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HUMAN RESOURCES FOR HEALTH (HRH) PLAN COMPONENT OF NATIONAL HEALTH PLAN 2011-15 (PORTUGAL)

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Acronyms

ACES	Agrupamentos de Centros de Saúde
ACSS	Administração Central do Sistema de Saúde
EU-15	European countries before May 2004
FTE	Full-time equivalents
HFA	Health for All database of the World Health Organization Europe Region Office
HRH	Human resources for health
HSS	Health services system
HW	Health workers
HWD	Health workforce development
HWP	Health workforce policy
LTVR	Lisbon and Tagus Valley Region
NHP	National Health Plan
NHS	National Health System
OECD	Organisation for Economic Co-operation and Development
USF	Unidade de Saúde Familiar
WHO	World Health Organization

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Key messages

1. Objectives in relation to the health workforce (HW) are not independent, but subordinated to the health and services policies of the country
2. A valid assessment of the current HW situation (a « State of the Portuguese HW report ») is the basis of sound planning
3. A solid and reliable database is a requirement for monitoring and for future needs assessment
4. Consultation of stakeholders on HW needs and on policy objectives is a condition of success of the HW component of the National Health Plan (NHP).
5. Technical capacity and appropriate mechanisms are needed at Ministry of Health level to conduct the planning and intervention process
6. A 9-month process is recommended to define a set of objectives for the 2011-16 period. This time is needed to ensure that HW component of the NHP is based on a rigorous analysis and has the support of stakeholders.
7. HW development is a process which aims at improving the performance of the HW on a continuing basis. This requires careful monitoring of changes and the capacity to adjust rapidly to new needs of the health services systems. A plan is needed, but it should not be treated as a blue-print which can only be modified in 5 years.

1. Background, scope of work and structure of paper

Background: The inclusion of a health workforce (HW) component in the next National Health Plan (NHP) of Portugal is fully justified and is in line with the values[1] and the approach to the new 2011-2016 NHP (Modelo conceptual, PNS 2011-16). Already in 2004, the current NHP (2004-2010) recommended that such strategy should be developed.

The need to pay greater attention to HW issues and needs was reiterated by the World Health Organization (WHO) in its assessment of the current NHP and of the performance of the Portuguese health services system (HSS) (WHO 2009).

Also, Portugal is among the member states of the WHO Region who have adopted the *Tallinn Charter: Health Systems for Health and Wealth* (2008), which includes a commitment to strengthen the HW as an important component of a strategy to make HSS more effective and to better contribute to the improvement of the health conditions of their population.

At European Union level, the Commission has issued a Green Paper (2008, 2009) which invites member countries to address actual and forthcoming HW challenges raised by the aging of populations (and of the HW itself), changing expectations and behaviors, and rapid technological changes. Finally, in Portugal, various reports have identified HW issues as requiring greater attention from planners and decision makers (Amaral, 2005; Conceição, Lima, Ferrinho 2007; Ramos 2007). Interviews with key-informants conducted by an international consultant (Professor James Buchan, Queen Margaret University, Edinburgh) reinforced this perception.

Objective and scope of work: This report aims at supporting the process of formulation of the NHP 2011-16, with regard to its HW development component. The report should be read as a "plan of the planning process" rather than a plan *per se*. It seeks to help planners to define their approach and strategy to spell out the elements of the NHP which deal with human resources for health (HRH) challenges, such as improving access to primary care services by training adequate numbers of personnel with the appropriate competencies, and by reducing geographical imbalances in their distribution. The report proposes an approach based on a conceptual framework which locates HW issues within the context of the overall health strategy of the country. It suggests a strategy to ensure that proposals to address these issues are as much evidence-based as the quality of available data and knowledge permits, while acknowledging that no HW policy (HWP) can be expected to produce its desired results without the support and collaboration of social partners. It also makes

[1] Social justice, universal coverage, equity, responsiveness and solidarity.

recommendations as to how to proceed with the development of a HW plan as a tool which will be built progressively and adjusted as the context changes.

Method of work, sources of information, structure of the report: The work consisted of several stages. Firstly recent, international literature on HW development was reviewed for insights on good practices. Then national sources were analyzed, including statistical information on the various occupations which constitute the HW. These are identified in Annex 1, and a broad sample of available data is provided in Annex 2[2]. As there is no single source of HW data in Portugal, various methodological problems have been encountered and are discussed below.

The literature review indicates that HRH problems are context and time-specific and that policies to address them have to be designed in accordance to the specific circumstances of the country: baseline situation, national health objectives, values, political and economic environment, and so on. There is no blueprint which a country can use to replicate reforms which may have been successful elsewhere. This said, there are general principles to be considered, lessons to be learned, and tools to be adapted.

Another lesson learned is that the process of designing a health workforce development strategy (HWD) or plan is as much important as the strategy itself. This means that participation of the stakeholders in assessing the HW situation, in identifying issues in need of a solution and in designing interventions, is a critical ingredient in the success of the strategy. This is the rationale for the focus of the report being on the "how to" approach HWD in the next NHP.

To do so, we first present a conceptual approach which provides the basic principles on which the process of planning can be built. Then we present the three main stages of the development of the strategy: (1) the analysis of the present HW situation, (2) the identification of priority problems and objectives for the 2011-16 period, and (3) the formulation of policy options and strategies. In each section, recommendations will be made on how to go about managing the process. These recommendations take into account the comments and suggestions of the international consultant who reviewed drafts of this report and who visited Portugal in September 2010to discuss with key-informants.

[2] Annex 2 is based on a report prepared by Conceição, Ribeiro, Pereira and Dussault (2009)

2. Conceptual approach

The development and implementation of a health workforce policy[3] (HWP) is a pillar of any National Health Plan (NHP). It aims at ensuring that the labor force needed to achieve the overall objectives will be available in adequate quantity and quality.

To be effective, the HWP needs to be aligned with the other components of the NHP, and to be built on a valid understanding of what is expected of the workforce and of the dynamics of the health labor market in which it operates.

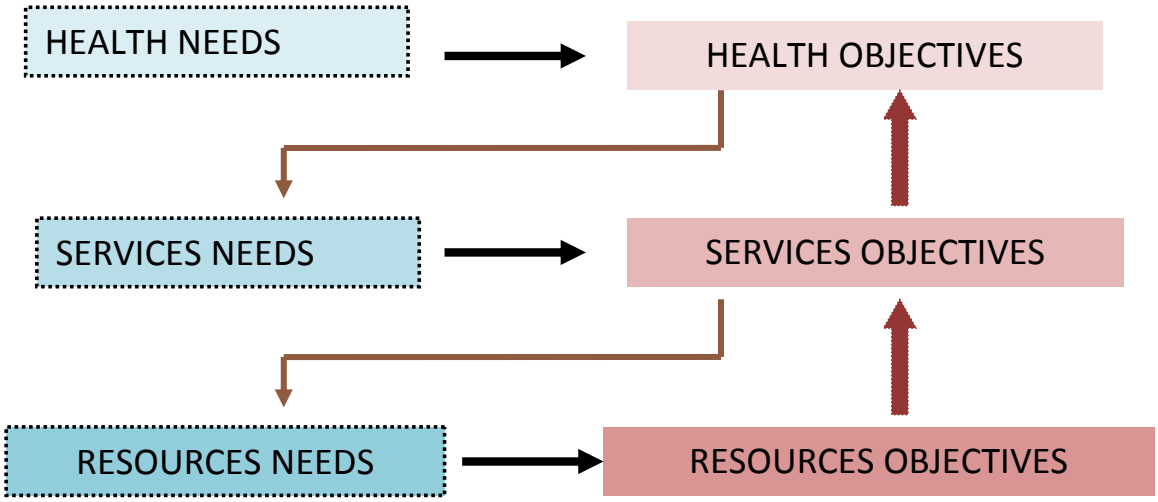
Three sets of relationships need to be taken into account: (1) between needs for health services/ resources and corresponding objectives; (2) between the performance of the HW and that of the HSS, and (3) between the various flows which constitute the dynamics of the health labor market.

2.1. The relationship between health services and resources needs and objectives

There is a hierarchical relationship between resources, services, and health needs and objectives (Figure 1). Needs correspond to the gap between an actual situation and a defined or desired one, and objectives are the specific results which are expected to be achieved during the course of implementation of the NHP. In an ideal world, service needs are derived from health objectives, and then resource needs from service objectives. These are then translated into specific resource objectives. There is, therefore, a subordination link between resources, services and health policies. Thus the objective of HWP is to contribute to achieving the objectives of services policies. Accordingly, these policies cannot be developed as an independent component of the country's health policy framework. This entails that clarity of service objectives is a critical prerequisite, as these will determine human and other resources needs. The answer to the question "how many health workers, with what skills, and located where?" requires first that we know which services the country wants to provide.

[3] The expression "human resources for health (HRH) policy" is also commonly used.

Figure 1 - The relationship between needs and objectives



1.2. HW and HSS performance

The contribution of the HW to the performance of the HSS is generally acknowledged, but rarely analyzed in a systematic manner. Figure 2 proposes a conceptual framework to help better understand the relationship between the performance of the HW and that of the HSS. The latter is defined by WHO (2000) in terms of the degree of achieving equity of access to effective services, produced in an efficient and responsive manner, and guaranteeing protection against the impoverishing effects of illness.

We propose to define HW performance according to three dimensions:

- ***coverage***, or the extent to which the workforce provides services to the various sub-groups of the population and provides the whole range of services needed;
- ***productivity***[4], or the relationship between the volume of services produced and resources used;
- and ***quality***, which has two sub-dimensions: ***technical*** and ***service.*** The former corresponds to the degree to which providers produce services which meet the accepted standards of their profession and whichmprove outcomes; the latter refers to meeting users' expectations in relation to other dimensions such as ethical behavior, respect of values, courtesy, etc..

[4] This is also called ***technical efficiency***.

The performance of the HW, taken as a whole, is a function of the personnel potentially available (***stock*)**, which includes those who participate in the labor market, whether they are active[5] or not; it also includes those who do not participate, but are qualified as health workers and could potentially become active; performance is also function of ***competencies***, in terms of knowledge, skills and attitudes which determine their capacity to produce, quantitatively and qualitatively; and ***motivation***, e.g. willingness to produce services in adequate quantity and quality. The stock fluctuates according to flows of entries (new graduates, immigrants, permanent or temporary return of leavers, contracted) and exits (temporary leaves, exit of health sector, retirement, emigration, illness, death), each of which has a dynamic of its own (Vujicic & Zurn, 2006).

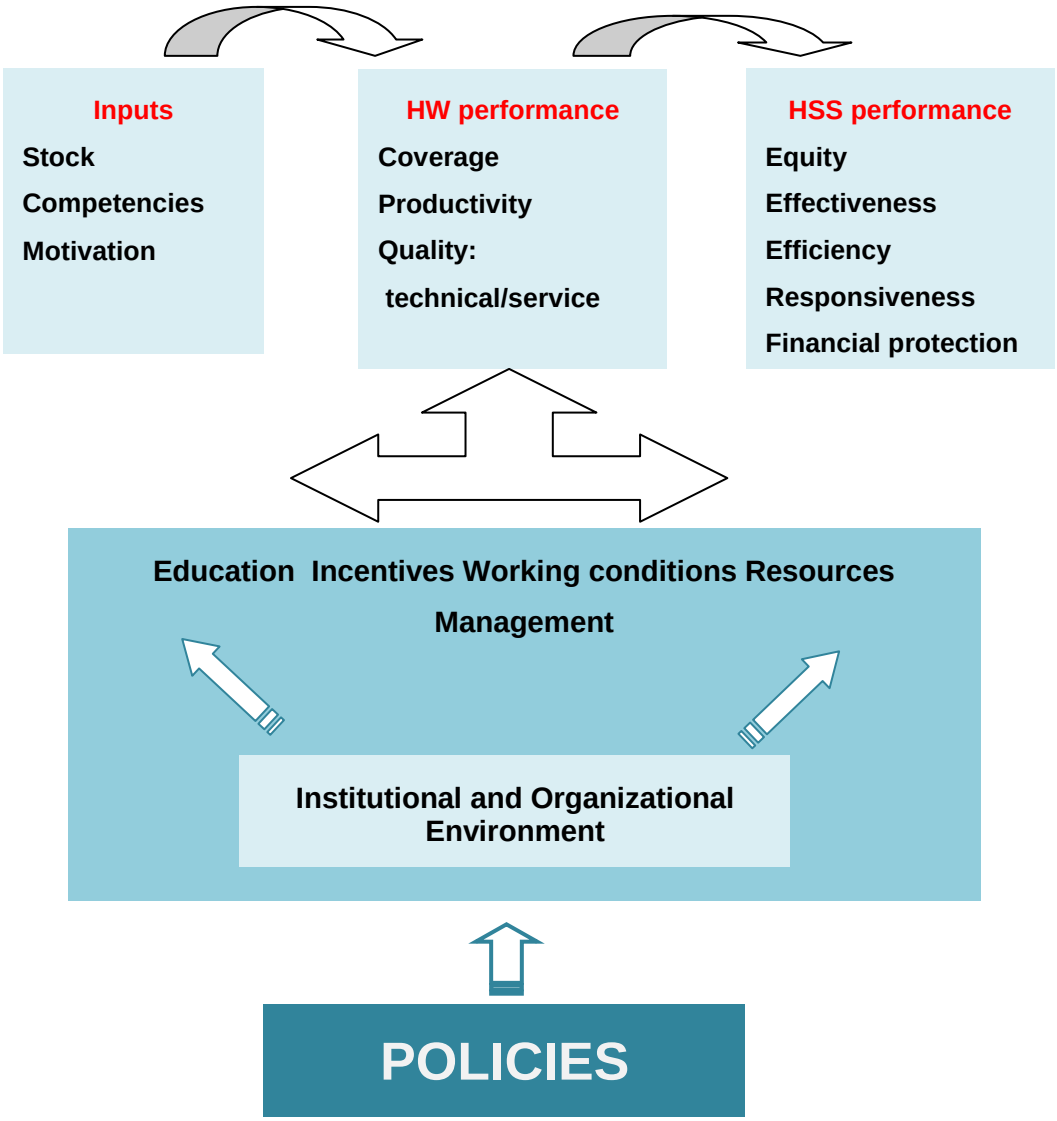
Various variables are at work to influence how the HW will be composed and will perform. These are the ***education processes*** which determine how many workers, of what kind and with what competencies will be produced; professional and financial ***incentives*** that orient decisions and behaviors of workers, such as the choice of a specialty, a location for practice (including the decision to migrate), a level of intensity of work; the ***working environment***, e.g. compensation, physical and organizational working conditions, such as a participatory management, access to information, team spirit; ***resources*** available to be effective and efficient (equipment, consumables, information); and by the type and effectiveness of ***management***, which can be more or less participative, conservative or innovative, reactive or proactive, supportive or controlling.

All these variables are influenced by existing ***policies***, which give the directions to follow (more or less clearly), define the rules of the game (for instance decision-making processes) and make resources available through budget allocation.

Policies which have an impact of the HW and on the HSS emanate from the health sector itself, but also from various other sectors at national (education, finance, public administration, labor, and professional regulators) and international (EU directives on working time, recognition of qualifications, mobility of workers; “Bologna process”) level.

[5] This includes those who are employed, and those who are not, but are available for work.

Figure 2 – HW and the performance of the HSS



1.3. Labor market dynamics

Any plan for the future development of the HW must take into account the current situation and also the likely features of the supply and demand for health workers.

Demand corresponds to work (this can be expressed in terms of positions, hours, services) which employers are prepared to pay for. In a country like Portugal, there are three main sources of demand: public services (SNS, education institutions, armed forces,…), private organizations (hospitals, clinics, insurers, pharmaceutical and medical equipment industry,…) and individuals through out-of-pocket payments. Demand should be clearly distinguished from needs, which correspond to requirements based on health needs (so many children to vaccinate), some norms defined by professional groups, or on some service targets (1 family physician per X population, or so many nurses per physician). It should be noted that demand may be met by different labour market responses- such as skill mix change, or substitution of labour for new technology. When assessing future needs for health workers, it is important to consider such options which may have an impact on how many workers of each professional category will be needed.

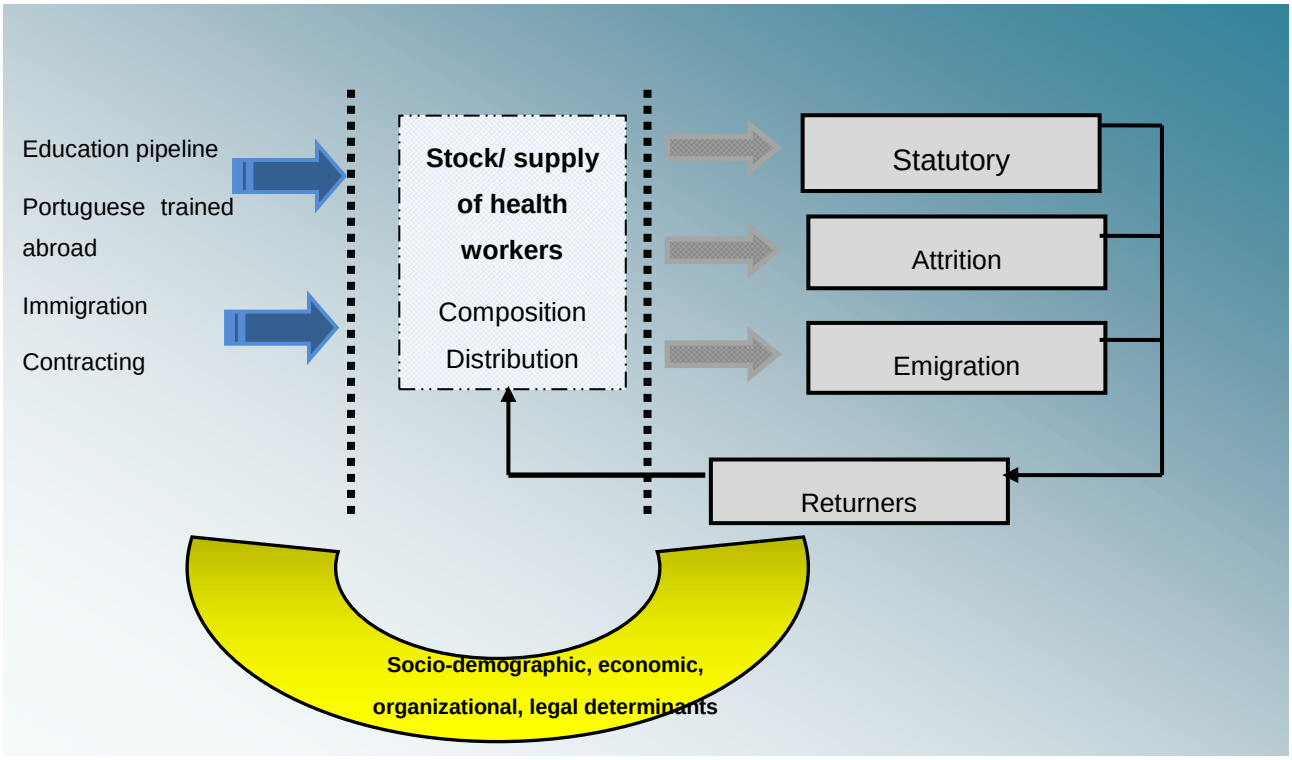
The ***supply*** of health workers corresponds to the number of workers who are available to participate in the production of health services. This is a sub-group of the stock of health workers which represents the potential supply, as it includes those trained to work in health but who have decided not to enter the labor market or have entered another sector.

Two important dimensions of the stock and supply are their composition, in terms of occupational groups, sex and age structure, ethnic composition, by nationality, and distribution by level of care, type of services and region. The stock and the supply are globally shaped by various flows (entries and exits), which are themselves influenced by such determinants as: socio-demographic (feminization, aging of the HW), economic (competitiveness of compensation packages, incentives), legal (recognition of foreign qualifications), and organizational (recruitment, posting, promotion, transfer processes).

Most workers are produced by the education system, but Portuguese trained abroad and immigration also contribute to the stock. Also, workers can be contracted from abroad for specific tasks or periods (e.g. recent contracts with Cuba and Uruguay).

Exit flows correspond to statutory retirement, to involuntary attrition due to illness, death, forced premature retirement, and to voluntary attrition resulting from exit to other sectors, and from emigration, which is treated separately as it is has its own determinants and dynamics. Some leavers may eventually decide to reintegrate the national HW. This illustrated by Figure 3.

Figure 3 - A simple model of health labor market dynamics



Adapted from Dussault et al 2009

A good understanding of how the health labor market functions and is likely to evolve is needed to assess future needs for health workers, to design strategies to educate, train and retain them, and to shape the working environment (payment mechanisms, management structures, …).

Recommended approach

The principles that can be derived from the above conceptual elements imply that the approach to HW development should be based on sound information on the current and likely future demand and on the objectives set by the NHP in terms of services to be made available. Information is also needed on the current configuration of the HW, its probable evolution, and on that of the health labour market and on the factors that influence it. Another implication is that ideally, the approach should consider the HW as a whole, rather than in a piecemeal fashion consisting in designing a policy for physicians, another for nurses, etc. There will be a need to tailor specific policies for specific occupational groups, but this should be done from within an overall integrated workforce policy framework. These

are very challenging requirements in a context of incomplete information and of fragmentation of policy making[6] between various ministries and state agencies, as well as professional organizations. Additional challenges, more political, are to reconcile local and national needs, as well as the diverging interests and objectives of the numerous groups which comprise the HW, and to assess costs and risks involved in adopting specific workforce policies.

With those consideration in mind, we propose that the formulation of HW component of the new NHP be based on steps which combine the objective of building the information base in support of decision-making, and that of creating a consensus basis sufficiently strong to obtain the adherence of the interested parties to the HW development plan and to mobilize their contribution to its implementation.

These steps are:

(1) an analysis of the current situation which includes the collection of available relevant minimum set of quantitative and qualitative data on the current HW, on its performance and on the factors which determine it; and an identification of workforce issues which the new NHP should address.

(2) the selection of priorities and of corresponding objectives for the 2011-2016 period;

(3) and the identification of options of strategies, tested for their affordability, acceptability and feasibility, in terms of risks of any kind associated with their implementation. .

These steps follow a logical sequence, but are not purely linear, as there can be adjustments as new information becomes available.

At all steps, it is critical to engage the main stakeholders of the health sector, as their support (or at least their neutrality) will be needed at all stages of the design and of the implementation of the NHP. For instance, it will be difficult to get support for specific objectives, if stakeholders do not first agree on the diagnosis which justifies them.

2. Health workforce situation analysis

[6] Decisions in relation to career structures, remuneration, working conditions, training, quality management are under the responsibility of different ministries and agencies.

Because of the specificities of a country's HSS and HW situation, policy choices in health cannot be merely copied from other countries or from some standard normative model. It is critical to base planning options and policy choices on a solid analysis of the current situation. There are various methodologies for analyzing the situation of the HW[7] in a country, which can inform the process of passing judgments on the performance of the HW. This is done by analyzing the available information, which by definition is imperfect and incomplete, in the light of the principles, values and objectives by which the planners [policy makers] are guided. An effective strategy would minimally include the following:

1. The collection of available data and information, and assessment of their reliability and validity. It is particularly important to check whether there is double counting of personnel (cases of multiple employment), and when surveys or reports are used as a source information, whether their key findings and conclusions are representative or not. Whilst there may be a need for an initial "one-off" data collection, consideration should be given as to how to develop a routine and sustainable HW minimum data set? At this stage, information gaps can be identified for future attention.
2. The analysis of trends and projections of personnel and competencies needed to achieve the objectives of the NHP. There are various options to do that, ranging from simple demographic projections of the existing workforce to health needs-based forecasts, each with its technical difficulties and limitations[8]. The important is that these limitations are fully acknowledged, and that analysis is driven by the need to inform or validate policy direction. One way of proceeding is through a scenario building strategy, using projections of various possible "realities", and assessing the service planning and policy implications of each.
3. The identification of gaps between the observed situation, with regard to the four dimensions of performance, and the desired situation. The following section suggests questions to be asked in relation to each dimension to describe the current situation, As to the desired (desirable?) situation, it is a matter of value choices which are preferably made in consultation with the stakeholders.
4. The identification and analysis of factors which explain those gaps, done through the review of relevant literature and surveying the opinions of experts and of stakeholders.

[7] See World Health Organization, Health workforce program, resource centre; www.who.int/hrh/resources/en/

[8] These are reviewed in Dussault, G., Buchan, J., Sermeus, W., Padaiga, Z. (2010)

5. The promotion of a consensus on what the situation is and what needs to be maintained, strengthened or changed.

This strategy should lead to the identification of problems and current and future needs which a HW policy should address. The following section illustrates how such an analysis can be conducted.

2.1. Data and information collection

In the absence of a source which collates all relevant data and information on the HW in Portugal, the identification of existing sources is an initial step. Annex 1 lists the main statistical data bases and comments on their strengths and weaknesses.

Other sources include research reports and surveys looking at specific aspects of the HW, like entry into the health labour market (Ordem dos enfermeiros 2009), or satisfaction of health workers (Biscaia 2004) or the health status of health workers (Fronteira, Biscaia 2007).

The analysis of trends can be based on simple projections, as conducted by ACSS[9] which forecasts the needs for replacement of medical doctors in the NHS (ACSS 2009). Demographic projections based on professional councils data is needed to have an overall picture of the future evolution of the HW. The validity and reliability of such data need to be tested.This information is combined with similar projections for the population, and simple health worker/ population ratios can be produced. These ratios can be compared to target ratios set by the Ministry of Health (MoH), like one family physician per 1500 inhabitants, or by professional associations, like one oncologist per X patients with a cancer diagnosis. Regarding professional norms, care is needed to ensure that these are based on an analysis of needs.

A more refined analysis can, even should, adjust the projections by taking into account factors likely to change the productivity of health workers (aging of the HW, work-life balance expectations, reduction of hours worked, efficiency gains through teamwork, new work patterns, skill mix change, better integration of services, use of information technology, etc.), and of factors affecting the needs for services (aging of the population, expectations of a better informed population, mobility, etc.). More sophisticated analysis requires better information about expected changes in the behavior of providers and users, as well as on the environment in which services are produced (organizational and technological changes,

[9] A report was also produced in 2001 to plan for the training needs of professionals in the health sector::Grupo de Missão. (2001). *Plano estratégico para a formação nas áreas da sa*úde, Lisbon, Ministry of Health

evolution of costs, etc.). Since predicting such changes is not exact science, the utilization of scenarios, based on different hypotheses is a valuable approach.

The identification of needs and issues, corresponding to differences between the existing and what is desirable, can be accomplished through asking series of questions in relation to the various dimensions of performance of the HW. Examples are provided in Tables 1-2-3, with suggestions of strategies to provide informed answers.

2.1.1. Coverage

The main dimensions of coverage that need to be reviewed are: categories of health needs, types of services, groups of population, geographical zones. Accordingly, the main questions are described in

Table 1.

Table 1 – Analysis of coverage

Questions	Strategy to respond
Does the HW attend to all health needs of the population (for example in nutrition, dental, occupational, mental health)? If not which needs are not covered? For what reasons?	An analysis of the degree of achievement of health objectives of the NHP 2004-11 provides an initial answer. A survey of expert and stakeholders opinions can complete this analysis.
Are all types of services covered according to the objectives of the services policy?	Analysis of the composition and distribution of the stock of health workers
Is the priority given in the next NHP to first level services, supported by the availability of an adequately prepared workforce of family and community physicians, nurses and other personnel?	Quantify the number of professionals working at first level and among them, those with a specific training to do so.
Are there imbalances in the distribution of personnel between health centers, hospitals, and other services, such as rehabilitation or home care?	Analysis of NHS data and private sector data (the later being less accessible))
Are trends in the evolution of the composition of the HW, for the next 5-10-15 years, likely to reduce, enhance or maintain these imbalances?	Projections based on current situation and on various scenarios, trends and scenario analysis, taking into account: based on projections. (1) the evolution of health and services needs (aging population, higher expectations, impact of new technology – pharmaceuticals, ICT, genetics, organizational innovation, etc.-), to (2) the division and organization of work in health (review of the scopes of practice, task-shifting, teamwork, etc.), and to (3) the behaviors of health workers (level of activity, international

Questions	Strategy to respond
	mobility, etc.).
Congruence between competencies acquired and population needs (mental health, chronic diseases, deficiencies, geriatrics, palliative care, HIV, health of migrants) and reform objectives: Does training provide the right clinical and behavioral competencies?	Analysis of contents of training curricula, role definitions, and job descriptions; consultation of experts.
Is the geographical deployment of the HW consistent with the distribution of needs for health services? Where are the unmet needs? What are the causes of imbalances? What interventions are in place or planned to correct imbalances?	Analysis of data on location of practice, taking into account that some services (e.g. family medicine) require the presence of health workers at proximity of users, whereas others like neuro-surgery, or transplants derive productivity and quality gains from being concentrated in a limited number of locations. Surveys to identify the causes of the difficulties to recruit and retain health personnel have to be further explored.

2.1.2. Productivity

Technical efficiency can be analyzed in its dimensions of production, e.g. output per worker or groups of workers, and of cost-effectiveness, by comparing different combinations of utilization of workers, e.g. teamwork, more nurses per physician, or of distribution of tasks between workers, e.g. prescription rights of nurses. It is much dependent on how work is divided (which tasks each group of workers are authorized to perform and do actually perform) and organized and managed. In addition, access to tools which improve productivity, like better diagnosis equipment, information systems and internet, are important contributors to productivity. Relevant questions are listed in Table 2.

Table 2 – Analysis of technical efficiency

Questions	Strategy to respond
What are the outputs of occupations like physicians, pharmacists or dentists? (these are selected because measurable indicators are available) What are the outputs of each category of health organization? (This is to capture the productivity of the HW as a whole) How have these changed during the NHP 2004-2010 period? Are there variations between organizations? How can these be explained? How do Portuguese health organizations compare internationally?	Analysis of ACSS statistics and of reports of private hospitals. Routinely collected statistics may not be available for other groups than physicians and not for all specialties. Special studies, mixing data analysis on samples of providers and qualitative surveys may be needed.
Which factors (HRH strategies or practices) influence productivity in a positive or negative manner?	Studies of satisfaction and motivation levels of providers can help interpret variations in productivity levels. Examples are teamwork (integration of nutritionists, pharmacists, psychologists in clinical teams), training in the use of new techniques and communication

Questions	Strategy to respond
Is the current distribution of tasks within the HW cost-effective? Do health workers have access to tools and equipments known to have a positive effect on productivity?	tools, in adapting to strategies to reduce the need for hospitalization (day surgery, home care services), redeployment of personnel among services (more in health centers), delegation of tasks (diagnosis and prescription rights to nurses, utilization of dental hygienists), professional and financial incentives (career development perspectives, access to continuing education, performance linked remuneration), and improved management climate (see the example of "magnet hospitals"). Audit and/or Benchmarking of organizations; International comparisons, literature search, cost-effectiveness analysis.

2.1.3. Quality (technical, services)

Assessing the various aspects of the quality dimensions of the performance of the HW is difficult, if only because definitions of quality and outcomes are not univocal. The main questions to be asked concern technical aspects of what health workers do and aspects related to how they do it (services quality) (Table 3).

Table 3 – Analysis of quality

Questions	Strategy to respond
What are the sources of professional norms? To what extent do health workers respect the technical norms defined by the profession and by the organizations in which they work? How is technical quality monitored and evaluated (inspection, reporting), by whom (Ministry of Health, Inspectorate of health, professional councils, quality groups in hospitals and health centers)? Which strategies are used to maintain and improve the technical dimension of health workers' outputs? Are there mechanisms to monitor and report errors? What happens to formal complaints by users? What is done to prevent and eventually correct technical errors? Training, accreditation, guidelines, sanctions? Are there mechanisms to ensure that health workers have the right competencies and that they use them in an appropriate manner? How effective are these mechanisms? Do health professions engage in clinical audit and feedback?; are they required to undertake mandatory refresher training and development?	Analysis of reports and quality studies by professional associations and councils, accreditation bodies, of data on medical errors; survey of opinions of providers can be additional sources of information.
To what extent health workers' behavior is responsive to non-clinical legitimate expectations and needs of users, such as	Analysis of satisfaction surveys, like the ones conducted in USF or by user groups (European Health Report 2009), as well as qualitative studies can provide elements of response.

Questions	Strategy to respond
respect, empathy, adequate information?	

The HW situation analysis also calls for the explanation of observed performance gaps. These can be related with the characteristics of the stock of workers available and the dynamics of its evolution, the type, appropriateness and quality of competencies (knowledge, skills, attitudes) of health workers, their motivation to contribute to better coverage, productivity and quality, or more likely to a mix of the three and to constraints/facilitators of the services system and its organization and management (Figure 2). The detailed analysis of these dimensions and of the policies and organizational factors which make them vary is beyond the scope of this report, but preliminary observations can be made to start identifying issues in need of attention.

Finally, a situation analysis that is not accepted by the stakeholders is not likely to be conducive to effective policies. If there is no consensus, as is currently the case, on whether the numbers of physicians and nurses are sufficient, or on what should be the division of labour between them, any policy is likely to meet resistance. A process of informing stakeholders and involving them in the validation of this information is important. Strategies to do so include (1) establishing local or national working groups or reference groups; (2) developing a communications strategy linked to the NHP; (3) developing an information clearing house, accessible to all, and (4) consultations on drafts of a comprehensive situation analysis, Models of such reports (Bossert et al.2007) can be adapted to the context of Portugal.

To illustrate the proposed process, we offer a preliminary reading of the situation of the HW in Portugal, based on available data (Annex 2 presents a series of tables providing data on physicians, nurses, pharmacists and dentists, the four groups about which data are more accessible) and on a review of selected documentary sources (Table 4) .

Data exist on other occupations active in the NHS, but little is known on the workforce in the private sector, in particular that which is in the informal sector. Information on the following variables is a minimum basis for assessing the stock of health workers:

- total numbers of individuals (headcount and FTE);
- growth rates;
- age-sex distribution;
- geographical distribution;

- distribution by level of care, type of organization (hospital, health center) public/private sector;
- ratios: health worker/population, individuals and FTE, nurse/physician ratios, various technicians/ physician ratios, individuals and FTE;
- Education of HRH: entries (new graduates, immigrants, contracted, returners), number of places available, of applicants, of admitted, of entrants, of graduates, number of programs (under/ postgraduate), number of full-time/part-time teachers, demographic profile, level of education (PhD, MSc, other), student/ teacher ratios, students in training abroad, exits (retirees, emigrants, attrition rates), exits (retirees, emigrants, attrition rates).

Observations on the statistics available on four better documented groups indicate:

- A continuing growth in the number of physicians, nurses, dentists and pharmacists per 100 000 inhabitants since 2000. The largest growth rate has been observed among dentists, probably due to an influx of immigrants, and the smallest in the physicians/ 100 000 inhabitants ratio. The number of inhabitants per physician has decreased since the 1990's in the country as a whole, and in every region, including Azores and Madeira; Portugal's ratio is slightly higher than the EU-15 countries (3.6 vs 3.4 in 2008).
- A rapid process of feminization of the medical profession, like in most comparable countries. The proportion of female physicians is now larger than the proportion of male physicians in the lowest age groups (below 31 years, from 31 to 40 years and from 41 to 50 years); it is only a matter of time before women become a majority in medicine;
- The nurses/100 000 inhabitants ratio increased, but not the nurses/physician ratio, which has stayed at around 1.2 nurses per physician since 2002. These ratios are the second lowest among the EU-15[10]. In the Family Health Units (USF), the number of physicians and of nurses is roughly equivalent[11];
- the highest density of physicians is in Lisbon and Tagus Valley Region (LTVR), and the lowest in the Azores: for every physician in Azores there are 2.2 physicians in LTVR;

[10] In 2008, Portugal's ratio was 5.3, the EU-15, 7.7. Denmark, 14.2, France. 8.9, the Netherlands, 10.9 (HFA database)

[11] As of October 2010, there were 255 USF, in which 1809 physicians and 1827 nurses worked.

- a low proportion of specialist nurses;
- a slowly increasing percentage of male nurses as more young men enter the profession;
- a young nursing workforce: in 2009, 49.3% were under 40 years of age. The average age is lower in Portugal than in other EU-15 countries like Denmark or the UK, as well as Canada and the USA (ICN 2008);
- a high concentration of nurses in LTVR in absolute numbers; however, Madeira and the Azores have the highest ratio of nurses per 100 000 (795 and 702 nurses per 100 000 inhabitants, in 2009). In mainland Portugal, the North Health Region has the highest density of nurses; for every nurse in Algarve, there are 1.6 nurses in Azores. In mainland Portugal, the asymmetry is smaller: for every nurse in Algarve, there is 1.2 in North Health Region;
- a proportion of NHS physicians and nurses working in primary health care[12] (PHC) that is half that of those working in hospitals or other settings. Since 1998, the number of physicians working in PHC has in fact diminished (-6,6% between 1998 and 2007). The number of other health professionals has increased during the same time period: higher health technicians (tecnicos superiores de saúde), 105%; nurses, 16%; and diagnostic and therapeutic technicians, 41%.
- A high proportion of the pharmacists working in community pharmacies; 40% of pharmacists are less than 35 years of age; and 36% working in the LTVR, which has the highest density, whereas the lowest is in the Azores. For every pharmacist in the Azores, there are 2.6 in the LTVR. In mainland Portugal, the asymmetry is lower; for every pharmacist in Algarve Health Region there are 1.9 pharmacists in LTVR;
- a majority of dentists working either in the Lisbon and Oporto districts; the North Health Region has the highest density of dentists, and Alentejo the lowest: for every dentist in Alentejo Health Region, there are 2.4 in North Health Region;
- Some occupational categories, and some regions, have higher and more chronic shortages than others (positions remaining unfilled for long periods). Shortages need to be quantified and explained.

Data on the private sector have to be read with great caution: first the definition of “private sector” may vary from one source to another. The data source covers only partially

[12] PHC seems to correspond to non-hospital settings in NHS statistics. According to WHO (2008), primary care (such as prevention, promotion) can be provided in all types of settings. The utilization of the expression may need revision.

organizations which provide private services, and it is not possible to say which percentage is included. Finally, as dual employment is believed to be important, some individuals (a number that we could not determine), may be counted as working in the public as well as in the private sector. With those reservations in mind, we can make the following observations:

- The majority of physicians in the private sector work in the LTVR: in 2000, two-thirds of them were less than 50 years of age. This percentage was reduced to 52% in 2007;
- The number of nurses working in the private sector grew between 2000 and 2005 (+147%). The percentage of specialist nurses in the private sector has grown significantly between 2000 and 2007 (840%), but this refers to small numbers (from 33 to 277);
- More than half of nurses in the private sector, work in the LTVR; almost half of these nurses had less than 30 years of age (2007);
- Forty percent of pharmacists working in the private sector work in the LVTR. In 2007, 72% of the pharmacists working in the private sector were below 40 years of age;
- The North Health Region has the highest proportion of dentists working in the private sector;

Data on the education pipeline, which help project the future output of graduates, indicate that:

- Between 2000 and 2010, the number of admissions[13] for training of medical doctors, nurses, pharmacists and dentists has grown on a continuing basis; the smallest growth in admissions was for dentists and the largest for physicians (almost 5 times greater);
- For nurses, the number of admissions grew between 2000 and 2002 and between 2004 and 2005. In the remaining years there has been a decrease in the number of admissions (more pronounced in 2008, when there were less 14,8% admissions compared to 2007);
- In pharmacy, the number of admissions grew every year although by different percentages. The only exception was 2003, when fewer pharmacists were admitted compared to 2002;

[13] Data on admissions is produced by the General Directorate of Higher Education; Department of Modernisation and Health Resources; MCES-OCES, Ministry of Science and Higher Education, Observatory on Science and High Education. It is complete for public institutions, but may not be for private ones. The same applies to data on applications as for some years, less applications are reported than admissions.

- The greatest growth in the admissions of dentists took place in 2004 (more 11,4% than the previous year). In 2003, 2005 and 2008, there was a negative growth, -3,8%; -3,7% and -10,3%, respectively;
- The average annual growth of graduates from 2000 to 2008 is positive for physicians, nurses, pharmacists and except for dentists in 2004, when there was a reduction of 41%.
- For nurses, the number of graduates varied from one year to another as a result of the introduction of the university degree (licenciatura) in nursing in 1999; graduates included students who registered directly in the new program, and nurses who upgraded their training.

Additional analysis is needed on:

- Participation rates in the health labour market
- Number of positions (filled, unfilled –for how long?) in public services, time trends, by level of care, type of organization, by region.
- Number of positions (filled, unfilled–for how long?) in private services, time trends, by level of care, type of organization, by region
- Dual employment: extent of phenomenon, profile of workers who practice, attrition rates of NHS staff and reasons,
- Hours worked, full-time equivalents in public and private sectors
- Remuneration levels (salary, benefits, subsidies, incentives) in public and private sectors
- Type of employment (contract, civil service, on call, part-time, full-time)
- Unemployment rates by occupation, duration of unemployment, time required to enter the market (trajectory between graduation and first job)
- Underemployment: workers working less hours than they are willing to; for example, dentists who could accept more patients
- Turnover (joiners, leavers by source and destination); stability rate; absenteeism rates

- Differences between applications to professional schools, admission rates, graduation rates and the reasons for attrition[14].
- Profile of teaching staff
- Mechanisms to assess quality of education; Variations in pedagogical strategies
- Policies, including laws and regulations, explicitly targeting the HW
- Other relevant policies (civil service –retirement age, penalties for early retirement, education)
- European Directives and other regional processes (ex: Bologna)
- Professional regulation (role and activities of councils, accreditation, quality surveillance mechanisms, re-certification, recognition of qualifications of foreign professionals)
- Working conditions, quality of working environment, exposure to risks
- Personnel management processes: recruitment, promotion, transfer, appraisal, job descriptions/ role definitions
- Management structures, decision-making processes
- Labor relations: unions, professional associations, mechanisms of negotiation, strikes, main issues.

Table 4 – Additional observations

Source	Comments on the HW situation	Proposals/recommendations
NHP 2004-2010	The Plan has a limited strategic focus on sustainable human resources for health. It could have called attention to the growing shortage of an imbalance in human resources. The progressive general shortage applies in particular to family health care professionals and will become exacerbated with the retirement of about 20% of medical doctors within the next five years (pages 21,22). This imbalance (caused, for instance, through a concentration in the largest cities and substantial shortages in rural areas) may worsen with the practice of dual employment of health professionals in the public and the private sector. No precise	An increase in the overall numbers of health professionals does not answer the question of whether human resources for health match the needs of the population at local level or whether such resources are effectively employed in the system. (page 16) More research on human resources for health is needed to enhance the evidences available to support decision making (page 21)

[14] There is no database on applications, but one is available on the number of available places and the number of admissions.

Source	Comments on the HW situation	Proposals/recommendations
	picture of the mix of activities of health professionals seems to be available at national level, nor does information on dual employment. This lack of monitoring capacity is an important shortcoming of the Plan, particularly since the pressure on human resources may result in growing migration of physicians to the private sector and may compromise access to care for patients within the NHS. The problems pertaining to human resources for health reflect a relative lack of long-term policy and planning in the past. This is certainly one of the biggest challenges that the Portuguese health system will have to face in the years ahead. (page 9)	
Biscaia, Martins, Carrolo (2007)	There is no HRH policy or even a strategic thinking on HRH in Portugal (p.282). There is no sector wide approach to pre-service training of HRH (Ministry of Education), the Ministry of Health and the Ministry of Finances. As a consequence Portugal is contracting foreign HRH, namely nurses and doctors. The criteria for HRH allocation to the several level of the NHS are not clear and are insufficient Growth in precarious working conditions Insufficient and inadequate remuneration systems	
	More varied skill mix	To reappraise solutions because there is not a sufficient evidence base on best practices
Fronteira, Biscaia (2007)	Portuguese health care professionals do not suffer more from health problems than the overall population. They assess their health as better than that of the general population They report healthier health behaviors (smoking, drinking and exercise). They miss work less than the overral population	
WHO (2009)	One of the critical challenges to the sustainability of the Portuguese Health System relates to health human resources. In terms of total health expenditures, the proportion of spending on health human resources has historically been relatively high in Portugal, due to a significant proportion of extra-hours payments. This has led to cost-containment measures, which among other factors pushed health	Develop health human resources strategies that include planning for both appropriate numbers and mix, addressing professional scope of practice, and clarifying the role of professional councils. Lead the development of an integrated strategy related to health human resources through multi-stakeholder collaboration and clarify and promote the role of

Source	Comments on the HW situation	Proposals/recommendations
	professionals to move from public to private sector work, full or part time.	professional organizations with regards to health human resources policy The lack of data about health human resources in the private sector in general and about dual employment in particular is a major issue, because it makes planning more difficult without this information. . Current concerns related to human resources for health show the need to develop long-term policies and enhance capacities for planning in this area. The Ministry of Health should lead the development of an integrated strategy related to health human resources. This policy should review imbalances in the mix and scope of health human resources, including changes in the scope of practice of professionals. Incentives to correct current imbalances should be introduced. Mechanisms to promote multi-stakeholders collaboration in health human resources development should be promoted and the role of professional organizations clarified.

- There is not an explicit HW workforce policy linked to the National Health Plan.
- Little consideration seems to be given by policy-makers from other sectors to the impact of their decisions on the HW.
- The role of professional councils remains loosely defined and accountability mechanisms are weak.
- Decision-making in relation to HW remains centralized.
- Top-down traditional management seems prevalent
- Regulation of the HW in the private sector seems weak.
- The regulation of recognition of qualifications of immigrant professionals lacks consistency (multiple mechanisms: medical council, ministry of higher education, faculties)
- Strikes are frequent and generate disruption of services; mechanisms to prevent stoppages seem weak.

From these data and information, **problems, needs or risks** can be identified for further analysis and validation, and for discussion, with in mind the caveat that in the absence of an

integrated information system and of standards in data collection on HRH, it is difficult to provide a comprehensive picture of the HW in the country. The issues listed in Table 5 have an impact on all dimensions of the performance of the HW. For example, the low nurse/physician ratio indicates primarily a productivity and cost-effectiveness problem, as physicians have to perform tasks which could easily be delegated. It also has an impact on coverage, if physicians see less patients for lack of time and that waiting lists grow longer as a result. Finally, nurses overloaded because of their low number, may commit more errors and be less responsive to users.

Table 5 – Issues in HRH in Portugal

Issue	Comment
The number of family practitioners is not congruent with the priority given to expanding the USF coverage.	The coordination between health and education policies needs to be assessed, as well as the coordination between policies and practices (for instance, is the allocation of places for specialty training consistent with policies, particularly that of expanding family practice?) Career structures/options: incentives for different medical specialties to be reviewed
Low nurse per physician ratio	Indicates that productivity and of cost-effectiveness may not be optimal (as would indicate international comparisons). This happens in a context of unemployment of nurses.
There are shortages of certain categories of personnel in the NHS; there are unfilled positions at USF-ACES level. Other examples in need of better documentation are: oncologists, and radiotherapists; psychologists, nutritionist, epidemiologists, occupational therapists, etc.. Rural and remote areas are more at risk of shortages.	Are shortages in the NHS due to a lack of available personnel (insufficient stock, which does not seem to be the case given the existence of unemployment), or to other reasons (inefficient recruitment procedures, unattractive working conditions, losses to private sector, early retirement)?
Unemployment, particularly of young nurses. There is possibly underemployment also.	The growth in precariousness of work needs to be documented Reasons for un- and underemployment need to be explored
What is the contribution of immigration to the Portuguese HW? What is the impact of EU mobility and recognition of qualifications directives? There are losses of health professionals to emigration (how many, profile, destination, reasons to migrate?) and at the same time the	In need of documentation What is the process and impact of the eventual integration of medical students graduated from foreign universities? Are immigrant workers short or long term stayers? What is the role of recruiting agencies? (Professional Connections, CLR Health Jobs, HCL International,

Issue	Comment
country contracts from abroad.	Best Personnel Limited, Contexte médical, Moving People). What is the impact of international demand (including Angola) on the Portuguese HW? What are the advantages/disadvantages of contracting from abroad? Why is it necessary?
There are distribution imbalances: by level of care (not enough in primary care, in spite of being defined as a priority) skills-mix ; geographical	Will training more providers (ex: new medicine program in Aveiro) solve the geographical distribution and other imbalances?
Monitoring of losses of public sector to private services: monitoring trends.	Need to document better the reasons for exit of the NHS, such as the impact of penalties for early retirement (passing from 4,5% per year to 6% per year), quotas for promotion, salary levels, rigidity of conditions of employment – part-time, gradual retirement. Also, what is the impact on the training of residents? In which occupations is dual employment more prevalent? What is the impact of dual employment on access to services, on total costs of health, and on the quality of public services How should dual employment be regulated? Is current regulation adequate?
How to explain fluctuations in the number of admissions in professional schools?	How does Portugal compare to countries with comparable populations in terms of entrants? Is the process of deciding to open a faculty/school appropriate? Role of the Ministry of Education, of the Ministry of Health and of professional councils/ associations? What is known about application trends/ intake trends/ attrition during training?
Need for a human resources for health policy:	This raises questions such as: contents and period covered? who does it? Who should be in charge? resources for implementation? how to cover the public and private sectors? Should the health workforce be managed at decentralized level (outside the Civil Service administration)?
The role of professional councils in protecting the public against low quality practice and in regulating the health workforce; how quality of training is ensured? How good practices are communicated to professionals? How is their utilization monitored?	Examine the issue of regulation of private clinics (most operate without a license); Assess the role and performance of *Entidade Reguladora da Saúde*, role of *Agência de Avaliação e Acreditação do Ensino Superior*created in 2007
There is a need for adaptation of working conditions to an aging HW, to new expectations of younger workers, to a more feminine medical profession and a more masculine nursing profession.	Educators and employers of health workers need to agree on which adaptation is needed and how to ensure tht it takes place. This is normally done under the responsibility of accreditation agencies.

Issue	Comment
The impact of medical tourism on health workforce demand (ex: dental care)	In need of documentation
There is scope for task-shifting, and delegation of tasks, particularly from physicians to nurses and to other technicians and auxiliaries (even to new professional groups). There is also a need to look at overlaps between professions like among physiatrists, physiotherapists, occupational health technicians, etc.	Study foreign experiences delegation: Sweden, Finland, England, Canada, USA.
Are managers selected, trained, supported in an optimal manner?	In need of documentation

3. Priorities, objectives, policy options and strategies

We regroup the discussion on steps 2 and 3 of the HW planning process, for at least two reasons: first, although they are presented as sequential, in reality they are developed in an iterative way. For instance, reflecting on strategies may suggest that some objectives should be reviewed, just as thinking about objectives implies that the existence of effective strategies should be considered. The second reason is that decisions in relation to these four components of a plan all need to pass the test of feasibility and to be made in consultation with the stakeholders.

Setting priorities is necessary because problems and needs are too numerous to be tackled at the same time and because their importance varies. The definition of what is more important is a value-laden exercise. The selection of priorities depends on the criteria used, and, to a certain extent, on the agreement among actors, as a prerequisite for the success of any intervention affecting the HW. We suggest that a minimal a set of criteria include:

- Congruence with basic values and objectives of the National Health Plan, which supposes that these are explicitly stated: for instance, equity of access to services of quality is an expressed value of the forthcoming NHP. It supposes that the level of coverage is as complete as possible, which means that filling all open positions in health centers should be regarded as a priority. In the same vein, the objective of covering the whole population with family medicine services makes the training of family practitioners a high importance need and need to look at skill mix in family medicine.
- The urgency of taking action: some problems, irrespective of their relative importance require immediate attention, for instance if they are a source of tension or conflict, or

if solving them cannot be delayed (e.g. lack of personnel in emergency services or in some specialties, generating long waiting lists).

- The importance of the impact of the problem on access (unfilled positions in rural or remote areas), cost (inefficient use of nurses and physicians, or need to buy services from the private sector), or quality of services (lack of or inadequate functioning of accreditation mechanisms).
- Amenability to interventions known to have a good potential of effectiveness. This can be assessed by learning from foreign experiences, by consulting experts, or by testing (pilot interventions) in the field. When no effective intervention is known, the problem should be considered as a priority for research.
- The time lag between intervention and results might determine the importance of acting rapidly to launch a process of change, even though results may take years to be observed. Examples are curriculum review, or the creation of new speciality.
- The legitimate expectations of stakeholders need also to be considered, as their agreement is among the factors of success of interventions.

Other criteria can be added in accordance to the context and to priorities in other sectors, such as education, planning, public administration or finance. There will always be untold criteria, like political or economic gain, but in an effort to make HW development more rational and more aligned with the NHP, these have to be kept at a minimum. Making the process of setting priorities and objectives transparent can contribute to this.

On the basis of initial observations above, the following may be considered as potential priorities:

- Balancing the distribution of the workforce between primary care and other levels of services;
- Reviewing the composition and the skills-mix (reviewing scopes of practice) of the HW to make it more efficient; adjusting production of new graduates accordingly;
- Adjusting competencies to new needs and strengthening continuing professional development mechanisms for improved care and other services;
- Reviewing and strengthening the role of professional councils in quality maintenance and improvement (clearly separate roles of unions and of councils);
- Addressing the issue of geographical imbalances;
- Regulating dual employment and work in the private sector in general;
- Addressing over-supplies and shortages, un- and underemployment, particularly of nurses;

- Promoting and supporting health services and HW research.
- Audit to make recommendations to improve HW data collection and analysis
- Audit to assess need to enhance HRH management and policy making capacity

The priority selection process implies that consistency with NHP principles and objectives is first established. Once priorities are selected, specific, realistic and measurable objectives are need for the duration of the 2011-2016 NHP and for the longer term. A monitoring system, such as the one in place to assess the implementation of the 2004-10 NHP is required to ensure that policy-makers are periodically informed of progress and that adjustments to interventions are made if needed. At this stage too, the approval of stakeholders is important. To obtain it may require time to consult and negotiate, but it should be regarded as an investment in favor of the success of the NHP.

There are usually different ways of achieving HW development objectives, and policy-makers need to be aware of the options and corresponding strategies. These can be derived from lessons learned from past interventions or from foreign experiences, recommendations of technical agencies like the WHO and OECD, by research organizations or consulting firms (see *Useful links* in the *References* section) or by professional organizations. Scenarios can be built around different projections of the evolution of the current HW and of needs for services. Scenarios are used for discussion and consultation purposes as they provide a basis for informed discussion and set legitimate parameters on the likely scope for change. They are formulated on the basis of various hypotheses and ask the question: what if…? It is important that each scenario be analyzed in terms of their costs and affordability (will financial resources be available?), their legal (can they be implement under the existing legal framework, or would legislative change be required?) and organizational requirements (does the capacity to implement the scenario exist, or can it be developed?).

Policy options and strategies must pass the test of feasibility before being included in the NHP. This covers the dimensions of affordability (economic resources are/will be available), legality (the intervention can be implemented under current legislation or only needs minor legal adjustments), organizational capacity (expertise exists or can be created to implement the option), and of acceptability (health workers will cooperate, politicians and the public will support change). Policy-makers may review affordability, legality and capacity by conducting technical analysis, but acceptability requires consultations. These can be specific, in the format on policy dialogues on HW development proposals, or be included in the broader consultations on the NHP.

Recommendations

Like in any other country, there is a need for planning mechanisms and policy levers to address the imbalances in the skills-mix and the organizational and geographical distribution of health workers, as well as to improve the general performance the HW. This section proposes a process to conduct the formulation of the HW component of the NHP 2011-16 and to support its implementation on a longer term basis.

An initial recommendation is for the Ministry of Health to create a stakeholderstrategy groupwith a 6-month mandate " to map out the current data availability and identify gaps, and define the principles on which the planning of the HW should be based. The group would also define general and specific objectives for inclusion in the NHP and submit them for broader consultation (call for written comments, web-based questionnaire, conference). The composition of the group should reflect the configuration of actors with a stake in HW development, i.e. professional organizations, education institutions, employers (SNS, private sector), and Finance and Public Administration Ministry.

A technical group can be created to support the strategy group in assessing data availability and documenting HW problems. As a starting point, it should produce a report on the implementation of recommendations of NHP 2004-10 in relation to the HW, as well as an overview of previous efforts at HW planning, with a view to drawing lessons learned. Its mandate would be to develop a planning strategy based on the principles and objectives agreed by the former.

This group could be composed of 3-4 professionals (already employed in the civil service) with demonstrated technical capacities in policy analysis, demographics and statistics, and planning and management, and as much as possible, familiar with HW issues. In the longer term, the work of this group would consist of;

Building the minimum information base on the national HW, by collecting and validating data available from different sources, standardizing indicators for future data collection, and by negotiating the collaboration of organizations which collect relevant data, such as professional councils, ACSS or other agencies such as the National Institute of Statistics (INE), o« Serviço de estrangeiros e fronteiras », and regulators like the Entidade Reguladora da Saúde and the Agência de Avaliação e Acreditação do Ensino Superior. The group would be responsible for designing the structure of a HRH information system andfor its development and management.

- Producing of a « State of the Portuguese HW report », which would then serve as a baseline for monitoring change and future evaluation of the effects of policy

interventions. Submit the report to stakeholders for validation. This type of report should become annual or at least every other year.

- Monitoring the implementation of HW policy and other interventions.
- Responding to specific requests for information from the Ministry and from other government agencies and civil society organizations
- Providing technical support and collaborating to research on HW conducted by academic institutions (for which funding is needed through the FCT, which at present has no specific program for health services research).

The technical group would be entitled to seek the advice of specialists and to commission studies in support of their work.

In the context of a rapidly changing environment, HW policy development is a continuing process that needs to be sustained and continuing stakeholder involvement is a permanent requirement. This would justify the creation of a National Health Workforce Board or something similar to play a strategic advisory role, with the power to make policy recommendations. It could include, at minima, representatives of professional councils, of ACSS, of the Ministries of Science, Technology and Higher Education and of Finance and Public Administration, of education institutions, and of regulatory bodies. Other stakeholders could be consulted on an ad-hoc basis.

Consideration should be given to the creation of an "observatory" which would focus on longer term health labour market issues, on policy analysis, international comparisons, and so on. It could also be responsible for disseminating relevant information and knowledge, and for providing an independent arena for discussion among stakeholders. This function could be devoted to an academic institution.

These measures can be implement within a period of one-year, at relatively low cost if the stakeholders can be convinced to collaborate –which is not a technical issue, but a political one.

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