited software tools to support strategic workforce planning. Some of the literature considers patient safety and quality in relation to workforce planning and note staff shortages is an issue and suggest measures such as developing new roles, different ways of working, greater flexibility and integrated working and enhanced use of digital technology. The proposals for the health and social care workforce contained in the policies reviewed mirror these and are intended as broad actions to address workforce planning, staff shortages or future service developments. However, the policies do not include workforce models or guidance about how to achieve these measures.

3. What are the most effective methods for strategic health and social care workforce planning?

The review found that one of the main challenges is the lack of evaluation in the national and international literature of what are the most effective methods for health and social care workforce planning; this is a significant gap.

4.1 Recommendations

A key implication of the review findings is the importance of moving away from supply-based approach to strategic workforce planning to a demand-based or, ideally, a needs-based approach. It seems

appropriate that the focus of strategic workforce planning is population needs, although we recognise that this presents added complexity. However, the ability to layer in complexity seems an essential characteristic of future strategic workforce planning.

The lack of evaluation of existing workforce planning models and methods means that it is difficult to suggest a particular model or method, but Appendix 4 provides details of popular workforce planning models and resources. While the Star model and the Six Step Methodology provide an overall framework for strategic workforce planning, this needs to be combined with data and tools for understanding likely future demand.

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Appendix 1 Key health and social care policy drivers

Year	Policy title	Link
2010	Equity and excellence: Liberating the NHS	Link
2011	The Dilnot Review into the funding of adult social care calls for major reforms.	Link
2012	Caring for our future: reforming care and support	Link
2012	NHS Mandate	Link
2012	Health and Social Care Act	Link
2014	Horizon 2035: Health and care workforce futures Progress update	Link
2014	Health and Care Bill	Link
2014	Five Year Forward View.	Link
2016	The Cities & Local Government Devolution Bill	Link
2017	Next steps on the NHS Five Year Forward View	Link
2019	The NHS Long Term Plan	Link
2019	Interim NHS People Plan (June)	Link
2019	The Topal Review Preparing the healthcare workforce to deliver the digital future	Link
2020	WE ARE THE NHS: People Plan 2020/21 - action for us all (July)	Link
	Our NHS People Promise	Link
2020	HEE Star: Accelerating workforce redesign	Link
2020	House of Commons Health and Social Care Committee, Third Report of Session 2019–21, Social care: funding and workforce, HC 206	Link
2021	Putting data, digital and tech at the heart of transforming the NHS	Link
2021	Integration and innovation: working together to improve health and social care for all	Link
2021	Workforce planning template	Link
2021	The future of NHS human resources and organisational development	Link
2021	COVID-19: our action plan for Adult Social Care	Link
2021	NHS System Oversight Framework 2021/22	Link
2021	The state of the adult social care sector and workforce in England 2021	Link
2021	Building Back Better: Our Plan for Health and Social Care	Link
2021	The NHS Constitution for England	Link
2021	People at the Heart of care: adult Social Care reform	Link
2022	Health and social care integration: joining up care for people, places, and populations	Link
2022	Delivery plan for tackling the COVID-19 backlog of elective care	Link

Appendix 2 Inclusion/Exclusion Screening Algorithm for Workforce Observatory Scoping Review

Inclusion/Exclusion Screening Algorithm for Workforce Observatory Scoping Review

The scoping review seeks to answer the following three questions:

1. How is strategic workforce planning currently undertaken in health and social care?
2. What tools and technologies are available for supporting strategic workforce planning in health and social care?
3. What are the most effective methods for strategic workforce planning in health and social care?

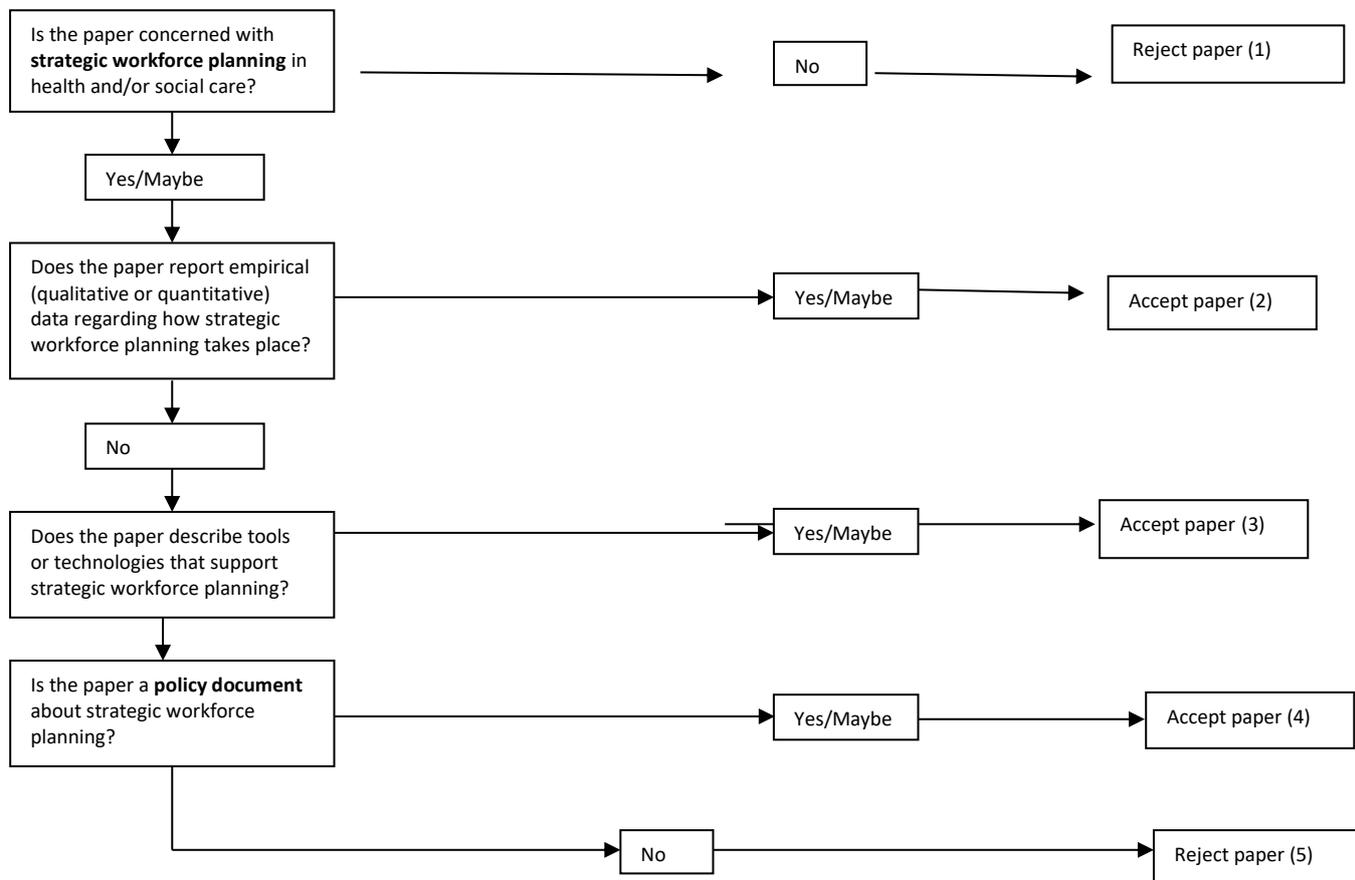
We will include empirical papers (qualitative or quantitative), papers that describe tools and technologies, and policy documents.

Definitions:

Strategic workforce planning: Concerned with longer term workforce planning (e.g., over next year to 10 years), rather than short term staff scheduling.

Policy document: Policy documents, guidance, and frameworks from bodies such as NHS England, the Department of Health, and Health Education England (or their international equivalents).

Please record the appropriate number for each reference in the 'Research notes' field in EndNote. If you come across duplicates, please enter 'D'. If the paper is not in English, please enter 'NE'. Once you have screened all the references in the EndNote library, please save it as a compressed library and send it to Rebecca (r.randell@bradford.ac.uk).



Appendix 3 Inclusion and Exclusion Criteria Full Texts

Criterion	Inclusion	Exclusion
Type of source	Published qualitative, quantitative or mixed methods studies, policy, strategy, guidance and framework documents organisations such as NHS England, the Department of Health, Health Education England (or their international equivalents) as well as think-tanks such as The King's Fund and The Health Foundation	Any type of review, case report, letter, book, guidelines, comments, discussion, editorial, conference abstract, study protocol, Master's dissertation or doctoral thesis
Availability of source	All full texts available through UoB library services, Google, Inter-library loan requests	Abstracts for which a full text is not available via UoB library services, Google or Inter-library loan requests
Date/period	01.01.2005 to 31.01.2022	Before 01.01.2005 and after 31.01.2022
Language	English	Any other languages
Areas of interest:	<p><u>Area 1</u></p> <p>Focused on how strategic workforce planning happens in practice.</p> <p>Strategic workforce planning in health and social care where strategic workforce planning is: 'Strategic workforce planning is a technical task – using data to develop projects of expected demand for care and of how that demand can be met with a sufficient number of trained and appropriately skills staff' (The King's Fund 2018: 2).</p> <p>Strategic workforce planning in health and social predicts, forecasts, anticipates future staffing requirement for health/social care service provision at least 1 year in advance.</p> <p>Strategic workforce planning does not only describe the status quo of staffing/personnel/human resources/manpower/healthcare professionals but anticipates future requirements/needs.</p> <p><u>Area 2</u></p> <p>Models and methodologies of strategic workforce planning are approaches or systems that may be characterised as 'judgemental, mathematical and a mix' (Kunc in Willis et al 2018: 251).</p> <p>Willis et al. (2018) identifies models that enable supply-demand prediction as 'strategic'.</p>	<p><u>Area 1</u></p> <p>Operational workforce planning in health and social care details the short-term/day-to-day requirements of a single service. It does not attempt to predict, forecast or anticipate future staffing requirements.</p> <p>Concerned with determining required workforce numbers but not undertaken within health or social care organisation, it is an academic exercise.</p> <p><u>Area 2</u></p> <p>Models/methodologies that are 'operational' or 'tactical' such as staff scheduling for a single service (Willis et al. 2018).</p> <p>Papers concerned within determining required workforce numbers but do not describe a</p>

	<p>Workforce modelling ‘generates a dynamic picture of the workforce across the scenarios and the impact of future issues’ (Willis et al. 2018: 253).</p> <p>Includes technologies and tools.</p> <p><u>Area 3</u> Evaluations of models and/or methodologies.</p>	<p>particular model or methodology.</p> <p><u>Area 3</u> No evaluative commentary on models and/or methodologies.</p>
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References:

The King’s Fund (2018) *Developing a strategy for the health and care workforce in England*. https://www.kingsfund.org.uk/sites/default/files/2019-03/developing-strategy-health-care-workforce-england_0.pdf Accessed 10 February 2022.

Willis, G., Cave, S. and Kunc, M. (2018) Strategic workforce planning in healthcare: A multi-methodology approach. *European Journal of Operational Research* 267, 250-263.

Codes for Full Text Screening:

D = duplicate

NA = not available

NE = not in English

R = reject

1 = include under Area 1 (as defined above)

2 = include under Area 2 (as defined above)

3 = include under Area 3 (as defined above)

UB = useful background

? = query, consult another reviewer for confirmation of screening decision

Notes:

Add relevant code for full text screening to ‘Research Notes’ section of EndNote entry for each source. For example, an item of quantitative research on strategic workforce planning accepted at title and abstract screening and included at full text screening under Area 1 will read as: ‘2/1’.

Organisation	Model	Website	Approach/ resource
Health Education England	HEE Star	https://heestar.e-lfh.org.uk/	Comprehensive approach
Centre for Workforce Intelligence	The CfWI robust workforce planning framework	https://www.basw.co.uk/system/files/resources/basw_22641-9_0.pdf	Supply and demand approach for social care
Whole Systems Partnership	SWiPe	https://www.thewholesystem.co.uk/workforce-modelling/swipe/	Whole systems approach
World Health Organization	Workload indicators of staffing need (WISN)	https://www.who.int/publications/i/item/9789241500197	Demand based approach
Health Resources and Services administration	Health Workforce Simulation Model	https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/data-research/technical-documentation-health-workforce-simulation-model-archived.pdf	Supply and demand approach for health care
World Health Organization	Models and tools for health workforce planning and projections	https://www.who.int/workforcealliance/knowledge/toolkit/14.pdf?ua=1	Projection model examples and case studies
Organisation for Economic Co-operation & Development	Health Workforce Planning in OECD Countries	https://www.oecd-ilibrary.org/docserver/5k44t787zcwb-en.pdf?expires=1647274117&id=id&accname=guest&checksum=FD37998AAF8DBCC71B06395F671A2DE5	Review of 26 projection models from 18 countries
WRaPT	Workforce Repository and Planning Tool (WRaPT)	https://wrapt.org.uk/	Supply based approach with scenario modelling
Skills for Health	Six Step Methodology	https://www.skillsforhealth.org.uk/integrated-solutions/workforce-development/six-step-methodology/	Largely supply based approach
Birch, S et al.,	Health Human Resources Conceptual Model	https://pubmed.ncbi.nlm.nih.gov/19829233/	Needs based approach
Van Greuningen, M., et al	The Dutch simulation model for workforce	https://human-resources-health.biomedcentral.com/track/pdf/10.1186/1478-4491-10-21.pdf	Simulation model, including

	planning, version including scenarios		supply, demand, population
RCM	Birthrate Plus®	https://www.rcm.org.uk/media/2367/birthrate-plus-what-it-is-and-why-you-should-be-using-it.pdf	Workload/ type and midwives
HEE	Recipe for good workforce planning	https://recipeforworkforceplanning.hee.nhs.uk/the-recipe	Overview of workforce planning
South West Yorkshire Partnership NHS Foundation Trust (2021)	Workforce & success planning round 2021-22	Not available	Overview of workforce planning using an Excel spreadsheet