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3 Expert Panel on effective ways of investing in Health

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5 (EXPH)

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Opinion on
Task shifting and health system design

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The EXPH adopted this opinion at its XXth plenary on XX Month 2019

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after a public hearing on 5th June 2019

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27 About the Expert Panel on effective ways of investing in Health (EXPH)

28 Sound and timely scientific advice is an essential requirement for the Commission to
29 pursue modern, responsive and sustainable health systems. To this end, the Commission
30 has set up a multidisciplinary and independent Expert Panel which provides advice on
31 effective ways of investing in health ([Commission Decision 2012/C 198/06](#)).

32 The core element of the Expert Panel's mission is to provide the Commission with sound
33 and independent advice in the form of opinions in response to questions (mandates)
34 submitted by the Commission on matters related to health care modernisation,
35 responsiveness, and sustainability. The advice does not bind the Commission.

36 The areas of competence of the Expert Panel include, and are not limited to, primary
37 care, hospital care, pharmaceuticals, research and development, prevention and
38 promotion, links with the social protection sector, cross-border issues, system financing,
39 information systems and patient registers, health inequalities, etc.

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The opinions of the Expert Panel present the views of the independent scientists who are members of the Expert Panel. They do not necessarily reflect the views of the European Commission nor its services. The opinions are published by the European Union in their original language only.

53

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55
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57 opinion.

58

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75 The declarations of the Working Group members are available at:

76 https://ec.europa.eu/health/expert_panel/wg-task-shifting-healthcare-systems_en

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81

82 **ABSTRACT**

83

84 Imagine a health professional in any European country who fell asleep in 1960 and
85 awoke in a health facility in 2019. Much of what the observer saw would be quite
86 different. There would be many more patients who were surviving into old age thanks to
87 advances in therapy. Many of the treatments that they were receiving would be much
88 more complex, involving radically new techniques such as laparoscopic or even robotic
89 surgery, and they would be amazed by the advances in diagnostic capacity. Yet, in many
90 health systems, some things would have changed very little. Among them would be the
91 traditional roles of different types of health worker, with responsibility for certain task
92 being reserved for those with particular qualifications based on custom and practice
93 rather than on evidence.

94 This opinion argues that this situation must change. There is now an impressive body of
95 evidence that things can often be done differently. This does not mean that they should
96 be. Change is only appropriate where it helps to achieve the goals of the health system,
97 of providing better care in ways that are more responsive to the needs of users. But too
98 often, health systems feel to do so.

99 Tasks can be shifted from health workers to patients and their carers, to machines, and
100 to other health workers. Where these shifts have been evaluated, they often, but not
101 always, are associated with outcomes that are as good or even better than with the
102 status quo. However, the results are often context dependent, and it cannot be assumed
103 that what works in one situation will apply equally to another. What matters is the
104 evidence, rather than traditional, but often obsolete rules.

105 If a health system can ensure that tasks are being undertaken by those most appropriate
106 to do them, it will enhance patient care. However, change is often difficult. Those
107 involved must be convinced of the rationale for change and must be supported in
108 implementing it. This should recognise that any change in roles will have implication for
109 their status and thus existing hierarchies. It may also be necessary to challenge outdated
110 legislative or regulatory barriers.

111 Finally, it is essential the changes are evaluated, results are documented, and lessons
112 are learned, both in relation to what works and in what circumstances.

113 Task shifting, where it is based on robust evidence and implemented effectively, can
114 make a major contribution to health outcomes and to the sustainability of health
115 systems. It is not, however, a panacea for all of the challenges health systems face.

116

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190 **EXECUTIVE SUMMARY**

191
192 Health systems, those who design, fund and manage them, those who use and work
193 within them, and those who train the professionals on which the running of the system
194 depends, are all faced with the growing challenge of functioning efficiently and effectively
195 to meet present need and prepare for future need. They are required to achieve this
196 within the context of established norms and practices, guided by varying forms and
197 sources of evidence. In this context it is evident that health systems and their workforce
198 skills and composition need to be dynamic, resilient, and evidence-based to maximise
199 impact using the resources at hand while minimising waste and harm within ever
200 evolving environments. Many of these changes involve a fundamental reappraisal of who
201 does what within the health system and leads to questions of what is the optimal skills
202 and staff mix and who should be doing what, in what circumstances and context? This is
203 the issue that the Expert Panel aimed to examine: in these changing circumstances, who
204 within health systems should do what?

205 The question that has been asked relates to what has been termed task shifting. Task
206 shifting can be seen as way of strengthening health system resilience, efficacy and
207 effectiveness as well as patient experience and autonomy. While much of the focus has
208 been on task shifting in the context of low and middle income countries in which there
209 are markedly limited resources and few qualified health professionals, we have taken a
210 broader and more nuanced approach to conceptualising task shifting. We ask whether
211 the division of labour, as is currently organised, is appropriate. Are there tasks being
212 done by one type of health worker that would, more appropriately, be done by another?
213 However, our analysis goes further, asking whether there are tasks reserved for qualified
214 health workers that, more appropriately, might be undertaken by patients and carers?
215 And, given advances in technology, are there tasks currently being performed by health
216 workers that would more appropriately be undertaken by machines? We also view task
217 shifting as a bidirectional phenomenon. If change is required in the existing allocation of
218 tasks, the optimal change may not translate to delegating responsibility downwards.
219 Instead, the task may actually require someone with a higher level of skills than at
220 present for change to realise the desired benefits.

221 Thus, the premise for the opinion is that what matters is what model of care achieves the
222 best results and outcomes, given the available workforce and the following points in turn
223 guided the analysis:

- 224 1. How to identify and characterize “tasks” suitable for a “task shifting” process?

- 225 2. What are the main enabling conditions and difficulties/risks that have to be taken
226 into account when defining “task-shifting” measures as part of a health system
227 reforms?
228 3. How to measure the impact of “task shifting” in contributing to the effectiveness
229 of the health system using an evaluation framework to inform decision-making?

230 There are at least four reasons why it is timely to consider task shifting within health
231 systems; (1) task shifting has the potential to contribute to the *sustainability of the*
232 *health workforce*, (2) it can contribute to the *financial sustainability* of health system as
233 well as *social sustainability*, (the maintenance of a health system trusted and utilised by
234 communities), (3) task shifting can be a means to improve *quality* of care, and (4) task
235 shifting can enhance the *resilience* of the health system, especially where different
236 professional groups can substitute for one another in emergency settings. However, to
237 realise these potential benefits, action must be informed by the evidence and be guided
238 by clear and defined goals to enhance health systems functioning and ultimately patient
239 and population outcomes. We therefore sought to synthesise the evidence on task
240 shifting, its drivers and barriers, to better inform discussion on the role of task shifting in
241 meeting health systems challenges in Europe.

242 We propose that task shifting can be categorised within the following taxonomy:
243 enhancement, substitution/delegation and innovation. Building upon this, and guided by
244 the literature, we identify multiple forms of task shifting. For example, tasks can be
245 shifted from health workers to patients and their carers, to machines, and to other health
246 workers. The evidence for each of these categories and forms varies, for example, in
247 methods used, outcomes measured and contexts. The available evidence is much less
248 than would be desired but it does show that many of the tasks once reserved for
249 particular groups can be undertaken as effectively, or more so, by others, but each case
250 should be assessed on its merits. Importantly, there is little evidence for the rigid
251 demarcation between different health professionals, such as doctors and nurses, that
252 exists in many countries. It is clear that groups other than physicians, and especially
253 nurses and pharmacists, can undertake substantially expanded roles compared to what
254 has traditionally been the case. However, they require adequate training and support
255 within in integrated teams and open approaches to information-sharing. There is limited
256 understanding of the optimal combination or “package” of changes and additions that can
257 act synergistically to improve the quality and safety of healthcare as well as patient
258 experience. While it is not necessary nor feasible to evaluate every change, there is a
259 strong argument for doing so where major changes are taking place, as there are real
260 and perceived risks of unintended consequences. This should not, however, be an
261 argument for inaction.

262 Understanding of the drivers, enablers, and barriers of successful implementation and
263 trialling of task shifting as well as complementary policy and working environments is
264 critical to the adoption of effective and safe changes. Multiple drivers are likely to co-
265 exist and change depending on policy and health system environments as well as
266 population and service contexts. The drivers of change may be diverse, with the analysis
267 identifying desire to improve patient experiences and clinical outcomes, optimise
268 resource use and availability, address increasing and changing patient need, and
269 maximise cost effectiveness, among others, as potential incentives to task shifting.
270 Country-level analyses provide insight into what is known about enablers and barriers to
271 successful task shifting. Such analyses reveal a broad range of factors that have the
272 potential to enhance or hinder task shifting, ranging from legal, cultural and financial
273 factors to staff shortages and the use of pilot projects. It is likely that at any given point
274 in time, multiple factors are influencing the adoption of task shifting and may be related
275 to the health care worker, human factors, and organisational factors.

276 Base on the evidence reviewed, the panel supports the view that European health
277 systems must embrace flexibility in professional roles, including task shifting, if they are
278 to respond to changing circumstances and maximise health gains. Crucially, task shifting
279 should not be viewed in isolation but seen in the wider context of the health system. A
280 change in roles will likely have wide ranging consequences, challenging traditional
281 hierarchies and professional norms. Although, many barriers to change are likely to exist,
282 including unsupportive and rigid attitudes, legislative, regulatory and financial
283 constraints, if carefully managed, these can often be overcome. Sometimes, this may be
284 as simple as optimising and formalising what already practiced, albeit informally,
285 whereas, in other circumstances, it requires wide system redesign.

286 While explicit protocols of which tasks, and to whom, should be shifted are inappropriate,
287 the evidence reviewed demonstrates that many tasks traditionally been done by one type
288 of health worker, can be performed as well or even better by others. We also show that
289 because something works in one context does not mean that it will necessarily be
290 beneficial in another, given the diversity in health systems, public and professional
291 expectations, and regulation of professions. Consequently, we do not prescribe any
292 formal constraints on what tasks can be shifted but argue that whether they can or
293 should be will be dependent upon a range of circumstances: (1) is there a case for
294 shifting the task and will it contribute to meeting health system goals, (2) does the
295 individual taking on the new task have the skills and expertise necessary or can they
296 acquire them with appropriate training, (3) are there any legal or regulatory barriers to
297 shifting the task that can be changed, and (4) what are the consequences for the
298 working of the organisation and will these require adoption of new organisational models,
299 including where necessary changes in the status of the health workers involved.

300 Following these considerations, it is recommended that, when undertaking task shifting,
301 the objective being pursued is clear, the rationale for selecting task shifting as a means
302 to achieve that objective explained, and the evidence on which the decision is based
303 presented. Task shifting should be planned carefully, taking full account of the
304 implications both for the individuals concerned and for the wider health sector. Those
305 responsible for implementing task shifting should also actively engage in dialogue with
306 those who will be affected by it, including patients and their carers where appropriate, to
307 understand expectations and fears. Importantly, task shifting to patients and their carers
308 should be guided by their goals, expectations, and capacities, while ensuring that they
309 are empowered to co-design their care packages and that these are subject to ongoing
310 monitoring and evaluation. There should also be increased investment in research on
311 task shifting, aiming to increase studies from settings that are under-represented and
312 build understanding of the contextual factors that determine what works and in what
313 circumstances.

314 More broadly, to support the creation of environments and systems that support effective
315 and efficient task shifting and oversight, health worker training should foster positive
316 attitudes to interprofessional and team working, and provide opportunities for
317 interprofessional learning experiences and development of specific skills necessary for
318 evidence-based task shifting. Health systems and legislative and regulatory systems
319 should be evaluated to assess the extent to which they support or place unjustifiable
320 barriers in the way of more flexible ways of working, and, where appropriate and
321 necessary, action taken to address barriers, taking account of the growing body of
322 evidence on the potential benefits of task shifting in particular contexts.

323

324
325

326 **1. BACKGROUND**

327 Health systems must adapt to constant change in the causes of ill-health in the
328 population, technological advances in the ability to respond to the changing disease
329 burden, and evolving evidence on the optimal models of providing care, including
330 changes in professional roles, in increasingly complex circumstances. Many of these
331 changes involve a fundamental reappraisal of who does what within the health system.
332 The argument that this is the way that something has always been done is no longer
333 sustainable. This is the issue that the Expert Panel has been asked to examine. In these
334 changing circumstances, who within health systems should do what?

335 The question that has been asked relates to what has been termed task shifting. We
336 have, however, taken a somewhat different approach from that which dominates the
337 literature on this topic, much of which comes from resource constrained low income
338 settings. That literature often takes as its starting point a situation in which qualified
339 health workers are few in number and asks whether the pressure is upon them can be
340 alleviated by shifting some of the less complex tasks to others with lower levels of
341 training and, in many cases, who receive lower pay. This is, of course, one of the ways in
342 which tasks undertaken within the health system can be shifted. However, in this
343 opinion, which while drawing on experience globally, focuses on the situation in Europe,
344 takes a more nuanced approach.

345 As with much of the literature, it asks whether the division of labour, as is currently
346 organised, is appropriate. Are there tasks being done by one type of health worker that
347 would, more appropriately, be done by another? However, it goes further, asking
348 whether there are tasks reserved for qualified health workers that, more appropriately,
349 might be undertaken by patients and their carers? And, given advances in technology,
350 are there tasks now being done by health workers that would more appropriately be
351 undertaken by machines?

352 It also differs from some of the existing literature by viewing task shifting as a
353 bidirectional phenomenon. If change is required in the existing allocation of tasks, it may
354 not necessarily follow that this should involve delegating responsibility downwards. In
355 some cases, the task may actually require someone with a higher level of skills than at
356 present.

357 Our opinion sees health systems as complex adaptive systems. Any changes will have
358 consequences, some of which can be anticipated and some of which are unpredictable.
359 Changing someone's responsibilities is likely to lead to a change in their status and their
360 expectations, something that can challenge traditional hierarchies. It is unreasonable to
361 make one important change but expect everything else to remain the same.

362 Yet while the changing nature of healthcare demands changes to the way in which health
363 workers exercise the responsibility, we should not seek to implement change for change's
364 sake. We start from the premise that change should only be implemented where there is
365 a rationale for doing so. The goals of a health system are to promote health, to respond
366 to the legitimate expectations of users, and to achieve financial protection. It must do so
367 within available resources, and in particular, the existing health workforce. Our position is
368 that task shifting should be undertaken in pursuit of these goals. Thus, what matters is
369 what model of care achieves the best results, given the available workforce. Crucially,
370 the availability of health workers is important not just that the overall level of the health
371 system, but at the moment in time when patient care is being delivered. Consequently,
372 we see task shifting as including an element of flexibility, whereby those with different
373 professional qualifications can substitute for one another, when required.

374 The structure of our opinion is as follows. The next section sets out the terms of
375 reference, as given to the Expert Panel. This is followed by an elaboration of the concepts
376 underpinning our approach and by an exploration of the issues that have placed task
377 shifting on the health policy agenda, thereby setting out why it is important to examine
378 this issue now. The following section reviews the different types of task shifting. This is
379 followed by a series of reviews of the evidence on different types of task shifting, from
380 health workers to patients and community workers, to machines, and to different types
381 of health worker. It then examines the factors that either enable task shifting or act as a
382 barrier. It continues with a review of experience on task shifting and a discussion of how
383 its impact might be evaluated, before setting out a series of recommendations.

384

385 **2. TERMS OF REFERENCE**

386 Taking into account the ongoing work by the European Observatory on health systems
387 and other sources of reported examples / existing studies / analysis, the Expert Panel is
388 requested to provide its analysis on the following points:

389

390 (a) How to identify and characterize “tasks” suitable for a “task shifting” process?

391 (b) What are the main enabling conditions and difficulties/risks that have to be taken
392 into account when defining “task-shifting” measures as part of a health system
393 reforms?

394 (c) How to measure the impact of “task shifting” in contributing to the effectiveness
395 of the health system using an evaluation framework to inform decision-making?

396

DRAFT

397 **3. OPINION**

398 **3.1. What is task-shifting?**

399 Task shifting was defined by the World Health Organization (WHO), over a decade ago,
400 as “the rational re-distribution of tasks among health workforce teams”.(1) This has the
401 merit of simplicity, while implying, with the word “rational”, that it should result in the
402 task being allocated to the most appropriate person. However, the WHO goes on to
403 qualify this, saying that “specific tasks are moved, where appropriate, from highly
404 qualified health workers to health workers who have fewer qualifications in order to make
405 more efficient use of the available HRH [human resources for health]”. This assumes that
406 the most appropriate person is either the one that is already doing it or one with fewer
407 skills and, again implied, who is less expensive. It may also suggest a level of
408 permanence to the “task shifting” as opposed to an opportunity that can be utilised when
409 appropriate and needed, which may be related to monetary costs or the availability of
410 resources. The Panel considers that this is unduly limited, given that a task may be
411 undertaken more appropriately by someone at the same level, in terms of employment
412 grade or salary, but with different and more appropriate skills, or even by someone at a
413 higher employment grade. Thus, there is growing evidence that reductions in qualified
414 nursing staff in several countries, with accompanying delegation to less expensive
415 nursing or health care assistants, is associated with lower quality care.(2) Thus, one
416 study conducted in six European countries found that substituting one nurse assistant for
417 a qualified nurse for every 25 patients was associated with a 21% increase in the odds of
418 dying.(3) Thus, in this opinion, we have adopted the first part of the WHO definition,
419 whereby the goal of task shifting is the rational distribution of tasks. It would not, in our
420 view, be rational for a highly skilled, and thus, in most circumstances, better paid health
421 worker to be undertaking tasks regularly that could equally well be undertaken by
422 someone less skilled, although the importance of flexibility within teams, especially at
423 times of high intensity workload, argues against rigid demarcation rules, but it is
424 important that task shifting should not be seen as purely a process of delegation. Hence,
425 while the mandate for this opinion refers to task shifting, it follows that the opinion must
426 also consider *task distribution*, involving the development of an overview of who does
427 what, without any implied imperative to change it, *task sharing* and *competency*
428 *sharing*,(4) which recognise that responsibilities are often shared between different
429 professional groups and with the patient and, in some cases their families. It must also
430 consider task shifting that is *horizontal*, where roles are exchanged between those with
431 similar status. This may arise where a particular technology is developed with a new
432 application. For example, advances in endovascular procedures mean that different
433 medical specialties have developed responsibility for the management of major

434 haemorrhage. Another example is the increased use of angioplasty to replace the more
435 invasive coronary artery bypass, which involves a shift in tasks from cardiothoracic
436 surgeons to interventional cardiologists. This is in addition to *vertical* task shifting, which
437 involves the transfer of responsibility for a task up or down a hierarchy. Task shifting
438 may also occur in response to the introduction of *new/novel* approaches to diagnosis and
439 management, for example the role of psychologists and social workers in the care for
440 common mental health issues.

441 The Panel favours a broad perspective in defining task shifting. The emphasis has
442 traditionally been on tasks related to delivery of care and medical professionals.
443 However, within a health care system, other tasks can also be shifted. For instance,
444 responsibility for organization, procurement, and financing of specific types of care (such
445 as long term care, social care or health promotion) can be shifted from central
446 governments to regional authorities or municipalities. Insurance tasks can be shifted
447 between public and private bodies. Such forms of task shifting can have major
448 implications for the performance of health care systems and deciding who is best
449 equipped to perform these tasks is not straightforward. Here, however, the focus will be
450 on task shifting in relation to health care delivery.

451 This opinion complements a related publication being developed on skill mix in the health
452 system by the European Observatory on Health Systems and Policies.

453 **3.2. Task shifting then, now, and in the future**

454 **3.2.1. Factors driving change**

455 The roles of health workers have changed continually throughout history.(5, 6) Once,
456 surgeons were evaluated by speed with which they could perform amputations on the
457 battlefield. Now, they perform intricate procedures akin to those of the watchmaker,
458 aided by microscopes, endoscopes, and robotic instruments. Physicians were judged by
459 their ability to provide reassurance while the patient, hopefully, recovered spontaneously,
460 sometimes accompanied by remedies with a similar evidence base to that employed by
461 the alchemists among whom they lived. Now, they target therapy to the individual
462 receptors of the cells whose dysfunction is causing the disease they are treating. Nurses,
463 once seen as the handmaidens of physicians, have become professionals in their own
464 right, trained to have a comprehensive understanding of the many physical,
465 psychological, and other needs of their patients, with some acquiring highly specialised
466 skills in areas such as neonatal and intensive care, counselling, and care for patients with
467 chronic, and often multiple, conditions. At the same time, a constellation of new
468 professional roles has emerged, such as electrophysiologists, ultrasound technicians,
469 information technology specialists, and many others.

470 In looking to the future it is first necessary to reflect on how task shifting has come about
471 in the past. Historically, changing roles in the skill mix and the distribution of tasks have
472 been driven by at least five factors, the changing pattern of disease, technological
473 advances, professional norms, including attitudes to hierarchies, shortages of health
474 workers, and the drive for increased efficiency and cost effectiveness. We now look at
475 each in turn, reflecting on their importance in the past and their contemporary and future
476 relevance.

477 The greatest change in the *pattern of disease* since the emergence of modern scientific
478 medicine has been the epidemiological transition,⁽⁷⁾ characterised by a decline in
479 infectious disease and a growth in chronic non-communicable disease (although the
480 threat from infections, and especially antimicrobial resistance, has never disappeared).
481 These changes have had profound implications for the practice of medicine.⁽⁶⁾ The first
482 surgeons to operate within the thoracic cavity specialised in treating the cavities caused
483 by tuberculosis or relieving the stenosis of mitral valves damaged by rheumatic fever.
484 Yet, they were developing their new skills, however crude, at a time when the problems
485 they were responding to were already on the wane, thanks to a combination of improved
486 living conditions and new treatments, such as streptomycin and penicillin. However, just
487 as some diseases were disappearing, others were appearing. Some thoracic surgeons
488 shifted their attention to the growing burden of smoking-related lung cancer while others
489 moved from rheumatic heart valves to diseased coronary arteries. Yet even these were
490 only temporary respites, as the epidemics of lung cancer and ischaemic heart disease
491 peaked and then declined, causing some to retrain with the skills required to conduct
492 heart and lung transplants. Similarly, the orthopaedic surgeons of the 1950s, faced with
493 a decline in the need for spinal surgery for tuberculosis or tendon transplants for polio
494 developed new skills in joint replacement. More recently, the emergence of HIV/AIDs
495 gave rise to an entirely new medical speciality; the development of medicines to suppress
496 HIV is now bringing about further changes as the long-term consequences of this disease
497 and its treatment for multiple organ systems becomes apparent.

498 Enhanced survival of people with other diseases has also led to changes in professional
499 roles. New types of safe and effective treatment have allowed many more people to
500 survive into old age, often living active and fulfilling lives. However, a growing number
501 experience multi-morbidity, where a number of conditions coincide, sometimes with the
502 complicating factors of renal, hepatic, or cognitive decline.⁽⁸⁾ This also requires new
503 skills, with health workers who have the ability to assess and manage all of the complex
504 and interacting needs of these patients. As more people live into very old age, the
505 number of people experiencing frailty rises, with consequences for the roles played by
506 nurses and a diverse array of therapists, as well as those providing social care. Among
507 the most important is the need for team working, where a patient with complex health

508 problems is managed by a set of individuals, including patients themselves and health
509 professionals with a range of different, complementary skills. Within that group, different
510 individuals will undertake different roles, but these may change over time, for example
511 when the patient progressively develops expertise in their own condition and takes on
512 responsibilities that were once reserved for clinicians, in some cases informed by new
513 technologies that allow them to monitor their own physiological parameters. Within these
514 groups, there will often be tasks that can be done by several different individuals, with
515 the choice of who does what determined by logistical and convenience considerations.

516 A second, related factor is the *growth of technology*. In the 19th century, the discovery of
517 x-rays paved the way for new methods of diagnosis, and with it radiologists and
518 radiographers. Advances in chemistry created a need for laboratory scientists. Pasteur's
519 discovery of bacteria led, in due course, to the emergence of microbiology. More
520 recently, a combination of safer anaesthesia and new surgical techniques have led to the
521 emergence of operating theatre assistants, perfusion technicians and others.(9)
522 However, technological advances are not just creating new roles. They are also making
523 some obsolete. Modern ECG machines not only record heart rhythm but also analyse it.
524 Near patient testing has rendered obsolete a number of traditional laboratory activities.

525 This is an area that is changing rapidly, with consequences that are difficult to predict.
526 Some technological advances are driving ever narrower specialisation, with new roles
527 such as interventional radiology. The growth of automation will continue, for example in
528 areas such as image processing. Thus, software programmes can achieve a high degree
529 of accuracy in screening cervical smears. Yet, as in this example, further advances can
530 render the technology obsolete as screening for abnormal cells is being replaced by
531 testing for the presence of Human Papilloma Virus.(10) Shortages of health workers,
532 discussed further below, are incentivising other types of automation, including the use of
533 robots to provide care, albeit with mixed results.(11)

534 While these developments are changing the roles of health professionals, others are
535 changing the roles of patients. Already, anyone with access to the internet can obtain
536 large amounts of information on their symptoms or conditions, some that is helpful and
537 accurate but much that is not.(12) They can also use a growing number of applications
538 employing artificial intelligence to offer them potential diagnoses, although despite great
539 enthusiasm from some, the experience so far suggests the need for considerable caution,
540 including the threat posed by adversarial attacks on systems by groups with a range of
541 nefarious motivations.(13)

542 The third factor relates to the set of *norms* within each profession. Changes to the tasks
543 undertaken by physicians, including many of those listed in the preceding paragraphs,
544 are often relatively uncontroversial. In most cases, individual enthusiasts develop new

545 services, including the accompanying new roles, and simply implement them. However,
546 they can also reflect differences in the power of particular groups, and especially the
547 medical profession. Thus, Nancarrow and Borthwick describe how orthopaedic surgeons
548 concentrated on those activities that were interesting and well remunerated, creating a
549 void that was filled by other professional groups, including podiatrists and
550 physiotherapists.(14)

551 Sometimes, changes are dependent on decisions made on the basis of evidence from
552 health technology assessment or it may require specific allocation of funding, but there is
553 rarely a debate about whether the physician can actually undertake the new role. This is
554 often different for other professional groups. For example, there is widespread variation,
555 even within Europe, in the extent to which nurses have taken on extended roles.(15, 16)
556 In some countries, it is unusual for nurses to administer vaccines or take cervical smears,
557 whereas in others it is the norm. A review of task shifting in primary care found nurse
558 practitioners working at high levels of advanced practice in Finland, Ireland, The
559 Netherlands, and the United Kingdom.(17) There was some, but much more limited task
560 shifting in Belgium, Croatia, Cyprus, Denmark, Estonia, Hungary, Iceland, Italy Latvia,
561 Lithuania, Luxembourg, Malta, Portugal, Slovenia, Spain, and Sweden. However, there
562 was no significant task shifting in Austria, Bulgaria, Czech Republic, France, Germany,
563 Greece, Norway, Poland, Romania, Slovakia, or Switzerland. These changes are
564 challenging hierarchies, which traditionally have placed the medical profession at the
565 head of the team. Thus, there are now some examples, such as in occupational health,
566 where doctors may be managerially accountable to nurses, although in other countries
567 this is still seen as unimaginable.

568 These differences reflect a variety of factors, the most important of which is financial. It
569 seems more difficult to shift responsibility away from physicians in those cases where
570 they may lose income as a result (e.g. in a fee-for-service payment system). Decisions
571 about the allocation of roles are also influenced by the extent to which the relationship
572 between physicians and other health workers is based on a hierarchy or a collaboration
573 between equals, with the latter increasingly becoming the dominant paradigms, even if
574 the pace of change varies greatly among countries. In parallel with the erosion of
575 traditional hierarchies, and reflecting some of the same social forces, there has been a
576 growing focus on empowerment of patients, with important decisions on management
577 shared between the patient and their health professional and the patient assuming a
578 much greater role in self-management. This factor also encompasses the *changing role of*
579 *communities and patients in healthcare*. A shift is taking place towards community
580 empowerment and greater patient engagement. Traditional paternalistic practice styles of
581 health care providers create dependency of patients on providers and on the health care
582 system, which can adversely affect quality of care, patient experience, and clinical

583 outcomes. An informed and empowered patient has the knowledge, skills and confidence
584 to manage its own health and health care, make healthy lifestyle choices and make
585 informed and personally relevant decisions about their treatment and care. They are
586 more likely to adhere to treatment regimes, experience fewer adverse events, and use
587 fewer health care resources. Enhancing health literacy, supporting self-management, and
588 facilitating patient participation are three key ways health care providers can support
589 empowered communities and engaged patients for quality services, including greater
590 adherence to treatment regimens and fewer adverse events, better patient experience
591 and ultimately, improved clinical outcomes. This, however, requires a new set of skills
592 and competencies of providers.

593 The fourth factor is a shortage of health workers. In many parts of the world, including,
594 in previous times in Europe, a shortage of health workers simply meant that people were
595 denied access to care. However, once states took responsibility for expanding coverage,
596 they needed to find the workers to deliver it. There were two broad approaches. One,
597 which was developed to its greatest extent in the USSR, was the development of mid-
598 level health workers, or feldshers.(18) These individuals had basic medical training, with
599 the skills to provide first aid and simple care for patients with chronic diseases,
600 constrained by shortages of equipment and medicines. However, they were able to offer
601 something to those living in remote areas that would otherwise lack anything. In western
602 Europe, in contrast, health systems were able to recruit health workers from low and
603 middle income countries, in some cases benefitting from a common language with former
604 colonies, a practice that has attracted growing criticism because of the adverse impact on
605 countries of origin.

606 A *fifth* factor is the need to address rising health care costs and identify more cost
607 effective approaches to health care delivery that maximise efficiency and use of limited
608 resources while meeting the needs and demands of local populations. Countries the world
609 over are faced with the challenge of identifying how to deliver an effective and efficient
610 health care system that is also sustainable, which has led to changes in the configuration
611 of health care staff, their tasks, and the skills required to undertake these evolving roles.

612 Now, the challenges are especially severe as European countries are facing a combination
613 of falling birth rates, with consequent reductions in the share of the population in working
614 ages, ageing populations with multiple health problems, as discussed above. One recent
615 analysis estimates that, by 2030, there could be a global shortage of 15 million health
616 workers, with the problem greatest in high-income countries.(19) The challenges relate
617 to both the absolute numbers of health workers and their distribution, with particular
618 difficulties in attracting and retaining health workers in rural and remote areas,
619 sometimes called "medical deserts".(20) This has long been a problem in some parts of

620 the world, in most cases leading to severely limited access to care by those living in
621 these areas, while in others there have been a range of responses including flying
622 doctors, in Canada, Australia, and East Africa.

623 Finally, the need to maximise efficiency contributed to a process of *decentralisation of*
624 *responsibility*, especially in those countries where traditional hierarchies were most rigid.
625 This envisages health professionals and patients being educated and empowered to
626 develop, jointly, solutions that, while strongly rooted in evidence, allow for adaptation to
627 the particular circumstances that prevail. Thus, responsibilities may differ in a dense
628 urban setting and a rural one where settlements are extremely isolated. This process can
629 be facilitated by advances in technology and in the acquisition of new roles and
630 responsibilities by different groups of health worker. However, it also requires health
631 workers to develop new managerial skills in planning and co-ordination.

632 3.2.2. Different paces of change

633 The preceding paragraphs provide many examples of how responsibilities for different
634 tasks have shifted over time. However, as noted, change has happened at different
635 speeds in different places and, as alluded to in the paragraph on professional norms,
636 there are many barriers to adopting new models of care.

637 One problem is the *limited evidence base*, as many of the changes that take place are
638 never evaluated. In contrast to the introduction of pharmaceuticals and other innovative
639 products and interventions, which are subject to intensive evaluation and lengthy
640 approval processes, the adoption of new professional roles often takes place without any
641 scrutiny, unless it is linked to the implementation of new technology. Even then,
642 attention typically focuses on the equipment rather than the entire package, comprising
643 the technology, the operator, and the supporting system. Yet, as will be described later
644 in this opinion, there is extensive evidence that a move away from traditional roles can
645 be associated with as good or higher quality care, such as the routine management of
646 uncomplicated chronic disease by nurses or non-physician health workers rather than
647 doctors.(21, 22) A related issue, which becomes important when considering whether
648 research findings can be transferred from one setting to another, is definitional. The 2013
649 Question of the Year in the Journal of the Association of American Medical Colleges was
650 "What Is a doctor? What is a nurse?". (23) The authors noted how roles and functions of
651 health care providers have changed considerably in the last three decades. However, the
652 pace of change has varied greatly among countries.

653 A second problem is that changing roles can threaten *established hierarchies*. Artificial
654 restrictions, unsupported by evidence, on what some professional groups can do often
655 relate more to maintaining the dominance of one group over another rather than the

656 welfare of the patient. The situation is further complicated when changing responsibilities
657 have financial implications for those involved.

658 A third, and related problem, of much greater importance in some countries than others,
659 is where these hierarchical divisions are enshrined in *legislation or regulation*, both of
660 which may be very difficult to change as they often reflect well-established power
661 imbalances, in many occasions manifest as institutionalised financial incentives which,
662 unless changed, can inhibit reform.

663 **3.2.3. Why is it important to re-examine task shifting now?**

664 There are at least four reasons why it is timely to consider task shifting within health
665 systems. The first is that task shifting can contribute to the *sustainability of the health*
666 *workforce*. As noted above, health systems in all countries are facing shortages of health
667 workers, with different groups affected to greater or lesser degrees. Historically, in high
668 income these shortages have been met, to some extent, by inward migration, and in
669 some cases by increasing training capacity, yet challenges remain. In these
670 circumstances, it makes little sense for scarce health workers to be undertaking roles
671 that can easily be undertaken by others. Task shifting may also help to address the
672 increasingly recognised problem of burnout among health workers.(24) There is growing
673 evidence that burnout rates are substantially higher among health professionals than in
674 the general population,(25) associated with long hours of work, shift work, and the need
675 to deal with stressful situations.(26, 27) It is associated with risks to the health of those
676 affected, the loss of highly skilled professionals in the workforce, and lower quality of
677 care, in particular through medical errors.(28-31) Research using a variety of methods
678 identifies lack of administrative support, requiring health professions to undertake
679 inappropriate tasks, as a key factor.(24, 32)

680 Again, this is an area where advances in technology may be able to play a role, yet
681 paradoxically, some new technologies have actually had the opposite effect, so that
682 traditional administrative roles have disappeared, leaving health professionals
683 responsible for, for example, data entry and written communications, tasks that can
684 easily consume considerable amounts of time, if not decreasing quality of care provided
685 (when a general practitioner seeing a patient spends more time looking at a computer
686 than at a patient being a common example).

687 Second, task shifting can contribute to the *financial sustainability* of health system. Many
688 health professionals spend a considerable amount of their time undertaking activities for
689 which they are overqualified. If it is possible to transfer these responsibilities to less
690 qualified and, consequently, less highly paid health workers, it will reduce costs without
691 affecting health outcomes therefore improving the efficiency of the health system. The

692 saved resources can contribute to sustainability of health spending and/or be re-invested
693 in other valuable healthcare. In other circumstances, transferring roles to a higher
694 qualified health worker, even if more expensive to employ, may be more efficient if their
695 greater expertise means that they use fewer resources or achieve better health
696 outcomes. Task shifting may also support *social sustainability*, meaning the maintenance
697 of a health system that societies trust and want to use.

698 These changes may involve the transfer of responsibility for an entire package of care,
699 for example where a doctor's role is taken over by a nurse or a nurse's role is taken over
700 by a healthcare assistant. It may also involve separating out the elements of a package,
701 for example where the more routine elements of a surgical procedure are undertaken by
702 someone other than a surgeon but with specialised training in a particular area. There
703 may be cases where the allocative efficiency of the health system is still improved even if
704 task shifting implies a (small) reduction in health outcomes if the costs savings that arise
705 can be re-invested in healthcare with larger health benefits. Task shifting does not have
706 to involve transfers of task exclusively across personnel. Health workers may also be able
707 to be much more efficient if adequately supported by technology. This is an area that is
708 likely to expand considerably in future years, with advances in artificial intelligence,
709 although experience points to the need for a healthy scepticism about many of the claims
710 that are being made.

711 Third, task shifting can be a means to improve *quality* of care, where evidence shows
712 that activities are performed better by one group than another, such as the example of
713 routine management of uncomplicated chronic disease by nurses cited above, although
714 often this will depend on the context.

715 Finally, task shifting can enhance the *resilience* of the health system, especially where
716 different professional groups can substitute for one another in emergencies. However,
717 this requires the existence of established, and tested, systems and mechanisms through
718 which task shifting can be adopted and supported in a timely manner. Assembling the
719 right mix of skills in the right place is challenging, given the complexity of modern
720 healthcare. Task shifting can contribute to the flexibility necessary to respond when the
721 system is under pressure.

722

723 **3.3. Types of task shifting**

724 In thinking about task shifting, we draw on a simplified version of a framework developed
725 by Sibbald et al. to describe potential changes in skill mix in healthcare (Box).(33)

726 **Box 1 A taxonomy of changes in skill mix**

727

Changing roles	
Enhancement	Increasing the depth of the job by extending the role or skills of a particular group of workers
Substitution/ delegation	Exchanging one type of work from one profession to another profession, breaking traditional professional divides
Innovation	Creating new jobs by introducing a new type of worker (or technology)

728 Source: Sibbald B, Shen J, McBride A. Changing the skill-mix of the health care
729 workforce. *Journal of health services research & policy* 2004; 9 Suppl 1: 28-38.

730 **3.3.1. Enhancement**

731 As has been described previously, medical progress has been characterised by a
732 continuing process of enhancement of skills and the corresponding tasks performed,
733 driven by changing patterns of disease and technological advances. Examples include
734 minimally invasive procedures to replace open surgical operations, interventional
735 cardiology in the management of myocardial infarction, or dialysis of patients with acute
736 renal failure. However, similar processes have been taking place with other professional
737 groups. Among them, enhancement of the role of nurses has attracted most attention
738 from researchers, in areas such as the management of chronic disease. There is now
739 considerable evidence that nurse led clinics achieve better results than those conducted
740 by physicians in the management of uncomplicated chronic diseases,(34) although not
741 when the disease is severe.(35)

742 Another area that has been studied is the enhanced role of pharmacists, who in a
743 number of countries are taking on a much more active role in the management of
744 medicines regimes, advising on interactions, supporting and adherence by patients, and
745 in some cases, prescribing or monitoring the effects of treatment. For example,
746 pharmacists perform as well as or better than physicians in managing
747 anticoagulation.(36, 37)

748 Midwives have also experienced enhancement of their roles in many countries. A
749 systematic review identified five sets of non-traditional roles that have been assumed by
750 midwives in a number of countries. These are: high dependency care/managing chronic
751 or critical illness in pregnant women; midwife-led care where the midwife is responsible
752 for overall care; neonatal care to maintain a continuity of care with midwife, mother and
753 child; genetic screening and counselling; and abortion services.(38)

754 A 2016 Cochrane review of prescribing by non-medical health workers found 45 studies
755 in which nurses or pharmacists with high levels of prescribing autonomy were compared
756 with medical prescribers.(22) It concluded that outcomes for non-medical prescribers
757 were comparable to medical prescribers for: high blood pressure (moderate certainty of
758 evidence); diabetes control (high certainty of evidence); high cholesterol (moderate
759 certainty of evidence); adverse events (low certainty of evidence); patient adherence
760 (moderate certainty of evidence); patient satisfaction with care (moderate certainty of
761 evidence); and health-related quality of life (moderate certainty of evidence).

762 A third group comprises those health workers who crew emergency vehicles. Once, their
763 role was limited to driving ambulances and provision of immediate basic first aid. Now, in
764 many countries, they are trained and equipped to provide advanced life support,
765 including the administration of thrombolytic drugs for patients with suspected myocardial
766 infarctions, initiation of intravenous infusions, and advanced airways management.
767 However, the limited evidence relating to this development is mixed. One early study
768 found a higher mortality among trauma patients treated by paramedics compared to the
769 traditional model whereby patients were taken straight to hospital, attributed potentially
770 to longer delay at the scene of the injury.(39) There is also some evidence that the use
771 of doctors for pre-hospital management of trauma can achieve better results than when
772 it is given by other health workers.(40) However, a cluster randomised controlled trial of
773 paramedics with advanced skills found that they could reduce hospitalisation rates and
774 achieve higher levels of satisfaction compared to a model in which ambulance staff
775 provided only transport.(41) The most recent Cochrane review, from 2014, concluded
776 that there is no benefit for patient outcomes of advanced life support training for
777 ambulance crews.(42)

778 **3.3.2. Substitution/ delegation**

779 Substitution is intrinsically linked to enhancement of roles, for example where one group
780 of workers, such as nurses, enhance their skills and takeover roles that had previously
781 been undertaken by doctors. This is happening in many countries but is proceeding at
782 different rates. A study of nine European countries, comparing 2010 and 2015, found
783 that the scale of change had been considerably greater in The Netherlands, England, and

784 Scotland, all three of which had implemented regulatory or legislative changes, than in
785 the Czech Republic, Germany, Italy, Norway, Poland, or Turkey.(43)

786 Levels of patient satisfaction are often better with nurses than primary care doctors.
787 However, nurse consultations are often of longer duration and are associated with more
788 return visits. All but one of the randomised controlled trials included had been conducted
789 in high income countries. Obviously, these results will be context dependent. Other
790 research suggests that, at the risk of generalisation, nurses often have greater
791 interpersonal skills while physicians are better at resolving technical problems.(44)
792 However, that research is now 20 years old, since when medical education in some
793 countries has placed a much higher emphasis on communication skills,(45-47) while
794 nurse education has become more technical. A number of studies have looked at the role
795 of nurses in specialised areas, finding, for example, that they are less likely to intervene
796 in neonatal care than are doctors, while achieving comparable outcomes.(48) Childbirth
797 is an area where there is wide variation in professional roles among countries, reflecting
798 a combination of historical norms and financial incentives. In general, midwives achieve
799 higher levels of maternal satisfaction, better assessments of mothers and children, and at
800 the same time cost savings. Some hospitals have introduced the model of emergency
801 nurse practitioners, with one randomised trial finding that they achieve similar outcomes
802 but higher levels of patient satisfaction, while delivering better documentation than junior
803 doctors.(49) Another found them to deliver similar quality of care to junior doctors,
804 although both performed less well than more experienced doctors.(50) Yet another trial
805 found that the quality of care was similar to that delivered by junior doctors but nurses
806 were reported as giving more information and achieving higher patient satisfaction.(51)
807 Finally, one study found them to be equally skilled at interpreting radiographs.(52) The
808 development of other professional groups allied to medicine has taken place to varying
809 extents across Europe. However, in general, non-medical groups with specialised
810 expertise, such as dieticians and physiotherapists, get better results than physicians
811 undertaking the corresponding roles among many others.

812 Much of the evidence on delegation relates to the transfer of tasks from trained nurses to
813 less skilled individuals, a group that goes under various names including healthcare
814 assistants and nursing assistants. This is not necessarily cheaper, with some research
815 suggesting that lower skilled nursing assistants may have higher rates of absenteeism
816 and turnover, while they may be less willing to take the initiative when patients have
817 problems. There is also a growing body of research showing that outcomes, including in-
818 hospital mortality, are improved where there are more trained nurses.(2, 3, 53, 54)

819 A substantial amount of care has always been provided by informal carers. The ANCIEN
820 study, using Eurobarometer data from 2007, in 2012, found that, on average, 14% of

821 respondents were providing care for someone unable to perform at least one activity of
822 daily living, varying from just over 10% in Denmark to almost 19% in Lithuania.(55) It
823 identified four clusters of countries, defined in terms of how long-term care is provided.
824 The first comprises the Nordic countries, where care of older people is largely the
825 responsibility of the state and where people pay high taxes but get generous provision in
826 return. The second are the Anglo-Saxon countries, where people pay low taxes but then
827 take responsibility for themselves, with the state providing a safety net once they have
828 run out of money (and assets). The third comprises the Mediterranean countries, where
829 the family is the natural provider, with the state only becoming involved where this fails.
830 The fourth group are the countries of Central and Eastern Europe, where those who did
831 live into old age were looked after mainly by relatives. In all of these clusters, informal
832 care is about twice as likely to be provided by women. There is a clear association with
833 age, with 5-8% of those aged 15-29 acting as carers, with the corresponding figures 13-
834 20% among those aged 65+.

835 Finally, task shifting can be from health workers to patients. The concept of the “expert
836 patient” recognises that individuals with long term conditions often develop a high levels
837 of skills in managing them. Thus, since the first glucometer was developed in 1970,
838 patients with type 1 diabetes have been monitoring their condition using test strips, now
839 being replaced by continuous glucose monitoring, adapting their insulin dosage, which
840 they self-administer, as required. Self-management is increasingly being used with other
841 chronic conditions. A Cochrane review of self-management of chronic obstructive
842 pulmonary disease found that those that included a plan for managing exacerbations
843 were associated with improved quality of life and fewer admissions, with no increase in
844 all-cause mortality.(56) It is also important to recognise when shifting to self-
845 management has been found to be challenging for patients and may require additional
846 educational and psychological support, for example during the transition from
847 adolescence to adulthood.(57, 58)

848 **3.3.3. Innovation**

849 This can involve the development of new types of existing professionals, following the
850 acquisition of new skills. Examples might be nurses specialising in the care of patients
851 recovering from cancer, providing care for those with colostomies or post mastectomy.
852 Others are entirely new types of worker. Over the past 30 years, many health systems
853 have introduced phlebotomists to take blood samples, a task that would once have been
854 the responsibility of the doctors or nurses. More recently, some countries are introducing
855 physician’s assistants, to take over some of the work undertaken by doctors. Another
856 form of innovation, used increasingly in low and middle income settings, but also in some
857 high income settings, is the employment of community health workers, both paid and

858 volunteers. For example, there are many systematic reviews supporting the effective use
859 of task shifting for mental health in LMICs, including those focused on specific
860 populations such as people living with HIV/AIDS or mothers with post-partum
861 depression. While the promotion and development of new professional roles have the
862 potential to support cost containment and improved health care delivery, the optimal
863 skill-mix needed to realise such benefits deserves further scrutiny and future
864 research.(59)

865 In addition, other areas falling within this category involve the transfer of tasks from
866 humans to machines, for example in laboratories. Many of these changes have taken
867 place without attracting much attention. Thus, BP is now commonly measured using an
868 automated sphygmomanometer, rather than a mercury one, which required a trained
869 health professional. This has made it possible for those with hypertension to take control
870 of their condition, monitoring their blood pressure on a daily basis.

871 Innovation can also lead to the withdrawal of certain roles or tasks. For example,
872 patients can often make medical appointments and order repeat medications using
873 website interfaces or mobile phone apps. Similarly, patients can self-test for HIV using
874 kits ordered via the internet. These systems may reduce the need for administrative or
875 pre-test counselling roles.

876 Looking ahead, this is an area where there is much interest in the use of artificial
877 intelligence, example being the automated reading of mammograms.

878 Beyond that, there is considerable theoretical potential for shifting responsibility for the
879 diagnosis and management of some conditions to individuals, taking advantage of
880 wearable technology.(60) Thus, many existing phones have the ability to track levels of
881 physical activity.

882

883 3.4. What tasks can be shifted? The evidence

884 3.4.1. Task shifting from health professionals to patients

885 In deciding whether a particular task can be undertaken by a specific type of
886 professional, several issues must be considered. First, does the task need to be carried
887 out by a health professional at all? As noted above, patients with long term conditions (or
888 parents of children who have these conditions) often become experts in monitoring and
889 managing these conditions. Increasingly, they can draw on support from technology,
890 including devices that can monitor physiological parameters in real time, such as blood
891 glucose.

892 A 2014 review of self-management of COPD traced how this concept had changed over
893 four decades.(61) It began with a description of patients in a classroom, being taught in
894 a didactic manner by a nurse, taken from a 1971 paper.(62) The focus is on the
895 pathophysiology of the condition and the patients are expected to be passive recipients
896 of information. Yet, it is now recognised that this approach is of very little value, with
897 patient education and treatment plans largely ineffective.(63)

898 A widely used definition of self-management is the ability to "... *manage the symptoms,*
899 *treatment, physical and psychosocial consequences and life style changes inherent in*
900 *living with a chronic condition. ... [the] ability to monitor one's condition and to effect the*
901 *cognitive, behavioural and emotional responses necessary to maintain a satisfactory*
902 *quality of life"* (64) It emphasises the importance of adopting the patient's point of view
903 and provides an agenda for health professionals and others to encourage patients to
904 acquire and apply certain skills to help them manage their illness. These skills are
905 gathering information, managing medication, managing symptoms, managing
906 psychological consequences, adjusting their lifestyle, using social support, and
907 communicating effectively.

908 It is beyond the scope of this opinion to review comprehensively the evidence on self-
909 management of chronic conditions. A search of the Cochrane Library conducted in March
910 2019 using the key word "self-management" identified 75 systematic reviews, with most
911 addressing specific diseases, such as epilepsy, diabetes, or stroke, while others focus on
912 specific methods, such as mobile phone messaging or mobile technology interventions.
913 The authors' conclusions from relevant reviews published since 2014 are set out in Annex
914 1.

915 These reviews suggest that the evidence base for self-management of many long term
916 conditions is relatively weak, reflecting a combination of limitations of many of the
917 studies that have been undertaken and a lack of studies on key issues. It does seem to
918 be associated with improved quality of life for patients with stroke and COPD, although

919 self-management of exacerbations of COPD may be associated with higher respiratory
920 mortality. The evidence in support of technology is also limited; it has been associated
921 with better control of oral anti-coagulation but other forms of monitoring, such as pulse
922 oximetry, are not supported.

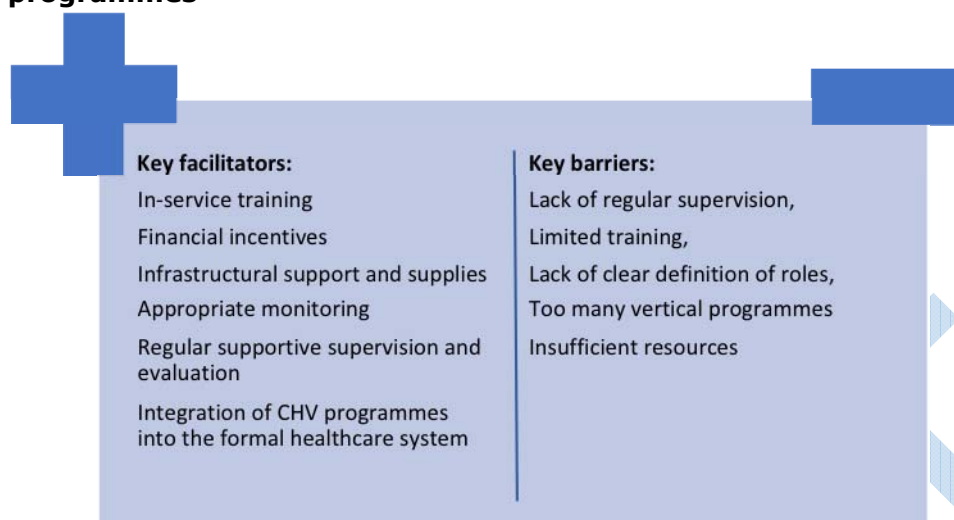
923 **3.4.2. Task shifting to community workers**

924 A systematic review of the use of community health workers for maternal and child
925 health found that they were providing a range of preventive interventions in low- and
926 middle-income countries.(65) The review found some evidence of effective strategies but
927 concluded that there was insufficient evidence for most interventions. A scoping review of
928 the role of community health workers in Canada and other high-income settings, found
929 that while there was evidence to suggest that this group of workers provide a range of
930 health-related services and represent an often under-utilised public health work force,
931 much of their activities are unregulated and unrecognised.(66) Therefore, they require
932 better integration into the health and social care systems in order to realise the full
933 potential of their roles. Similarly, another scoping review of 20 studies concluded that
934 while patient navigators may facilitate connecting patients who require primary care to
935 the relevant health professional as well as supporting the wider agenda of patient-
936 centred care.(67) However, further research is needed to detail the impact and cost-
937 effectiveness of this role and the experience of patients and their families who interact
938 with them and the service they provide.

939 A recent umbrella review of the use of community health volunteers found 39 systematic
940 reviews.(68) Most concluded that services provided by these volunteers were not inferior
941 to those provided by other health workers, and sometimes better. However, they
942 performed less well with more complex tasks such as diagnosis and counselling. Many of
943 the reviews concluded that their performance could be strengthened by regular
944 supportive supervision, in-service training and adequate logistical support, as well as a
945 high level of community ownership. This review identified a series of facilitators and
946 barriers to successful implementation (Figure 1). It seems especially important to ensure
947 that adequate training is provided and ongoing supportive environments exist. The
948 review found no evidence supporting their involvement in the management of complex
949 care activities.

950

951 **Figure 1 Key facilitators and barriers to success of volunteer-led health**
 952 **programmes**



953
 954 Source: Woldie et al. 2018

955 **3.4.3. Task shifting from health workers to machines**

956 Manufacturing and services industries are being transformed by the introduction of new
 957 technology, such as robots(69), internet-based applications, and blockchain, making it
 958 possible to organize work in new ways, giving rise to the term "industry 4.0".(70) These
 959 developments have had a major impact on other industries, such as transportation,
 960 where monotonous work that once involved processing of documents is being shifted to
 961 autonomously acting agents. So far, the impact on health services has been somewhat
 962 less, in part because of the nature of the interaction between the patient and health
 963 professional, characterised by empathy and responsiveness to subtle verbal and non-
 964 verbal cues. Nonetheless, there are a growing number of tasks that are being shifted
 965 from health workers to machines (Table 1).

966 **Table 1 Potential areas of task shifting to machines**

- | |
|---|
| <ul style="list-style-type: none"> • autonomous embodied agents (e.g. apps to support people with mental health problems) • digital image processing (e.g. radiology, sperm counts, haematology/ cytology) • replacing laboratory personnel by automated production lines (3D printing of implants, automated biochemical analysis, microbial genetic analysis replacing culture) • autonomous monitoring and alert systems based on wearable technologies supported by artificial intelligence on servers and cloud technology (e.g. blood pressure, ECG, oximetry, blood glucose, ovarian cycle monitoring (e.g. www.ladytechnologies.com)) • robot assisted physiotherapy and rehabilitation • replacement of administrative staff (e.g. automated hospital coding replacing human coders) • automatic/robotic medication dispensing systems • artificial intelligence supported decision making |
|---|

978 Source: Authors' compilation

979 It is beyond the scope of this opinion to review in detail the evidence for all of these.
980 Instead, the following sections summarise some key issues.

981 Autonomous embodied agents are being used increasingly with voice recognition
982 technology to interact with humans in a number of consumer facing areas, such as
983 mobile banking. The rapid growth of smart phones and other handheld devices has
984 encouraged developers to create apps that might be used to support people with mental
985 or physical health problems. A systematic review of mental health mobile apps for
986 preadolescents and adolescents, published in 2017, identified 24 relevant publications
987 covering 15 different apps.(71) Two small RCTs and one case study found no evidence of
988 benefit and six apps aimed at children and adolescents had never been evaluated. The
989 authors concluded that the evidence base was inadequate to support the use of any of
990 these products. Another systematic review, also published in 2017, included 27 studies of
991 mobile apps and SMS messaging for physical and mental health problems.(72) Primary
992 outcome measures included weight management, smoking cessation in pregnancy,
993 medication adherence, and reduction in depression, anxiety, and stress. The authors
994 concluded that mobile apps and SMS messaging showed promising evidence of efficacy.
995 However, a more recent review criticised the methodology of many evaluations of apps,
996 noting the use of diverse, and frequently non-standardised or validated outcome
997 measures.(73)

998 Autonomous monitoring and alert systems would seem to have considerable potential to
999 detect episodic problems such as arrhythmias. One evaluation, in which 102 hospitalised
1000 patients were assessed using both continuous ECG monitoring and a variety of wearables
1001 found a high level of agreement for heart rate estimation in sinus rhythm and atrial
1002 flutter but underestimation of heart rate in atrial fibrillation.(74) However, this provides
1003 no information on the accuracy of these devices when used by healthy active individuals
1004 in the community. The Apple Watch is, however, being evaluated in a large scale study
1005 that will examine the predictive value of arrhythmias detected in wearers.(75) However,
1006 this has raised concern about the risk of false positives, leading to significant over
1007 diagnosis, with additional workload for health systems and potentially increased levels of
1008 undue patient anxiety.(76)

1009 There are important questions about these devices and apps. Thus, one recent study,
1010 looking at apps that could be used by patients with chronic kidney disease, described
1011 how they were difficult to find and to assess and, like wearable technology, gave rise to
1012 substantial concerns about security of the data generated.(77) These concerns reflect
1013 growing awareness of the way in which information captured by social media have been
1014 used to target individuals for marketing purposes, or in some cases to discriminate
1015 against those with particular characteristics.(78) Thus, the business models of some of

1016 the companies involved are extremely opaque, attracting vast sums from investors
1017 despite failing to generate significant returns so far.(79) This has raised fears that they
1018 will seek to exploit the health data they harvest from users for other purposes, as was
1019 done in the United Kingdom EU referendum campaign when what appeared to be a
1020 football competition on social media was actually an exercise to facilitate targeting
1021 individuals with anti-EU messages.(80)

1022 There is also growing use of robots in a number of areas of clinical care. Most attention
1023 has focused on robotic surgery, with a journal dedicated to the subject established in
1024 2008. A review of robotic techniques in reproductive surgery found them to be associated
1025 with decreased blood loss, less post-operative pain, shorter hospital stay, and faster
1026 convalescence, while achieving similar outcomes for the primary objective of the
1027 procedure.(81) Another, in the treatment of rectal cancer, found a lower rate of
1028 conversion from laparoscopic to open surgery, but longer operating time,(82) with similar
1029 findings in a systematic review of their use in pancreatic surgery.(83) However, a
1030 systematic review of robotic knee arthroplasty found no difference in operating times and
1031 better mechanical alignment.(84) Overall, it seems that robotic surgery does offer certain
1032 benefits but each case should be assessed on its merits as the outcomes are not
1033 invariably better than with conventional surgery. A caveat is, however, required. A recent
1034 study found that the probability that trials of robotic surgery would generate positive
1035 results was correlated with the scale of financial conflict of interest.(85)

1036 In the area of physiotherapy and rehabilitation, a systematic review of robot-assisted
1037 interventions for patients with spinal cord injuries identified 11 RCTs, finding their use
1038 associated with greater walking independence and endurance.(86) The authors concluded
1039 that robot-assisted training has potential as an adjunct to existing rehabilitation
1040 programmes.

1041 Robotic medication dispensing has the potential to reduce dispensing errors. One before-
1042 and-after study found substantial reductions in dispensing errors and stockouts, with
1043 increased staff satisfaction.(87)

1044 Finally, the potential use of artificial intelligence to facilitate diagnosis has attracted
1045 considerable attention.(88, 89) Once again, there are both opportunities and concerns.
1046 These concerns include a growing number of unintended consequences, such as what has
1047 been termed "e-iatrogenesis", defined as "patient harm caused at least in part by the
1048 application of health information technology".(90) A recent review of these unintended
1049 consequences described a series of problems,(91) such as where skilled human
1050 observers presented with images already annotated by computers had reduced accuracy
1051 and where algorithms developed in one setting gave misleading results in another. Use of
1052 such algorithms may be more suitable for environments where continuous monitoring

1053 provides access to timely and precise data, with clear cut-off points for decision-making
1054 (e.g. ICU). However, where decisions rely more on clinical judgment and patient-centred
1055 dialogue, as in primary care, their use may not be appropriate. One app, now being
1056 promoted within the English National Health Service has come under particular criticism
1057 for its accuracy, leading to complaints to the medical device regulator,(92) with users
1058 circulating examples of highly implausible diagnoses on social media. Further concerns
1059 relate to the scope for attacks on the software, manipulating algorithms for a variety of
1060 reasons, with potentially dangerous consequences and privacy, following revelations
1061 about widespread abuses of data collected on social media,(93) especially given the
1062 intimate nature of some of the information collected.(94)

1063 **3.4.4. Task shifting between different types of health worker**

1064 We have sought to identify the scope for task shifting within the health system by
1065 conducting an umbrella review, as it is far beyond the scope of this opinion to conduct a
1066 series of new systematic reviews. The search strategy is reported in Annex 2. A formal
1067 review, including assessment of quality of studies, was also beyond the scope of this
1068 opinion, while the heterogeneity of studies precluded a meta-analysis. The initial search
1069 yielded 631 publications. There was considerable duplication, for example where a
1070 Cochrane review was also published in an academic journal or a major review superseded
1071 several earlier smaller ones. Thus, only those which contributed something that was
1072 substantially new were retained, with 44 reviews summarised in the following sections.

1073 From the outset, it is necessary to recognise that this approach has certain limitations.
1074 First, as will be discussed later, much task shifting takes place informally and is never
1075 evaluated. Second, those changes that are evaluated tend to be within larger
1076 innovations, such as the development of new models of care. Hence, relatively few
1077 examine straightforward substitution of one role for another. Third, as with all health
1078 services research, evaluations are distributed very unevenly geographically, with most
1079 taking place in a small number of countries, which in Europe include the United Kingdom,
1080 the Netherlands, and Scandinavia predominantly. We also have not included a search of
1081 the "grey" literature.

1082 The findings could be presented in various ways, such as by the type of task shifting
1083 (enhancement/ substitution/ innovation) or the professional group involved. However,
1084 the variety of topics defies simple classification so, instead, we present them according to
1085 a list of topics that, while lacking a theoretical basis, offers a pragmatic solution to the
1086 challenges involved and was informed by consideration of the dominant topics covered in
1087 the selected reviews.

1088 **3.4.5. Substitution of nurses for doctors**

1089 A Cochrane review identified 16 studies in which nurses were substituted for doctors in
1090 primary care.(95) In seven, the nurse assumed responsibility for first contact and
1091 ongoing care for all presenting patients. There was considerable heterogeneity in the
1092 outcomes investigated, precluding data synthesis. In general, however, there were no
1093 appreciable differences in the studies between doctors and nurses and health outcomes,
1094 process of care, resource utilisation, or costs. In five studies, nurses assumed
1095 responsibility for first contact care for patients requiring urgent consultations during
1096 routine office hours. Again, patient outcomes were similar, but patient satisfaction was
1097 higher with nurse led care. The nurses tended to provide longer consultations, give more
1098 information to patients, but also recalled patients more frequently than did doctors. In
1099 four studies, the nurse took responsibility for the ongoing management of patients with
1100 specified chronic conditions. Again, the outcomes investigated varied, but overall there
1101 were no appreciable differences in health outcomes, process of care resource utilisation,
1102 or cost. The authors expressed caution because only one study was adequately powered
1103 to assess equivalence of care and many of the studies have methodological limitations
1104 but they concluded that, overall, appropriately trained nurses can produce as high-quality
1105 care as primary care doctors, with good health outcomes in certain settings. They also
1106 noted that the impact on workload may be limited because nurses are addressing
1107 previously unmet needs or are generating demand for care that previously was
1108 unavailable.

1109 A Cochrane review identified five studies comparing nurse led and physician led care of
1110 patients with asthma.(96) There was no significant difference between the two models of
1111 care, and the one study that examined costs also found no difference. Three trials
1112 reported quality of life, again finding no significant difference.

1113 Weaning patients off mechanical ventilation can be very difficult and, historically, it has
1114 been undertaken by anaesthetists or intensive care physicians. A systematic review
1115 identified three studies comparing nurse and physician led weaning.(97) Nurse led
1116 weaning was associated with a non-significant reduction in the duration of mechanical
1117 ventilation (mean difference = -1.69 days, 95% CI -3.23 to 0.16), and significant
1118 reductions in length of stay in the intensive care unit (mean difference = -2.04 days,
1119 95% CI -2.57 to -1.52) and in hospital (mean difference = -2.9 days, 95% CI -4.24-
1120 1.56). This evidence supports an enhanced role for appropriately trained nurses in
1121 intensive care units.

1122 Four studies comparing nurse and physician led management of obstructive sleep apnoea
1123 found no differences in outcomes.(98)

1124 It should be noted however, that while many of the studies demonstrated the positive
1125 impacts of nurse led care for health systems and patient outcomes, particularly in the
1126 context of well-defined and protocol driven care pathways, further research is needed to
1127 explore this model of care with complex patients who have multi-morbidity.

1128 **3.4.6. Enhancing the role of pharmacists**

1129 Historically, hospital pharmacists stayed in the pharmacy, with their role limited to
1130 preparing and dispensing medicines prescribed by physicians. Their manufacturing role
1131 has long since gone, with modern medicines prepared in industrial processes subject to
1132 tight regulation and distributed in carefully designed packages accompanied by detailed
1133 information sheets. At the same time, an increasing number of patients are taking
1134 multiple medications, creating a risk of interaction and, in an increasingly frail elderly
1135 population, in dosages that need to be tailored to the individual's renal or hepatic
1136 function. Getting this right requires specialised knowledge of pharmacokinetics, in some
1137 cases beyond what can be expected from the generalist physician or the physician caring
1138 for a patient who has additional health problems beyond their normal scope of practice.
1139 As a result, pharmacists are increasingly present on wards and in outpatient clinics in a
1140 number of countries. A systematic review and meta-analysis of the role of pharmacists
1141 on hospital wards identified 18 RCTs and 7 economic evaluations.(99) It concluded that
1142 the regular involvement of pharmacist was cost-effective, with an Incremental Cost-
1143 Effectiveness Ratio of £632/ QALY gained, and was associated with a reduction in mean
1144 length of stay of 1.74 days (95% CI 2.76-0.74) and an increase in the probability that
1145 patients or carers would report satisfaction (relative risk = 1.49, 95% CI 1.09 to 2.03).

1146 Another meta-analysis reviewed 13 RCTs that had examined enhancement of the role of
1147 pharmacists, giving them a role in supporting the discharge of patients from
1148 hospital.(100) 10 of the RCTs used medication errors as an outcome, finding that
1149 pharmacist involvement was associated with a significant reduction of over 50% (odds
1150 ratio 0.44, 95% CI 0.31 to 0.63). Four examined the incidence of subsequent emergency
1151 room visits, finding a significant reduction of almost 60% (OR 0.42, 95% CI 0.22-0.78).
1152 Similar findings were obtained in a systematic review and meta-analysis of pharmacist
1153 led medication reconciliation programs during discharge from hospital, with a marked
1154 reduction in re-attendance for adverse drug events (relative risk= 0.33, 95% CI 0.20-
1155 0.53), and in emergency department visits (RR 0.72, 95% CI 0.57-0.92).(101) Another
1156 systematic review reached a similar conclusion.(102) Many of these studies involved
1157 adult patients. However, one systematic review looked specifically at the use of clinical
1158 pharmacists on paediatric wards, finding improved understanding of medication and
1159 adherence, improved patient satisfaction, and better control of chronic conditions.(103)

1160 Another systematic review looked at the impact of multifaceted pharmacist-led
1161 interventions in hospital settings.(104) 28 studies were identified, of which six were
1162 multicentre and 16 were RCTs. In each of them, usual care was the comparator. 11
1163 found improved quality of medication use, although one found it was worse. 4 reported
1164 either a reduction in length of stay or a postponement of revisits, with one finding an
1165 adverse effect. All studies examining mortality, patient reported outcomes, and cost
1166 effectiveness found no significant results. The authors concluded that greater
1167 involvement of pharmacists could improve medication use and reduce utilisation of
1168 services, but with no evidence of benefit for patient outcomes.

1169 Another systematic review looked at the role of pharmacists, working in multiple settings
1170 in hospitals, ambulatory care facilities and community settings, to support patients with
1171 stroke.(105) Although the evidence was limited, it pointed to a potential contribution in
1172 addressing problems with medication, including greater use of evidence-based therapies,
1173 adherence to treatment, and reduction in risk factors. Not all reviews were, however, so
1174 positive and a systematic review of 17 studies in which a pharmacist participated in the
1175 medication reviews with patients following acute coronary syndrome found mixed
1176 evidence of improved adherence.(106)

1177 A systematic review that included 25 studies of pharmacist managed services for people
1178 with diabetes included a wide range of services, from general therapeutic monitoring to
1179 targeted education and immunisation services.(107) Thus, it was difficult to combine the
1180 studies but, consistently, they found cost savings compared with usual practice, which in
1181 most cases involved delivery by physicians.

1182 **3.4.7. Pre-operative assessment of patients**

1183 Historically, preoperative assessment of patients undergoing surgery was undertaken by
1184 doctors. A Cochrane review examined nurse led preoperative assessment, finding one
1185 randomised and one nonrandomised study, both looking at the accuracy of the
1186 assessment.(108) One included an economic evaluation. There was no evidence of any
1187 difference in performance or in cost.

1188 **3.4.8. Prescribing by non-physicians**

1189 A Cochrane review of prescribing by non-doctors in primary and secondary care found 46
1190 studies.(22) 26 examined prescribing by nurses and 20 by pharmacists. 45 compared
1191 non-medical prescribing with the usual medical prescribing, while one compared nurse
1192 prescribing supported by guidelines with what was the usual nurse prescribing care.
1193 There was considerable variety among countries in the training required for non-medical
1194 prescribing. A meta-analysis found that non-medical prescribing was associated with
1195 reduction of risk factors, including blood pressure, lipids, and glycosylated haemoglobin.

1196 Although there was considerable heterogeneity among studies, there was also evidence
1197 associating non-medical prescribing with improved medicines adherence. There was little
1198 evidence on patient-related adverse effects. Patients generally reported satisfaction with
1199 non-medical prescribers. Importantly, non-medical prescribers tend to prescribe more
1200 drugs, intensified drug doses, and used a greater variety of drugs than medical
1201 prescribers. There was little difference in subsequent hospitalisations, emergency
1202 department visits, or outpatient visits. The authors concluded that non-medical
1203 prescribers, practising with varying but high levels of prescribing autonomy, in specific
1204 settings, often within protocols, were as effective as usual care medical prescribers.
1205 Another systematic review, which included three RCTs in different settings reached
1206 similar conclusions.(109)

1207 A systematic review of pharmacist prescribing in hospital settings included 15
1208 studies.(110) Many of the studies were underpowered, and there was considerable
1209 heterogeneity in outcomes. However, in general, pharmacists were found to be better at
1210 adhering to warfarin dosing nomograms than doctors, were more likely to maintain
1211 patients within the therapeutic range for anticoagulation, made fewer prescribing errors
1212 and omissions, and achieved similar levels of satisfaction from patients.

1213 **3.4.9. Enhanced roles of nurses**

1214 A Cochrane review of hospital nurse staffing models identified 15 studies suitable for
1215 inclusion.(111) However, the authors concluded that the evidence they provided was
1216 limited. There was no evidence that the addition of specialist nurses to nursing staff
1217 reduced mortality, emergency department attendances, or readmission rates, but did
1218 seem to be associated with shorter length of stay and reductions in pressure ulcers. The
1219 addition of specialist support staff, such as those providing dietary advice, did seem to be
1220 associated with improved patient outcomes.

1221 A growing body of evidence supports a model of care for cancer survivors that is patient
1222 centred, based on long-term relationships with trusted health workers. A systematic
1223 review of nurse-led case management identified nine experimental studies.(112) The
1224 authors concluded that nurse led case management improved patient's quality of life and
1225 significantly reduced hospital readmission rates, but there was mixed evidence on
1226 whether this model could reduce healthcare costs.

1227 A meta-analysis of five studies comparing nurse coordinated care with usual care for
1228 chronic renal disease found that the former was associated with reduced risk of death
1229 and slowed progression to end-stage renal failure, although there was a small increase in
1230 the incidence of cardiovascular complications, demonstrating the need to consider both
1231 the strengths and limitations or undesired impacts of nurse led care.(113)

1232 The emergence of palliative care has created opportunities for new ways of doing things.
1233 In many countries, nurses have played a key role in developing services. A systematic
1234 review of clinical nurse specialist led interventions with patients who have palliative care
1235 needs found 37 RCTs, 13 economic evaluations, and a number of studies using other
1236 methods.(114) The authors concluded that clinical nurse specialist interventions can be
1237 effective in reducing hospitalisations, length of stay, and costs of care, but the evidence
1238 on their cost effectiveness was mixed.

1239 The importance of rehabilitation following cardiac surgery is now well-established. One
1240 systematic review examined the effectiveness of nurse led rehabilitation programs
1241 compared to usual care.(114) The authors concluded that there was not enough evidence
1242 to support or discourage nurse led rehabilitation programs based on changes in health-
1243 related quality of life, although the sparse data was suggestive of the benefit. A similar
1244 concept has been applied to patients needing intensive care units, reflecting recognition
1245 of what has been termed the post intensive care syndrome (PICS). However, a
1246 systematic review of interventions to support patients following discharge, which
1247 identified four RCTs and one nonrandomised study, 4 led by nurses and one by a
1248 multidisciplinary team, concluded that the evidence was insufficient to determine whether
1249 this approach was effective, with the findings allowing them to say with reasonable
1250 certainty that there was no impact on mortality or health-related quality of life.(115)

1251 A Cochrane review of the organisation of clinical services for heart failure found good
1252 evidence that case management led by a nurse specialising in heart failure reduced
1253 readmissions, for both all causes and heart failure specifically, as well as all-cause
1254 mortality.(116) The authors were not able to identify which particular elements of the
1255 interventions were most important, but found that telephone follow-up by the nurse was
1256 common to many of those that were successful. These findings are consistent with
1257 another systematic review, finding access to a specialist heart failure team reduced
1258 readmissions and mortality.(117) They also found that a collaborative model of care in
1259 the community, where a primary care physician shared care with the cardiologist,
1260 improved patient outcomes. Another Cochrane review examined the role of nurse led
1261 management of patients with heart failure, where the nurses titrated the dosage of
1262 medication to the condition of the patient.(118) It concluded that nurse led teams were
1263 associated with significantly improved outcomes, in terms of hospital admissions and
1264 mortality. They concluded that the use of nurse led teams could prevent the deaths of 27
1265 in every 1,000 patients receiving that model of care.

1266 Another group that may benefit from post discharge care by health workers adopting new
1267 roles are those with chronic respiratory disease. A systematic review and meta-analysis
1268 examined the use of a trained nurse educator in discharge planning of children with

1269 asthma.(119) The authors found a significant reduction in re-hospitalisation for
1270 exacerbations (Odds ratio 0.29, 95% CI 0.16 to 0.50). However, there was no significant
1271 difference in emergency department or general practitioner attendances. Nor was there
1272 any evidence on cost effectiveness, length of stay of subsequent hospitalisations, or
1273 adherence to medications.

1274 A systematic review of the use of specialist nurses in the care of women with
1275 gynaecological cancer included seven qualitative studies.(120) The evidence synthesis
1276 concluded that specialist nurses could play a role in understanding and meeting the
1277 individual needs of women affected, they could guide women along the continuum of
1278 care, and were trusted by their patients.

1279 The term nurse champion has been used to designate senior nurses who can increase
1280 awareness of a condition among other nurses, providing training and mentorship. A
1281 systematic review of the use of nurse champions in diabetes identified three RCTs and
1282 several other studies using a range of methodologies.(121) The authors concluded that
1283 implementation of a nurse champion model improved knowledge of diabetes among
1284 nurses and patient outcomes, including control of blood glucose, quality of life, and
1285 reduced diabetic emergencies.

1286 In contrast to many of the other studies of enhanced nursing roles, a systematic review
1287 of nine studies, seven of which were RCTs, examining geriatric focused nursing
1288 assessment in emergency departments found no overall benefit, and in fact there was
1289 some evidence of an increase in subsequent emergency visits in the intervention
1290 group.(122) Finally, there are few studies of the cost effectiveness of clinical nurse
1291 specialists and nurse practitioners and inpatient roles, and overall the quality of the
1292 economic analyses was described as poor in one systematic review.(123)

1293 Alongside this body of research on effectiveness and impact, a recent Cochrane review of
1294 66 qualitative studies (11 from low- or middle-income countries and 55 from high-income
1295 countries), explored the factors that influence implementation of interventions to
1296 substitute doctors with nurses in the primary care setting, as well as patient acceptance
1297 and views of such interventions.(124) All those involved, patients, doctors and nurses,
1298 were found to welcome new models of care that involved shifting of tasks to nurses.
1299 Importantly, however, certain features of the tasks, for example how "medical" they
1300 were perceived to be and how health promotion/prevention in nature they were, were of
1301 importance to patients and nurses, respectively, in shaping their acceptance of the task
1302 shift. Nurses valued adequate training, a close doctor-nurse relationship as well as
1303 expressions of value and respect from doctors, and felt that tasking shifting allowed them
1304 to gain new skills and develop personally. Both doctors and nurses highlighted the need
1305 for adequate resources to undertake task shifting effectively and efficiently, and also

1306 noted the considerable amount of paperwork that accompanied shifting a task from one
1307 professional group to another. These issues have important implications for designing,
1308 implementing and evaluating future task shifting interventions as well as the creation of
1309 professional groups and environments conducive to adopting such initiatives.

1310 **3.4.10. Information technology as a facilitator of task shifting**

1311 As noted earlier, it is reasonable to assume that advances in information technology
1312 could facilitate task shifting. A systematic review that included 13 studies, 11 RCTs,
1313 identified a number of applications of information technology to support patients with
1314 chronic diseases.(125) These included electronic decision support tools, electronic
1315 platforms linked to a call centre, electronic health records, and electronic communication
1316 applications. The authors concluded that the inclusion of information technology in
1317 shared care can improve some outcomes, such as confidence and satisfaction, especially
1318 where this involves electronic communication systems. Other outcomes were mixed.
1319 Overall, the evidence was quite limited.

1320 Adoption of electronic health records forms a key element of many approaches to task
1321 shifting, enabling the exchange of information among different professional groups.
1322 However, there are concerns that existing systems can be cumbersome, requiring
1323 complex data entry processes. A systematic review found significant increases in the
1324 amount of time that physicians and nurses spent documenting patients' records although
1325 the authors suggested that there was some evidence of the time required reducing as
1326 staff became more familiar with the new systems.(126)

1327 As with self-management, there is a growing interest in the use of mobile technology
1328 within hospitals. A systematic review of the impact of mobile technology on teamwork
1329 and communications within hospitals found that few of the studies were of high
1330 quality.(127) However, the authors did suggest that the available evidence pointed to the
1331 potential, if not yet the realisation, of improvements in workflow, the quality and
1332 efficiency of communication, and enhanced accessibility and improved relationships
1333 within teams.

1334 A Cochrane review of computerised advice on drug dosage to improve prescribing
1335 practice, now rather outdated as it included studies only up to January 2012, found a
1336 number of benefits.(128) These included an increase in the number of patients receiving
1337 aminoglycoside antibiotics with levels inside the therapeutic range, better control of
1338 circulating levels of oral anticoagulants and insulin, a reduction in the time taken to
1339 achieve stabilisation with oral anticoagulants, a reduction in unwanted effects from
1340 antirejection drugs, and reduction in thromboembolism events with anticoagulants. The
1341 authors noted that many studies had a high risk of bias and urged caution in interpreting

1342 the results. Furthermore, they found no evidence of an impact on mortality or other
1343 adverse events.

1344 A systematic review of electronic clinical decision-making tools identified five studies,
1345 four of which were RCTs.(129) All but one found a significant reduction in prescribing of
1346 potentially inappropriate medicines, with a meta-analysis of two trials providing a
1347 summary relative risk of 0.82 (95% CI 0.76-0.88)

1348 **3.4.11. Innovative models of care**

1349 Several reviews examined innovations in delivery of care that included some element of
1350 task shifting. Most involve the creation of multidisciplinary teams and, while it is beyond
1351 the scope of this opinion to examine team working specifically, they are included here
1352 because they provide some information about collaborative working across professional
1353 boundaries.

1354 Given the complex needs of patients with cancer, there has been growing use of
1355 multidisciplinary teams. A systematic review sought to identify what characteristics of
1356 multidisciplinary cancer clinics were most effective.(130) There was some evidence
1357 supporting a reduced interval between diagnosis and treatment, and some very limited
1358 evidence pointing to improvements in patient satisfaction, increased collaboration within
1359 the clinical team, and better communication. However, overall, the authors noted that
1360 there was a marked paucity of evidence on which to base decisions.

1361 In a meta-analysis of the use of fracture liaison services, designed to support patients
1362 who have experienced an osteoporotic fracture,(131) the authors identified 57 high
1363 quality RCTs. The meta-analysis found that the use of liaison services was associated
1364 with a 27% increase in the probability that the patient would have bone mineral density
1365 testing. Components associated with success included multidisciplinary involvement, with
1366 a dedicated case manager, regular assessment and follow-up, and multifaceted
1367 interventions.

1368 Advances in medical care have greatly increased the need for vascular access. It has
1369 been suggested that that Vascular Access Specialist Teams (VAST) can improve clinical
1370 outcomes and patient experience. However, a systematic review found no evidence to
1371 support this argument, although as the authors noted, this could change when an
1372 ongoing study reports.(132)

1373 A Cochrane review of interventions to promote collaboration between doctors and nurses
1374 found two trials.(133) In one, the intervention was the implementation of structured
1375 daily team ward rounds in which nurses, doctors, and other professionals make decisions
1376 jointly. It found a reduced length of stay and a reduction in hospital charges. There were
1377 no differences in mortality rates or the destination on discharge. The second trial

1378 examined a similar intervention, although undertaken four times per week. In this case,
1379 the were no significant differences.

1380 **3.4.12. Other forms of task shifting**

1381 A systematic review of care provided by mid-level and higher-level health workers found
1382 little difference between the effectiveness of care in areas such as maternal and child
1383 health and communicable and non-communicable diseases.(134) In obstetric care, rates
1384 of episiotomy and analgesia use were significantly lower in women cared for by midwives
1385 compared to doctors (likely driven by multiple factors), and the satisfaction of the woman
1386 giving birth was higher.

1387 The HIV epidemic was an important stimulus to interest in task shifting, given the
1388 shortage of trained health workers in many of the countries most affected. A Cochrane
1389 review identified 10 studies, all in Africa.(135) Four were RCTs and the remainder cohort
1390 studies. There was good evidence from the RCTs that initiation and maintenance of
1391 antiretroviral therapy by nurses was associated with no difference in mortality but
1392 reduced loss to follow up. The cohort studies suggest a small increase in the risk of death
1393 in the group where care was provided by non-physicians and no difference in loss to
1394 follow up, although in this case the confidence intervals were very wide. Care initiated by
1395 doctors, with nurses undertaking follow-up, was not associated with any differences in
1396 survival or follow-up.

1397 An initiative in Scotland, which is facing a severe shortage of general practitioners,
1398 compared the conventional model, where patients with musculoskeletal problems are
1399 seen first by doctors, with one in which extended scope physiotherapists managed
1400 patients independently, referring for orthopaedic opinions where necessary. Using a
1401 range of measures, including patient satisfaction and appropriateness of referrals, it
1402 found that the two models achieved comparable results.(136)

1403 **3.4.13. Summary**

1404 Task shifting can take many forms. Tasks can be shifted from health workers to patients
1405 and their carers, to machines, and to other health workers.

1406 There are many theoretical arguments for greater self-management of long-term
1407 conditions, placing the patient in control. Of course, for many conditions, such as
1408 diabetes, this already happens to a considerable extent, increasingly aided by the
1409 introduction of new technology, such as continuous glucose monitoring. It is arguable
1410 that, because the benefits are so obvious compared to the alternative, this model of care
1411 has not been subject to evaluation. Following from this, those models of self-
1412 management that have been evaluated are ones that involve an enhanced role for the
1413 patient. The evidence reviewed here is, of necessity, incomplete, as it was far beyond the

1414 scope of this opinion to undertake the very large number of systematic reviews that
1415 would be required. However, by examining in detail the existing Cochrane reviews, it is
1416 possible to obtain a broad overview of the available evidence.

1417 This evidence can be summarised, broadly, as showing that most of the self-
1418 management interventions do not improve outcomes for patients but neither do they do
1419 any harm. Some do give patients a greater sense of control, although this should be
1420 interpreted in the light of differences within the population in the extent to which
1421 individuals actually want to take responsibility for their conditions. Thus, in a recent
1422 study in which patients in hospital were asked if they wished to self-administer their
1423 medication, a relatively simple act, while 84% were willing to do so, the remainder were
1424 not.(137) One factor that seems to be important is the extent to which the patient views
1425 the particular condition as able to be controlled, with greater enthusiasm for self-
1426 management of diabetes and asthma than migraine.(138)

1427 The conditions where self-management does seem to be most effective are those
1428 characterised by frequent changes in physiological parameters, such as blood glucose or
1429 blood clotting in those on anticoagulants. In these cases, the patient is aided by
1430 technology. However, each situation should be judged on its own merits, with no reliable
1431 evidence that pulse oximetry helps patients experiencing exacerbations of asthma.

1432 On balance, it seems that decisions about self-management should be taken by the
1433 individual patient, advised by their health professionals and the available evidence. This
1434 approach cannot be considered a universal panacea, but does seem to offer benefits for
1435 patients who seek greater autonomy and feel able to assume it and should be integrated
1436 as part of a wider goal-oriented care approach.

1437 The evidence on task shifting to community workers, whether paid or volunteers, is
1438 mixed. They are capable of undertaking many basic tasks, as well as or in some cases
1439 better than trained health workers, but only if they are well-defined and clearly
1440 structured. They do, however, require adequate training, appropriate support, and
1441 supervision.

1442 Advances in technology are offering many new possibilities for shifting tasks from
1443 humans to machines. However, the evidence for their effectiveness seems relatively
1444 limited, with several of the reviews identified noting how many had not been subject to
1445 evaluation. This is a serious gap because there is considerable potential for unintended
1446 consequences, including unconscious bias being introduced into algorithms and breaches
1447 of privacy leading to unauthorised uses of data.

1448 As with self-management, it seems that much task shifting among health workers
1449 happens informally, and is not subject to any rigorous evaluation. Those evaluations that

1450 have been undertaken focus on a relatively limited number of areas, and in particular
1451 enhancement of roles of particular groups such as pharmacists and nurses and the
1452 introduction of new models of care, with limited evidence on substitution of nurses for
1453 doctors and even less on task shifting to other groups. In many cases, the examples that
1454 have been studied are concerned with enhancement of roles, such as pharmacist taking
1455 on medication reviews on the wards or new roles for nurses. These involve people doing
1456 things that were not being done previously, and in general, they seem to be associated
1457 with improvements in patient care. In general, when nurses take on some defined tasks
1458 once reserved for doctors, generally in the context of a single-condition with a clear
1459 protocol based on explicit cut-off points, they can achieve outcomes that are at least as
1460 good, and in some cases better. Examples include the management of chronic disease,
1461 preoperative assessment, and prescribing for people with long-term conditions.

1462 To summarise, there is little evidence for the rigid demarcation is between different
1463 health professionals, such as doctors and nurses, that exists in many countries. It is clear
1464 that groups other than physicians, and especially nurses and pharmacists, can undertake
1465 substantially expanded roles compared to what has traditionally been the case. However,
1466 they must be adequately trained and supported and function in integrated teams with
1467 information-sharing. There is also a need to better understand the optimal combination
1468 or “package” of changes and additions that can act synergistically to improve the quality
1469 and safety of healthcare as well as patient experience. While it is not necessary to
1470 evaluate every change, there is a strong argument for doing so where major changes are
1471 taking place, as there is scope for unintended consequences. This should not, however,
1472 be an argument for doing nothing. Understanding of the drivers of implementation and
1473 trialling of task shifting as well as the enablers and barriers to successful design and
1474 implementation of such initiatives and complementary policy and working environments
1475 is critical to the adoption of effective and safe changes. The drivers of change may be
1476 diverse, for example the above review of the literature identified desire to improve
1477 patient experiences and clinical outcomes, resource use and availability, rising and
1478 changing patient need, and optimising cost effectiveness, among others, as potential
1479 incentives to task shifting. Multiple drivers are likely to co-exist and change depending on
1480 policy and health system environments as well as population and service contexts. The
1481 following section outlines country-specific examples of enablers and barriers to task
1482 shifting and some of the drivers that stimulate change.

1483 **3.5. Enablers and barriers**

1484 Barriers and facilitators to task shifting have been identified primarily from a recent
1485 publication of country case studies of policies on skill mix across the EU undertaken by
1486 the European Observatory on Health Systems and Policies.(139)

1487 **3.5.1. Staff shortages**

1488 Shortages of staff, overall or in particular sectors or geographical regions, have been an
1489 important driver of changes in clinical responsibilities. The economic recession
1490 experienced in Finland in the 1990s, which led to severe shortages of doctors in many
1491 rural areas, was an important stimulus to innovation, with nurses taking on a number of
1492 roles that had been traditionally reserved for doctors. Similarly, a shortage of doctors in
1493 rural France, as noted previously, has been an important driver of innovation.
1494 Recognition of the problems ahead, in 2003, led to the development of a new policy that
1495 included changes to regulatory processes for non-medical professionals, enhancement of
1496 nurse training with the introduction of Masters degrees, and the creation of new roles
1497 such as nurse practitioners. This also allowed for experiments to be undertaken.

1498 Also in France, it was previously necessary for spectacles or contact lenses to be
1499 prescribed by an ophthalmologist if they were to be reimbursed by the insurance funds.
1500 However, a new generation of ophthalmologists focused their attention on ophthalmic
1501 surgery. The resulting shortage was a stimulus for an acceptance that visual aids could
1502 be prescribed by orthoptists, as is the case in many other countries. There was, however,
1503 considerable opposition from the older ophthalmologists, who expressed concern about
1504 the risk of other diseases being missed. In practice, these nonsurgical ophthalmologists
1505 are diminishing in number, with most now close to retirement.

1506 **3.5.2. Increasing complexity of care**

1507 Changes in the characteristics of patients and in the opportunities to intervene have been
1508 an important driver of change in several countries. Thus, in Denmark, community nurses
1509 have had to take responsibility for patients with conditions that would previously have
1510 been managed in hospital, including dialysis, administration of intravenous
1511 chemotherapy, and complex palliative care. Similarly, those looking after frail elderly
1512 residents in care homes are providing care that would once have been administered in
1513 hospital. Their representatives recognise the need for additional skills.

1514 **3.5.3. Legal factors**

1515 Free movement of persons is one of the four fundamental freedoms that underpins the
1516 European Union. For nationals of the Member States, this includes, in particular, the right
1517 to pursue a profession, in a self-employed or employed capacity, in a Member State
1518 other than the one in which they have obtained their professional qualifications. In order
1519 to promote the free movement of professionals, while ensuring that those moving have
1520 the necessary skills, certain professional associations and organisations or Member
1521 States are able to propose common platforms at European level. A common platform is a
1522 set of criteria which encompass the range of differences that have been identified in

1523 training requirements in at least two thirds of Member States including all Member States
1524 that regulate the profession in question. These criteria may, for example, include
1525 requirements such as additional training, an adaptation period under supervised practice,
1526 an aptitude test, or a prescribed minimum level of professional practice, or combinations
1527 thereof.

1528 The recognition of professional qualifications laid down in Directive 2005/36/EC enables
1529 the free movement of professionals such as doctors or nurses within the EU. The general
1530 system of recognition enables workers to have their professional qualification recognised
1531 in another EU country. Article 24 of the directive requires that basic medical training shall
1532 comprise a total of at least six years of study or 5,500 hours of theoretical and practical
1533 training provided by, or under the supervision of, a university. Article 25 sets out the
1534 requirements for specialist medical training

1535 There is a system of automatic recognition of professional qualifications for seven so-
1536 called sectoral professions that includes nurses, midwives, doctors, dentists and
1537 pharmacists (as well as architects and veterinary surgeons). Directive 2005/36 adopts
1538 the principle of automatic recognition for medical and dental specialisations that were
1539 already common to at least two Member States when the directive was promulgated, but
1540 restricts new medical specialisations eligible for automatic recognition to those that are
1541 common to at least two fifths of the Member States.

1542 The general system for recognition does not prevent a Member State from making any
1543 person pursuing a profession on its territory subject to specific requirements due to the
1544 application of professional rules justified by the general public interest. Rules of this kind
1545 relate, for example, to organisation of the profession, professional standards, including
1546 those concerning ethics, and supervision and liability. However, directive 2005/36
1547 contains a provision aimed at preventing the circumvention of national requirements by
1548 having qualifications recognised in another Member State and then asking the country of
1549 origin to recognise them.

1550 While the revised directive, replacing one initially promulgated in 1974, is a major
1551 advance on what went before, it is important to note that it says almost nothing about
1552 the scope of practice of the professionals, as this is a matter reserved for Member States.
1553 Hence, health professionals moving across borders must be aware that there may be
1554 differences enshrined in law or regulations, that either assume that they will have skills
1555 not used in their country of origin or find that they are constrained in doing what they
1556 have previously done.

1557 Within member states, laws regulating professional barriers can, if poorly drafted, act as
1558 a major barrier to task shifting, as was found in a review of task shifting from doctors to
1559 nurses in Europe, North America, and Australasia.(140) The Belgian 1967 Royal Decree

1560 on health professions set out in great detail the interventions that could be undertaken
1561 by different professional groups, as well as those that a member of one profession could
1562 delegate to another. A key objective was the protection of patients from charlatans, who
1563 could be prosecuted for malpractice if they undertook something they were not permitted
1564 to do. However, the legislation struggled to keep pace with the changing roles of
1565 professions, and especially the emergence of new categories of health workers, while
1566 there was no fundamental change to the legislation. It also had many unintended
1567 consequences. Thus, a medical secretary who assisted the general practitioner by
1568 measuring blood pressure or taking a urine sample was at risk of prosecution. An
1569 informal caregiver was prevented from providing basic care to their relative, for example
1570 by administering medication or dressing a wound, unless they had received a certificate
1571 from a qualified nurse. A patient could take their own medicine but a family member who
1572 gave it to them was, at least in theory, at risk unless they had been authorised to do so
1573 by a qualified health professional.

1574 A new Belgian law, enacted in 2016, takes a different approach. It comprises two
1575 components, one relating to the framework for regulating health professionals, and the
1576 second regulating professional practice. The professions are described in terms of
1577 competences rather than the previous list of interventions that can be undertaken by
1578 different health professionals. It is envisaged that there will be a short list of activities
1579 that are exclusively preserved for specific professionals while many others can be
1580 undertaken by those who can be shown to have the necessary skills and competencies.
1581 Each professional group will be required to hold a licence to practice that will be valid for
1582 a period of five years, with renewal based on a portfolio of activities, experience, and
1583 continuing education, and which can include details of the additional tasks they are able
1584 to undertake. While legal uncertainty can facilitate changing roles, as in Portugal or
1585 Denmark, for example by making pilot studies easier, this was identified as a barrier to
1586 scaling up nurse prescribing in Finland.

1587 **3.5.4. Professional associations**

1588 There are many examples where professional associations and trade unions have
1589 opposed changes in responsibilities. The 2017 legislation in Austria was opposed by the
1590 medical profession, who argued that it would threaten the quality of care that patients
1591 receive if they were treated by other professional groups, it would undermine the
1592 relationship of trust between the doctor and the patient, reduce the right to a free choice
1593 of doctors, and weaken the position of the profession when negotiating with the social
1594 insurance funds.

1595 The 2003 proposals on skill mix in France faced considerable opposition from both the
1596 medical profession and trade unions representing other health workers. Multiple

1597 compromises were needed and the law introduced in 2009 was considerably less
1598 ambitious than what have been proposed in 2003. Terms such as “task transfer” and
1599 “task delegation” gave way to “cooperation”. The process was, however, facilitated by
1600 medical leadership within the Ministry of Health, where the Minister was a highly
1601 regarded professor of medicine. The process was taken forward by another respected
1602 medical leader, who had been the president of a university hospital in Marseille. His
1603 tenure as the president of the National Observatory of Health Professions for 13 years
1604 provided a degree of stability that facilitated the implementation and embedding of
1605 change.

1606 In a few countries, such as Malta, patient advocacy organisations have been important in
1607 promoting the development of new roles by non-medical professionals.

1608 **3.5.5. Financial incentives**

1609 Financial incentives can either stimulate or discourage task shifting. Task shifting in
1610 general involves two parties: one party handing over a task and one party taking on a
1611 new task. Financial incentives are relevant for both these parties. Handing over tasks for
1612 example will be less likely when this implies a reduction in income. Whether this is the
1613 case depends on many factors and circumstances, including whether the freed time will
1614 be filled with other (income generating) activities, whether financial arrangements are
1615 made to avoid income reductions, and whether income was based on activity (rather
1616 than being a fixed salary). Moreover, it depends on who takes over the tasks and
1617 whether that person is part of the same organisation (e.g. dentists hiring oral hygienists
1618 in their own practice to perform certain activities). Financial motives in that sense can
1619 also stimulate task shifting, e.g. when task shifting leads to income gains, for example
1620 because replacing activities increase income or when the people now performing the task
1621 are working for the party handing over the tasks. Both encouraging and discouraging
1622 financial incentives can contribute to optimal outcomes, since task shifting can be
1623 desirable or undesirable.

1624 The party taking on the new role also faces financial incentives. Health professionals may
1625 be reluctant to develop and use new skills if their investment in training and acceptance
1626 of additional responsibility is not rewarded. In England, the development of a career
1627 development process, Agenda for Change, has been identified as facilitating changing
1628 skill mix. All non-medical health professionals are on a commonplace deal, which includes
1629 a “skills escalator”, whereby the acquisition of new skills relevant to the job is
1630 recognised and rewarded. In Finland however, pay differentials between prescribing and
1631 non-prescribing nurses was reported as being divisive and causing resentment by the
1632 latter.

1633 In Poland, introduction of nurse prescribing has had very limited success. Nurses seeking
1634 to prescribe must complete a specialised course but were not rewarded financially for
1635 their investment in training or their additional responsibilities. This has meant that there
1636 has been very little uptake and, in some cases, threats of industrial action.

1637 In several countries, including Germany and Switzerland, payment of physicians by fee-
1638 for-service provides a strong incentive not to encourage task shifting to other health
1639 professionals. Similarly, in Finland, the provision of additional payments for home visits
1640 meant that physicians were reluctant to support enhanced roles for nurses and other
1641 health workers. Conversely, while capitation or “bundled” payments may encourage task
1642 shifting, there is a risk of this being inappropriate or leading to reduced quality of care if
1643 not accompanied by regulatory oversight, and adequate documentation and
1644 accountability.

1645 Moreover, if task shifting results in cost reductions, for instance because lower skilled and
1646 lower paid personnel takes over tasks, it is important to recognise this does not
1647 automatically lead to lower expenditures. Payment systems should not only enable of not
1648 promote desirable task shifting, but also lead to a fair division of cost savings between
1649 providers of care and payers/society.

1650 **3.5.6. Changing professional attitudes**

1651 In many countries the traditional model of primary care, based on an often male doctor
1652 in sole practice, often supported by family members, is disappearing. There are several
1653 reasons. One is the feminisation of the medical workforce. Another is the desire among
1654 younger doctors for an improved work life balance, coupled with the impact of the
1655 European Working Time Directive. A third is a recognition among the younger generation
1656 of doctors of the many benefits of multidisciplinary teamwork, especially with an ageing
1657 population with multi-morbidity.

1658 Cross-sectional research in 9 countries of the self-reported motivators and barriers to
1659 changes in professional roles, reveals that, in the context of major skills mix reforms,
1660 nurses were more likely to be motivated to undertake a new role (66.5%) and to have
1661 opportunities to do so (52.4%), when compared to nurses working in countries where
1662 such reforms had not been implemented (39.2%; 24.8%; $p < .001$ each).(141) Intrinsic
1663 motivators, such as personal satisfaction and use of qualifications, were identified by
1664 physicians and nurses as being of greater influence to adopt role changes than extrinsic
1665 factors (e.g. salary or career opportunities). Professional and management support were
1666 seen to facilitate role changes, while workforce shortages were reported as hindering
1667 such change.

3.5.7. Pilot projects and experiments

1668
1669 One barrier to the adoption of new models of task shifting is a concern that, once
1670 implemented, they cannot be reversed. Several countries have adopted mechanisms that
1671 allow for pilot projects to be undertaken, with continuations subject to a positive
1672 evaluation. The new law on healthcare professions in the Netherlands makes explicit
1673 provision for experiments whereby designated healthcare professionals can carry out new
1674 procedures for up to 5 years and, if the new model is positively evaluated, it can then be
1675 incorporated into law. This link to evaluation has made it easier for otherwise
1676 controversial changes to be accepted. Thus, a provision for nurses with basic
1677 qualifications to prescribe a very restricted list of low-risk medicines was accepted with
1678 little controversy but another proposal, to allow nurses with additional training to
1679 prescribe a wider range of medicines was only accepted within the framework of an
1680 experiment.

1681 Provision of additional funding for these projects also facilitates their introduction, as in
1682 Austria, where 75 primary healthcare projects have been implemented, many involving
1683 some reallocation of tasks, a process linked to a new system of nurse training. Additional
1684 funding for pilot projects has also been provided in Norway.

1685 The ease with which pilot projects can be undertaken depends on the extent to which the
1686 prevailing legislation specifies professional roles. Thus, it was relatively straightforward in
1687 Portugal where the legislation contained few details. Similarly, in Denmark and Finland,
1688 there has been considerable experimentation at local level, some of which have involved
1689 considerable innovation, such as the creation of multidisciplinary teams that will visit
1690 patients experiencing exacerbations of COPD in their homes.

1691 The 2009 law in France, which provided a legal basis for experimentation, with proposals
1692 tested against two criteria, scientific validity and clinical relevance. However, the pace of
1693 change has been slow. One report describes how 31 draft protocols were submitted in
1694 the Ile-de-France region but only 12 were implemented.

3.5.8. Capacity to implement change

1695
1696 The implementation of new models of care, including task shifting, requires considerable
1697 clinical and managerial investment. For example, a report from Denmark suggested that
1698 general practitioners were feeling overwhelmed with their workload and unable to devote
1699 the necessary time to implement new arrangements for task shifting, even when they
1700 accepted the case for doing so.

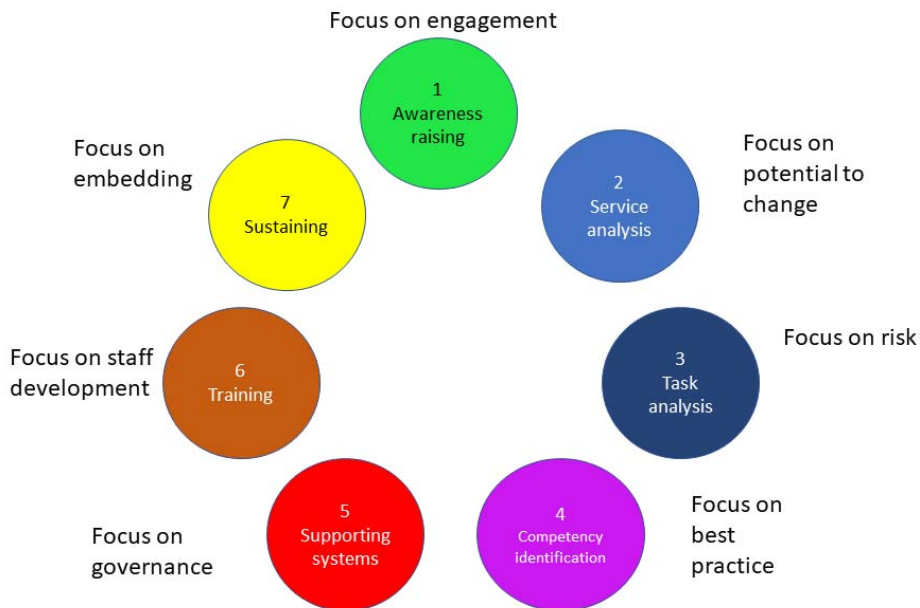
1701 In England, a national non-profit organisation, Skills for Health, provides support on a
1702 consultancy basis to healthcare employers seeking to transform their workforce. A
1703 number of healthcare providers have used what is termed the Calderdale

1704 Framework,(142) an evidence based approach named after the location in which it was
1705 developed, whose developers provide training, materials, and ongoing support for those
1706 seeking to implement extended roles (Figure 2).(142) This stresses the importance of
1707 taking a system-wide approach in which those seeking change engage fully with those
1708 affected, identify, draw on existing best practice, address issues of governance, develop
1709 staff, and follow through to ensure sustainability.

1710

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1711 Figure 2 The Calderdale Framework



1712

1713 Source: www.calderdaleframework.com

1714 © R Smith and J Duffy (t/a Calderdale Framework Ltd). Reproduced with permission.

1715

1716 Task shifting in England has also been supported by extending the roles of certain
1717 professionals through the shifting of specific tasks. This has been accompanied by
1718 adequate training, certification and regulation. For example, radiographers may receive
1719 training to develop skills to perform tasks typically performed by radiologists, such as x-
1720 ray interpretation as well as administration of intravenous injections and barium
1721 enemas.(129)

1722 In some countries, such as France, a useful starting point was to identify substitution
1723 practices that were already happening, even if informal or even illegal. This was coupled
1724 with identification of local medical champions who were willing to engage in the
1725 experiments made possible by the new law.

1726 **3.5.9. Regularisation of informal practices**

1727 Considerable task shifting already takes place in some countries on an informal basis. For
1728 example, in Austria, much long-term care was provided informally, often by migrant
1729 workers with uncertain employment status. The new law, enacted in 2017, seeks to
1730 formalise these processes, requiring care workers to possess a minimum set of

1731 qualifications. In France, doctors were reluctant to give official recognition to the many
1732 tasks being undertaken by non-medical workers informally, as this would require that the
1733 staff concerned be paid commensurate with their responsibilities.

1734 For completeness, it should be noted that there are examples of health professionals who
1735 obtain inappropriate employment in the health sector. Examples include doctors working
1736 in nursing roles and nurses working as health care assistants. This may be because they
1737 are paid higher salaries than if they were performing the role for which they are qualified
1738 in their countries of origin but are unable to obtain those posts in the country to which
1739 they migrate or because their qualifications are not recognised in their countries of
1740 origin.

1741 **3.5.10. Legal indemnity**

1742 Since the late 19th century, state legislatures and professional medical organizations
1743 have developed mechanisms to license physicians and other non-physician providers,
1744 establish standards of practice, and protect patients by establishing standardized
1745 credentials as markers of competence. These may or may not specify what each group is
1746 permitted to do and, specifically, whether they have legal authority to do it. The absence
1747 of specific provisions to provide legal indemnity for health professionals assuming new
1748 responsibilities has been identified as a barrier to change in a number of countries. This
1749 may require legislative change. Although we are unaware of any systematic attempt to
1750 track the scale and pace of change in Europe, a review of regulations in US states
1751 between 2001 and 2010 found a progressive relaxation of existing restrictions on nurse
1752 practitioners and physicians' assistants.(143)

1753 One area that requires particular attention is complementary and alternative medical
1754 (CAM) therapy. Complementary and alternative medicine (CAM) are difficult to define but
1755 can be considered to include medical products and practices that are not part of standard
1756 medical care. While some qualified and licenced health professionals do practice CAM,
1757 much is undertaken by those without a recognised qualification. For example, a "diet
1758 therapist" may use a special diet to treat cancer instead of anticancer drugs prescribed
1759 by an oncologist. While much CAM, such as homeopathy, is harmless (except where it
1760 deters a patient from seeking effective treatment, such as the use of homeopathic
1761 "antimalarial prophylaxis"), it creates many opportunities for fraudulent practices,
1762 misleading information, incorrect diagnosis, improper treatment, and severe patient's
1763 injuries.

1764 The number of CAM-trained practitioners is growing. In Europe, CAM is practiced by
1765 approximately 145.000 physicians (trained in both conventional medicine and CAM

1766 therapies), as well as more than 160.000 non-medical practitioners.(144) Social media
1767 has increased the popularity of CAM.

1768 Thus, a comprehensive assessment of task shifting cannot ignore the extent to which
1769 some task-shifting is taking place from those practicing evidence-based therapies to
1770 ineffective or possibly dangerous CAM. Although it is beyond the scope of this opinion to
1771 propose solutions to this problem, it is important to recognise its existence.

1772 Returning to conventional treatment, a change to the law on roles of nurse practitioners
1773 and physicians' assistants in The Netherlands in 2011 made it lawful for them to conduct
1774 a range of procedures that had previously been reserved for physicians, such as
1775 cardioversion/defibrillation, catheterisation, endoscopy, injections, some prescribing, and
1776 minor surgical procedures, although in practice, they had long been undertaking some of
1777 them informally. An evaluation found that this change led to an increase in both groups
1778 undertaking these roles although in some cases they were held back by opposition from
1779 physicians and inadequate budgets for training.(145) As noted earlier, a study comparing
1780 progress in task shifting in The Netherlands, England, and Scotland, all of which
1781 introduced legislative or regulatory change between 2010 and 2015, found that progress
1782 in shifting tasks from doctors to nurses was greater than in six other countries where no
1783 such change occurred.(43)

1784 **3.5.11. New areas of work**

1785 Traditionally, nursing has had relatively low status in Germany, while the medical
1786 profession has been very strong. There has been considerable opposition to nurses taking
1787 on extended roles that are common elsewhere. One of the few areas where this has been
1788 possible has been in the new long-term care sector, which has been created in response
1789 to the ageing population and facilitated by the system of long-term care insurance.
1790 Nurses working in this sector have been able to adopt extended roles beyond that in
1791 other parts of the health system.

1792 The development of palliative care in Switzerland, occupying what had been a gap in the
1793 care pathway, provided an opportunity for enhancement of the nursing role.

1794 A related factor in some countries has been the shift from hospital to ambulatory care.
1795 Thus, in Ireland, a move to manage the care of patients with epilepsy in the community
1796 stimulated the development of a new professional group, epilepsy specialist nurses. They
1797 work in a multidisciplinary team, but with substantially enhanced roles. Thus, they have
1798 their own patient caseloads, and can train to become registered advanced nurse
1799 practitioners, running community clinics, providing outreach services, and admitting and
1800 treating patients autonomously. A similar program, with enhanced roles for nurses, has
1801 been developed for diabetes, with the clinical nurse specialists undertaking advanced

1802 training programs. Another scheme has been developed in Dublin where management of
1803 patients with COPD is led by a physiotherapist.

1804 **3.5.12. Summary**

1805 Although the preceding sections examine individual factors, many accounts show that
1806 they often act in combination. A systematic review of barriers to non-medical prescribing
1807 identified 17 themes.(146) The first three related to the prescriber. These were attitude,
1808 with some welcoming the additional responsibility and others frightened by it, area of
1809 competence, with reluctance to prescribe for patients with additional or complex
1810 problems, and clarity about the professional's role and responsibilities in the
1811 organisation. The second four relate to human factors, including patients, especially
1812 where they welcome the holistic care from non-medical providers, managers, especially
1813 where they are supportive, medical professionals, where they are supportive and offer
1814 advice when needed, and peers, especially where there are trusting relationships. The
1815 third category, of organisational factors, is sub-divided into four broad groups. The first is
1816 related to administration (presence of a formulary, a clear and permissive policy, and
1817 appropriate remuneration for the additional skills and responsibilities). The second relates
1818 to development (support following initial training, selection of appropriate individuals for
1819 training). The third covers service delivery (providing more timely care for patients, as
1820 long as the prescribers do not have excessive workloads, infrastructure, specifically
1821 access to patient records, and a sense of greater patient satisfaction). The fourth group
1822 relates to the types of patients, especially those with long term needs with whom the
1823 professionals can develop a relationship, and the setting, for example where non-medical
1824 prescribing allows patients to remain in their own homes.

1825 **3.6. Implementing task shifting**

1826 **3.6.1. A conceptual framework**

1827 The preceding sections highlight the complexity of task shifting in health care.
1828 Implementing new practices in an organisation requires changes in both individual and
1829 collective behaviour. In this section we draw on a study in a Norwegian hospital in which
1830 nurses successfully assumed responsibility for bone marrow aspiration, a task previously
1831 undertaken solely by doctors.(147) This process was informed by a qualitative study that
1832 included interviews with those involved.

1833 It drew on two theories, the Capability, Opportunity and Motivation behavioural
1834 model(148) and the Theoretical Domains Framework.(149) It identified ten factors that
1835 were perceived to influence implementation. Three were related to capability: knowledge
1836 and acceptability of the rationale for task shifting; dynamic role boundaries; and
1837 technical skills to perform the task. Five were related to motivation: beliefs about task

1838 shifting consequences, such as efficiency, quality and patient satisfaction; beliefs about
1839 capabilities, such as technical, communicative and emotional skills; job satisfaction and
1840 esteem; organisational culture, such as team optimism; and emotions, such as fear of
1841 informal nurse hierarchy and envy. The last two related to opportunity: project planning
1842 and leadership, and voluntariness; and patient preferences.

1843 Turning first to those related to capability, it was important that all those involved fully
1844 understood the rationale for behaviour change and were provided with the evidence base
1845 for task shifting. Training should also address perceptions about the roles of different
1846 professional groups, recognising that some of those involved could see change as a
1847 threat. This was not just those whose traditional roles were being replaced but also those
1848 whose roles were expanding. Thus, some nurses worried that the adoption of new
1849 technical tasks could erode their general nursing skills. Finally, training in the technical
1850 aspects of the new tasks was essential.

1851 Training also features strongly in the factors related to motivation. Thus, it was important
1852 that those involved could understand the benefits from task shifting. These included
1853 giving doctors more time to spend on more advanced cases. However, this needed to be
1854 balanced with the risk of fragmentation of responsibility within the team. Task shifting
1855 was also seen as a means of demonstrating trust in those health workers whose roles
1856 were being expanded, as it was accompanied by investment in their continuing
1857 professional development.

1858 Finally, under opportunity, the importance of planning the process of task shifting, with
1859 effective leadership, but taking account of the need for adoption of new roles to be
1860 voluntary, was stressed. So was the need to take account of patient preferences,
1861 although in this case it was believed that what mattered to patients was the competence
1862 of the individual rather than the professional title.

1863 Two main issues emerged from this study, education and environmental restructuring.
1864 Environmental restructuring related primarily to the structure of teams and hierarchies.
1865 It involved addressing uncertainty about roles, the building of trust, and the creation of
1866 mutual respect. In the next section, we examine the issue of education training, and
1867 continuing professional development in more detail.

1868 **3.6.2. Education, training and continuing professional development**

1869 Lifelong learning, whereby health workers continuously develop new skills and expertise
1870 to allow them to respond to changing circumstances, is fundamental to everything that
1871 has been written in the previous sections of this opinion. It underpins the flexibility
1872 required in the health care workforce if it is to have the necessary capacity to respond to
1873 a changing world. It gives health workers the skills they need, conveys an understanding

1874 of the need for, and benefits of change, and the confidence to make that change. It is
1875 beyond the scope of this opinion to examine in detail the type of training required as it
1876 will vary according to the tasks being shifted, the new roles being adopted, and the
1877 health system and wider contexts. However, it is important that it includes not just
1878 training in the technical aspects of the tasks to be shifted but also the "soft skills" that
1879 act as enablers for teamwork, creativity, decision-making, communication, and
1880 collaboration, conveying an understanding of the rationale for change, the benefits of
1881 doing things differently, and a means of discussing fears and anxieties.

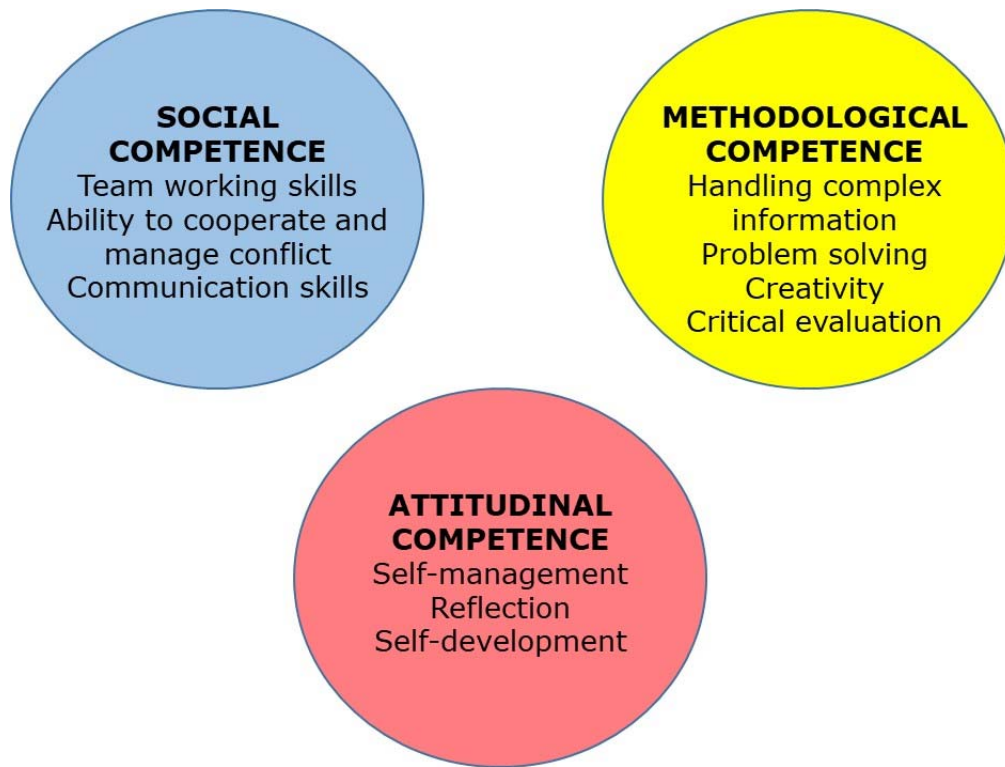
1882 It seems intuitive that an environment in which different professional groups are trained
1883 together will foster mutual respect, support collaborative working, and help break down
1884 traditional hierarchies. Yet training of health professionals often persists in promoting
1885 many of the characteristics associated with an old-fashioned, individual, craft-based
1886 system that is incompatible with the teamwork that is recognised to be essential for safe
1887 and effective care.(150) Simply put, curricula and training produce specialists capable
1888 performing their respective tasks but they then work together as a group and not as a
1889 team. Yet, as one Cochrane review has noted, key factors influencing care "include the
1890 existence of teamwork and of trust, collaboration, and communication between health
1891 workers".(151) By not capitalizing on the benefits of distributed, decentralized efficient
1892 team working (TEAM "Together Each Achieves More") services fail to improve despite
1893 having the specialists for key tasks.(152-154)

1894 These issues are beginning to be addressed in more recent documents on medical
1895 curricula, also reflecting a realisation that much of the knowledge traditionally taught is
1896 not retained unless directly relevant and should more appropriately be included in
1897 subsequent specialist training.(155) Hence, medical training in some, but not all
1898 countries, is moving towards a model (Figure 3) that takes account of the need for a
1899 range of competences.

1900

1901
1902

Figure 3 **Generic competencies for health professionals**



1903

1904 Source: Bourek A, 2019

1905

1906 A scoping review found that, while there was limited research on interprofessional
1907 education, and what existed was of mixed quality, in general, it was associated with
1908 positive changes in student perceptions and attitudes,(156) although there are
1909 exceptions, as in a study of graduate entry medical students(157) exposed to an
1910 interprofessional learning experience who demonstrated a decline in scores on the
1911 Readiness for Interprofessional Learning Scale (RIPLS), which measures attitudes to
1912 team work and collaboration, professional identity, roles and responsibilities, and patient-
1913 centeredness and has been used in a number of studies to evaluate interprofessional
1914 learning(158). Another recent study, based on a 24-month intervention period, provided
1915 further evidence to suggest that combining interprofessional practice and education in
1916 the ambulatory care setting delivers beneficial outcomes for both students and
1917 patients.(159) A systematic review of 16 articles, concluded that, based on objective
1918 measures, interprofessional education leads to improvements in collaborative skills,
1919 knowledge and behaviours. Learning material complexity, programme design and its
1920 appropriateness, as well as use of explicit standards of competence were identified as
1921 contributing to the effectiveness of interprofessional education.(160)

3.7. Measuring the impact of task shifting

1922
1923 It is beyond the scope of this opinion to examine in detail the impact of particular forms
1924 of task shifting. Rather, we note that such policies should be evaluated, but in ways that
1925 take account of the complexity that characterises them. Thus, a change in responsibilities
1926 of one professional group will have consequences for others and, potentially, for the
1927 wider health system. There is also the need to conceptualise the changes/interventions
1928 being measured when designing and undertaking evaluations. For example, there are
1929 theoretically two types of impact that may be the desired outcome: (a) changes in the
1930 way health care providers meet health system goals, with the impacts being measured
1931 by improvements goal attainment, and/or (b) changes in the way providers achieve a
1932 pre-determined outcome, that is, the establishment of resilience and flexibility that
1933 allows a provider to achieve goals using combinations of resources available.

1934 Future evaluation studies must embrace this complexity, seeing it as a system-wide
1935 intervention. Thus, they must endeavour to capture the wider effects that can result from
1936 a health system perspective. There are few studies that focus on the wider impact of task
1937 shifting. Such studies should recognise explicitly that task shifting has implications across
1938 the health system, extending beyond the specific tasks and actors directly involved, with
1939 potential impacts on health system planning, workforce capacity development and
1940 decision-making. As a result evaluation systems need to capture the system-wide effects
1941 of task shifting, including both intended and unintended consequences on the healthcare
1942 system and ultimately on health outcomes. Studies evaluating task shifting interventions
1943 for mental health have done this, highlighting the importance of barriers, enablers and
1944 effects that fall outside the specific scope of the task shifting process.(161, 162) Such
1945 evaluations will require a more systematic approach to determining the influence of wider
1946 health system elements and how these in turn are impacted by task shifting.

1947 One important omission from much of the material reviewed for this opinion was the
1948 inclusion of considerations of equity, as noted in a systematic review of research on task
1949 shifting in high income countries.(163)

1950 Further considerations include *who* benefits from task shifting, what *form* this benefit
1951 takes and at what cost or *impact* (financial or otherwise) on others does this incur. This
1952 can be illustrated by considering potential impacts of financial incentives. When the
1953 payment system is based on activity (and perhaps responsibility) rather than who
1954 performs the activity, task shifting may lower costs but need not lower total
1955 expenditures. An example is when dentists employ oral hygienists to deliver particular
1956 services (which may be performed under their supervision). This may lower costs of
1957 providing the service but not necessarily payments by patients or third party payers as
1958 the cost savings can translate into private gains rather than health care or societal

1959 benefits. This creates strong financial incentives for task shifting but has undesirable
1960 effects on the division of profits and sustainability. A balance that incorporates the
1961 interests of the professional and the service user needs to be found.

1962 Second, the impact on informal carers is important and deserves attention. In terms of
1963 sustainability it must be noted that the burden placed on these carers can be high.
1964 Shifting tasks to them may be a solution from the perspective of the formal care system,
1965 but not from a broader societal perspective, given the high costs on the carer, with
1966 health and wellbeing losses, private costs and reduced productivity and labour force
1967 participation. This is especially important as the demand for long term care is expected to
1968 grow further while supply of formal care may increasingly be constrained. Accurate
1969 measurement of the costs and benefits of task shifting then also requires considering
1970 factors that transcend the health care sector, such as policies on paid leave from work,
1971 as well as further consideration of what is feasible in relation to maintaining and perhaps
1972 expanding the tasks of caregivers.

1973 3.8. CONCLUSIONS

1974 So far, much of the discussion of task shifting in the health policy arena has been
1975 concentrated on the situation in low income countries. Yet, paradoxically, much of the
1976 research that exists on this issue is from high income countries. Those discussions have
1977 concentrated on finding solutions to a specific problem, the shortage of health workers in
1978 low income settings. However, as the evidence reviewed for this opinion shows, the
1979 challenges are much more complex. Clearly it is necessary to confront current and future
1980 shortages of health workers in all countries, but it is difficult to see how this will be
1981 achieved by shifting roles and responsibilities from one type of health worker, doctors,
1982 that are already experiencing severe shortages in many countries, to another, nurses,
1983 where the shortages are often even greater. Furthermore, much of the evidence related
1984 to task shifting relates to the quest for solutions to another problem, the growing
1985 complexity of care, in terms of patients with multiple conditions, new opportunities to
1986 intervene, and new models of care. Thus, task shifting should often be seen as an
1987 enhancement that makes health care more appropriate to the changing needs of patients
1988 rather than a means to cut costs or a means to take advantage of innovations, in
1989 technology and models of care.

1990 Given the pace of change, in patterns of disease, opportunities to intervene, and new
1991 ways to organise care. task shifting cannot be seen as optional. It is essential, simply to
1992 keep pace with these changes. Changing professional roles, and the associated tasks that
1993 are performed, are essential for the sustainability of health care. Financial sustainability
1994 requires that those with high levels of skills are not being deployed in roles and on tasks
1995 that do not require their expertise. Yet sustainability involves more than ensuring that

1996 there are adequate financial resources for the health system. Money is of little use if
1997 there is nothing to buy with it. Many countries are experiencing high rates of dropout
1998 among health professionals, with a new generation less willing to accept the adverse
1999 work life balance that was taken for granted by their predecessors.

2000 The evidence reviewed for this opinion shows that many tasks traditionally undertaken by
2001 certain types of health workers, and particularly doctors, are now being undertaken by
2002 others, including nurses and pharmacists. New professional groups are also emerging,
2003 such as nurse practitioners and physician assistants. But the pace and scale of change
2004 vary greatly.

2005 The available evidence is much less than would be desired but it does show that many of
2006 the tasks once reserved for particular groups can be undertaken as effectively, or more
2007 so, by others, but each case should be assessed on its merits. Crucially, task shifting
2008 should not be viewed in isolation but seen in the wider context of the health system. A
2009 change in roles will often have wide ranging consequences, challenging traditional
2010 hierarchies and professional norms.

2011 There are many barriers to change, including unsupportive and rigid attitudes, legislative
2012 and regulatory constraints, payment systems and others. Yet, if carefully managed, these
2013 can often be overcome. Sometimes, this simply involved formalising what already
2014 happens, albeit informally. In other cases, it requires wide system redesign.

2015

2016 **4. RECOMMENDATIONS**

2017 Our recommendations stem from our clear opinion, based on the evidence that we have
2018 reviewed, that European health systems must embrace flexibility in professional roles,
2019 including task shifting, if they are to respond to changing circumstances and maximise
2020 health gain. We have explicitly not set out to provide a list of what tasks can or should be
2021 shifted from one type of health worker to another, or from health workers to patients and
2022 their carers or to machines because this would impose an inappropriate degree of
2023 rigidity. The evidence that we have reviewed shows that many tasks that have
2024 traditionally been done by one type of health worker can be done as well or even better
2025 by others, but we also show that because something works in one context does not mean
2026 that it will necessarily work in another, given the diversity in health systems, public and
2027 professional expectations, and regulation of professions.(164) Consequently, we do not
2028 impose any formal constraints on what tasks can be shifted but argue that whether they
2029 can or should be will depend on a range of circumstances. The first consideration is
2030 whether there is a case for shifting a task. Task shifting can be justified on various
2031 grounds, including clinical effectiveness, economic considerations, or a response to staff
2032 shortages, among others. We caution that task shifting should not be seen simplistically
2033 as a means of delegating tasks to cheaper, lower skilled workers or to patients and their
2034 unpaid carers or machines. In fact, many of the examples we have described involve
2035 enhancement of roles, allowing health workers to develop new skills and expertise.
2036 However, it is essential that the case for doing so is made explicit.

2037 The second consideration is whether the individual taking on the new task has the skills
2038 and expertise necessary or can acquire them with appropriate training. This decision
2039 should be based on objective assessment rather than historical norms.

2040 The third consideration is whether there are any legal or regulatory barriers to shifting
2041 the task. This will be highly context specific, given the substantial diversity in the
2042 regulation of professions among member states. Thus, in some, specific tasks are
2043 restricted to some types of health worker, especially physicians. In others, the law is
2044 framed in a more permissive way, so that health professionals can undertake a wide
2045 range of (unspecified) procedures as long as they can demonstrate the requisite skills
2046 (which may not necessarily be linked specifically to a particular professional
2047 qualification). Other, similar barriers may exist where there are rules about whether
2048 procedures can be reimbursed by payers if they are undertaken by other types of health
2049 workers. Where such barriers exist, then it is necessary to assess whether they should or
2050 can be changed.

2051 A fourth consideration is that task shifting, especially where it involves substantial
2052 changes in roles, will almost inevitably have consequences for the working of the

2053 organisation, especially where this is based on hierarchies or command and control
2054 approaches. Consequently, task shifting will often have to be accompanied by new
2055 organisational models, including where necessary changes in status of the health workers
2056 involved. It is also critical to be aware of the potential impacts task shifting can have on
2057 attitudes (both public and professional) towards the professions concerned. That is, by
2058 altering the mix of skills and tasks associated with a particular qualification may change
2059 the interest/desire for that profession, for multiple reasons – career path, opportunities,
2060 income – and thereby demand for entry and training in that profession and ultimately the
2061 composition of the health care work force. This implies a need to consider the short and
2062 longer term impacts of task shifting on career choice and paths.

2063 Our recommendations follow these considerations.

2064 There are many reasons why certain tasks might be shifted, from health workers to
2065 patients and their carers, to machines, or to other health workers. **We recommend**
2066 **that, in all cases, the objective being pursued is clearly specified, the rationale**
2067 **for selecting task shifting as a means to achieve that objective is explained, and**
2068 **the evidence on which the decision is based is presented.**

2069 We recognise, however, that although we have been able to review a large volume of
2070 evidence for this opinion, there are still many weaknesses in the evidence base and the
2071 evidence that exists is concentrated in a small number of countries. **We recommend**
2072 **that there should be increased investment in research on task shifting, with the**
2073 **goals of increasing the number of studies from settings that are inadequately**
2074 **represented and understanding the contextual factors that determine what**
2075 **works in what circumstances.**

2076 Task shifting will only work if those involved understand the rationale for doing it. Health
2077 workers, overwhelmingly, are committed to providing high quality care. The available
2078 evidence shows that they are often willing to adopt new ways of doing things providing
2079 they are convinced that it will improve care, and of course, providing that the existing
2080 structures and incentives do not create major barriers. For this to happen, it is necessary
2081 to have appropriate training throughout the entire educational journey travelled by
2082 health workers to give them both the general skills and the specific technical skills
2083 necessary to undertake the new tasks, to provide convincing evidence that it will actually
2084 improve the quality of care, and to foster attitudes, from the undergraduate level
2085 onwards, that promote collaboration among professional groups and team working. Task
2086 shifting is facilitated by having dynamic role boundaries, whereby different health
2087 workers understand the importance of working as a team rather than as individuals with
2088 rigid professional boundaries. There is some evidence that interprofessional learning
2089 experiences can foster positive attitudes. On the other hand, if those who provide

2090 education themselves promote rigid hierarchies, there is a danger that this could
2091 reinforce such outdated attitudes. **We recommend that those responsible for**
2092 **training health workers ensure that they:**

2093 **a) convey positive attitudes to interprofessional and team working and that**
2094 **those being trained have opportunities for interprofessional learning**
2095 **experiences**

2096 **b) provide the specific skills necessary for task shifting, in those cases**
2097 **where the evidence indicates that task shifting is likely to be effective.**

2098 Task shifting is more likely to succeed where those involved are convinced that the
2099 consequences of implementing it will be positive. This means that it should not be seen
2100 as simply a form of cost-cutting. As the evidence reviewed in this opinion shows, in many
2101 cases, task shifting should be seen as a means of enhancing the quality of care. Given
2102 the importance of recruiting and retaining health workers at the time of shortage, it
2103 should also be seen as a means of enhancing job satisfaction. **We recommend that**
2104 **those responsible for implementing task shifting engage in dialogue to**
2105 **understand the expectations and fears of those who will be affected by it,**
2106 **including patients and their carers where appropriate.**

2107 Success is more likely if there is a supportive organisational culture. There is now a
2108 wealth of evidence that an organisational culture characterised by flat hierarchies and
2109 mutual respect and trust is associated with better patient outcomes. It is also likely to
2110 promote models of task shifting that ensure that the most appropriate types of health
2111 worker are undertaking particular roles. **We recommend that those responsible for**
2112 **health services evaluate, and where necessary, intervene to improve the**
2113 **organisational culture of the facilities that are within their remit to ensure that**
2114 **they promote flexible approaches to working.**

2115 Regulation of professions in the health sector should permit sufficient flexibility for them
2116 to assume different roles in certain settings, such as in areas where there are shortages
2117 of one sort of health professional. Yet, in practice, professional bodies have often seen
2118 their role as promoting restrictive practices. It is necessary to recognise that certain
2119 tasks can be performed equally well by different health care professionals with
2120 appropriate, and in some cases advanced specialised training. Professional bodies have a
2121 crucial role in promoting these new ways of working. **We recommend that legislative**
2122 **and regulatory authorities review the rules that exist in their jurisdiction to**
2123 **assess the extent to which they place unjustifiable barriers in the way of more**
2124 **flexible ways of working, taking account of the growing body of evidence on the**
2125 **potential benefits of task shifting in particular contexts.**

2126 There is considerable scope for task shifting from health professionals to patients, but the
2127 opportunities must be balanced with the risks. **We recommend that task shifting to**
2128 **patients and their carers should recognise the goals, expectations, and**
2129 **capacities of those adopting new roles, ensuring that they are empowered to**
2130 **engage fully with health workers to design their care packages and with the**
2131 **ongoing monitoring and evaluation of these packages.**

2132 Task shifting involves careful planning. It will only succeed if there is a clearly defined
2133 objective. **We recommend that decisions to engage in task shifting should be**
2134 **planned carefully, taking full account of the implications both for the individuals**
2135 **concerned and for the wider health sector.** We have described one approach to
2136 doing this, the Calderdale Framework, and while we do not suggest this is the only way,
2137 we see the elements contained within it as being important.

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DRAFT

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2671 **6. ANNEXES**

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2673 **6.1. Annex 1 Summary of conclusions from Cochrane reviews of**
 2674 **self-management**

Condition	Authors' conclusions
Bronchiectasis(165)	There is insufficient evidence to determine whether self-management interventions benefit people with bronchiectasis. In the absence of high-quality evidence, it is advisable that practitioners adhere to current international guidelines that advocate self-management for people with bronchiectasis.
Cystic fibrosis(166)	The available evidence from this review is of insufficient quantity and quality to draw any firm conclusions about the effects of self-management education for cystic fibrosis. Further trials are needed to investigate the effects of self-management education on a range of clinical and behavioural outcomes in children, adolescents and adults with cystic fibrosis and their caregivers.
Osteoarthritis(167)	Low to moderate quality evidence indicates that self-management education programmes result in no or small benefits in people with osteoarthritis but are unlikely to cause harm. Compared with attention control, these programmes probably do not improve self-management skills, pain, osteoarthritis symptoms, function or quality of life, and have unknown effects on positive and active engagement in life. Compared with usual care, they may slightly improve self-management skills, pain, function and symptoms, although these benefits are of unlikely clinical importance.
Oral anti-coagulation(168)	Participants who self-monitor or self-manage can improve the quality of their oral anticoagulation therapy. Thromboembolic events were reduced, for both those self-monitoring or self-managing oral anticoagulation therapy. A reduction in all-cause mortality was observed in trials of self-management but not in self-monitoring, with no effects on major haemorrhage.
Chronic obstructive pulmonary disease(169)	Self-management interventions in patients with COPD are associated with improved health-related quality of life as measured by the SGRQ, a reduction in respiratory-related and all cause hospital admissions, and improvement in dyspnoea as measured by the (m)MRC. No statistically significant differences were found in other outcome parameters. However, heterogeneity among interventions, study populations, follow-up time and outcome measures makes it difficult to formulate clear recommendations regarding the most effective form and content of self-management in COPD.
Adults with epilepsy(170)	Two intervention types, the specialist epilepsy nurse and self-management education, have some evidence of benefit. However, we did not find clear evidence that other service models substantially improve outcomes for adults with epilepsy. It is also possible that benefits are situation specific and may not apply to other settings. These studies included only a small number of service providers whose individual competence or expertise may have had a significant impact on outcomes. At present it is not

Task shifting in healthcare systems

	possible to advocate any single model of service provision.
Children with epilepsy	While each of the programmes in this review showed some benefit to children with epilepsy, their impacts were extremely variable. No programme showed benefits across the full range of outcomes, and all studies had major methodological problems. At present there is insufficient evidence in favour of any single programme.
Smartphone and tablet self-management apps for asthma(171)	The current evidence base is not sufficient to advise clinical practitioners, policy-makers and the general public with regards to the use of smartphone and tablet computer apps for the delivery of asthma self-management programmes. In order to understand the efficacy of apps as standalone interventions, future research should attempt to minimise the differential clinical management of patients between control and intervention groups. Those studies evaluating apps as part of complex, multicomponent interventions, should attempt to tease out the relative contribution of each intervention component.
Computer and mobile technology interventions in chronic obstructive pulmonary disease(172)	<p>Although our review suggests that interventions aimed at facilitating, supporting, and sustaining self-management in people with COPD and delivered via smart technology significantly improved Health Related Quality of Life (HRQoL) and levels of activity up to six months compared with interventions given through face-to-face/digital and/or written support, no firm conclusions can be drawn. This improvement may not be sustained over a long duration. The only included study that measured outcomes up to 12 months highlighted the need to ensure sustained engagement with the technology over time. Limited evidence suggests that using computer and mobile technology for self-management for people with COPD is not harmful and may be more beneficial for some people than for others, for example, those with an interest in using technology may derive greater benefit.</p> <p>The evidence, provided by three studies at high risk of bias, is of poor quality and is insufficient for advising healthcare professionals, service providers, and members of the public with COPD about the health benefits of using smart technology as an effective means of supporting, encouraging, and sustaining self-management. Further research that focuses on outcomes relevant to different stages of COPD is needed. Researchers should provide clear information on how self-management is assessed and should include longitudinal measures that allow comment on behavioural change.</p>
Quality of life in people with stroke(173)	The current evidence indicates that self-management programmes may benefit people with stroke who are living in the community. The benefits of such programmes lie in improved quality of life and self-efficacy. These are all well-recognised goals for people after stroke. There is evidence for many modes of delivery and examples of tailoring content to the target group. Leaders were usually professionals but peers (stroke survivors and carers) were also reported - the commonality is being trained and expert in stroke and its consequences. It would be beneficial for further research to be focused on identifying key features of effective self-management programmes and assessing their cost-effectiveness.

<p>Type 2 diabetes in adult people with severe mental illness(174)</p>	<p>Evidence is insufficient to show whether type 2 diabetes self-management interventions for people with severe mental illness are effective in improving outcomes. Researchers must conduct additional trials to establish efficacy, and to identify the active ingredients in these interventions and the people most likely to benefit from them.</p>
<p>School-based interventions for asthma in children and adolescents(175)</p>	<p>School-based asthma self-management interventions probably reduce hospital admission and may slightly reduce ED attendance, although their impact on school attendance could not be measured reliably. They may also reduce the number of days where children experience asthma symptoms, and probably lead to small improvements in asthma-related quality of life. Many of the studies tested the intervention in younger children from socially disadvantaged populations. Interventions that had a theoretical framework, engaged parents and were run outside of children's free time were associated with successful implementation.</p>
<p>Exacerbations in patients with chronic obstructive pulmonary disease(56)</p>	<p>Self-management interventions that include a COPD exacerbation action plan are associated with improvements in HRQoL, as measured with the SGRQ, and lower probability of respiratory-related hospital admissions. No excess all-cause mortality risk was observed, but exploratory analysis showed a small, but significantly higher respiratory-related mortality rate for self-management compared to usual care.</p>
<p>Pulse oximeters in asthma(176)</p>	<p>We found no reliable data to support or refute patient use of pulse oximeters to monitor oxygen saturation levels when experiencing an asthma attack. People should not use a pulse oximeter without seeking advice from a qualified healthcare professional.</p> <p>We identified no compelling rationale for home monitoring of oxygen levels in isolation for most people with asthma. Some people have a reduced perception of the severity of their own breathlessness when exposed to hypoxia. If trials on self-monitoring of oxygen levels in the blood by pulse oximeter at home by people with asthma are conducted, the pulse oximeter must be given as part of a personalised asthma action plan.</p>
<p>Home telemonitoring and remote feedback between clinic visits for asthma(177)</p>	<p>Current evidence does not support the widespread implementation of telemonitoring with healthcare provider feedback between asthma clinic visits. Studies have not yet proven that additional telemonitoring strategies lead to better symptom control or reduced need for oral steroids over usual asthma care, nor have they ruled out unintended harms. Investigators noted small benefits for quality of life, but these are subject to risk of bias, as the studies were unblinded. Similarly, some benefits for lung function are uncertain owing to possible attrition bias.</p>

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2676 Source: Extracted from the Cochrane Library

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6.2. Annex 2 Search strategy used to identify evidence on task shifting in the hospital sector

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2682 1 (((Patient Care Team/ or case management/ or Delegation, Professional/ or ((skill*
2683 adj3 mix) or ((chang* or multidisciplin* or multi-disciplin* or interdisciplin* or inter-
2684 disciplin*) adj3 (role* or collaborat* or cooperat*)) or ((collaborat* or cooperat*) adj6
2685 (doctor* or physician* or nurse* or pharmacist* or specialist* or care or healthcare)) or
2686 new role* or ((task* or decision*) adj3 (shift* or reallocat* or allocat* or sharing or
2687 substit*)) or teamwork or (team adj (work or approach or member* or training or
2688 educat* or interact*)) or ((multidisciplin* or multi-disciplin* or interdisciplin* or inter-
2689 disciplin*) adj3 (team* or round*)) or ((Shift* or liaison* or coordinat*) adj3 (care or
2690 rore*)) or ((change* or extend* or expand* or transform*) adj3 (responsib* or skill* or
2691 boundar* or competenc* or boundar*)) or ((non-medical* or nonmedical* or nurse* or
2692 pharmacist* or nurse practitioner* or nurse specialist* or specialist nurse* or physician
2693 assistant* or medical assistant* or PA) adj3 prescri*) or ((case or discharge* or nurse*
2694 or care) adj manag*) or ((service* or skill* or role* or task* or responsib*) adj3
2695 transfer*) or ((nurse* or pharmacist* or physician-assistant* or pa or medical-assistant*
2696 or dentist* or dentalassistant* or physiotherapist* or physicaltherapist*) adj (led or
2697 intervention* or managed or run or directed)) or (Substitut* adj3 (doctor* or physician*
2698 or nurse* or pharmacist* or specialist*)) or ((care or healthcare) adj coordinat*) or
2699 delegation or (exten* adj3 role*) or (professional* adj3 (autonom* or boundar*)) or
2700 (role* adj6 (nurse practitioner* or nurse specialist* or specialist nurse* or physician
2701 assistant* or medical assistant* or palliative care* or end of life* or informal care* or
2702 family care*)) or new role* or chang* role* or shared care or joined consult* or Patient
2703 navigat* or ((additional or advanced or new or extended or changed or expanded or
2704 supplementary or joint or shared or sharing) adj6 (task* or role* or skill* or competenc*
2705 or responsib*)) or (Replace* adj3 (care or healthcare)) or ((new or expanded or enlarged
2706 or advanced) adj3 scope*-of-practice) or (shar* adj3 decision*).ab,ti.) and (exp Health
2707 Personnel/ or exp Attitude of Health Personnel/ or caregivers/ or exp interprofessional
2708 relation/ or (((health care or healthcare) adj3 (personnel* or staff* or worker* or
2709 workforce*)) or nurse* or doctor* or ((clinical or health* or care or medical or end-of-
2710 life) adj3 (manpower* or workforce* or humanresource* or personnel* or professional*
2711 or staff* or worker* or visitor* or provider* or assistant*)) or Physician* or general-
2712 practitioner or doctor* or consultant* or nurse or specialist* or clinician* or ((Advanced
2713 or mid-level) adj3 (Pract* or provider*)) or physician-assistant* or medical-assistant or
2714 physiotherapist* or physi*-therapist* or occupational-therapist* or midwif* or midwiv*
2715 or dentist* or dental-staff or pharmacist* or pharmac*-technic* or medical-assist* or
2716 MD-extender* or physician-extender* or psychiatrist* or psychologist* or
2717 psychotherapist* or Dietician* or Dietitian* or nutritionist* or ((speech or language) adj3
2718 (therapist* or pathologist*)) or logopaedist* or logopedist* or audiologist* or
2719 ophthalmologist* or optometrist* or caregiver* or carer* or caretaker* or (communit*
2720 adj3 professional*) or paramedic* or gp or gps or ((practice* or gp) adj3
2721 receptionist*).ab,ti.) and (Meta-Analysis/ or ((systematic* adj3 review*) or meta-
2722 analys*).ab,ti.) not (case report/ or case report.ti.) not (letter or news or comment or
2723 editorial or congresses or abstracts).pt.) and english.la. (2678)
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2725 2 Hospitals/ (74192)
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2727 3 hospital.mp. [mp=title, abstract, original title, name of substance word, subject
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2729 supplementary concept word, protocol supplementary concept word, rare disease
2730 supplementary concept word, unique identifier, synonyms] (1141563)
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2732 4 secondary care.mp. [mp=title, abstract, original title, name of substance word, subject
2733 heading word, floating sub-heading word, keyword heading word, organism

2734 supplementary concept word, protocol supplementary concept word, rare disease
2735 supplementary concept word, unique identifier, synonyms] (5907)
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2739 6 Tertiary Healthcare/ (823)
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2749 supplementary concept word, unique identifier, synonyms] (1466192)
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2753 10 1 and 9 (631)
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