Best Practice in Workforce Planning and Management

Background paper and literature review for World Bank 2021

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Aims of the paper

This paper was commissioned by the World Bank as a research paper to inform a major report on healthcare workforce mobility across continental Europe[1] and the pressures created particularly for the net exporting countries. The commission was to conduct a literature review, identify and report best practice in workforce planning and management and identify key issues and scope for further improvement the healthcare delivery systems across the OECD. The paper specifically addresses three major current healthcare workforce concerns:

> Section 1 reviews how different countries plan their health workforce, the data and methods employed and the organizational arrangements with a view to identify best practice at the national level;

> Section 2 reviews how modern human resource management is used in both national policy and within facilities to ensure a motivated workforce. This includes areas such as working conditions, transparent promotion policies, continuous medical education, task-shifting etc;

> Section 3 also reflects on how the COVID19 epidemic has influencing health workforce planning and management going forward including any emergent good practice which can be carried forward.

The paper is based on a literature review focussing on practical approaches to the three major concerns including sources which span a 15-year period up to and including 2020 and draw on case studies of current approaches across OECD countries including EU member states, the United States, Canada, the UK and Australia.

Executive summary and major findings

International best-practice in workforce planning The European Commission describes workforce planning as 'the tool which ensures the availability of people whose skills and approaches are essential to achieving and sustaining high-quality healthcare delivery'. Workforce planning has moved centre-stage in health system development in recent years because:

- The assessment of patient need and delivery of care remains largely a hand-craft industry with high-quality outcomes dependent on a high-quality workforce

- The workforce accounts for 75-85% of the recurrent costs in healthcare delivery

A most recent review of healthcare workforce planning in 18 OECD countries characterised best-practice as a comprehensive, integrated and stage by stage process. This encompasses

- A detailed understanding the starting point, which highlights key challenges and opportunities

- Forecasting requirements for staff in relation to population, morbidity patterns and strategic service, capacity and utilisation plans

- Sustaining staff supply through recruitment training, career progression whilst mitigating attrition

Effective workforce planning begins with national leadership and oversight of the process which should be vested with dedicated bodies. Each project should be well-designed and managed with senior executive leadership. International best practices identify the following major stages in workforce planning:

- Defining the specific objectives and project scope congruent with the national health strategy
- Situational analysis including understand the business and analysing the current workforce
- Connect workforce planning to future service strategy or demand planning and workforce design including gap analysis, quantified to inform cost analysis and scale of the challenge
- Supply planning to deliver the requirements and ensure sustainability
- Actions plans

Developing the quantitative data base Good practice is to 'measure, measure, measure'. This begins with a data-base on population, existing service structure, capacity and utilisation including bed levels, occupancy, patient activity levels by type of facility – thus tertiary and secondary acute care, mental health, intermediate such as skill nursing,

step-down and community or district hospitals.   In order to inform meaningful analytics, the data-set on current staffing should be structured in parallel with the service.   Of all statistics on healthcare system capacity, workforce data can be the most contestable.   The starting data-base should therefore be agreed and signed off by all key stakeholders from the outset.

Situational analysis   The next stage reviews the existing workforce against current service activity and capacity AND future plans and strategies for service capacity and activity. This stage articulates the numbers and structure of the existing workforce in relation to the current capacity and utilisation of the health care system in each major service area. The output highlights the major challenges and also the scope and opportunities for change and development. At the national level, drawing comparative data from other countries using sources such as the OECD and WHO are a useful starting point.   Within country, comparative data sets may be gathered from primary sources, or if lacking be a prime objective at the outset.   Qualitative data can be gathered using Delphi techniques with specialist focus groups and semi-structured interviews with specialist leads and experts who can also input any recent and relevant local work in specific fields of expertise and experience.

Future requirements or demand planning   There has been major progress internationally on many aspects of strategic HR planning. However, although giving evidence to substantial progress in many areas of healthcare workforce development, the literature review confirms that quantitative demand planning needed to detail the workforce requirements for delivering current and future healthcare systems *remains the least well-developed aspect of HR planning* internationally. As the OECD observed in 2016: "Too often there appears to be a lack of proper coordination in health workforce planning to assess in a more comprehensive way the future requirements of different categories of health workers".   Similarly in 2019, the Kings Fund in the UK observed that for the NHS in England, *"an incoherent approach to the NHS workforce at a national level and poor workforce planning'* is producing severe staff shortages due to "inadequate funding for training places, restrictive immigration practices, frozen or capped pay increases and worryingly high numbers of doctors and nurses leaving their jobs before retirement*".*

Since the absence of quantified scenarios for future staffing clearly render reliable financial planning and supply planning problematic, section 1.5 below addresses this issue in some detail and sets out systematic and practical approaches by service and staff grouping which have been successfully applied in multiple high-, middle- and low-income countries alike across all sectors of healthcare delivery.

Workforce redesign or task sharing   Changing healthcare needs in the 21st century require a more creative approach to staff role design and recruitment from new labour markets.   Too many countries still plan future services on the basis of 20th century staffing conventions.   Whereas recent visioning expects that 60% of new staff entering the workforce over the next 20 years should be in support roles to professionally trained and registered staff leading teams. This is particularly the case in the management of non-communicable, chronic diseases where *in addition to formal workforce needs,* the potential of patients, carers and their immediate communities as further resources remain largely untapped.   Rationale for and some examples of current best practice are therefore explored.

Supply planning   Supply challenges have often been the initial motivation for embarking on a national workforce planning initiative.   However, they should also be instrumental in deciding which demand scenario is most viable. A supply plan assesses the scale of any country's starting point, identifies the key pressure points and specify HR policies to address these in order to move workforce capacity towards strategic demand.   The first stage is to quantify current attrition rates. The second stage is to map the flow of new entrants to the workforce. This will require an assessment of the country's training capacity in relation to service need.

Action plans should set out as a minimum the programme of work required over the first two years and inform to implement strategic developments including phasing, staffing supply, training capacity and resourcing.

Section 2. Ensuring a motivated workforce through best-practice Human Resource management

It is a primary aim of good HR management to optimise the motivation and job-content of the workforce. Not only are initiatives in this field instrumental to mitigating attrition, but they can also open up new sources of workforce supply by extending potential employment markets.   The major areas of opportunity explored in the paper are:

- Workforce redesign and task-sharing
- Improving motivation through enriching job-content
- Career progression
- Optimising work-life balance in relation to the age-structure of staff attrition
- The needs of women in the workforce

- Leadership and communication
- Specific approaches in rural communities.

3. Learning to-date from the Covid19 epidemic

A recent review on behalf of WHO in September 2020 concluded that the intensity and brevity of the pandemic so far is not well-suited conclusively to tease out the complexity and scope of the challenges facing the health workforce in Europe'. However it does report that COVID-19 has already revealed and exacerbated workforce pressures in health systems across the Europe including:

- Cumulative imbalances in the health sector linked to the pursuit of economy drives implemented during preceding years
- The need to improve coordination between primary healthcare, hospitals and long-term care with unclear referral pathways
- Depleted public health services in some countries have created the need to reinforce this sector with varying degrees of success
- The distortions of over-dependence on health workers from outside the European region, has been halted by the pandemic (see 3.2 below) although this is likely to prove temporary.

The lessons learnt from COVID-19 also present 'a unique opportunity to re-orient health workforce policy as connected to future service planning and delivery' - for example the rapid replacement of some previously face-to-face ambulatory care to virtual working.

Section 1 Best-practice in workforce planning methods across the OECD and European Union

1.1 Overview   The Joint Action Health Workforce Planning and Forecasting initiative on behalf of the European Commission describes the purpose of workforce planning as 'putting the right number people, with the right skills at the right place, with the right productivity, at the right time to fulfil the goals of the organisation'[2] [3].   "It is the tool which ensures the availability of people whose skills and approaches are essential to achieving and sustaining high-quality healthcare delivery.   Similarly, for the Queensland Health Board (Australia)[1] " Strategic workforce planning is a cyclical process of evidence gathering, scenario planning, strategy development, action planning and review. As a defining feature of this type of planning, workforce strategies are aimed at positioning the workforce in ways which effectively support achievement of the health service organisation's strategic objectives over the medium- to long-term.[4]" Planning timescales are typically:

- *Strategic,* for planning futures*,* up to five year for most staff groups and 10 to 15 years for senior medical staff consistent with the timescale required for them fully to train

- *Operational* usually over a two-year cycle to resolve pressing service delivery, financial or supply issues.

Evolving from an initial concern with forecasting the need for investment in professional training capacity, workforce planning has moved centre-stage for two further reasons:

- Even with technical advances of the 21st century, the assessment of patient need and delivery of care remains predominantly a hand-craft industry with high-quality outcomes dependent on a high-quality workforce

- The workforce accounts for 75-85% of the recurrent costs in healthcare delivery so workforce planning should be a major national concern in countries where healthcare is funded wholly or predominantly by government.

The workforce plan should be *forward-looking* and thus driven by future service needs and strategies in turn designed to meet the changing needs of the population and healthcare delivery. This constitutes a complex agenda requiring a systematic approach.   Hence the most recent review of healthcare workforce planning in 18 OECD countries characterised best-practice as a comprehensive, integrated within a stage-by-stage process[5].

Comprehensiveness spans:

- A detailed understanding the starting point, which highlights key challenges and opportunities in the relation to existing healthcare delivery systems

- Forecasting requirements for staff in relation to population trends, changing morbidity patterns and future service strategy, structure and utilisation

- Sustaining staff supply through recruitment, entry-level training, career development and mitigating attrition or outflow.

 Integration has two dimensions:

- *Horizontal Integration* focusses on the relationships within professional groups across healthcare delivery such as tertiary and secondary acute care, primary care and the growing out of hospital sectors including step-down, pro-active management of non-communicable diseases and community-based paediatrics and care of older people

- *Vertical integration* concerns the relative roles across staff groups within workforce redesign including task-sharing from registered professionals to mid-level staff such as physician assistants and licensed vocational nurses, as well as to support/auxiliary staff.

1.2 National leadership   Effective workforce planning begins with national leadership and oversight of the process which should be vested with dedicated bodies.   In some countries this is Ministry of Health or national statistical office, in others new agencies comprising experts and senior stakeholders have been specifically created.   In addition to funding healthcare, the national government has a number of major roles and priorities which impact on the healthcare workforce including:

- Defining national objectives and priorities
- Regulating working hours, conditions of employment and compensation
- Liaising with professional regulatory bodies on standards
- Planning and funding professional training
- Planning major service developments such as new hospitals which have major staffing implications
- Reflecting population needs, expectations and the perspectives of service users in relation to their interface with staff
- Supporting and regulating best practice in workforce planning within the healthcare delivery network.

To promote best practice, the national leadership needs to prioritise workforce planning and ensure that the wider healthcare delivery system shares that priority and is both empowered and incentivised to engage constructively.   As well as policy statements and strategies, this requires defining national health workforce strategies and objectives, providing guidance on process and expectations, and optimally supportive practical tools which can:

- Ensure future service strategies and capacity plans are congruent with planning their future workforce implications
- Ensure a comprehensiveness and comparability between workforce plans
- Facilitate localised planning flexible to population needs and diversity, urban versus rural healthcare requirements and localised supply challenges such as within and out of country migration patterns
- Support the delivery of key stages in the process
- Monitor delivery and outcomes particularly in relation to national concerns
- Develop capacity at regional and provider levels[6].

1.3. Project design   From the outset and whether for an entire country, region or large provider, each workforce planning project should be well-designed and managed with senior executive leadership. It is axiomatic that workforce planning should be collaborative with key stakeholders and counterparts fully involved at each stage of the process. This generates ownership and enriches the process with local knowledge and expertise so the outcome becomes bespoke to each country.   Participants should include a senior lead from the Ministries/Departments of Health (MoH), Finance and Labour according to jurisdiction over salaries, healthcare budgets and conditions of employment including setting staffing levels in providers. Other key partners include the heads of regulatory bodies and medical and nursing directors within the MoH. The optimal structure is a formal Steering or Working Group tasked to determine Terms of Reference, oversee delivery, ensure sufficient resourcing, and convene sub-groups with specific areas of expertise as required.   In parallel to the formal structure, semi-structured interviews with local specialists and experts can focus on specific qualitative issues and concerns.   Field trips to providers both within and outside of capital cities such as rural areas will highlight their special challenges and aspirations as well as issues relating to the interface with national jurisdictions. Periodic meetings with any other international agencies working in related fields will add further value and avoid unhelpful over-laps or contradictions.

International best practices identify the following major stages in workforce planning:

- Defining the specific objectives and project scope congruent with the national health strategy
- Situational analysis including understand the business and analysing the current workforce
- Connect workforce planning to future service strategy or demand planning and workforce design including gap analysis, quantified to inform cost analysis and scale of the challenge
- Supply planning to deliver the requirements and ensure sustainability
- Actions plans (Implementation planning including detailed strategies, phasing, staffing supply, training capacity and resourcing) [7].

Accordingly the essential components of best practice are summarised in Figure 1 [8]

Healthcare service structure and utilisation	
Current	Future
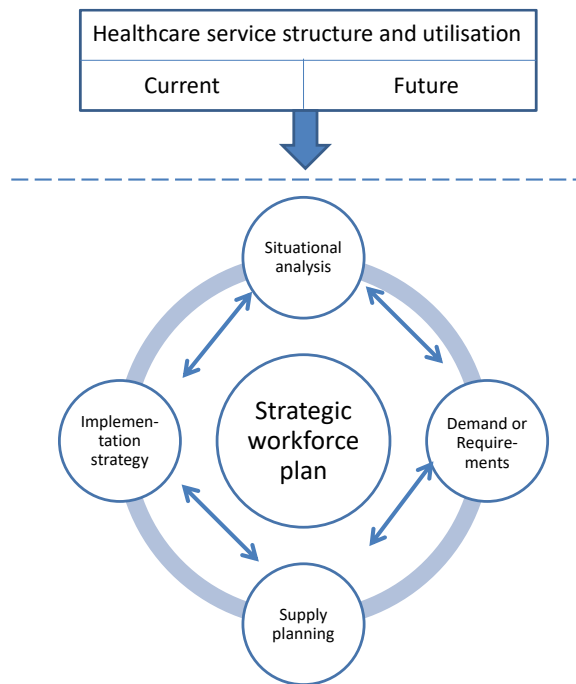
1.4 Project scope objectives and priorities typically include:

- Connect and dovetail the strategic objectives and goals of the future healthcare delivery system and the aims of national workforce planning
- Modernising the workforce in line with the health system development priorities such as the building and refurbishment of hospitals and health centres, and developments in medical practice
- Improving the working lives of staff and thus aiding retention
- Addressing any staffing challenges identified by the senior stakeholders such as the skills and competences of particular staff groups or perceived capacity imbalances
- Improving value for money and staff productivity including changes in technology which impact on more traditional staffing models
- Replacing obsolete, rigid parameters - such as staffing to beds provided in under-utilised hospital capacity - with more dynamic and flexible methods which better reflect patient need and improve efficiency
- Strengthening specific service sectors such primary care or the range of specialists in hospitals
- Focus on the specific needs of diverse populations such as in rural communities
- Scoping to cover the entire healthcare system, specific programmes or service priorities[9].

1.5 Situational Analysis   Since workforce planning is not an exact science we need to know where we are starting from [10]. This stage articulates the numbers and structure of the existing workforce in relation to the current capacity and utilisation of the health care system in each major service area. The focus is thus on quality and productivity across facilities, services and specialties. The output highlights the major challenges and also the scope and opportunities for change and development as well as any potential barriers.   Hence both quantitative and qualitative data and analysis are required.

1.5.1 Developing the quantitative data base   Good practice is to 'measure measure measure'[11]. This begins with a data-base on population, existing service structure, capacity and utilisation including bed levels, occupancy, patient activity levels by type of facility – thus tertiary and secondary acute care, mental health, intermediate such as skill nursing, step-down and community or district hospitals.   In order to inform meaningful analytics, the second essential data-set on current staffing should be structured in parallel with the service.   It should also include all major staff groups by grade - ideally staff in-post and establishment in full-time equivalent, plus headcount.   These data on staff groups encompasses:

- Hospital doctors (surgeons and physicians) by major specialty and grade mix
- Primary care physicians similarly by grade mix
- Nurses by service sector ideally highlighting 'skill mix'[12]: registered nurses versus vocational/assistant staff
- Professional and technical staff including diagnostic technicians, allied health, and laboratory staff
- Age-structure, annual leavers or outflows and recruitment including migration in and out of country
- Capacity and output of training universities and institutes
- Current and future policies on staff working hours or participation such as working-time directives.

Individual stakeholders are often the main source of some supply data.   For example Directors of Nursing nationally or in the tertiary hospitals usually record outflows including levels of migration.

1.5.2 Agreeing the data base with stakeholders   Of all statistics on healthcare system capacity, workforce data can be the most contestable.   To an extent this is due to staffing numbers being in a constant state of flux month by month (particularly at provider level) as well as to multiple, mutually-inconsistent sources of workforce data.   These may be lodged with separate personnel and financial systems as well sourced via one-off annual surveys.   Accordingly, to avoid findings being criticised on grounds of   'unreliable or irrelevant data', it is important to reach agreement with key stakeholders on which data are to be used.   For example, the NHS in England conducts a 3-monthly census on staffing from all providers[13]. This is a rich data-base which is structured in parallel to the national service capacity and utilisation data so supports baseline analysis at the national level.   At the provider level, however, staffing data derived from payrolls is the most up-to-date and reliable and thus inspires the confidence of professional and managerial stakeholders.   Where an annual census is the only available national source, the data will inevitably be several months out of date by the time they have been   collated, audited and reported – so this needs to be recognised and understood where used.

1.5.3 Assessing existing staffing through normative analysis or benchmarking Drawing comparative data from other countries is a both a common and useful starting point.   Table 1 below shows comparative data across the OECD and EU on some key workforce indicators drawn from multiple primary sources for 2017. It is essential to agree with local stakeholders, which comparator countries should be selected. Clearly whilst this data would be useful in the case of a high-income country looking to modernise its health system and workforce, caution would be required in comparing a mid-income country with one of the above.   Hence a wider range of comparators can be derived from other similar projects or from WHO data[14] .   Also allowance needs to be made for differences in the healthcare delivery networks and resident population size.   Given their impact on healthcare need and utilisation, age-structure and morbidity patterns are also relevant[15].   It is helpful to present the initial normative analysis back to stakeholders and counterparts as a draft. This stimulates discussion of underlying issues and confirms that any evident outlying performance is not due to data error, incompleteness or misinterpretation.   This forum also provides an opportunity to review and agree the planning parameters to be used in the next requirements or demand planning stage[16].

Table 1

Workforce capacity data in OECD, EU and selected constituent countries, 2017

Indicator	Sample average	OECD average	EU average	UK	AUS	CAN	FRA	GER	NLD	SWE	CHE	US	DEN
Doctors													
Doctors per 1000 population	3.5	3.4	3.5	2.8	3.7	2.7	3.2	4.3	3.6	4.1	4	2.6	4
Medical graduates, per 1000 population	12.5	13	14.6	12.9	15.5	7.7	9.5	12	13.5	11.5	11.2	7.8	21.5
Nurses													
Nurses per 1000 population	11.4	9.3	8.5	7.8	11.7	10	10.8	12.9	10.9	11	17.2	11.7	10
Nursing graduates, per 1000 population	56	44	37	29	85	53	41	55	53	39	101	62	44
Ratio of nurses to doctors	3.3	2.7	2.4	2.8	3.2	3.7	3.4	3.0	3.0	2.7	4.3	4.5	2.5
Workforce by type of care													
General practitioners, per 1000 population	1.1	1	1	0.8	1.6	1.3	1.4	1	1.6	0.7	1.1	0.3	0.8
Specialists, per 1000 population	2.2	2.2	2.5	2.1	1.8	1.4	1.7	3.3	2	2.2	2.6	2.3	1.8
% primary care doctors	31.4	29.4	28.6	28.6	43.2	48.1	43.8	23.3	44.4	17.1	27.5	11.5	20.0
Ratio of specialists to PHPs	2	2.2	2.5	2.6	1.1	1.1	1.2	3.3	1.3	3.1	2.4	7.7	2.3
Non-nationals													
Doctors trained abroad, % of total)	21.4	18.2	12.4	28.6	32.1	24.6	11.2	11.9	2.2	34.8	34.1	25	9.2
Nurses trained abroad, % of total)	9.3	6	3.2	15	18.4	8.1	2.9	7.9	0.5	3	25.9	6	1.8
Staffing to Beds													
Beds per 1000 population	4	4.7	4.8	2.5	3.8	2.5	6	8	3.3	2.2	4.5	2.8	2.6
Specialist Doctors per bed (GPs excluded)	0.6	0.5	0.5	0.8	0.6	0.6	0.3	0.4	0.6	1.5	0.6	0.8	1.2
Nurses per bed	2.9	2.0	1.8	3.1	3.1	4.0	1.8	1.6	3.3	5.0	3.8	4.2	3.8

1.5.4 Qualitative data can be gathered using Delphi techniques with specialist focus groups and semi-structured interviews with specialist leads and experts who can also input any recent and relevant local work in their areas of responsibility. Issues to explore include:

- Current staff skills in relation modern practice
- Speciality imbalances and constraints
- Operational roles of staffing including any demarcations inconsistent with patient-centred care
- Staffing in relation to changing patient acuity in the hospital sector
- Initiatives on task-sharing such as nurse practitioners and extended support-roles in imaging or laboratories
- Restrictions, inter-staff demarcations and limits on career development which contribute to high turnover and migration
- Identifying good practice in one major provider or locality which could be shared across the health system as a whole
- Incentives and disincentives in relation to salaries which favour one type of provider over others
- Balance of responsibilities on HR management between providers and national jurisdiction and scope for delegation
- Patient, relatives and wider local community preferences which constrain workforce modernisation and may need national public awareness campaigns to address. These may include over-utilisation of emergency hospital doctors for minor injuries and illnesses appropriate for primary care, similarly, preference for paediatricians for minor children's illnesses, and lack of familiarity with all nurse-led services such as insisting on obstetricians for low-risk pregnancies.

1.6 Future requirements or demand planning The aim of this stage is to project the numbers and types of staff required by the objectives. This is a key component where practice in future staff planning often falls short. As the OECD observed in 2016: "Too often there appears to be a lack of proper coordination in health workforce planning to assess in a more comprehensive way the future requirements of different categories of health workers"[17]. Similarly in 2019, the Kings Fund in the UK observed that for the NHS in England, "an incoherent approach to the NHS workforce at a national level and poor workforce planning' is producing severe staff shortages due to "inadequate funding for training places, restrictive immigration practices, frozen or capped pay increases and worryingly high numbers of doctors and nurses leaving their jobs before retirement".[18] Accordingly it is critical to workforce planning to focus on practical approaches to best-practice in *requirements* planning or demand forecasting.

High-level indicators such as those in Table 1 are of limited value for demand-forecasting. The best practice at the national level is to employ methodologies and parameters that are:

- Valid in terms of the projects aims
- Driven by available data
- Reflect variations in population size and age structure
- Adaptable to a country's specific health care structure and development strategies
- Connect to and are meaningful at local and facility level whenever possible.

- Tailored to specific staff groups and the sub-sets within them by reflecting their specific types of activity and workload
- Inform both productivity and quality concerns by staffing to patient-care utilisation by differing levels of need, rather than service capacity per se
- Allow assumptions and variables to be tested in sensitivity analysis.

Some examples which are both (i) directly driven by utilisation and thus efficient whilst also (ii) needs-based so assure quality, include:

- *Doctors including physicians and surgeons in tertiary and secondary care hospital networks and primary care physicians* are planned using current, evidence-based guidelines on population served specific to each speciality. This is the case both at the national-aggregate levels and for individual tertiary and secondary care hospital networks and for primary care localities down to small-areas of 10,000 population

- *Nurses in hospitals* are planned on service capacity and utilisation by sector adjusted for varying patient acuity in different service areas

- *Nurses in primary and community care* are planned in relation to the number of doctors and the type of services which primary care are required to offer within any healthcare system. The type of care provided by nursing staff has been changing over the last 5 years with the emphasis integrated care including 'out of hospital services' and management of patients with chronic conditions including new support roles such as health coaching

- *Other allied and professionally qualified technical staff* are planned on population, and where available the annual activity and appropriate productivity ratios of staffing to that activity. A secondary parameter is the proportion of these staff within the medical workforce overall.

1.6.1 Internationals staffing guidelines for senior specialist, consultant-level physicians and surgeons. Across the OECD the professional regulatory bodies in each country comprise speciality-specific associations. These recommend *needs-based standards or guidelines* to resident populations for the required number of consultants or senior grades (or attending physician in the US). To ensure consistency the associations work collaboratively across national boundaries to discuss workforce requirements given changing needs and practice. In any medical workforce plan therefore, the requirements for each of the full range of specialties required in modern hospitals can be assessed nationally on this basis. Indeed, this approach is used in Germany, Spain and the Netherlands in the EU as well as UK, the United States, Australia and Canada[19]. The approach has also been applied in a number of Gulf states to ensure workforce planning complements their national health strategies and major hospital building programmes. It has also been deployed in tertiary hospitals in the UK (i) to meet DoH requirements for more systematic medical workforce planning and (ii) to align the specialist staffing to patient activity and better manage costs. 20 years ago, in the UK, the DoH and the Royal Colleges began to work closely to discuss staff planning so there is now generally accord on the parameters and horizon scanning.

A number of considerations arise when using these parameters:

- *Variations in definitions* Since definitions at sub-speciality level can vary between countries, mapping the specialities as defined in the country's data base with those in the guidelines is required.

- *Variations in local practice* Parameters need to be interpreted in terms of local clinical practice. For example, in most OECD countries, midwives lead on childbirth for women with low-risk pregnancies. Hence the planning guideline for OBGYN doctors may reveal a current overprovision in countries where the midwifery role is less developed. Indeed this can also usefully highlight the opportunity to develop or expand the midwifery role particularly in rural areas remote from secondary acute care in line with best practice across the OECD[20] [21].

- *The role of senior doctors in delivering hands-on care.* There is an overt policy in many OECD countries to establish a consultant-led service with senior staff providing a minimum of 50% of the direct-care to patients (hands-on) in their respective departments on a 24/7 basis.

- *Task-sharing through workforce redesign* Regulatory bodies increasingly focus on the developing contributions of nurse practitioners and mid-level licensed practitioners such as physician assistants within a

team-based approach[22]. These staff can prove particularly helpful in enriching the training experience, job content and optimising the productivity of training grade doctors (see Section 2).

1.6.2 Specialists in family medicine including primary care physicians and general practitioners Whilst 20 years ago a parameter of 1 doctor to 2000 population was generally accepted, today an increased ratio to population is required for a population with 15-20% aged over 65[23]. As well as population ageing, this reflects growing patient expectations, and widening scope of practice such as more pro-active care for patients with non-communicable diseases. For example the Primary Care Medical Home initiatives in the US and other OECD countries have demonstrated that with a multi-disciplinary team approach with the doctor as lead, a parameter of 1 doctor per 1800 similar to 1 per 1700 guideline in Germany (see Section 2).[24] Workforce redesign within primary care including extending the role of nurses and support staff within multi-disciplinary teams is also a central component of the 2020 workforce strategy for rural health care in South Australia[25].

1.6.3 Worked example (See also annex 1) In order to illustrate the process by an example, a set of indicative country data for doctors has been created using actual baseline data from recent projects which accord with commonly-encountered national starting points. To generate future demand requirements, international guidelines are applied to the national population which is 10 million in the example. This highlights a number of key issues and opportunities which commonly emerge in medical workforce planning or horizon scanning:

- *Levels of staff* The total number required for all services is 2.9 doctors per 1000 population which lies towards the efficient end of the comparative range in Table 1.

- *Grade mix* However only 17% of the current workforce at senior or consultant grade compared to well over 50% in the comparators, this analysis demonstrates the scale of this grade-mix challenge and need for post-graduate training . This aspiration is not simply an issue of quality of care for patients since the opportunity to progress to senior level is essential to modern medical career development. This is therefore a HR management concern in relation to staff retention and expanding sources of supply (see Section 2).

- *Speciality shortages* The example illustrates imbalances between the requirement for and the current provision of hospital doctors in some specialties. Hence there an over-reliance on 'medical generalists' and insufficient sub-specialist physicians in hospital - despite high levels of obesity and therefore prevalence of diabetes and heart disease in the population.

- *Over-capacity specialities* Consistent with many countries embarking on effective workforce planning there is an excess of general surgeons, and OBGYN specialists which may indicate that primary care midwifery is under-developed. Similarly high numbers of paediatricians may highlight local population reluctance to entrust the care of their children to "generalist" primary care physicians.

- *Primary care* At only 5%, there was a particularly short-fall in staff fully-trained in the international scope of practice for family medicine[26]. There is a substantial agenda in the example to develop the skills-base of primary care doctors as well as to expand the workforce. To supplement the supply of new staff with new entrants into this workforce, experience from other countries highlights an opportunity to redeploy existing narrow specialists. In both high-spending and transitional countries, group practices of internists, paediatricians and obstetricians have been created and each of the partners re-trained across the family medicine scope of practice.

1.6.6 Nurses in hospitals are planned based on ratios to patients required *operationally* which vary with acuity between and within hospital departments. As with medical staffing there is some consensus across OECD countries on nurse staffing in the hospital sector. For example, the standards required by the State of California[27] for its contingent hospitals are highly respected internationally, and correspond very closely to those of other countries such as the recommendations of the UK Royal Colleges of Nursing and Midwives. California is also highly concerned with quality and managing costs, since it offers one of the most comprehensive benefits packages to residents who qualify for Medicaid - known as Medical in the State. Hence these standards are designed to ensure value for money. Workforce planning, however, requires mapping these standards to efficient utilisation of services. Hence applying these standards in specific departments requires their conversion into full-time equivalents (FTEs) *or the number of nurses required to be employed*. These parameters are ratios to service utilisation measures such as occupied beds (in wards) and patient volumes (in ER and outpatients), weighted by acuity. This contrasts with the practice in some countries of using beds provided as the workload driver so that underutilised capacity is not staffed thus improving productivity. In this way, replacing rigid national norms was successfully implemented in Bosnia and Serbia. In a

large teaching hospital in England, disparities in staffing between services were addressed and also improved budgetary management. *Annex 2* explains this process and shows the California standards converted into workforce planning parameters.

1.6.7 Skill-mix and workforce redesign through task-sharing The California standards relate to the requirement for nurses who are professionally qualified such as RNs, midwives *and* licensed staff such as LVNs in the US and healthcare assistants in the UK. Hence in each department the balance of qualified to licensed and other support staff needs to be considered. As a general rule, the higher the acuity of the patients, the higher the ratio of registered to licensed nurses. Thus, in intensive care the ratio may be 80% registered and 20% licensed, whereas in step-down it could be 40:60 respectively. Nursing has also led the trend to substitute qualified staff with trained and competent support workers supervised within a defined scope of practice in a given service. This has expanded in the last decade into comprehensive workforce redesign both within and between all healthcare staff group and is discussed in more detail in Section (2).

1.6.8 Remedial therapy and technical staff in hospital There can be over 20 distinct services provided by these staff encompassing remedial therapies – such as physiotherapy and speech therapy- pharmacy, laboratories, imaging and other diagnostic services. Allied health and technical staff do not routinely figure in the standard sources of international comparators. This is because the services grouped under this heading vary widely by country as does the extent of out-sourcing for these services. Thus in the UK hospital pharmacy services are mostly contracted out. Therefore, if these staff groups are part of any project brief, staffing levels by specific country for a selected, preferred basket of comparators will need to be researched. For example, there are 250,000 radiographers in the US for a population of 320m whilst a recent report on hospital pharmacy across 53 countries reported a ratio of 1.05 pharmacists per 100,000 population[28]. In hospitals in England, these staff groups in total amount to 15% of directly-employed workforce. As with other staff groups there is international collaboration on staffing requirements so it is important to discuss these with the heads of service particularly in the tertiary hospital sectors as they are often cognisant of any recommended standards in their respective fields.
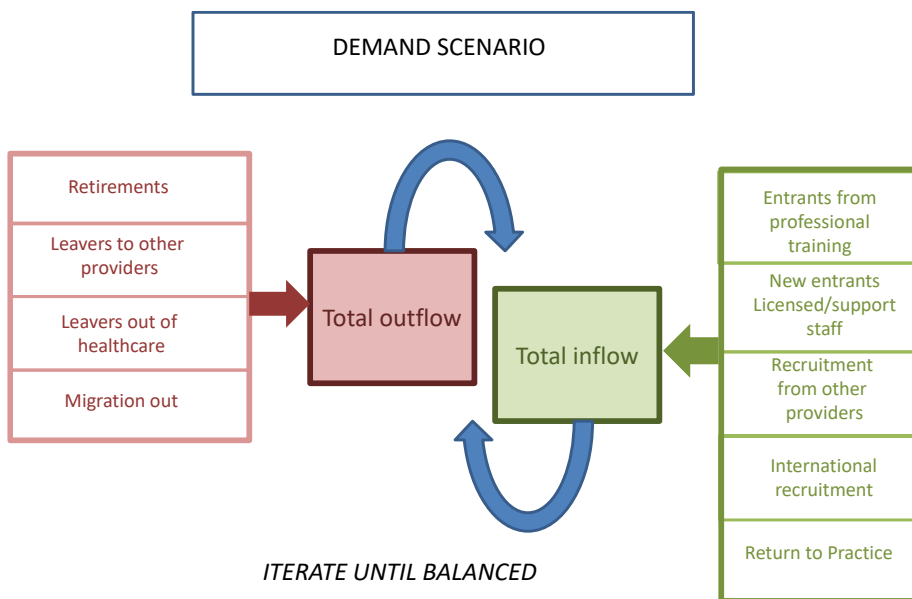
1.6.9 Scenario planning Given the range of variables within service planning and consequently workforce demand forecasting, a limited range of scenarios should be produced by varying key assumptions through *sensitivity analysis*. Indeed this is the approach in 6 EU countries[29]. A preferred scenario may be recommended as the most consistent with the project objectives, however the others should also be carried forward into the supply planning stage for sensitivity testing. Not least, workforce plans should be kept under constant review and monitored against out-turn at least every 5 years and optimally bi-annually.

1.7 Supply planning Supply challenges have often been the initial motivation for embarking on a national workforce planning initiative[30]. A supply plan assesses the scale of any country's starting point, identifies the key pressure points and specify HR policies to address these in order to move workforce capacity towards strategic demand. The first stage is to quantify current attrition rates. An analysis of the workforce age-structure indicates expected retirements. There are three categories of leavers: those who opt to work abroad, those who move internally to other providers and those who leave the health workforce altogether. Internal migration from rural areas to major cities is often a major challenge, particularly in smaller countries where the capital city is the location of all tertiary services, and medical training universities and generally a mecca for younger people. Best practice is to encourage providers to conduct exit interviews to determine (a) the reasons for leaving and (b) destinations in terms of future employment. This data can then inform current HR management and retention strategies. Also the cost of replenishing attrition should be monitored within HR financial management. Due to freedom of movement and common standards of professional training, recruitment across national boundaries within the EU is generally less than half the cost of recruiting staff from countries further afield[31]. This therefore incentivises the larger member states to focus their recruitment drives within the EU.

The second stage is to map the flow of new entrants to the workforce. This will require an assessment of the country's training capacity in relation to service need. Good practice is to align state-funded or -subsidised training capacity to local demand to ensure jobs for all newly qualified staff. This often includes some of degree of conditionality on entry to training, such as a minimum period of service and/or contribution to training costs. In relation to doctors, best-practice horizon scanning should align both the capacity and incentives for post-graduate training to the changing requirements by specialty in hospitals and not least primary care. For doctors, allowance is made for the timescale of 10 to 15 years for new entrants to medical training to progress to senior or consultant grade.

1.7.1 Balancing demand and supply   Supply challenges can be instrumental in deciding which demand scenario is most viable.   However, supply constraints are also an opportunity to redesign aspects of the workforce and expand sources of supply (see Section 2 below). A supply model is shown in figure 2.

Figure 2: supply model


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                        ┌─────────────────────────┐
                        │     DEMAND SCENARIO     │
                        └─────────────────────────┘

┌──────────────────┐
│   Retirements    │
├──────────────────┤            ┌──────────────┐  ┌──────────────┐        ┌──────────────────────┐
│ Leavers to other │            │              │  │              │        │  Entrants from       │
│    providers     │    ──►     │ Total outflow│  │ Total inflow │  ◄──   │  professional        │
├──────────────────┤            │              │  │              │        │  training            │
│  Leavers out of  │            └──────────────┘  └──────────────┘        │  New entrants        │
│    healthcare    │                                                      │  Licensed/support    │
├──────────────────┤                                                      │  staff               │
│   Migration out  │                                                      │  Recruitment         │
└──────────────────┘                                                      │  from other          │
                                                                          │  providers           │
               ITERATE UNTIL BALANCED                                     │  International       │
                                                                          │  recruitment         │
                                                                          │  Return to Practice  │
                                                                          └──────────────────────┘
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1.8 Implementation plan, monitoring and review   This should focus on all the activities required to deliver the workforce plan.   Detailed actions over the forthcoming two years should be mapped out. The responsibilities for delivery should be clarified and sufficient resource support identified.   The content will of course depend on the nature and scope of the plan itself. To effect the desired change, the strategy must have clear outcomes and appropriately-defined measures to assess and report on performance. These results can be used to inform further analysis and subsequent strategy review cycles which may be annually or up to five years.

Section 2. Ensuring a motivated workforce through best-practice Human Resource management

It is a primary aim of good HR management to optimise the motivation and job-content of the workforce. Not only are initiatives in this field instrumental to mitigating attrition, but they can also open up new sources of workforce supply by extending potential employment markets. The major areas of opportunity are:

- Workforce redesign and task-sharing
- Improving motivation through enriching job-content
- Career progression
- Optimising work-life balance in relation to the age-structure of staff attrition
- The needs of women in the workforce
- Leadership and communication
- Specific approaches in rural communities.

2.1 Workforce redesign and task-sharing The benefits of enriching the job content of healthcare staff through task-sharing are well illustrated by an instructive case study in the primary care team redesign innovation in Group Health Seattle - which has since influenced innovation across the OECD. Indeed, in the NHS in England, the learning has informed extended primary care initiatives in England including a nationally innovative joint project between the NHS and the Department of Defence to serve both the local community and one of the largest military bases in Europe. In 2005 this not-for-profit health plan and provider, serving half a million beneficiaries, faced a problem with both attrition and recruitment of primary care physicians (PCPs) working it its hubs of 10,000 population[32]. The findings of systematic qualitative research highlighted the main cause as burn-out amongst PCPs due to patient workload pressures and content. The solution was to design multi-disciplinary care teams, led by PCPs who see only the more complex patients whilst retaining accountability for the delivery of care to all. Devolution to other staff and introduction of virtual consultations, reduced patient volumes for PCPs and increased the average patient consultation time. An expanded team-staffing model was developed which devolved care management to RNs and clinical pharmacists. The telephone advice service, outreach patient-coaching, and support activities in the practice were delivered by a new, specifically designed medical assistant role (MA)[33].

The outcome was a dramatic reduction in PCP burn-out, improvements in morale and in job satisfaction all of which resolved the PCP attrition and wider supply problems. The FTE of the primary teams expanded by 20% (from 13 to 16 FTE) but with the same number of GPs and some substitution of MAs for registered nurses. Indeed the MAs grew to become 'the workhorses of the practices'. Also the new team facilitated an innovative focus on whole population management and chronic disease management which reduced hospital utilisation and expenditure so as to more than compensate for the costs of the new staffing. Patient satisfaction also increased. As the pilot was rolled out across the entirety of Group Health these results were replicated across the organisation. This experience offers valuable learning which can generalised and illustrate how workforce redesign and task-sharing are a core components of better HR management.

- Initial supply problems for senior staff often provide an opportunity to redesign the workforce which then improves both quality and efficiency including staff productivity

- Redesign improves the working lives and motivation of senior staff and can reduce attrition even in one of the most competitive international job markets in the world for high-quality primary care physicians and nurses across continental North America

- Creating new roles for non-registered staff, such as the medical assistant, opens up new job markets and sources of workforce supply. This provides valuable career opportunities for younger people with no formal skills and training and/or the educational attainment needed event to enter formal professional training at all. They thus have an opportunity to explore and subsequently embark on a career as a licensed practitioner which may lead on to professional training. This workforce is becoming increasingly important as practice changes. Indeed in one recent report on horizon scanning by the Centre for Workforce Intelligence on behalf of the European Commission, it is anticipated that by 2035, 60% of the additional workforce capacity required will be deliverable by healthcare support workers[34].

- Workforce redesign has the potential to improve value for money not just in staffing but in wider aspects of health care delivery

- Task-sharing from doctors to new staff roles are often welcomed and appreciated by patients and users once any initial concerns are addressed through consultation, public awareness campaigns and not least direct experience as service users.

2.2 Further HR management opportunities to improve working lives   In 2019, in a major project called 'Closing the GP' the UK Kings Fund along with the Nuffield Trust and Health Foundation conducted extensive research on why staff leave for reasons other than for purely compensation[35]. This highlights a range of HR management initiatives which mitigate attrition, and which can be adapted to most if not all healthcare systems.

2.3 Improving motivation by enriching job content People leave because they feel overworked, poorly treated, and unable to deliver good care.   Hence motivation is improved by enriching job content. Rigid demarcations between staff groups limit the role of staff by (i) requiring highly trained doctors to undertake to much routine work and (ii) prevent nurses using and thus losing many of the skills they acquired in professional training.   Improving job designs through skills transfer across professional boundaries improves motivation.   At the same time, task-sharing to support staff, trained in-service to be competent across a defined scope of practice, also opens up new sources of workforce supply.

2.4 Career progression   In the international field of medical and nursing practice, career development towards the highest international standards of practice are critical to staff.   Lack of career and job opportunity emerges as demotivating to staff as perceived inadequate compensation. This requires continuous professional development to be an essential component of human resource management and working lives.   Indeed gaining access to the best-in-class post-graduate professional development is a major motivator staff from lower income countries migrating to OECD countries.   Also, within and across providers, there should be open competition in staff recruitment based on qualifications, practice experience and prior achievement.   Not only should all jobs be generally advertised, the job descriptions including the required skills and experience should be accessible to all potential applicants.   Similarly promotion within provider services and departments should be based on fair and transparent procedures based on criteria directly relevant to performance in the post.

2.4 Optimising work-life balance To begin with most attrition for the professional staff is 'J-shaped' in terms of age and length of service: thus relatively high amongst the youngest staff, then decreasing before rising sharply towards retirement age [36].   One cause is rigid rostering which impacts on the work-to-life balance particularly for staff raising children. Hence working hours more specific to age group and child-rearing responsibilities are required. Interviewing staff, it was found that many older staff for example would welcome remaining in service on the basis of reduced participation with the hours more attuned to their role of grandparents to young children.   Indeed work-life balance often emerges as the major reason for leaving the organisation. For younger people a HR cultural problem of inadequate induction leads to a 'sink or swim' working environment with too much responsibility and complexity vested in only recently-qualified staff.

2.5 The special needs of women in the workforce   In many countries, women form the backbone of the healthcare workforce.   Staffing establishments, working hours and participation rates need therefore to reflect the role of women during pregnancy and child-birth.   In countries and regions where the culture prescribes the predominant role for women in child-rearing, family-friendly policies, flexible shift-patterns and shorter working days are required.

2.5 Sensitive staff management including continuous communication is vital   In any setting, it is crucial to develop a culture with mechanisms for staff concerns to be articulated, understood and responded to.   This requires a compassionate and inclusive HR leadership and culture, with meaningful internal communication and employee engagement which monitors staff concerns and aspirations.   In service consultation should be supplemented by exit interviews to ascertain each staff member's reasons for leaving and destination in terms of future employment. This provides useful qualitative intelligence to inform bespoke staff-retention initiatives.

2.6 Specific needs of rural areas All countries face challenges in retaining healthcare staff in rural areas, due in part to the migration of younger people both to the cities and also out of country. This challenge can be particularly acute in lower-income countries where supply shortages impose particular pressures on the remaining staff to cover services 24-hours a day.   One solution lies in appropriately designing the service network with the more specialised and higher acuity patient-care centred on regional acute hospitals in the cities and large towns.   The rural healthcare network can then focus on step-down and lower intensity inpatient care, extended primary care including community midwifery for low-risk pregnancies, and chronic disease management. In terms of staffing, it then becomes viable in these lower-intensity services (i) to extend traditional and narrow roles of nurses and (ii) deploy support staff, including medical assistants and paramedics in urgent care who are trained in-service across a defined scope of practice. This approach not only improves the working lives of professional staff, it can also create new local

job opportunities particularly for younger people who would prefer to live locally. In rural Kyrgyzstan this approach has been used to resolve supply challenges for primary care physicians in the more remote settlements by staff training and equipping nurse-midwifery practitioners as the first responders.

3. Learning to-date from the Covid19 Pandemic

3.1 Findings to-date A recent review on behalf of WHO in September 2020 concluded that the intensity and brevity of the pandemic so far is not well-suited conclusively to tease out the complexity and scope of the challenges facing the health workforce in Europe'[37] .   However it does report that COVID-19 has already revealed and exacerbated workforce pressures in health systems across the continent including:

- Cumulative imbalances in the health sector linked to the pursuit of economy drives implemented during preceding years
- The need to improve coordination between primary healthcare, hospitals and long-term care with unclear referral pathways
- Depleted public health services in some countries have created the need to reinforce this sector which have been reinforced for the time being. The preferred solution of wholesale contracting out in the UK has added to national workforce capacity however the outcomes not proving as encouraging as it has proved costly so far
- The distortions of over-dependence on health workers from outside the European region, currently halted by the pandemic (see 3.2 below).

The lessons learnt from COVID-19 also present 'a unique opportunity to re-orient health workforce policy as connected to future service planning and delivery' [38] (thus the approaches in section 1 and 2 above).   These include:

- Learning from the switch in outpatient activity to virtual consultations which if mainstreamed would release staff in these departments to other areas under pressure.
- Burnout amongst health workers workforce reinforces the need for the HR management policies set out in Section 2 whilst mental health and psychosocial support for the health workforce in high-pressure services may also become a key priority[39].
- Many professional staff leave mid-career for a variety of reasons but if a data-base on them is retained they can be approached again through return-to-practice initiatives. These have proved very successful prior to the pandemic [40] and are recognised as contributing significantly to managing the immediate increased patient demand from Covid19.
- The connection of adverse outcomes from Corvid19 to life-style related morbidities such as obesity and type II diabetes have brought the issue of self-care by patients into sharp relief.   Expert commentators such as Angela Coulter have consistently highlighted the under-explored potential of informed patients and carers to impact on both on service demand and as co-producers, supplement the formal healthcare workforce through intelligent self-care:

  "Patients have been described as the greatest untapped resource in healthcare. Recognising their capacity and that of local communities as co-producers of health, could do much to transform quality. What is needed is a shift away from a reactive, disease-focused, fragmented model of care, towards one that is more proactive, holistic and preventative, in which people are encouraged to play a central role in managing their own care[41]"

- Indeed digital technologies may prove a promising solution to facilitate self-care and support health workers particularly in services for those with chronic disease, so long as they are implemented within a strong governance framework with a key clear focus on keeping equity firmly in mind.[42]

- Based on the experience of the US and the UK in previous recessions of the scale caused by the pandemic, higher income countries may well increase recruitment to treat the growing number of patients, both locally and internationally, as this becomes more possible.

3.2 Further Reflections on the Covid19 pandemic including return to practice initiatives   A further silver-lining arising from the Covid19 experience for those countries who face particular challenges with healthcare workforce migration to higher-income countries, is the a reported sharp decline in the volume of residence permits issued by countries which recruit high levels of migrant healthcare workers.   This offers offer some breathing space in which to develop more dynamic workforce planning and retention strategies. This should be informed by in-

country research, staff surveys and focus groups in both the urban and rural settings to explore the issues highlight in Section 2 above and to revise and tailor HR management policies accordingly.   Further opportunity should be taken to review any extant staffing norms based purely on capacity and review central data-bases on the healthcare workforce against the workforce planning agenda set out in Section 1.   This can then inform the design of continual HR workforce data capture which commands confidence across key stakeholders in the process. Against these requirements, the current organisational structures within which workforce planning current takes place, should be reviewed and proposals for reform and improvement generated.   The crisis has also demonstrated how good ideas can be fast-tracked where a collective sense of urgency is present. Faster decision-making in relation to HR planning, development and management would be also major positive from this experience, provided health systems can become more resilient to external shocks and threats.   The EU for example could once more become more proactive to mitigate internal migration which undermines healthcare delivery in current and prospective member states.

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Annex 1 Worked example of demand planning for doctors

Specialists in hospitals Across the OECD the specialist associations within the national regulatory bodies in each country set standards of FTEs to resident population for the required consultants or senior grades (or attending physician in the US). The American Colleges, the UK Royal Colleges[42], the medical societies in France, the Royal College of Physicians and Surgeons of Canada[42] etc all incorporate single speciality-specific associations who work collaboratively across national boundaries to discuss workforce requirements. Accordingly this ensures a high degree of consistency in their respective recommendations. The associations undertake detailed quantitative work on expected demand in terms of volume projections arising from population changes and qualitatively analysis including the impact of changes in clinical practice, the type of interventions or case-mix , as well as developments in task-sharing which devolves work from doctors to other professions. Each association then projects the need for consultants in its respective over a strategic given planning period (usually 5-10 years)[42]. Paediatrics, OBGYNs, and geriatricians will also consider projected changes to population age structure. The demand planning parameter is expressed as the level of population which would generate the need for 1 FTE senior grade or consultant[42]. In any workforce plan therefore, the requirements for each of the full range of specialties required in modern hospitals can be assessed nationally on this basis.

For example the most recent guidance from the UK Royal College of Paediatrics and Child Health recommends a requirement of 1 consultant for every 3000 children and adolescents aged under 16. The Royal College of Obstetricians and Gynaecology recommends requires 1 consultant for every 13,000 women in the population or (assuming a 50:50 gender spilt) 1 per 25,000 all-ages total[42]. The most recent advice from the American Association of Neurological Surgeons recommends 1 per 55,000 all-ages population[42]. In Germany the demand planning guidelines (Bedarfsplanungsrichtlinie) for transfusion medicine specialists is 1 per 300,000 population[42]. In order to illustrate the process a set of indicative country data for doctors has been created using actual baseline data from recent projects which accords with commonly-encountered starting points.

The example assumes a total population of 10 million consistent in size with countries of similar size to Serbia and assumes 18% are aged 16 and under, 17% are aged 65 and over and 51% of the total are female. The national health workforce plan is aimed at complimenting a 10-year health system modernisation strategy supported by investing in improving hospital building stock and equipment – often the case in preparation for EU membership. Following discussions with local counterparts the international guidelines applied were those of the UK-based Royal Colleges and their US and Australian counterparts.

Primary care physicians Whilst 20 years ago a parameter of 1 doctor to 2000 population was generally accepted, today an enhanced ratio is required for a population with 15-20% over 65[42]. This reflects population ageing, growing patient expectations, and widening scope of practice such as more pro-active care for patients with non-communicable diseases. For example the Primary Care Medical Home initiatives in the US and other OECD countries have demonstrated that with a multi-disciplinary team approach with the doctor as lead, a parameter of 1 doctor per 1800 similar to 1 per 1700 guideline in Germany.

Table A1 shows the starting position as current or starting position and the requirements or out-turn for the strategic period informed by the national health strategy and its projections for service activity by speciality and capacity. Since the output from the guidelines is the requirement for consultant, the training grades in Table A1 represent the FTE equivalent of the service contribution of post-graduate trainees as recommended by the UK Royal Colleges. These would need to be reviewed in each project.

Table A1	Demand or requirements plan for doctors in example country of 10 million population										
Speciality	Current in FTE				"Required" in FTE				Difference required versus current in FTE	Difference required versus current as %
	Senior grades/ Consultant	Training grades	Total	% Senior grades/ Consultant	Cons	Training grades	Total	% Senior grades/ Consultant		
Blood Sciences	26	129	155	17%	167	55	222	75%	-66	-30%
Pathology/diagnostic labs	443	1,131	1,574	28%	1,200	464	1,664	72%	-90	-5%
Imaging	343	1,064	1,407	24%	1,334	500	1,834	73%	-427	-23%
General medical	550	2,911	3,460	16%	850	1,019	1,870	45%	1,591	85%
Sub-Specialist medical										
Cardiology	293	559	852	34%	1,000	1,000	2,000	50%	-1,148	-57%
Dermatology*	207	883	1,090	19%	466	242	709	66%	382	54%
Diabetes/Endocrinology	102	116	218	47%	666	833	1,500	44%	-1,281	-85%
Emergency Services	514	2,604	3,118	16%	800	1,520	2,320	34%	798	34%
Gastroenterology	124	101	225	55%	476	200	676	70%	-452	-67%
Infectious Diseases/Tropical	49	55	104	47%	500	300	800	63%	-696	-87%
Nephrology	131	410	541	24%	55	50	105	53%	436	414%
Respiratory	101	286	387	26%	185	135	319	58%	68	21%
Neurology	116	397	513	23%	333	308	641	52%	-128	-20%
Specialist medical sub-total	*1,638*	*5,411*	*7,049*	*23%*	*4,768*	*4,885*	*9,653*	*49%*	*-2,605*	*-27%*
Total medical	**2,187**	**8,322**	10,509	21%	**5,619**	**5,904**	11,523	49%	-1,014	-9%
Paediatrics/child health	**919**	**3,358**	**4,277**	**21%**	**800**	**400**	**1,200**	**67%**	**3,077**	**256%**
Surgical specialties										
Anaesthetics / Theatres/ICU	978	1,926	2,904	34%	2,000	300	2,300	87%	604	26%
Otolaryngology	262	764	1,026	26%	200	98	298	67%	727	244%
General Surgery	585	2,762	3,347	17%	400	372	772	52%	2,575	333%
Ophthalmology	337	761	1,098	31%	800	512	1,312	61%	-214	-16%
Orthopaedics	317	1,069	1,386	23%	185	46	231	80%	1,155	501%
Renal Transplant	131	324	455	29%	400	384	784	51%	-329	-42%
Urology	207	449	655	32%	800	512	1,312	61%	-657	-50%
Vascular Services	48	58	106	45%	800	800	1,600	50%	-1,494	-93%
Neurosurgery	132	216	348	38%	333	308	641	52%	-293	-46%
Cardio thoracic	140	106	247	57%	62	62	123	50%	124	101%
Plastic surgery	118	159	277	43%	167	200	367	45%	-90	-24%
Total surgery	**3,137**	**8,434**	11,571	27%	**6,168**	**3,554**	9,722	63%	1,849	19%
OBGYN	**617**	**2,764**	3,381	18%	**2,000**	**500**	2,500	80%	881	35%
Mental health	**159**	**409**	568	28%	**1,334**	**400**	1,734	77%	-1,166	-67%
Primary care	**528**	**11,082**	11,610	5%	**10,333**	**3,000**	13,333	77%	-1,723	-13%
Oral surgery and dentists	**513**	**8,032**	8,545	6%	**562**	**10,938**	11,500	5%	-2,955	-26%
Public health	**28**	**172**	200	14%	**576**	**102**	678	85%	-478	-71%
Others	**510**	**3,024**	3,534	14%	**500**	**500**	1,000	50%	2,534	253%
Total	**9,409**	**47,921**	**57,331**	**16%**	**30,592**	**26,317**	**56,909**	**54%**		

Annex 2   Planning nurse staffing in hospitals

Planning parameters for the number of nursing staff in full-time equivalent *required to be employed*, are derived from operational standards or the number of nurses *required to be deployed* to manage the number of patients in the department at any one time - according to their acuity or dependency. The differences in acuity are reflected in the operational ratios so that as patient need increases so the parameter assumes fewer patients per nurse on duty. Hence the ratio for medical/surgery (1nurse to 5 patients) reflects a lower acuity than in critical care/high dependency (1 to 2). Optimum utilisation levels (such as bed occupancy and patient throughput), are assumed for the provided service capacity (such as bed provision) by applying desirable shift patterns which add up to 24 hours per day covering 7 days per week. Finally an optimum absence allowance including in-service training, annual leave and sickness allowance is added in. The table in Annex 2 shows how the California standards[42] by acuity-level expressed as one nurse to patients convert into FTE per occupied bed / service unit which efficiently map to service capacity in tertiary and secondary acute specialties, obstetrics, paediatrics, emergency room/A and E, operating departments and psychiatry.

Table A2 State of California standards for nurses to patient converted to wte per bed/service (including supervision)

Specialty Area (beds unless otherwise specified)	*Operational* Ratio of nurse to patients	FTE Nurses *to capacity* as occupied bed/patient volume
Medical and surgical wards/floors	1 to 5	1.3
Padiatrics	1 to 4	1.6
Acute Specialist(oncology, cardiothoracic, spinal etc)	1 to 4	1.6
Critical care/High Dependency	1 to 2	2.8
Intensive Care	1 to 1	5.6
Obstetrics department		
Labour/delivery rooms	1 to 2	3
Ante partum beds ward/floor	1 to 4	1.6
Post partum ward/floor	1 to 6	1
Well baby nursery cots	1 to 8	0.75
Neonatal ICU cots	1 to 2	3
Emergency room/ A and E		
ER Room trauma per bed/trolley	1 to 1	5.6
ER Critical care per bed/trolley	1 to 2	3
ER Visting patients*	1 to 4	1.4
OR Department		
OR per room/theatre	1 to 1	5.6
Post-surgical recovery bed	1 to 2	2.8
Psychiatry	1 to 6	1

Source: Title 22 California Code of Regulations Division 5 Social Security provides information about nurse-to-patient

* based on a department withf 40,000 attendances per year

Annex 3 the Group Health experience and primary care teams

In 2006 Group Health of Seattle in the US launched its the Primary Care Medical Home pilot in one 10,000 population hub to address this burgeoning HR issue of poor job satisfaction amongst primary care physicians causing burn-out and leading to staff leaving for other parts of the US. The key components of redesign in the pilot were :

- Introduction of more virtual consultations with patients on telephone and email
- A redesigned role for the primary care physician (PCP) as a team leader and specialist practitioner for more complex patients, reducing the patient volume per PCP an increasing the average patient consultation time
- A new team structure bringing in clinical pharmacists, extending the role of nurse practitioners and designing a new medical assistant function with the following scope of practice:

  - As the first line of contact with telephone consultations informed by protocols which expanded to 40% of all activity due to popularity with patients
  - Health coaching of patients with non-communicable diseases
  - Supporting the registered practitioners managing the more complex needs
  - Supporting additional clinical audit requirements through data management and reporting.

The MA became the 'workhorse of the system' and is also the least expensive staff member on the team. They are relatively easy to supply requiring only 2 years in service training for new entrants to working healthcare. Hence the MA role opened up a new source of supply for primary care staff who may consider a longer-term career including progressing to professional training[42].

Table A3 shows the change in the primary care team serving a population of 10,000 people before and after the redesign

Table A3

	Before	After
Primary care physicians	5.6	5.6
Nurses (RNs and LVNs)	5	3
Medical Assistants		5
Physician assistants/paramedics	1.5	1.5
Clinical pharmacist	1	1
Total	13.1	16.1