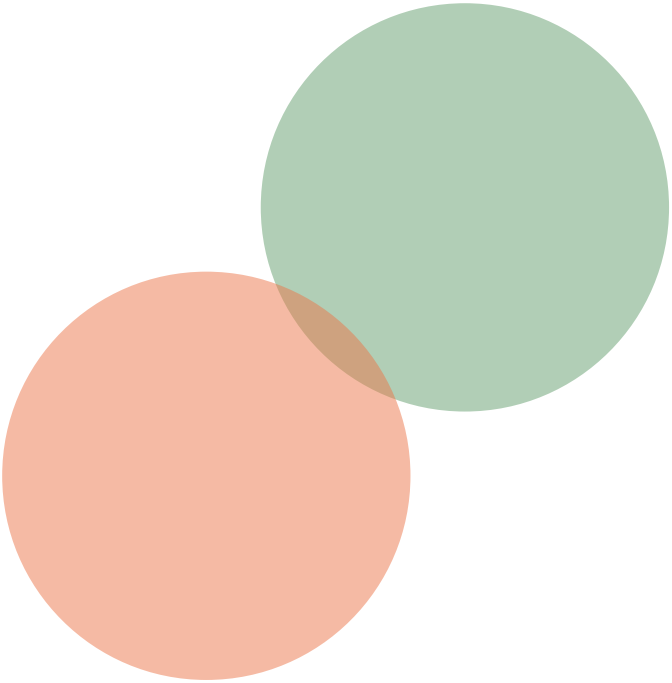
REAL Supply

TOPIC 4:
The role of skill-mix in the health and social care production function

Authors:
Diane Skåtun



University of York
University of Kent
1495 University of Aberdeen
SPRE
Part of: The Health Foundation REAL Centre

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Plain English summary

Context

Health and social care services rely on a variety of skilled workers to meet the changing needs of the population. Planning for the right mix of skills is essential to ensure that care is effective and efficient. This Pathfinder explores how different combinations of roles and skills impact workforce productivity and service quality.

Knowledge gap

There is limited understanding of the best way to balance different roles within health and care teams. Although new roles like advanced nurse practitioners and physician associates have been introduced, there is little evidence on their cost-effectiveness. Additionally, professional boundaries can slow down the adoption of new roles, making it harder to adjust the workforce to changing needs.

Value

By studying how skill-mix affects productivity, motivation, and job satisfaction, we can design better workforce strategies. This research can help decision-makers ensure that care providers have the right skills in the right places, making services more effective while keeping costs under control.

Impact

Understanding skill-mix can improve patient outcomes, increase job satisfaction for healthcare workers, and make the health system more efficient. Policymakers can use this knowledge to shape workforce strategies that address future health and care challenges, ensuring high-quality care for all.

Introduction

The health and adult social care workforce is comprised of staff who are required to provide a large range of tasks to support those in need of health and social care. These staff are a vital input in the health and social care production function. There is a need to understand the optimal mix of these staff and the skills they bring to the sector. This will ensure the tasks required can be implemented to the required level and that the composition of the future workforce is designed for the increased demands of the projected demographic change of an ageing population (Barnett et al. 2012; Watt et al. 2023). This pathfinder provides a high-level view of the key elements that should be considered in designing skill-mix strategies. It spans both demand and supply elements. It considers the choice of inputs from the demand side but also considers the impact a changing skill-mix might have on the supply of those skills.

Workforce planning is often defined as ensuring that an organisation has the right people with the right skills in the right place at the right time. "Within budget" is also added as an additional requirement for services provided within an increasingly cash-constraint public sector setting. The need to consider the size and shape of both the health and social care workforce in the long term has been recognised with the NHS Long Term Workforce Plan[1] and the Workforce Strategy for Adult Social Care in England developed by Skills for Care[2]. Staff number requirements are projected to increase substantially in the future (see pathfinders '**Pay and Conditions**' and '**Consequences of non-marginal changes in recruitment into training**'). Alongside this increase in size, there is recognition that the future workforce needs to include new roles and different models of skill-mix to meet changing needs. With an ageing population and one in which more people are living with multiple conditions, there may be more need for skills in geriatric care and complex conditions. With technological progress there may be more requirement for digital literacy[3].

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The choices made on the shape of the workforce will impact on efficiency and productivity within the system.[4]

Our wider engagement with employers and unions indicated a recognition that a change in skill-mix would be required to meet the needs of health and social care in the future. This was considered as a proactive move to a new way of working but also one necessitated by constraints on the supply of the workforce. However, there was recognition that occupational boundaries had reduced the acceptability of new roles in the past and that this needed to be considered if new roles were to be successfully incorporated in the health and care system.

1 https://www.england.nhs.uk/publication/nhs-long-term-workforce-plan/
2 https://www.skillsforcare.org.uk/Workforce-Strategy/Home.aspx
3 Topel Review 2019 "Preparing the health care workforce deliver the digital future" https://topol.hee.nhs.uk/
4 The assumption of improved productivity is built into the Long Term Workforce Plan for the NHS; see Warner and Zaranko (2023).

To improve population health and care, the health and social care system provides services that are composed of sets of tasks. Where tasks are not automated and they involve labour, the ability to deliver a task relies on a particular level of skill. The set of tasks required may change with the expansion or contraction in service provision (e.g. introduction of new services or removal of services) alongside a change in technology (innovation) which can alter the delivery of existing services.

The number and design of different roles is largely determined by the employer, who can determine the division of tasks and the composition of teams delivering those tasks. The skills required for a particular role are therefore determined by the set of tasks allocated to that role. However, with changes in health and social care demand, along with ongoing innovation, roles may require to alter over time. Without intervention, a given set of roles may no longer reflect the most cost-effective means of delivering health and social care services.

Therefore, the skill-mix of the health and social care workforce is a broad concept than one than can be defined by a mix of occupations[5]. It may refer to the range of skills or expertise that a single worker might have. Thus, within any one occupation, a worker may require a range of skills where the occupation title is a signal of that bundle of skills. Skill-mix may also refer to the range of levels of seniority within any one occupational group. This may include explicit additional skills or implicit additional skills that experience may bring to the role and impact on the transfer of the skill to the tasks required. Finally, skill-mix may refer to a mix of different occupational groups within a team or within an organisation (Sibbald, Shen, and McBride 2004).

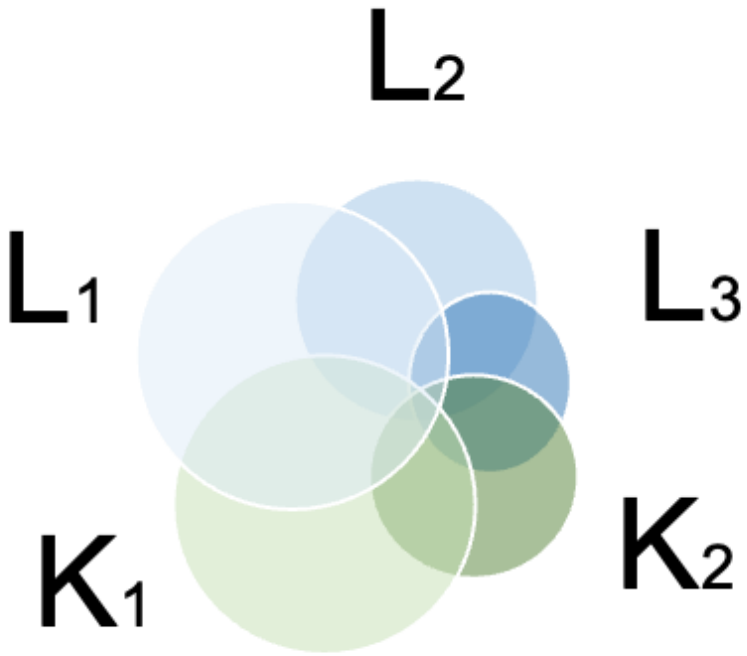
Economic framework

The basic economic framework to consider skill-mix in is the production function, which describes the relationship between the inputs and outputs in a production process. For health and social care, inputs include labour inputs that represent the time and skills supplied by the workforce, capital inputs such as hospital buildings or CT scanners, and other intermediate inputs such as medication. These combine to produce the output, that is an increased health and well-being of the population. How best to measure and value that output is an area of research in its own right (Castelli et al. 2005, 2007).

Different combinations of inputs can be combined to produce the same output. The ratios of each input in the combination depend on the substitutability between inputs. Information on the relative cost of the different inputs can then be used to determine the minimum cost at which a given level of output can be produced, i.e. the productively efficient combination of inputs. Figure 1: Skill-mix and input combination illustrates various inputs within a production function that can combine to produce the output. It indicates the broad sets of inputs that represent the classic labour and capital inputs (L and K) and alternative forms within each input group for example (L1, L2, L3) and (K1, K2).

5 And here it should be noted that while skills are different from tasks (Autor, Levy, and Murnane 2003), changes in skill-mix will impact on the tasks able to be carried out.

Figure 1: Skill-mix and input combination



Complementarity and substitutability

Capital and labour can be substitutes or complements. If for instance capital is a substitute for one type of labour and is cheaper, a firm will substitute into capital and away from labour. This will impact on the size of the workforce required and may also impact on the type of skills required and lead to a change in the mix of the labour inputs. Innovation may expand the possibility to substitute capital for labour (automation). Innovation may also reduce the relative price of capital. On the other hand, innovation can also bring new ways of producing output that increases the demand for labour and again may impact on the demand for specific types of labour.

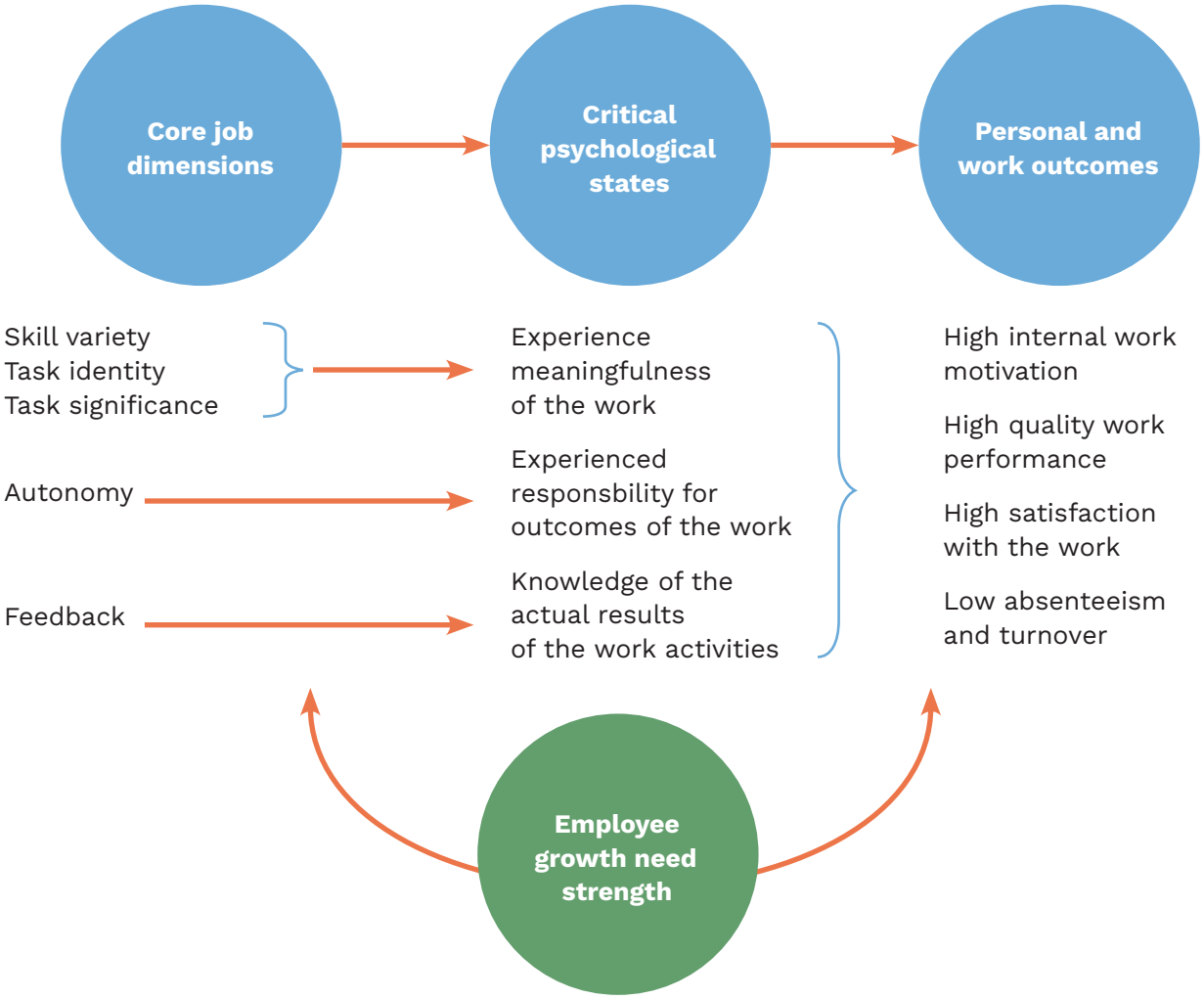
The ability to vary inputs is defined in terms of the short or long-run. In the short-run, at least one input is assumed to be fixed whereas in the long-run there are no fixed inputs. In terms of labour inputs in the health and social care sector, changes to skill-mix may involve investment in training the workforce that may have substantial time horizons that go beyond the end of formal training. Implementation challenges may also require time to embed new roles in the workforce.

Supply-side issues

Adjustments to an occupation's skills that impact on the tasks that are expected as part of the role, may have effects on the supply of labour to that occupation. This could impact recruitment and retention, the propensity to provide additional hours once working, the delivery of deliver zero hours through absenteeism and also the distribution of the workforce. This may occur through different mechanisms. A highly influential theory on how an employer can increase the intrinsic motivation in its employees is found in the Job Characteristics Model (Hackman and Lawler 1971; Hackman and Oldham 1976). Here, the nature of the job design, can impact on the intrinsic motivation of workers, and this could impact job satisfaction. It states five job characteristics which may affect intrinsic motivation. Figure 2 gives a graphical representation where the five characteristics (and one

"moderator") are: 1) Skill Variety: the degree a job requires a variety of different activities; 2) Task Identity: degree to which the job involves a "whole" and identifiable piece of work; 3) Task Significance: the degree an employee feels the job significantly affects others; 4) Autonomy: the degree the employee has discretion; and 5) Feedback: degree to which the job gives the employee information about performance. These are mitigated by Growth Need Strength which is the degree to which the employee has a high need for personal growth and development.

Figure 2: The Hackman-Oldham Model of Intrinsic Motivation



Source: Hackman and Oldham (1976), Figure 1

This framework has important implications on how skill-mix may influence motivation and productivity. For instance, when work becomes more complex workers may become demotivated through stress. In this context, there is empirical evidence that as more tasks are introduced, with the associated need for a broader skill-mix, productivity initially increases for then to decline.

The effect of changing roles on job satisfaction can also be looked through the lens of Lancaster's theory of consumption behaviour (Lancaster 1966). Just as goods can be characterised as being made up of a series of characteristics, a job can be seen to be made up of several aspects; each with their own individual level of satisfaction that combine to provide a level of overall job satisfaction. If roles change and the distribution of tasks alters, overall job satisfaction may change with a resulting impact on labour supply behaviour. For example, if non-career grade doctors or advanced nurse practitioners

are tasked with care for straight forward patients, this leaves consultants with all the complex cases with less good prognosis. This might utilise the consultants higher level skillset but perhaps reduce the intrinsic motivation they gain from successful treatment (this has implications for automation see '**Automation of Health and Social Care'**).

New or extended roles with different skill requirements will require new training pathways. The decision of individuals to invest in skills will reflect the expected returns on that investment. Thus, moving skill requirements to different occupations will require a commensurate change in the return. If additional skill requirements are not compensated correctly, then this may impact on the decision to undergo additional skill accumulation (see pathfinder '**Pay and Conditions**'). This has implications for whether task-shifting should be seen as a way of reducing cost. Similarly, if existing occupations have elements removed, this may result in an adjustment downwards in the return in the form of pay. However, this may not be immediate and so impact on recruitment may only be seen in the long-run as pay adjusts.

Resistance to new skill-mix models may come from professional groups. This may be for various reasons including a belief that the new model may compromise care, to protect the stature of the profession, or more cynically the protection of market power in pay negotiations. Whatever the reason, the ability to benefit from potential productivity gains from new ways of working requires effective implementation. Similarly, resistance to new roles may come from the public where traditional occupational titles convey signals regarding skills and competencies. Changes to perceived levels of competence may be a feature of the public's willingness to accept[6].

The introduction or removal of new roles within the health and social care sector is not a new phenomenon. New roles that have been introduced within the U.K. include advanced nurse practitioners (ANPs), speciality and specialist doctors, physician associates and nurse associates while other roles such as enrolled nurses have been phased out. Tasks have also been expanded to new occupational groups through upskilling, for example prescribing by non-medical professionals such as pharmacists. Other initiatives have changed the format of the teams providing care including the evolution of multi-disciplinary teams such as the role of pharmacists within general practice. These past examples of changing skill-mix provide scope to evaluate the potential for further changes. A rapid review of existing literature on the use of ANPs as substitutes for GPs and Consultants and the use of Physician Associates suggests a lack of evidence of cost-effectiveness with most studies focussing on limited measures of effectiveness or patient satisfaction.

6 Interestingly, in both these cases, if the driver behind skill-mix changes is shortages of staff, then both professional groups and the public should take in to account that the original unachievable model of care could also be detrimental to care.

What is the opportunity for research

This pathfinder is in a very early stage of development. The concepts within it are being developed further to identify best value in terms of research opportunities including existing data sources. There are opportunities to develop the concepts alongside the Health Foundation's recently announced 'NHS Productivity Commission' (Chair: Anita Charlesworth, CBE and Tera Allas, CBE).

Conclusions

Skill-mix is a choice variable for policymakers and providers of care. The choices made on the shape of the workforce will impact on the efficiency and productivity of the system. An understanding of the effectiveness and efficiency of new skill-mix models will support the decisions needed to grow the workforce in the right way to meet increasing demands.

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