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# The Joint Action on Health Workforce Planning and Forecasting: Results of a European programme to improve health workforce policies

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## ABSTRACT

Health workforce (HWF) planning and forecasting is faced with a number of challenges, most notably a lack of consistent terminology, a lack of data, limited model-, demand-based- and future-based planning, and limited inter-country collaboration. The Joint Action on Health Workforce Planning and Forecasting (JAHWF, 2013–2016) aimed to move forward on the HWF planning process and support countries in tackling the key challenges facing the HWF and HWF planning. This paper synthesizes and discusses the results of the JAHWF. It is shown that the JAHWF has provided important steps towards improved HWF planning and forecasting across Europe, among others through the creation of a minimum data set for HWF planning and the 'Handbook on Health Workforce Planning Methodologies across EU countries'. At the same time, the context-sensitivity of HWF planning was repeatedly noticeable in the application of the tools through pilot- and feasibility studies. Further investments should be made by all actors involved to support and stimulate countries in their HWF efforts, among others by implementing the tools developed by the JAHWF in diverse national and regional contexts. Simultaneously, investments should be made in evaluation to build a more robust evidence base for HWF planning methods.

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## 1. Introduction

Health workforces are crucial for the sustainability of health systems as there can be no health without a workforce [1]. Yet many European countries are faced with health workforce shortages. It is estimated that by 2020 there will be a shortfall of one million health workers in Europe [2,3], although it should be noted that this number is somewhat out-dated and the underlying calculations are subject to debate [4]. Expected shortages are particularly critical for certain health professions and specialisations, including nursing, elderly care and general practice. In addition, almost all European countries are faced with geographical maldistributions of health professionals, mostly expressed by an undersupply in rural and sparsely populated areas and oversupply in some urban areas [2,5,6]. The shortage of health workers is compounded by the fact that their skills, competencies and expectations are often

not optimally suited to meet changing population health needs [7,8]. Moreover, health reforms, taking place in many countries, also change the legal and institutional context of health professions. Given these challenges, human resource planning in the health sector, or health workforce planning, emerges as a key tool to address them [9].

### 1.1. Health workforce planning

Health workforce planning is concerned with ensuring that the right number of people, with the right skills, are at the right place at the right time to deliver the right services to those in need of them [10]. The main aim of planning is to achieve an optimal balance of demand and supply of health workers in both the short and long term [11]. To achieve this aim, forecasting is an important part of the planning process. Yet despite its importance, there is no agreed definition or single accepted approach to forecasting health workforce requirements [12]. In this paper, we understand forecasting as a scientific based and policy driven methodology. Forecasting workforces requires multiple steps: to predict several alternative futures, decide which is most probable or desirable, and

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then plan for that selected future by factoring in particular forces, such as political climate and resources [13]. It is important to stress that forecasts are not projections. A projection takes current conditions, develops scenarios by ‘educated guesses’ about possible future changes, and looks at the implications of those changes. In contrast, forecasting explicitly aims to define what the future will hold and requires theory and hypothesis about the mechanisms behind these potential futures [14].

## 1.2. Aim of this paper

The aim of this paper is to synthesize and discuss the results of an EU initiative – the Joint Action on Health Workforce Planning & Forecasting – set up to support and stimulate country efforts in health workforce development. The paper in particular focuses on five key findings of the JAHWF, related to the most severe current challenges in HWF planning, i.e. planning terminology, data availability, model-based planning, future-based planning and collaboration.

## 1.3. Challenges in health workforce planning

In a time of budget restraints, workforce shortages and changing health care needs, health workforce planning is more important than ever, but at the same time it is getting increasingly complicated [10,11]. The main difficulties facing health workforce planning and forecasting are of methodological as well as strategic nature, and are summarized below:

### 1.3.1. Lack of consistent terminology

To make an accurate calculation of the stock and flow of health workforces, systematic and consistent definitions are required. Definitions enable data and information collected from different sources (e.g. from public and private sector, professional registries, labour force surveys, etc.) to become comparable and to be used consistently in models and calculations. Currently, within and between countries, there is severe inconsistency and heterogeneity in the definitions that are being used for health professions and the general terminology surrounding health labour market indicators [10,15]. For example, there may be differences in health professionals’ status; some numbers may refer to ‘practising professionals’ (i.e. professionals that provide a service directly to the public), while others may refer to the ‘professionally active’ (i.e. professionals that completed an education as a prerequisite for the job). A prerequisite to feed and interpret health workforce models and forecasting is to have uniform definitions of both the units of analysis and the factors or parameters that are included in the models.

### 1.3.2. Lack of data

Recent data on the number of active health care workers and their distribution in the health system are a key requirement for health workforce planning [11]. Yet these information systems are lacking in numerous countries, representing one of the main obstacles to effective health workforce planning [9,10,16]. For example, in many European countries data on number of health workers and trainees, their specialisation, their geographical spread, age, gender and country of provenance are not or partly available, difficult to gather or not registered. A specific challenge for health workforce planning is the lack of data on cross-border and cross-sectoral mobility of health professionals; to quantify where health workers go, how long they stay away and whether they come back or not [17,18]. Accurate data about the migration of health workforces is not available in many European countries. A deficit which is compounded by the fact that there is no single definition of health professional mobility in place [10].

One way to cope with the lack of data on health workforces, as a first step, is to mobilize data collection and analysis on a limited number of indicators that are available, comparable and measurable using standard data sources. There is, however, no guideline or agreement on what these ‘minimum data requirements’ for health workforce planning should look like [10].

### 1.3.3. Limited model and demand-based health workforce planning

Currently, there appear to be few countries that engage in model based health workforce planning [19]. In some countries where national health workforce planning institutions are in place, quantitative tools or models are used to develop projections and/or forecasts of the required future workforce [10]. In general, three approaches can be discerned in these types of health workforce planning models [10,11]:

- The supply-based approach, which focuses on balancing health workforce inflow (e.g. graduates, immigrant health workers), outflow (e.g. health workers who emigrate or retire) and the activity rates of the currently active health workers (measured in either headcounts or FTE).
- The demand-based approach, which focuses on the current and future demand for health services (estimated from the population composition, demography, and health service utilization), and therefrom the required capacity of health workers.
- The needs-based approach, which extends the demand-based approach by additionally considering epidemiological and social-cultural factors.

Looking at the evidence that is available, the large majority of European countries that engages in model based workforce planning takes a supply-based approach and does not take into account the actual health needs of the population. Only a minority of countries incorporates a demands-based or needs-based approach in their model [10]. Also, many countries have a partial or ‘silo’ approach of planning separate health professions and ignoring relationships between health professions [20]. This limits the accuracy of planning models and restricts their potential impact. It has been noted that more sophisticated and integrated models of workforce planning that cut across different professional groups and take into account more factors, such as skill mix and working practices, seem to offer a better prospect of contributing to the sustainability of health systems. Finally, it can be concluded that very few health workforce planning models are or have been empirically evaluated, limiting the possibilities for assessment of the quality and impact of the various models on health workforces and health system performance [11].

There are various reasons why so few countries engage in model-based and demand-based health workforce planning. One reason is that it is difficult to incorporate the variables that determine the future supply and demand of workers, mainly due to the earlier mentioned lack of reliable data on these variables [11]. Apart from the methodological challenges, there are also strategic issues that need to be tackled for planning models to be initiated and implemented. This includes ensuring that the required capacity and skills for health workforce planning are sufficiently trained and available within institutions or departments in charge of workforce planning [10].

### 1.3.4. Limited future-based planning and use of qualitative methods

While planning the required numbers and types of health professionals to sustain the current distribution is a challenge, estimating the required skills and competences of the HWF for the future is an even greater challenge. Comprehensive health

workforce modelling and forecasting is complex and fraught with pitfalls [21]. Currently, no country matches and forecasts the needs, demand and supply of its health workers in a manner that can be referred to as “best practice” [8]. European countries are investing in better estimates to model their current and future health workforce requirements. Needs-based models are extended, for example, with information on trends in risk factors and the incidence/prevalence of different diseases to improve estimates of future care needs and the required health workforce [11]. This is often based on qualitative data collection through interviews and workshops with national experts in these areas [22]. Yet complex and challenging methodological and technical problems remain. Again, it should be noted that the current state of most country databases is generally inadequate to allow for a reliable analysis of the available and required qualitative and quantitative health workforce capacity [8]. Hence, needs-based models are inherently limited and/or need to draw on expectations with high uncertainties and normative judgments, for example about what type and level of care is really required [11].

### 1.3.5. Limited international collaboration in health workforce planning

Finally, while some countries take into account the health labour market situation of their neighboring countries, or explore regional border policies, the possibilities for countries to collaborate are largely underutilized. There is scope for increased collaboration and exchange of good practice in HWF planning between European countries, increasing the possibilities to support the development of national HWF policies for the future [15].

### 1.4. The Joint Action on Health Workforce Planning & Forecasting

In order to support EU Member States to tackle the key challenges facing the health workforce and health workforce planning, the European Commission funded a feasibility study on EU level collaboration on health workforce needs [10,23]. Based on the outcomes of the feasibility study, the Commission decided to fund a Joint Action on Health Workforce Planning & Forecasting (JAHWF) under the Health Programme (2008–2013). Coordinated by the Belgian Ministry of Health, the three year programme of work (2013–2016) involved 30 associated partners and 62 collaborative partners, representing countries and stakeholder groups from across Europe [24]. The focus of the JAHWF was restricted to doctors, nurses, pharmacists, dentists and midwives for two reasons. First, where planning models are available, they usually focus on one or more of these five professions. Second, these are the five professions with automatic recognition under Directive 2005/36/EC, making them especially relevant where mobility issues are concerned, and hence for health workforce planning.

The general objective of the Joint Action on Health Workforce Planning & Forecasting was to create a platform for collaboration and exchange between Member States, to move forward on the planning process and to prepare the future of the health workforce within Europe. More specifically, the JAHWF formulated the following eight objectives:

1. Better understanding of terminology
2. Better monitoring of the HWF by access to timely data
3. Updated information on mobility and migration trends in the EU
4. Guidelines on quantitative and qualitative HWF planning methodology
5. Increased quantitative and qualitative planning capacity
6. Estimation of future skills and competencies needed in the health workforce

7. A platform of cooperation to find possible solutions on the expected shortage of HWF
8. A higher impact of HWF planning and forecasts on policy decision making

The JAHWF was structured in work packages (WPs) [25], which are further elaborated upon in Appendix 1 in the supplementary material.

## 2. Methods

The JAHWF adopted a multi-disciplinary theoretical and empirical approach to map, study and improve health workforce planning in Europe. A variety of quantitative and qualitative methods were used, including literature reviews, survey research, semi-structured interviews and focus group discussions. Additionally, workshops were organized, bringing together a variety of European and global experts to critically examine and jointly discuss health workforce planning and particular challenges. Workshop responses were analysed qualitatively and incorporated in the final results. Specific initiatives of the JAHWF consisted of two pilot studies in Italy and Portugal to test and apply some of the JAHWF outputs (the ‘*Handbook on Health Workforce Planning Methodologies across EU countries*’ and the minimum data set). It was studied if they were effective in improving existing (national) HWF planning systems and what adaptations were necessary. Also, two feasibility studies – one in two German states and one jointly in Romania and Moldova – explored the opportunities of implementing new planning methodologies across regions and countries. Another pilot project in Belgium studied the incorporation of qualitative methods in the HWF planning process. It is based on this material gathered during the Joint Action that key findings on planning terminology, data availability, model-based planning, future-based planning and collaboration have been extracted. A full methodology description and overview of produced outputs can be found in Appendix 1 in the supplementary material.

## 3. Results

### 3.1. National and international terminology used in health workforce planning

The JAHWF compared the terminology used in HWF planning, both at national and international level, and found considerable gaps and inconsistencies in the terms and definitions that are used. At international level, the OECD/Eurostat/WHO-Europe Joint Questionnaire on Non-Monetary Health Care Statistics aims to serve as a harmonised tool for international reporting on the health workforce, aimed at providing internationally comparable data [26]. Yet when comparing the data supplied by EU Member States to the Joint Questionnaire, considerable discrepancies were found in the definitions and interpretations of some of the key Joint Questionnaire terminology. Table 1 summarizes the main inconsistencies identified by the JAHWF, broken down by type of professions, activity status and activity amount.

Hence, the JAHWF concluded that there are considerable differences between countries in some of the key definitions and interpretation of factors used in HWF planning. This is confirmed by the fact that national definitions are not always identical to the definitions used in the Joint Questionnaire [27]. It was found that these differences can often be traced back to the country-specific features of indicators. In the case of federal states or countries with regional based HWF planning, even more difficulties can occur due to differences in terminology used between regions, and/or between the regional and national systems.

**Table 1**  
Comparison Joint Questionnaire (JQ) and EU national HWF terminology by the JAHWF.

Dimension	Inconsistencies at international level
Profession	For professional nurses, associate professional nurses and midwives, there is a significant gap between the ISCO codes used in the JQ and nationally applied definitions and classifications. E.g. the JQ definition of professional nurses and associate professional nurses describes differences in job content and competence, while qualifications are not mentioned. In several countries though, including Finland, Germany, Ireland and the Netherlands, the boundary between the two groups is drawn by qualifications.
Activity status	The three JQ activity status categories (practising, professionally active, licensed to practice) are often not comparable to national and local legal concepts and practices. E.g. in Hungary a health professional has to fulfil the requirements of CPD83 in order to obtain the licence to practice status and thus get into the Operational Registry. The licence has to be renewed every 5 years. In Belgium, the proof of at least two occasions of reimbursement by the NIHDI (National Institute for Health and Disability Insurance) is the criterion to enter the practising MD category.
Activity amount	There are significant differences across EU countries in the measurement of full-time equivalent (FTE). E.g. in Finland, FTE is defined as 1.0 for full-time workers and 0.6 for part-time workers, while in Spain FTE for men is 0.9 times male headcount, and FTE for women is 0.8 times female headcount.

### 3.2. A minimum data set for health workforce planning

The JAHWF identified a number of recurrent challenges among EU Member States related to data, data sources and methodology. First and foremost, a consistent lack of data was reported. Other common challenges identified were related to a lack or misuse of planning models and methods, poor data quality and the absence of qualitative data. The JAHWF developed a minimum data set (MDS) – a limited and essential number of indicators, which are generally comparable and should be measured regularly with the use of standard data sources – in order to help improve the data availability for health workforce planning. The scope of the MDS was defined as follows:

- To recognize the major imbalances in the HWF;
- To analyse these imbalances; and
- To identify possible solutions.

The MDS contains a total of seven indicators, five on the supply side – labour force, training, retirement, migration (outflow) and migration (inflow) – and two on the demand side – population and health consumption, all to be calculated through eight categories of data. Table 2 shows the MDS and data availability across 11 EU Member States (BE, DE, ES, FI, GR, HU, IT, NL, PL, PT, SK) and Iceland, each cell containing the number of countries that reported having these data available.

It becomes clear from Table 2 that most of the twelve countries have basic data related to the HWF labour force available, although not specified in FTE (a more complex measure) and the country of professional's first qualification. For other indicators, data availability is lower and for the migration indicators, especially the outflow of the health workforce, data turn out to be scarcely available.

To test the MDS on its practical feasibility, the JAHWF conducted two pilot studies (Italy and Portugal) and feasibility studies (Germany and Romania/Moldova). It was shown that the MDS was sometimes partially used or used with some adaptations. For example in Italy data on specialisation was not available as doctors are planned as one single professional category. In Portugal, data

on professional activity status was added to distinguish the 'professionally active' stock from the 'licensed to practice' stock. Yet overall, the MDS developed by the JAHWF was considered useful by the pilot and feasibility countries for making simple projections.

### 3.3. Key elements of the health workforce planning process

While having a minimum data set in place is a prerequisite to enable HWF planning, data availability alone does not necessarily lead to successful planning processes. After all, challenges facing HWF planning are not merely methodological of nature, but also strategic. To shed light on the planning process, the 'Handbook on Health Workforce Planning Methodologies across EU countries' [28] identifies five key elements to be included by every planning system: goals, a forecasting model, data, link to policy actions and organisation. Table 3 describes each element in more detail.

The JAHWF pilot studies and feasibility studies showed that these five elements are indeed key and useful to start or improve HWF planning processes. Still, it was noted that especially goal setting and links to policy actions are hardly feasible within a limited timeframe. Yet added value was demonstrated in creating synergies between various bodies and stakeholders to reach goals, while developing a variety of strategies seemed to increase the chances of policy actions being turned into sustainable programmes for a sustainable future health workforce. Another important finding was that some dimensions in forecasting models are better forecasted at local level (e.g. population needs), while others at national (inflows from education) and international level (mobility flows). Finally, the importance of organising a HWF planning process was emphasised, especially the establishment of a project team with a sufficient number of capable staff with various skills.

### 3.4. Use of qualitative methods in health workforce planning

In view of the underuse of qualitative data in HWF planning, the JAHWF has developed guidelines on methods that can be used to include qualitative data in planning processes. It should be noted that qualitative methods can be used on their own, but are preferably applied alongside quantitative measures to ensure an integrated approach to HWF planning.

A survey by the JAHWF among 7 EU Member States (BE, DE, ES, FI, HU, NL, UK) and Norway showed that qualitative methods are already being used, to some extent, to determine how contingent and exogenous factors or changes may influence the supply and demand of health workers. It was mentioned by survey respondents that without qualitative input, HWF forecasting would only be based on observable historical data, i.e. "planning for yesterday". Another respondent stated that qualitative data are essential 'to generate or validate values used in modelling assumptions where robust quantitative data is not available'. A continuum of qualitative methods were listed by the JAHWF ranging from informal (interviews) to more structured (Delphi exercise). However, no hierarchy of approach can be implied. The six methods are:

- Stakeholder identification and analysis: ensures that all relevant people are identified and brought into the HWF planning process, to contribute to the relevance of outputs, transparency of decision-making and developing a shared vision of the HWF.
- Literature review: considers the evidence that is available, and examine previous research and thinking on a topic.
- Interview: identifies trends, factors and policies that may affect future health workforces.
- Survey: gathers information from a large group of respondents.
- Scenario: describes imaginative, plausible and challenging ways that the future might unfold.

**Table 2**  
Availability of data to cover the minimum data set for HWF planning in 11 EU Member States<sup>a</sup> and Iceland.

Data to calculate the indicator:	Supply indicators <sup>b</sup>					Demand indicators <sup>c</sup>	
	Labour force	Training	Retirement	Migration (inflow)	Migration (outflow)	Population	Health consumption
Profession	12	10	9	8	4	N/A	N/A
Age	12	5	7	5	2	11	8
Head count	12	10	10	7	4	11	8
FTE	7	N/A	N/A	N/A	N/A	N/A	N/A
Geographical area	11	6	7	5	2	9	7
Specialisation	11	8	6	6	2	N/A	N/A
Country of 1st qualification	6	3	3	5	2	N/A	N/A
Gender	10	N/A	N/A	N/A	N/A	N/A	N/A

<sup>a</sup> Belgium, Finland, Germany, Greece, Hungary, Italy, the Netherlands, Poland, Portugal, Slovakia and Spain. The table aggregates results on data for doctors, nurses, pharmacists, dentists and midwives per country. However, most often data are only available for physicians.

<sup>b</sup> *Labour force*: the number of health workers currently producing healthcare (practising); *Training*: the number of health professionals (headcount) that complete education (basic or specialist) per year; *Retirement*: forecast of the number of professionals (headcount and full time equivalent) that will retire each year; *Migration (inflow)*: forecast of the number of licensed and recognised health professionals (headcount) that may enter the country, calculated using average flow numbers in recent years; *Migration (outflow)*: forecast of number of practising professionals (headcount) that may leave the country, calculated using the average flow numbers in recent years.

<sup>c</sup> *Population*: number of current inhabitants, by age group; *Health consumption*: the total health consumption in year x, by age group.

- Delphi exercise: obtains expert consensus on a variable, parameter or factor that is needed in the calculation for subsequent workforce modelling stages.

The JAHWF pilot study in Belgium used some of these qualitative methods, most notably the Delphi exercise, to improve the Belgian general practitioner workforce planning process. It was found that the use of the Delphi method improved the GP forecasting model inputs and outputs by helping to quantify a range of variables. Therefore, this method will be structurally integrated in the Belgian HWF planning approach. While the Belgian experiences were positive, it was noted that the use and selection of any method should be dependent on the situation and context of the study they are being used in. Also, some level of expertise is required in applying the qualitative methods.

### 3.5. Collaboration among European countries in health workforce planning

The JAHWF significantly improved collaboration between European countries in terms of HWF planning and related processes. The JAHWF workshops and conferences proved to be a fruitful knowledge transfer mechanism, as they allowed country representatives and stakeholders with similar problems to come together and work on specific issues. Further workshops have been organized based on the JAHWF model, for example a Policy Dialogue on the HWF was organized in Brussels in May 2017, bringing together various Member States at the invitation of Belgium. Also, countries involved in the JAHWF have helped Italy in its deployment of planning models in most Italian regions, which have now been successfully implemented. Collaboration remains further intact through the European expert network on the HWF, which is currently in development. Also, international agencies such as the WHO have structurally embedded JAHWF results, for example in the development of the *National Health Workforce Accounts* [29].

## 4. Discussion

The aim of this paper was to synthesize and discuss the results of the Joint Action on Health Workforce Planning & Forecasting in light of the current challenges in health workforce planning and forecasting, i.e. planning terminology, data availability, model-based planning and future-based planning and collaboration. From the overview presented, it becomes clear that the JAHWF has addressed and provided guidance on these challenges, with the creation of the minimum data set and ‘*Handbook on Health Workforce Planning Methodologies across EU countries*’ as the two most tangible results.

**Table 3**  
Five key elements of the health workforce planning process<sup>a</sup>.

Element	Content
Goals	Setting objectives, communication of the goals, timeframe, etc.
Forecasting model	Mathematical forecasting model, quantitative and qualitative methods, scenario analysis, projection period, frequency of updating, migration flows, segmentation of future estimations, integration between/within professional groups, feedback effects between demand and supply, interaction with other goals, assessment of the outputs, etc.
Data	Aim of data collection, individual/aggregate data, unique/multiple sources, comprehensive information, updated database, etc.
Link to policy actions	How the planning process is connected with the actions that will achieve what has been planned, monitoring and controlling, etc.
Organisation	Workflow, decentralization of planning responsibilities, stakeholder involvement, role of the stakeholders, communication, staff members, etc.

<sup>a</sup> According to the JAHWF ‘*Handbook on Health Workforce Planning Methodologies across EU countries*’.

Moreover, by taking not only a theoretical but also an empirical approach, through the pilot- and feasibility studies, the JAHWF was able to show that the challenges facing HWF planning and forecasting across Europe are substantial but not insurmountable. In doing so, the JAHWF has provided important steps towards improved HWF planning and forecasting across Europe.

Looking at the future, the JAHWF has laid a solid foundation for the next steps in HWF planning and forecasting by providing the basic tools and insights to start a planning process. At the same time, as is often the case in HWF planning and forecasting [11], no formal evaluation of these tools has taken place and the positive results from the pilot- and feasibility studies can only be considered indications of effectiveness in solving HWF related problems. Moreover, the context-sensitivity of HWF planning was repeatedly noticeable in the application of the tools, sometimes even limiting their potential impact. In this sense, the JAHWF has drawn attention to the fact that HWF planning and forecasting are mostly a national and local affair and there is not one HWF planning model or methodological approach which is applicable across all settings. This context-sensitivity is confirmed by the fact that many of the differences found in HWF terminology originate from the country-specific nature of indicators. This justifies their use in current form at national or even regional level. As was also noted by Ono et al. [11], proper HWF planning needs to go below the national level. A

clear national or regional system for terminology, complemented with accurate data, therefore plays a more important role for HWF planning than internationally comparable definitions.

Furthermore, the JAHWF showed that national and local context not only influence the terminology used and the goals of a planning process, but also the choice and (full) use of HWF planning methods and tools. This conclusion is supported by earlier studies [5,30] on the different dimensions and determinants of HWF planning. Batenburg [30] concluded that HWF planning is context sensitive and that the level of model-based planning is strongly related to a country's type of health labour market or health system. Hence, the idea of a 'golden standard' in HWF planning models and methodological approaches is neither desirable nor feasible. HWF planning tools should have the flexibility to be adjusted to national and local needs and country characteristics, especially in the current climate of cutbacks and health system reforms [31]. The JAHWF has provided planning tools at a basic level that allow doing this. Yet so far, how to improve HWF planning in a context-sensitive manner is little investigated [30]. Experiments with the tools developed by the JAHWF, such as the minimum data set, in diverse national contexts may provide more insight into this area. Another interesting avenue for further exploration is the use of country learning clusters in HWF planning and forecasting. To improve context-sensitivity in HWF planning, it may be beneficial to cluster countries – e.g. based on health care system or primary care strength – that are expected to learn from each other because they share the same conditions and starting position for HWF planning [30].

## 5. Conclusions

When considering the challenges facing health workforce planning, the contribution of the Joint Action on Health Workforce Planning and Forecasting can be observed mostly in creating awareness and activating countries to consider the more basic planning elements (e.g. by providing a minimum data set). The prediction and evaluation of HWF planning, which are more complex and context dependent elements, appear to be a long way off for many countries. Yet through its pilot and feasibility studies, the JAHWF has shown that even though the challenges facing HWF planning and forecasting across Europe are substantial, they are not insurmountable. Further investments should be made by all actors involved to support and stimulate countries in their HWF efforts, among others by implementing the tools developed by the JAHWF, such as the minimum data set and Handbook, in diverse national and regional contexts. Simultaneously, investments should be made in evaluation, staff capacity and expertise to build a more robust evidence base surrounding HWF planning methods, especially in the face of growing evidence that HWF planning adds value and should be stimulated in general [11].

## 6. Conflict of interest statement

None of the authors has any potential conflict of interest related to this manuscript

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## Appendix 1 Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.healthpol.2017.12.002>.

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