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The best person (or machine) for the job: rethinking task shifting in healthcare

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Highlights

- Task shifting is often conceptualised as task-transfer from high to lower-skilled workers.
- A more comprehensive framework of, and approach to, task shifting is needed.
- There is evidence in support of task shifting, challenging rigid professional boundaries.
- Task shifting has the potential to contribute to health systems strengthening.
- Task shifting requires adequate planning, resources, education, training and transparency.

Abstract

Globally, health systems are faced with the difficult challenge of how to get the best results with the often limited number of health workers available to them. Exacerbating this challenge is the task of meeting ever-changing needs of service users and managing

unprecedented technological advances. The process of matching skills to changing needs and opportunities is termed task shifting. It involves questioning health service goals, what health workers do, asking if it can be done in a better way, and implementing change. Task shifting in healthcare is often conceptualised as a process of transferring responsibility for 'simple' tasks from high-skilled but scarce health workers to those with less expertise and lower pay, and predominantly viewed as a means to reduce costs and promote efficiency. Here we present a position paper based on the work and expertise of the European Commission Expert Panel on Effective ways of Investing in Health. It contends that this is over simplistic, and aims to provide a new task shifting framework, informed by relevant evidence, and a series of recommendations. While far from comprehensive, there is a growing body of evidence that certain tasks traditionally undertaken by one type of health worker can be undertaken by others (or machines), in some cases to a higher standard, thus challenging the persistence of rigid professional boundaries. Task shifting has the potential to contribute to health systems strengthening when accompanied by adequate planning, resources, education, training and transparency.

Introduction

One of the most difficult challenges facing those responsible for healthcare, at every level from the individual clinic to the system as a whole, is how to get the best results with the often limited number of health workers available to them. Almost every country faces shortages of health workers[1] and those they have are often poorly matched to health needs, both geographically and in terms of skill mix.[2] To add to the problem, those responsible for training, recruiting, deploying, and retaining health workers are aiming at a moving target as changing health needs, such as increasing numbers of frail older people with multimorbidity,[3] and changing opportunities to intervene, for example due to advances in technology or new approaches in care, such as 'goal-oriented care',[4] demand new skills and roles, and technology rendering some existing ones obsolete.

The process of matching skills to changing needs and opportunities is termed 'task shifting'. It involves questioning what health workers do, asking if it can be done in an improved way, and implementing change. This position paper summarises key findings from a report for the

European Commission[5] conducted by the European Commission Expert Panel on Effective ways of Investing in Health. It offers a new framework for thinking about task shifting and makes a series of recommendations based on a review of relevant evidence, drawn mainly on peer-reviewed literature (where possible from systematic reviews and set out in the original report), supplemented by the expert opinion of the working group. It is intended as a tool to aid those involved in planning, management, and regulation of the health workforce and related research to approach the concept of task shifting in their different roles, highlighting the complexity of the topic, providing examples of barriers and facilitators to appropriate task shifting and the role of governance and evaluation. While the paper is directed primarily at those working in high-resource settings, the evidence drawn upon came from high, middle and low-income settings and some of the main themes discussed (e.g. the need for patient participation and strong governance) will apply in all settings.

Task shifting: a new framework

In both the academic literature and in discourse on health service management, task shifting is often seen as a process of transferring responsibility for 'simple' tasks from highly-skilled but scarce health workers to individuals with less expertise and, correspondingly, less pay. It is primarily seen as a means to promote efficiency. We contend that this is over simplistic. First, there may be tasks that would be better performed by health workers with more skills, and higher pay, than at present. Second, the concept of a linear professional hierarchy is outdated and can undermine health care, with increasingly complex treatment being delivered by teams in which each member makes a distinctive contribution. Third, there is growing recognition of the value of patient empowerment, for example the idea of the "expert patient", in which individuals (or in some cases their carers) take on an increased responsibility for their management. Finally, technological advances offer growing possibilities to shift tasks from health professionals, and in some cases patients and their carers, to machines. These

considerations give rise to our framework (Figure 1), which goes beyond the traditional, more limited, focus on shifting tasks among different groups of health workers.

Drawing on earlier work by Sibbald et al.[6], we propose that each type of task shifting can involve three broad sets of changes to roles: *enhancement, substitution/delegation* and *innovation.* Enhancement involves expanding the depth and breadth of a role, which can be of a health worker or a patient or carer, with the acquisition of new skills and competencies. Substitution and delegation involve the transfer of responsibility of a task or role traditionally associated with one type of health worker to another or to a patient or carer. For example, many roles once reserved for physicians are now undertaken by nurses. Delegation implies a transfer to a 'lower' point in a hierarchy. Innovation involves the introduction of a new set of roles or tasks, for example following adoption of a new technology or a new diagnostic or therapeutic strategy (such as evidence-based medical guidelines allowing specialist nurses to take responsibility in chronic care for a variety of conditions), which sometimes involves creation of a new occupational group. For example, radiographers emerged following the discovery of x-rays. More recent examples include nurse specialists, phlebotomists, physicians' assistants and community health workers.

Task shifting can, at times, be a planned process, involving the formal definition of new roles, adoption of new training programmes, and a programme of implementation. More often, it is an incremental process. Thus, a task may be delegated to another health worker in response to staff shortages before being accepted as the norm.

There are many examples of how health workers responded to changing patterns of disease by adopting new, enhanced, roles, as happened with orthopaedic surgeons faced with a decline in spinal tuberculosis and paralytic polio and the opportunities offered by joint replacements. Given these circumstances, much task shifting remains unevaluated. This may not be a problem as, in many cases, it will be self-evident that a particular task can be done by someone else,

especially where it has traditionally been reserved for a particular profession because of financial incentives. Thus, even now, in some countries, nurses and pharmacists are prohibited from giving vaccinations.[7] There are also many areas where non-physicians have been shown to perform at least as well as physicians, and sometimes better, when processes can be standardized and when assessment considers measures of communication and patient satisfaction. Examples include pharmacists managing anticoagulant therapy,[8,9] expanded roles for midwives,[10] and in certain situations, prescribing by non-medical prescribers.[11] In other cases, especially where the tasks being shifted are more complex, more caution is needed. Thus, there is a growing body of evidence documenting the effectiveness of nurse-led clinics, with those managing uncomplicated chronic diseases often achieving better results than those conducted by physicians.[12] However, this is not the case where the conditions are severe or complex.[13] Some changes that seem intuitive, such as an enhanced role for ambulance workers, have produced mixed findings[14–16] and the most recent 2014 Cochrane review found no evidence in favour of advanced life support training for this group.[17]

While much of the existing research has asked whether one type of health worker gets results that are as good as, or better than, another, in some cases linked to a comparison of costs, it is also important to take a broader perspective, seeking, in particular, unintended consequences. Thus, viewed narrowly, delegation of tasks from nurses to less skilled workers such as healthcare or nursing assistants, may seem desirable on grounds of cost savings, but it may be associated with greater absenteeism or reduced ability to respond when problems arise. A growing body of evidence shows an association between more registered nurses and better patient outcomes in hospital care.[18–21]

It is also important to consider how the introduction of new occupational groups impacts on existing ones, as otherwise it may be difficult to achieve the optimal skill-mix required to ensure benefits are realised.[22]

Context matters. Occupational labels, such as 'nurse', may fail to capture the international diversity in skills and competencies. Legal and regulatory regimes also vary, as does the case-mix of patients treated in superficially similar settings and their expectations of those fulfilling particular roles.[23–31] Thus, research undertaken in one setting may not be applicable to another. Generalising research can be especially problematic when shifting tasks from health workers to patients and carers. In Europe, for example, analysis of Eurobarometer data found markedly different patterns of informal care, with four dominant "clusters" of countries, reflecting their funding of formal long-term care and traditional norms concerning who provides care, particularly in old age.[32]

While the role of the 'expert patient' is increasingly accepted in many health systems, the ability of a patient to assume this role may depend on what other support is available to them, especially if they are unable to work and at times when they are especially vulnerable, as when transitioning from adolescent to adult care systems.[33,34]

Finally, the aspect of task shifting where change is occurring most rapidly, at least in some health systems, is the transfer of tasks from humans to machines. Examples include automation of many activities undertaken in laboratories, initially involving autoanalyzers that generated a series of biochemical measurements but now extending to the use of artificial intelligence, for example to process cytology images or help interpret radiology images. Conversely, innovation can lead to highly skilled health workers taking over many time-consuming administrative roles, for example entering data that once would have been handled by secretaries and clerks. Similarly, patients are increasingly having to navigate online booking systems. Meanwhile, innovations such as wearable monitoring technology is generating a vast amount of additional data, which someone or something then has to process.[35] To be of use and have an impact, collected data must be analysed and done so correctly by those trained in handling this type of data.

The evidence: what can be shifted and between whom?

The evidence reviewed in the following sections is from a variety of sources. Where possible, systematic reviews were synthesised. In some areas, such as shifting tasks to machines, a rapidly changing field with great diversity, an iterative approach was adopted to identify studies that could act as exemplars of particular topics and issues. Table 1 lists the reviews used to inform each element of the framework.

Substitution from doctors to nurses

The transfer of tasks from doctors to nurses has been subject to considerable research, although mostly limited to a few countries. This likely reflects how these two groups are the archetypal health professions and how the medical profession has, historically, tended to guard its privileges. The studies do, however, vary in the methods used, the task(s) shifted, and outcomes assessed.

We begin with studies undertaken in primary care. While heterogeneity of outcome measures precluded data synthesis, a Cochrane review of 16 studies found that, in general, nurse-led care for both first contact and ongoing management of specific chronic conditions led to no appreciable differences in health outcomes, resource utilisation, or cost.[36] Of note, while it was concluded that nurses can deliver care that achieves comparable outcomes to primary care doctors, given appropriate training, most studies were under-powered and introduction of nurse-led care may not be cost saving as it addresses previously unmet need or generates additional demand.[36] Other areas where nurse-led care has been shown to be as good as or superior to that provided by physicians includes weaning patients from ventilation, where a systematic review of three studies found significant reductions in intensive care unit and

hospital stay and a non-significant reduction in the duration of mechanical ventilation.[37] Four studies found no difference in outcomes with nurse and physician-led care of obstructive sleep apnoea.[38] A Cochrane review, comprising two studies assessing accuracy of nurse-led preoperative assessment (historically assigned to doctors), found no evidence of difference in performance or cost.[39]

Enhancing the roles of nurses

The literature on enhancing the role of nurses is mixed and is likely context dependent. A Cochrane review of hospital nurse staffing models found no clear evidence of reduced mortality, emergency department attendances or readmission rates associated with addition of specialist nurses but length of stay and incidence of pressure ulcers was reduced.[40]

Reviews of nurse-led care for chronic renal disease,[41] cancer care,[42] and palliative care,[43] all found mixed results, both successful and unsuccessful, varying among outcome measures (e.g. overall health outcomes, quality of life, disease progression, costs). Several other reviews explore enhanced nursing roles in rehabilitation post cardiac surgery, intensive care, and management of heart failure.[44–47] Again, results vary. One systematic review explicitly examined the quality of economic analyses of implementing clinical nurse specialists and nurse practitioners in inpatient care but found that they were generally poor.[48]

Enhancing the roles of pharmacists

A combination of expansion of the pharmacological armamentarium and increasing prevalence of multimorbidity has increased the complexity of treatment for many patients, increasing the risk of side effects and interactions. The role of pharmacists has also changed with mass production of medicines absolving them of responsibility for compounding bespoke products. Instead, in many countries they are adopting an enhanced role in medicines management. While many aspects of this process go beyond the scope of this paper, systematic reviews of

studies evaluating the impacts of enhanced roles for pharmacists within the clinical team have generally found that pharmacists engaged in medicines management achieve better results than when it is done by physicians, often within a rushed consultation.[49–56] This is also found in the more specialised area of paediatric care, with improved understanding of medications, adherence, patient satisfaction, and disease control.[57]

Substitution in prescribing

A Cochrane review of 46 studies of prescribing by non-doctors in primary and secondary care concluded that, in certain settings, non-medical prescribers, practising with varying but generally high levels of prescribing autonomy, often supported by protocols, were as effective as care delivered by medical prescribers.[58] This conclusion was supported by another systematic review of three randomised control trials in two countries.[59]

Innovation in models of care and other forms of task shifting

New models of care can include shifting of tasks between professionals or teams. While this may take many forms, prominent examples include, multidisciplinary lung cancer teams, where a review finds a paucity of evidence,[60] fracture liaison services, where better care was associated with multidisciplinary involvement, an assigned case manager, multifaceted interventions, and regular assessment and follow-up,[61] and vascular access teams, where there is a lack of evidence of improved clinical outcomes or patient experience.[62]

Further studies have explored the impacts of task shifting in the context of maternal and child health and communicable and non-communicable diseases,[63] initiation and maintenance of anti-retroviral therapy,[64] and management of musculoskeletal presentations in primary care.[65] While these studies generally found little difference when care was delivered by a worker other than a doctor, research on management of HIV in Africa suggested a small

increase in risk of death, but where care was initiated by doctors, with nurses preforming follow-up, there were no differences in follow-up or survival.[64]

While the evidence base is far from comprehensive, both in scope of practice and range of settings, there is a growing body of evidence that certain tasks traditionally undertaken by physicians can be undertaken by others, in some cases leading to a higher standard, thus challenging the persistence of inflexible professional demarcations.

Task shifting to patients

The concept of self-management has evolved over time, as illustrated by experience with chronic obstructive pulmonary disease.[66] Patients were once seen as passive recipients of information,[67] giving rise to models of care that conferred little value,[68] with emphasis now placed on the patient's viewpoint, linked to patient empowerment and skills development. Yet while there are many reasons, for example based on principles of agency and autonomy, to welcome these developments, the evidence that they improve outcomes is actually quite limited. While self-management does appear to be associated with improved quality of life for patients with stroke[69] and COPD (although self-management of exacerbations may be associated with greater respiratory mortality),[70] other studies offer only weak support for self-management of chronic diseases overall on grounds of improved outcomes. This seems to reflect limitations of many of the studies but also failure to address some key issues.[66,67,78,79,68,71–77] Similarly, while it seems intuitive that the enormous expansion in technology, such as apps on smartphones, to support self-management would be beneficial, again the evidence is decidedly limited.[72,80,81] There are some areas where it has been shown to be helpful, such as control of oral anti-coagulation,[82] this does not seem to be the case with others, such as pulse oximetry,[83] at least with existing technology and user skills.

Task shifting to community health workers

In low- and middle-income countries community health workers provide a range of preventive interventions, especially in maternal and child health. However, while a systematic review found some evidence to support their role in delivering specific services such as psychosocial support and breastfeeding, insufficient evidence exists in most cases.[84] Earlier reviews support early childhood psychosocial interventions delivered by community workers to families living in poverty, including for underweight and undernourished babies, in low-, middle and high-income countries.[85–87] In high-come countries there is evidence that they can play an important role but they are often under-utilised, with roles that are often unregulated and unrecognised, pointing to a need to strengthen their training and integrate them more effectively into the health and social care systems.[88]

Patient navigators represent an innovation intended to help patients with complex chronic conditions in their journey through the health system. Again, it seems intuitive that this will be beneficial but rigorous evidence of effectiveness and cost-effectiveness is lacking.[89]

Another innovation, in countries with severe shortages of health workers, is the deployment of community health volunteers to undertake basic tasks. A recent umbrella review found that, in general, they deliver services that are not inferior to, and at times better than, those provided by other health workers. However, this finding did not extend to more complex clinical tasks (e.g. diagnosis and counselling), while reports emphasise the need for ongoing training, supervision, and logistical backup to support and enhance their roles.[90] Importantly, a lack of evidence of benefit may be a reflection of poor or inappropriate study design and not necessarily that the intervention is ineffective.

Task shifting to machines

Technological advances, for example in the areas of automation and robotics, are fuelling radical changes in the manufacturing and services industries.[91,92] While on a less profound

scale, perhaps due to the unique nature of the health professional-patient relationship, task shifting to machines continues to grow in healthcare. Given the pace of change and the diversity of applications, it is not possible to explore this topic in great detail, but some key issues can be identified.

While the rise of smart phone use and app development have promoted interest in their potential use in management of physical and mental health problems, there is surprisingly little evidence demonstrating clear benefits. Many apps go unevaluated and concerns have been raised about the evaluations that have been performed, especially in relation to conflict of interest.[93–95]

Particular attention has focused on the potential of wearable and other forms of continuous monitoring devices,[96] with a large trial currently underway investigating the role of the Apple Watch.[97] However, the evidence so far is mixed, while there is growing concern about the many ethical and governance issues that arise, particularly regarding privacy, discrimination, and ownership of data.[98–100]

There is also growing interest in the use of artificial intelligence (AI) in supporting (or performing) diagnosis.[101,102] As with many of the developments discussed in this paper, achieving a delicate balance between optimising the benefits of using AI while mitigating the harms poses a major challenge, with growing recognition of the potential for what is now referred to as "e-iatrogenesis", defined as "patient harm caused at least in part by the application of health information technology".[103] A recent review identified a series of problems, such as the presence of computer-generated annotations on medical imaging negatively influencing the clinical judgments of those with limited knowledge and training in the correct clinical use of such annotations.[104] While there may be some scope for using algorithms is simple settings with established cut-offs between normal and abnormal, use in more complicated and nuanced settings that rely on dialogue and experienced judgments remains questionable. High level political support for one particular app, promoted as an aid to

self-diagnosis in the UK, has generated particular concern.[105] Other concerns have been voiced about the risk of leaving the health sector vulnerable to cyberattack, including algorithm manipulation by external agencies.[106,107] All of these issues demonstrate the need to scrutinise the evidence-base and governance of health technologies and ensure adequate training for those tasked with using them.

Recommendations from the European Commission Expert Panel on Effective ways of Investing in Health

If health systems are to make best use of the scarce resources available to them, flexibility in the role and responsibilities of health professionals is key. What tasks to shift and between whom should be guided by local reviews of context, resources and need. While the evidence suggests that many tasks can be undertaken effectively by health workers other than those who may have traditionally done them, it is also clear that diversity in expectations, health system design, and regulation of professions mean that what is possible, and has been found to work in one setting will not necessarily be appropriate or successful in another. We therefore propose (1) a range of considerations to help in deciding if tasks *can* or *should* be shifted, and (2) a set of recommendations on ways to facilitate this process.

A first consideration is the need to achieve clarity about why task shifting is being considered. This may be to improve clinical effectiveness, save costs, or circumvent staff shortages, for example. However, irrespective of the rationale, it should be made explicit. Top down initiatives driven by narrow goals of reducing staffing and costs by delegating to lower skilled or unpaid workers, patients and carers, or machines, are unlikely to achieve buy-in by those affected. A second consideration is the importance of careful preparation, taking into account the ability of the worker(s) assigned the new task to complete it effectively and safely and whether additional training is required. This should be based on an objective assessment of the

situation and not merely assumptions based on what is taken for granted. A third consideration is whether there are potential legal or regulatory barriers to the shifting of tasks, asking whether they should or can be changed. A fourth consideration is whether existing payment systems act as a barrier, for example if payers will only reimburse certain procedures if they are undertaken by specific health workers. Finally, a systems perspective is important as it allows wider considerations to be taken into account. For example, task shifting may change the level of interest in, and demand for, entry into and retention in certain professions. This will have implications for educational institutions and the wider health system, in the short and long term. These considerations lead to the following recommendations.

Governance

While there may be many reasons for shifting certain tasks between health workers, patients, carers, and machines, in all instances there should be transparency around the objective being pursued, the rationale for choosing task shifting as a means to meet this objective, and the evidence used to inform such decisions. All those impacted upon should be given opportunities to participate and voice their concerns. Task shifting requires careful planning and consideration of all potential implications and outcomes (both directly for the individuals concerned and indirectly for the wider health system). Potential outcomes should be anticipated and shared, and actions taken to mitigate against potential adverse effects and to react quickly to unintended negative effects which were not anticipated. Transparency and participation are likely to support acceptance by those impacted by change. Health workers taking on new tasks should receive adequate remuneration for increased workloads and responsibilities, details of which should also be made explicit. There should be clear lines of accountability when undertaking such assessments and responding when barriers are identified or negative consequences arise.

Research and evaluation

The evidence-base for task shifting remains limited in scope, with many areas, particularly the distribution of costs and benefits being under-explored. Research should ideally take a systems approach, recognising the scope for wider and potentially unforeseen consequences. There is a particular scarcity of high-quality economic analyses, although a challenge is that they are especially likely to be context dependent. There is a need for a prioritised research agenda, including methodological work on outcome measures, and emphasising the importance of studies in areas, both geographical and topic-based, that are under-researched. In expanding beyond existing settings, it will be important to include means of determining critical factors for success and failure to inform knowledge of what works in what circumstances. Evaluation should ideally take place before, during and after task shifting is implemented. As part of this process, those responsible for implementation should engage in dialogue to understand the expectations and concerns of those who will be affected by it, including patients and their carers.

Education and training

To be most effective, those involved with planning and undertaking task shifting need to understand the rationale and evidence-base for doing it. Health professionals are overwhelmingly committed to providing high quality care to their patients and there is often willingness to adopt new ways of working when there is a strong belief that it will improve patient care, provided that existing structures and processes do not pose insurmountable barriers. Appropriate training is needed at all stages in training health workers to (1) give them both the general and specific technical skills necessary to undertake new tasks, (2) share the evidence-base on task shifting and how it can improve the quality of care, and (3) foster positive attitudes towards adopting flexible role boundaries, and demonstrate the benefits of doing so. Those responsible for training health workers should therefore strive to promote the value of interprofessional and team working and ensure trainees have sufficient high quality

interprofessional learning experiences. Similarly, trainers will themselves require adequate support and skills to adapt and deliver novel curricula. When task shifting to patients and their carers is deemed safe and beneficial, those planning and executing the process should ensure that those taking on new tasks and roles have adequate training and skills to do so, and that they are empowered to engage with professionals in the design of their new care plans.

Legal and regulatory frameworks

Regulation of health professions should include sufficient flexibility to allow them to assume different roles in the face of evolving needs and circumstances, for example, unforeseen staff shortages. Some professional bodies promote restrictive practices, especially when faced with unhelpful financial incentives (for example, provider fee-for-service payments), but others have recognised that they have a crucial role in promoting novel ways of working, recognising that many tasks can be performed equally well by different healthcare professionals. Effective task shifting is only possible if the regulatory and legal frameworks underpinning the health system are supportive. Failure to anticipate potential legal or regulatory barriers to shifting of tasks between professionals or between professionals and patients and their carers can hinder implementation or at worse lead to creation of illegal or unsafe practice. However, such barriers can often be anticipated and mitigated, although in some cases it may be necessary to advocate for legislative change.

Conclusions

High quality healthcare is necessary if societies are to meet the health needs of current and future populations equitably and efficiently. Tasking shifting has the potential to contribute to health systems strengthening but it should not be seen as a panacea to the problems faced by health services. Task shifting should be evidence-based, and undertaken with adequate planning, resources, and transparency, with participation by those affected and supported by

appropriate training. When viewed as a skill that must be mastered, task shifting can be an important part of building effective, efficient and sustainable health systems.

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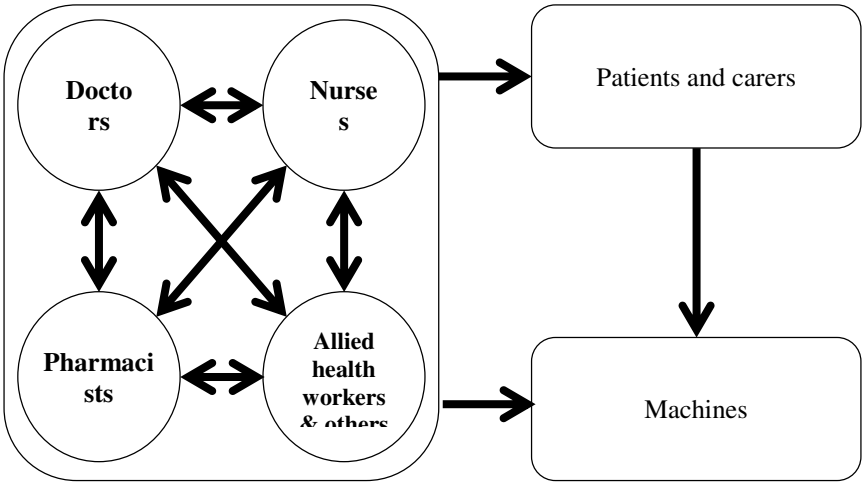
Figure 1: A framework for task shifting in health care



Considerations to help in deciding if tasks ***can*** or ***should*** be shifted:

1. Clarity **why** task shifting is being considered - it should be made **explicit**.
2. Careful **preparation**: consider the ability of the worker(s) assigned the new task to complete it effectively and safely. Is training required?
3. Are there potential legal or regulatory **barriers** to the shifting of tasks? Should or can

Source: The authors

Table 1: Selected reviews of task shifting by framework element

What can be shifted and between whom?

Substitution from doctors to nurses

Laurant M, Reeves D, Hermens R, Braspenning J, Grol R, Sibbald B. Substitution of doctors by nurses in primary care. Cochrane Database Syst Rev 2005:CD001271. doi:10.1002/14651858.CD001271.pub2.

Hirzallah FM, Alkaissi A, do Céu Barbieri- Figueiredo M. A systematic review of nurse- led weaning protocol for mechanically ventilated adult patients. Nurs Crit Care 2019;24:89–96. doi:10.1111/nicc.12404.

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Enhancing the roles of nurses

Butler M, Collins R, Drennan J, Halligan P, O'Mathúna DP, Schultz TJ, et al. Hospital nurse staffing models and patient and staff-related outcomes. Cochrane Database Syst Rev 2011:CD007019. doi:10.1002/14651858.CD007019.pub2.

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Enhancing the roles of pharmacists

De Oliveira GS, Castro-Alves LJ, Kendall MC, McCarthy R. Effectiveness of Pharmacist Intervention to Reduce Medication Errors and Health-Care Resources Utilization After Transitions of Care. J Patient Saf 2017:1. doi:10.1097/PTS.0000000000000283.

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