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Title

What are the motivating and hindering factors for health professionals to undertake new roles in hospitals? A study among physicians, nurses and managers looking at Breast Cancer and Acute Myocardial Infarction care in nine countries

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Highlights

- Skill-mix and role changes differ across European countries
- Healthcare professionals' motivation for undertaking new roles is consistently higher than self-perceived opportunities
- Workforce shortages is the most commonly reported barrier to role changes
- Facilitators are medical technologies, and within organisations professional and management support
- Managers should know the organisation-specific barriers and facilitators to govern changes effectively

Abstract

Background: Many European countries experience health workforce skill-mix challenges due to demographic changes, multimorbidity and medical technology. Yet, there is limited cross-country research in hospitals.

Methods: Cross sectional, observational study on staff role changes and contributing factors in nine European countries. Survey of physicians, nurses and managers (n=1,524) in 112 hospitals treating patients with breast cancer or acute myocardial infarction. Group differences were analysed across country clusters (skill-mix reform countries [England, Scotland and the Netherlands] vs. no reform countries [Czech Republic, Germany, Italy, Norway, Poland and Turkey]) and stratified by physicians, nurses and managers, using Chi-squared, Mann-Whitney U and Kruskal Wallis tests.

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Results: Nurses in countries with major skill-mix reforms reported more frequently being motivated to undertake a new role (66.5%) and having the opportunity to do so (52.4%), compared to nurses in countries with no or minor reforms (39.2%; 24.8%; p<.001 each). Physicians and nurses considered intrinsic motivating factors (personal satisfaction, use of qualifications) more motivating than extrinsic factors (salary, career opportunities). Reported barriers were workforce shortages, facilitators were professional and management support. Managers' recruitment decisions on choice of staff were mainly influenced by skills, competences and experience of staff.

Conclusion: Managers need to know the motivational factors of their employees and enabling versus hindering factors within their organisations to govern change effectively.

KeyWords: Motivation; Physicians; Nurses; Personnel Administration, Hospital; Health workforce; New Roles

Introduction

The skill-mix of health professionals has undergone changes in many countries in Europe. Population ageing combined with higher rates of chronic conditions has triggered changes to service delivery models, integrated care and coordination of services. It has also impacted on the health workforce. Many countries in Europe have changed the composition of their workforce to enhance the quality of care for patients with chronic conditions (1,2)

Skill-mix changes subsume changes to the skills, roles and/or tasks of health professionals that often take place as part of teams (3–5). A study conducted in 2015 found that the roles of nurses have changed in primary care in the majority of countries in Europe (6). The extent of changes as measured via nurses' official scopes of practice and reforms, varied considerably across the 39 countries surveyed. Eleven countries had authorised Nurse Practitioners/Advanced Practice Nurses to perform seven advanced clinical activities e.g. diagnosing and initiating treatments (6). One major skill-mix trend has been the introduction of nonmedical prescribing in Europe, for instance via enactment of laws for specific groups of nurses in Cyprus, Finland, France, the Netherlands, Poland, Spain, Sweden and the four nations of the United Kingdom.

Several drivers triggering skill-mix changes have been suggested in the literature. A systematic literature review identified four categories of facilitators and/or barriers to task re-allocation, focusing on the medical and nursing professions: the knowledge and skills available, professional boundaries at the interface between the medical and nursing profession, as well as organisational and institutional

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environment (7). Factors related to professional boundaries and the organisational environment were critical in facilitating (or hindering) change. A conceptual framework (8) identified five systemic factors acting as drivers for advanced nursing practice. These are the changing healthcare needs of the population, advanced (nursing) education, the workforce (e.g. shortages, gaps), practice patterns and a country's legal and health policy framework. Yet, the study provided limited information in which contexts these drivers act as barriers and vice versa. Delamaire and Lafortune (2010) have investigated influencing factors to the development of advanced practice nursing roles in twelve countries: nurse and medical associations, organisation of care (solo vs. group practices), payment modes in primary care, legislation and regulation, and education and training. Another influencing factor on new roles were costs (9). Levels of remuneration differed widely for physicians and somewhat for nurses across Europe based on the average remuneration in comparison to the average country wage (10).

To date, limited evidence is available on skill-mix changes in hospital settings and hospital-specific drivers and barriers to change (11–13). A qualitative multiple-case study in the Netherlands was conducted in five hospitals during the first half of 2013 to identify the extent to which nurse prescribing among nurse specialists was introduced and related hindering or facilitating factors (11). It identified organisational-level barriers to the introduction of nurse prescribing, including additional hospital-level restrictions (e.g. oversight measures by hospital boards) that as per Dutch law were not required (11).

The EU-funded MUNROS (Health Care Reform: The iMpact on practice, oUtcomes and cost of New Roles for health profeSsionals) study found an increasingly diverse composition of teams and health professionals working in hospitals in Europe (13). Based on a case study design in hospitals in eight countries, the study identified various role changes, including more specialised roles (e.g. among physicians, nurses, technicians) as well as more generic roles, focused on the coordination of care (e.g. among nurses, other health professions). Interviews with 160 physicians, nurses, technicians, managers and patients found that academic training and legal changes (e.g. to scope of practice) was less significant in the hospital settings. Suggested drivers were physicians' willingness to delegate tasks, professionals' trustworthiness and capacity to develop their work, medical technology and local service re-design(13). While the qualitative study provided important insights into what drivers can influence role change in hospitals, a quantitative approach may reveal what are more and less important factors for health professionals and managers. Moreover, the uptake of new professional roles in hospitals may also depend on the individual health professionals, their motivations and aspirations. These can be subsumed into intrinsic and extrinsic motivators (14).

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Hospital managers' views on barriers and enablers to skill-mix changes are potentially highly relevant, as they have a key role in steering change. Hospital managers do not only play a critical role in transformative processes, but also in recruitment decisions (15).

New roles occur not only for nurses but also for other non-medical professions e.g. pharmacists and tasks are discussed relating to prescribing medication or educating patients, among others (16,17). Furthermore, physicians' roles are also changing respecting management tasks which are a balancing act between formal and informal leadership, and medical and organizational tasks (18).

Previous work has focused on the extent of new roles in Europe, drivers and barriers for implementation in primary care or based on case studies. Therefore, there is a need for the perspective of health professionals in a hospital setting. The purpose of this European study was to examine the motivational factors of physicians and nurses to take up new roles in hospitals, differentiating between intrinsic (personal satisfaction, use of the qualification) and extrinsic motivators (salaries, career progression). In addition, the study analysed the perceptions of physicians, nurses and healthcare managers on the barriers and facilitators to skill-mix and role change in hospitals, as well as the major factors that lead to recruitment decisions among managers.

Methods and Materials

This study was part of the MUNROS project, funded by the European Union's 7th Framework Programme (FP7). The detailed study design is described elsewhere (19). The study had a multi-country, cross-sectional design. Country selection (Czech Republic, England, Germany, Italy, Netherlands, Norway, Poland, Scotland, and Turkey) was based on a purposeful sample, aiming to maximise the variations and diversity of Europe's health systems and health workforce (13,19).

Health professional and mangers survey

Health professionals, healthcare managers and patients were surveyed as part of the MUNROS project in 2015 and 2016. It included hospitals and related primary care sites, based on a non-representative sampling. A sub-sample of physicians and nurses working in departments specialised on patients with breast cancer or acute myocardial infarction were included; the managers were responsible for the staff of these departments. The disease type 2 diabetes was also part of the project but was excluded as the treatment is mainly provided in primary care, and the focus of this study was on hospital settings.

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Survey instrument

The questionnaires were originally developed in English and made available in seven languages through back-and-forth translation. The survey for healthcare professionals included questions on the motivation for a new role and the actual self-perceived opportunity to take up a new role. The survey covered factors that may act as barriers and/or facilitators to the uptake of new roles, using a 5-point Likert scale. Health professionals were asked to assess four factors either as motivating or demotivating to undertake new roles: personal satisfaction, use of qualification, career opportunities, and level of pay. Other questions covered were the job title and qualification (physician, nurse, manager), specialisations, demography and work experience. Similarly, to the professions' survey, the managers' survey included a question on barriers and facilitators to staff role change. This question had partly comparable items to the professions' survey but using a 3-point Likert scale. Other survey questions specifically designed for hospital managers captured, among others, influencing factors on the decision on choice of staff that determine recruitment decisions (3-point Likert): skills and competences, experience of staff, workforce availability, cost effectiveness, budgetary/cost consideration, and patient preferences.

Each country team obtained ethical approvals. Participants were informed about the study with an accompanied letter to the survey and were asked to return the questionnaire by the provided stamped addressed envelope. The filled in questionnaire was regarded as informed consent. The data entry was performed in each country based on a study protocol which included checks for plausibility and validity (19). The questions for job title and qualification were used to identify the profession of the participant. To have the same classification across countries a list of 28 pre-defined professions was used and two researchers in each country determined independently the profession, differences were discussed.

Data analysis

The analyses were conducted per two country clusters – countries with skill-mix reforms and countries with no or limited reforms for skill-mix for nurses. We followed the approach described elsewhere (19,20). Reforms focussing on new roles for physicians were not covered, however; the assumption is that changes to scopes of practice for nurses influence the division of work between nurses and physicians, e.g. tasks formerly done by physicians only are to some extent undertaken by qualified nurses (20). Due to the small number of respondents of other non-medical professions, analyses focussed on physicians and nurses. In England, Scotland and the Netherlands, skill-mix reforms have been implemented between 2010 and 2015 expanding the scope of practice for nurses (meeting the required qualifications) (20). The scope of practice in these three countries (hereinafter referred as

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'cluster 1 countries') encompasses the prescribing of medication (and other "medical tasks") originally solely performed by physicians. The second country group includes the Czech Republic, Germany, Italy, Norway, Poland and Turkey (hereinafter referred as 'cluster 2 countries') with no or limited skill-mix reforms.

Respondents were included in the analyses regarding the questions on motivation and opportunity for new roles if both questions were answered, and concerning the other questions if all items of the respective question were answered. In order to make the questions and hence the results to health professionals and managers comparable, questions with a 5-point Likert-scale (healthcare professional questionnaire) were condensed into a 3-point Likert. Data analysis was based on descriptive and bivariate analyses. Differences between two groups (cluster 1 vs. cluster 2 countries) and a categorical variable were tested using Chi-square test. For ordinal variables and two groups the Mann–Whitney U test was performed and for three subgroups (nurses, physicians and managers) the Kruskal–Wallis test was applied and if this test was significant, Dunn's test was used to identify differences among subgroups. The significance level of $p<0.05$ was used. Statistical analyses were performed with STATA 15©.

3. Results

The sample for this analysis comprised physicians, nurses and managers (n=1,524) working in hospitals (n=112) in nine countries. Physicians (n=395), of whom about half (54.8%) were female, had an average age of 43.5 years (SD 11.1), and had been 10.4 years (SD 9.3) in their role. The 816 nurses, of whom 91.0% were female, were on average slightly younger (42.2 years, SD 10.8) than physicians but had been longer in their current role (14.3 years, SD 10.1). Of the 313 managers, 59.5% were female, they were on average older than nurses and physicians (48.6 years, SD 8.2) and 9.4 years (SD 7.7) in their role.

Results are presented for the two country clusters and the different professional groups. The influencing factors to take up a new role will be presented for nurses and physicians (3.1 and 3.2), followed by all three professional groups (3.3.) and only for managers (3.4), depending on the research questions and data availability, as the surveys did not consistently ask all questions to all three groups.

3.1 Motivation and opportunity for new roles

Among the physicians and nurses surveyed, nurses reported more frequently than physicians being motivated to undertake a new role. Nurses' motivation was higher in cluster 1 countries (66.5%)

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(England, Scotland, the Netherlands), compared with nurses in cluster 2 countries (39.2%, p<.001) (Czech Republic, Germany, Italy, Norway, Poland and Turkey) (see table 1). Among physicians, a reportedly lower proportion working in cluster 1 countries (34.6%) showed motivation to change their role than cluster 2 countries (46.2%, p=0.038).

--- Table 1 ---

Overall, the reported *motivation* was higher than the *opportunity* for taking up new roles among nurses and physicians. Over half of the nurses in cluster 1 countries (52.4%) stated to have the opportunity to work in new roles, which was the highest value across the four professional and country clusters. In contrast, only one-fourth (24.8%) of nurses in cluster 2 countries considered to have such an opportunity. The results for physicians differ in comparison to the nursing profession insofar as physicians in cluster 2 countries stated more often to have an opportunity (41.3%) than physicians in cluster 1 countries (30.8%).

3.2. The role of intrinsically and extrinsically motivating factors for new roles

Table 2 takes a closer look at what is subsumed under motivating factors to take up new roles, differentiating between intrinsic (personal satisfaction, use of qualification) and extrinsic factors (career opportunities, level of pay). Among physicians and nurses, intrinsic motivators were more frequently reported than extrinsic factors. The most motivating factor was *personal satisfaction* (77.1% to 95.8%) among both profession groups and country clusters. The other intrinsic factor, *use of qualification,* was the second most frequently reported motivating factor among physicians in both country clusters and nurses in cluster 2 countries, whereas it was the third frequently reported motivating factor (79.1%) by nurses from cluster 1 countries.

---Table 2---

Extrinsic motivators were also reported as influencing the uptake of new roles, but to a lesser extent. Yet, nurses in cluster 1 countries considered *career opportunities* as the second most motivating factor, reported by 81.3% of the sample. The difference to nurses in cluster 2 countries is significant (51.6%, p<0.001). The results are reverse for physicians, since physicians in cluster 1 countries agreed less often (58.1%) than physicians in cluster 2 countries (77.6%, p=0.017).

The *level of pay* was less frequently reported to be a motivator among nurses and physicians. Nurses in cluster 2 countries have a mixed opinion, as more than half (53.8%) agreed that it was motivating

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and one-fourth (25.6%) stated that it was demotivating (p <0.001). Among physicians in cluster 2 countries, 70.6% accounted level of pay as motivating and 11.9% as demotivating for the uptake of new roles.

3.3 Facilitating factors and barriers from within and outside the organisation

The results on what factors act as facilitators and/or barriers to new role uptake are reported for physicians, nurses and managers, categorised into influencing factors within the organisation and external factors, and compared *across* the two country clusters (see table 3).

The two factors within the organisation *professional support* and *management support* had the highest approval rates as being a facilitator to the uptake of new roles compared with the external factors surveyed. Physicians, nurses and managers from both country clusters agreed most often (51.2% to 75.5%) that the professional support, which is the support provided by the health professions themselves, is facilitating the uptake of new roles. The support of managers was also reported by at least half of the respondents (50.4% to 66.3%) but to a lesser extent. However, on the contrary about one-fourth of the nurses in cluster 1 countries see professional (23.1%) and management support (25.6%) as a barrier, suggesting a mixed perspective among the nursing profession.

---Table 3---

Among the external factors, mixed results existed as to whether they were considered a facilitator, barrier or both. Physicians (46.2% to 50.0%) and nurses (66.4% to 74.4%) considered *workforce shortages* in the own profession and *regulations and legislation* (28.2% to 53.9%) as barriers, whereas mixed results exist as to whether *increased demand for academic qualifications* acts as facilitator or barrier to new roles. Nurses in cluster 1 countries had a split opinion. About one-third stated that academic qualification is a facilitator, barrier or neither, respectively. The results differ significantly (p=0.018) from nurses in cluster 2 countries of whom 40.3% stated that academic qualification is a facilitator and 23.5% that it is a barrier.

Managers showed a similar assessment to physicians and nurses as to the role of management support, but results differ regarding regulation and legislation in cluster 1 countries and to medical technology in cluster 2 countries. In cluster 2 countries, 77.1% of the managers reported that staff mix change is facilitated by *medical technology*, a significant difference (p<0.001) compared to managers in cluster 1 countries of whom about half agreed (46.3%). For *regulation and legislation* 39.0% of the mangers in cluster 2 countries stated that this factor is a barrier, but only 7.4% of managers in cluster 1 countries.

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Considering the three professions (physicians, nurses, mangers) *within* each country group, some differences occurred (see supplement 1 for cluster 1 countries and supplement 2 for cluster 2 countries). For instance, physicians and nurses in cluster 1 countries assessed the factor *regulation and legislation* more often as a barrier (28.2% and 31.4%) and less often as a facilitator (18.0% and 14.9%) than managers (7.4% as barrier and 35.2% as facilitator) ($p<0.001$).

3.4 Influencing factors on choice of staff

The hospital managers were asked which factors influence their choice of staff for recruitment decisions (see table 4). The most frequently stated factor was *skills and competences*, followed by the *experience of staff*. Managers in cluster 1 countries assessed both factors more often as "major influencing" (88.3% and 76.7%) than managers in cluster 2 countries (71.5% and 62.2%). Another influencing factor for managers in both country clusters was the *workforce availability*. Some influence on the mangers' decision was shown by the *costs of staff* for recruitment purposes (cost effectiveness and budgetary/cost consideration). Finally, the category "no influence" was cited most often for the factor *patient preferences* (25.0% cluster 1 countries, 34.4% cluster 2 countries).

---Table 4---

Discussion

Physicians' and nurses' personal motivation to work in new roles in hospitals was consistently higher than their self-perceived opportunities. The motivation was highest for nurses in countries with major skill-mix reforms (England, Scotland, and Netherlands). Nurses in this country group reported twice as often having the opportunity for a new role compared with nurses in countries with no or limited reforms. Furthermore, only nurses from countries with skill-mix reforms reported career opportunities as the second most motivating factor. Support by managers and colleagues was shown to positively influence the uptake of new roles based on physicians', nurses' and managers' opinion. The role of medical technology was shown to be a driver, whereas workforce shortages were reported to be a hindering factor. The managers' decision on staff recruitment was shown to be mainly influenced by the skills and experiences of staff.

For both professions, physicians and nurses across the two country clusters, there is a considerably higher proportion of staff being motivated for a new role than staff who report that there are opportunities in practice. This leads to a mismatch of motivation vs. opportunity. In countries with past reforms to scope of practice ('cluster 1 countries'), nurses reported to be more motivated and had

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simultaneously more frequently the opportunity to work in new roles. How personal motivation and the opportunity to work in new roles are related, influence each other, and what was first – whether new opportunities must be present at first to elicit motivation or nursing professionals with motivation create new opportunities at the work place – need to be explored in future research. This aspect is particularly relevant for countries with no or minor reforms ('cluster 2 countries'), since both results were significantly lower for nurses in this country group. Opportunities to work in new roles and career opportunities are related and results of this study show that career opportunities as a motivator to work in new roles differed significantly across the two country clusters as reported by hospital staff and was highest for nurses in cluster 1 countries, thus seems to be particularly relevant for this group. Research shows (21) that opportunities increased in countries that have a wider scope of practice. However, it is unclear if nurses in cluster 2 countries have limited opportunities to work in advanced practice roles because of the restrictive nature of regulation and legislation (21,22).

Regulation and legislation as an independent influencing factor was considered a barrier among the respondents in cluster 2 countries. This may be related to the restricted legislation in cluster 2 countries. These findings are partly in line with a previous study, in which "government legislation" was seen as a barrier in Poland, however, as a facilitator in the Czech Republic (21).

Salary as a driver for the uptake of new roles in our study was shown to be less important for physicians in cluster 1 countries than for physicians in cluster 2 countries. It is unclear why these cross-country group differences exist. One reason may be related to the cross-country differences in remuneration levels of physicians. OECD data from 2014 show that the salary is higher for physician specialists in the Netherlands and in the UK in relation to the average country wage than in the cluster 2 countries, except of German physicians (10). It can therefore be hypothesized that when a certain level of pay is achieved, it may no longer be a strong motivator for the uptake of new roles and tasks. However, the remuneration of physicians were seen as hindering the development of advanced nursing roles in the Czech Republic and Poland; and assessed as having no effect in the UK (21). The differences in remuneration were much lower for the nurses and ranged in 2014 slightly above the average in all countries, except for Turkey with no data (10). Therefore it is unclear why almost half of the nurses in cluster 2 countries considered salary as demotivating or neutral to work in a new role, and in contrast as motivating to two-thirds of the nurses in cluster 1 countries. Results regarding salary as a driver and the motivation for a new role went in the same direction, i.e. nurses in cluster 1 countries and physicians in cluster 2 countries reported more frequently being motivated for a new role, and salary was accounted more frequently as a driver; however, further analyses are necessary to proof a possible correlation.

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Workforce shortages in the own profession were perceived as a barrier from the majority of health professionals in this study, but more frequently from the nursing profession. This may be related to the fact that nurses perform the core nursing tasks when shortages of nurses are present (23). A workforce shortage projection (24) shows that healthcare workforce shortages will be a future problem, for physicians especially in Czech Republic, Poland, Italy and Turkey and for nurses in the Netherlands and the UK. Even in countries with a comparatively higher density of physicians (compared to OECD average) (e.g. Germany, Norway) the issue of geographical maldistribution is present (25). When introducing new roles, sufficient staff levels need to be target as workforce shortages were perceived as a hindering factor.

Professional support (by colleagues) was mainly reported as a facilitator but almost one-fourth of nurses in cluster 1 countries and one-sixth of nurses in cluster 2 countries considered this as a barrier. The study did not differentiate how professional support was defined. Colleagues can be nurses, but also physicians and conflict of interests between physicians and nurses can emerge (26), as potential overlaps of scopes of practice can occur. European guidelines recommend the treatment of both diseases by multidisciplinary teams (27,28) and presence or absence of this kind of collaboration may have influenced the results but further research is necessary to clarify the role of multidisciplinary teams as a facilitator for new roles.

Medical technology was reported to be a driver to staff role change in all countries. Yet, respondents in cluster 2 countries assessed medical technology more frequently as facilitator than respondents in cluster 1 countries. Medical technology was analyzed by country clusters, yet, there may be differences across as well as within countries (e.g. by hospital type) as to the use of medical technology and impacts on health professionals' roles. Technology should be explored as an influencing factor at the country, regional and hospital-level in future research. We have interpreted medical technology as country wide proxy, as research shows that the procurement of medical devices have been increasingly centralized in some countries e.g. in Italy at the regional level, and in England through the use of procurement hubs, whereas in Germany it is primarily decentralized (29). However, it may also depend on hospital characteristics, hence e.g. university hospitals tend to use more often new technologies (30,31).

Qualification is a key factor for health professionals and for managers. On the one hand, managers reported to give priority to recruiting staff that are well skilled and experienced. On the other hand, most physicians and nurses assessed the use of their qualification as motivating. The OECD study (25) assessed to what extent the skills of physicians and nurses match the task they perform at work. The study revealed that more than three-fourths felt for some tasks of their work over-skilled, meaning the skills are above the required level. At the same time 50% of the physicians and 43% of the nurses

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reported under-skilling, meaning the skills were below the required level, leading to a skill-mismatch of the health professionals (25). An adequate match of skills with demands can lead to safe treatment and care, efficient use of staff and job satisfaction (25).

Support by hospital managers were considered important from both, the nurses' and physicians' perspectives and were reported as the second most facilitating factor. A study in twelve countries also showed that the position of health care managers had predominantly a facilitating effect on the development on advanced practice nursing roles (21). Managers in hospitals, regardless of their profession and at which level, need a set of various competences. This includes management of human resources, including change management structures in place, and having a strategic vision (15). These aspects are necessary to integrate staff with new roles in a team, moreover formal orientation programmes for staff working in new roles have been found to positively impact role transition, for instance shown for nurses in the U.S. (32). This information is particularly relevant for hospital managers, as they can influence the structural conditions and can create the work-related opportunities. However, results in cluster 1 countries are mixed, 25% reported that managers can hinder the implementation of new roles. A case study in some hospitals in the Netherlands showed that hospital boards or management introduced oversight requirements which were reported to hinder the uptake of new nursing roles in prescribing medication (11).

Regarding patient preferences, managers assessed this aspect as having some or no influence on recruitment decision. Experts from the Czech Republic and Poland reported that the patients' attitudes have no effect on new advanced practice nurses roles, the result was mixed in the UK (21). Further research is required about patient preference regarding skill-mix and managers need to be informed about patients' preferences.

The study faces the following limitations. First, the analyses differentiate between two country clusters based on reforms to scopes of practice as a proxy for considerable changes to tasks and roles for the nursing profession between 2010 and 2015. Reforms focused on new roles for physicians only were not covered. Second, due to the survey design of the study, results may be biased by self-reports, e.g. for the term "new role". We covered "new role" in its broadest sense, which can mean the performance of medical tasks formerly done by physicians or new, i.e. supplementary tasks like case management. Third, the study was based on a small sample size and focussed on physicians and nurses caring for patients with breast cancer and acute myocardial infarction. Hence it is not possible to generalize the results to other health professionals, and to other areas of specialised care. Additionally, the study used a cross-sectional design, which limits attribution of causality.

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Notwithstanding the limitations, this study offers insights in the identification of influencing factors for the uptake of new roles at different level (individual, organizational, country-level) and how different layers impact on each other. Furthermore, the results are based on several European countries and include not only the health professionals' view but also the managers' perspective.

Conclusions

Professionals who are motivated to undertake a new role should be seen as a high valuable resource in health care system with workforce challenges. The use of qualification is important for physicians and nurses, concurrently managers want to employ staff with expertise and full use of qualifications. Managers need to know the motivational factors of their employees and enabling versus hindering factors within their organisations to govern change effectively. Furthermore, influencing factors on the system level like regulations and legislation need to be addressed when implementing new roles.

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Table 1
Motivation and opportunity for new roles

	Skill-mix reform countries	Countries with no/limited reforms	p-value	Skill-mix reform countries	Countries with no/limited reforms	p-value
	Physicians (n=107)	Physicians (n=288)		Nurses (n=227)	Nurses (n=589)	
Motivation for a new role (in %)	34.6	46.2	**0.038**	66.5	39.2	**< 0.001**
Opportunity for a new role (in %)	30.8	41.3	0.057	52.4	24.8	**< 0.001**

p-value based on χ^2-test, skill-mix reform countries: England, Scotland, Netherlands; Countries with no/limited reforms: Czech Republic, Germany, Italy, Norway, Poland, Turkey

Table 2
Motivating factors for new roles

		Skill-mix reform countries	Countries with no/limited reforms		Skill-mix reform countries	Countries with no/limited reforms	
Intrinsic motivators (in %)		Physicians (n=43)	Physicians (n=143)	p-value	Nurses (n=139)	Nurses (n=223)	p-value
Personal satisfaction	Motivating	88.4	95.8		95.7	77.1	
	Neutral	11.6	2.1		2.9	12.6	
	Demotivating	0.0	2.1	0.080	1.4	10.3	**<0.001**
Use of Qualification	Motivating	62.8	83.9		79.1	71.3	
	Neutral	32.6	11.2		19.4	20.2	
	Demotivating	4.7	4.9	**0.005**	1.4	8.5	0.054
Extrinsic motivators (in %)							
Career opportunities	Motivating	58.1	77.6		81.3	51.6	
	Neutral	32.6	18.9		15.1	36.8	
	Demotivating	2.3	3.5	**0.017**	3.6	11.7	**<0.001**
Level of pay	Motivating	37.2	70.6		67.6	53.8	
	Neutral	60.5	17.5		25.2	20.6	
	Demotivating	2.3	11.9	**0.002**	7.2	25.6	**<0.001**

p-value is based on Mann-Whitney-U test, skill-mix reform countries: England, Scotland, Netherlands; Countries with no/limited reforms: Czech Republic, Germany, Italy, Norway, Poland, Turkey

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Table 3
Facilitating factors and barriers to undertake a new role from the physicians' and nurses' perspective and to change the mix of staff from the managers' perspective in countries with skill-mix reforms

		Skill-mix reform countries	Countries with no/limited reforms		Skill-mix reform countries	Countries with no/limited reforms		Skill-mix reform countries	Countries with no/limited reforms	
		Physicians (n=39)	Physicians (n=126)	p-value	Nurses (n=121)	Nurses (n=149)	p-value	Managers (n=54)	Managers (n=249)	p-value
Factors within the organisation (in %)										
Professional support	Facilitator	56.4	66.7		51.2	60.4		61.1	75.5	
	Neutral	28.2	23.0		25.6	22.8		25.9	22.5	
	Barrier	15.4	10.3	0.226	23.1	16.8	0.109	13.0	2.0	**0.013**
Management support	Facilitator	53.9	64.3		50.4	59.1		53.7	66.3	
	Neutral	28.2	20.6		24.0	22.2		33.3	26.1	
	Barrier	18.0	15.1	0.281	25.6	18.8	0.123	13.0	7.6	0.068
Factors outside of the organisation (in %)										
Workforce shortages in the own profession	Facilitator	23.1	32.5		8.3	15.4				
	Neutral	30.8	17.5		17.4	18.1		n.a.	n.a.	
	Barrier	46.2	50.0	0.827	74.4	66.4	0.110			
Regulation and legislation	Facilitator	18.0	22.2		14.9	24.2		35.2	26.9	
	Neutral	53.9	44.4		53.7	30.9		57.4	34.1	
	Barrier	28.2	33.3	0.908	31.4	45.0	0.432	7.4	39.0	**0.001**
Increased demand for academic qualification	Facilitator	23.1	50.0		29.8	40.3				
	Neutral	66.7	34.9		33.9	36.2		n.a.	n.a.	
	Barrier	10.3	15.1	**0.035**	36.4	23.5	**0.018**			
Medical technology	Facilitator	38.5	61.1		28.1	45.0		46.3	77.1	
	Neutral	48.7	30.2		64.5	40.3		48.2	19.7	
	Barrier	12.8	8.7	**0.018**	7.4	14.8	0.105	5.6	3.2	**<0.001**

p-value based on-Mann-Whitney-U test; n.a.- not available, skill-mix reform countries: England, Scotland, Netherlands; Countries with no/limited reforms: Czech Republic, Germany, Italy, Norway, Poland, Turkey

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Table 4
Influencing factors on choice of staff (other than clinical knowledge) for managers in countries with skill-mix reforms (n=60) and managers in countries with no or limited skill-mix reforms (n=253)

	Skill-mix reform countries			Countries with no/limited reforms			
Factors (in %)	Major Influence	Some Influence	No Influence	Major Influence	Some Influence	No Influence	p-value
Skills and competences	88.3	11.7	0.0	71.5	26.9	1.6	**0.007**
Experience of staff	76.7	20.0	3.3	62.1	34.4	3.6	**0.041**
Workforce availability	60.0	38.3	1.7	54.9	38.7	6.3	0.347
Cost effectiveness	23.3	68.3	8.3	25.3	57.7	17.0	0.506
Budgetary/cost consideration	16.7	66.7	16.7	19.8	51.8	28.5	0.333
Patient preferences	21.7	53.3	25.0	22.5	43.1	34.4	0.384

p-value based on Mann-Whitney-U test, skill-mix reform countries: England, Scotland, Netherlands; Countries with no/limited reforms: Czech Republic, Germany, Italy, Norway, Poland, Turkey