



WP5

Report on the National Pilot Project - Portugal



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Executive Summary

The Portuguese Pilot Project was developed between 2015 and 2016, following discussions of Work Packages 4 and 5 of the Joint Action Health Workforce Planning and Forecasting (JAHWF). On a national level, participation was ensured by ACSS—Administração Central do Sistema de Saúde (Central Administration of the Health System), together with national stakeholders. This project took into account best practices and recommendations of the Handbook on Health Workforce Planning Methodologies Actions EU Countries, approved on 6th March 2015, and the existing Health Workforce (HWF) national planning system.

Introduction

The Portuguese Pilot Project aims the development of a projection model for doctors and nurses, until 2030 in Portugal. The project was an opportunity to improve the existing HWF planning system.

ACSS is the Ministry of Health central body responsible for HWF planning and forecasting. A number of instruments was already in place, some in the process of improvement and others have been planned during the pilot. Among the instruments already existent note for the National Health Service (NHS) Social Balance, the Health Sector Human Resources (HR) Inventory, the national monthly report on NHS human resources, needs of healthcare professionals available from the coordination with the 5 Regional Health Administrations and the NHS Monitoring Portal, including benchmarking data on HR, financial, performance and productivity. During the pilot, a parliament law approved the National Inventory of Health Professionals (NIHP) envisaging to include public, private and social sectors data. As for prospective tools, efforts were devoted to upgrade the centralization of NHS databases, business intelligence, quality and accuracy of data, the set-up of a Health Professionals Portal and the planning of a Geographic Integrated System for Health Planning (SIGPS).

Development

The Planning of the Pilot Project was set up considering the discussion held in the JAHWF workshop in Lisbon (2014, June 18th) based upon a step by step approach through three ambitions:

1. Know the exact current HWF situation;
2. Identify current and future imbalances;
3. Build a policy and a plan.

The projection model adopted in the Portuguese Pilot Project aims to identify imbalances in the number of professionals based on the population healthcare needs on a medium and long term horizon (2030).

The projection model includes two main components - the Supply and the Demand/Needs.

The Supply Model provides allocation scenarios for health system professionals. It is based, in one hand, in the production capacity of education systems (pre and post graduate) and in the other, in the outflows of the health system (based on past and anticipated trends) such as retirements, contract terminations and mortality.

The Demand/Needs Model builds predictable scenarios of professional needs based on demographic trends of the Portuguese population.

Results

The pilot produced several scenarios and forecasts for doctors and nurses, which vary significantly.

The variation of professionals' numbers is related with various factors such as the estimated decline of the population, the specificities of healthcare professionals' admissions in hospital and non-hospital clinical areas, the international best practices and the EU and OECD doctors and nurses' ratios.

Conclusions

ACSS saw the participation in this pilot project as an opportunity to strengthen its knowledge and share experiences on HWF planning, to improve the National HWF planning system reinforcing its sustainability and evaluation, trigger the involvement of national stakeholders in the HWF planning system and pave the way for a more consistent HWF planning and forecasting model, namely through the approval of a NIHP and a specific Advisory Board dedicated to HWF.

1. Introduction

The aim of this report is to summarize the main achievements obtained through the Portuguese Pilot Project implementation and to perform a final evaluation on its development.

To that purpose we will consider the project national context the pilot project aims, its management, the activities developed and the main conclusions.

Regarding the implementation of the pilot project, the obligations of ACSS stem from what is described in Annex 1 (page 75) of the Grant Agreement as follows:

[...] So, from month 25, part of experts group in planning methodologies, depending on MSs candidates identified in month 3, could work on a fixed term project to support national authorities in the implementation of models, procedures and tools, following the handbook. A steering committee will be task with strategic control of the pilot study. The steering committee exercises the strategic control of the pilot study through regular meetings in which the persons responsible for the implementation of the project will inform the Committee on the progress of the works, on any problems identified and possible actions to be taken. A report on pilot experience would be written as a separate deliverable. In order to prepare national authorities and expert of MSs candidate to implement the handbook starting from month 25, two in site visits will be done on month 10 and on month 18, to update about the progress of work package and to "prepare the ground" so as to be able to start the month 25 with planning the implementation of guide lines, and on month 27 with "doing" the implementation. Checking the value of implementation and eventually acting to improve it, will be, if possible, after the Joint Action as well as for the two countries hosting the "pre-study" for which after this Joint Action it will be possible to experiment the handbook.

Summarizing, the obligations of ACSS in what matters the pilot project are, the following from month 25 (May 2015):

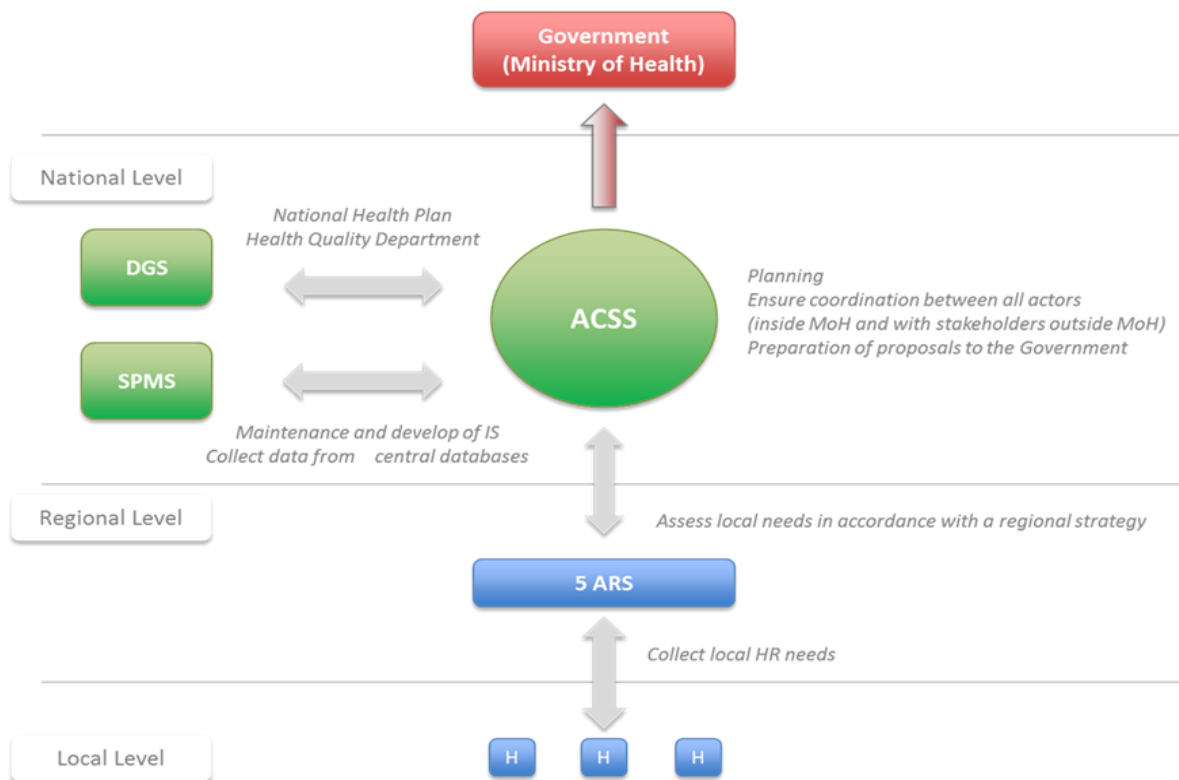
- To work on a fixed term project to support national authorities in the implementation of models, procedures and tools, following the handbook;
- To write a report on the pilot experience.

2. National Context

2.1 Main actors and functions

The main actors in health human resources planning in Portugal is represented in the following figure:

Human Resources Planning and Main Actors in Portugal



ACSS has a central role in the planning of health workforce in Portugal. It's ACSS's responsibility, among others:

- To ensure human resources for health planning, in order to meet the healthcare needs;
- To set an integrated system of indicators for human resources' characterization in the health sector, in order to support the definition of management policies of these resources in the NHS;
- To ensure the management of an information system for the integrated management of human resources and maintain a human resources database of the NHS, together with other departments and agencies;

- To ensure the collection and the quality of information needed to produce statistics and other management information in the human resources field.
- As central organism of the Ministry of Health, ACSS is also responsible for the regulation of human resources in the health sector.

Apart from ACSS, I.P. the main actors within the public administration and particularly within the Ministry of Health are:

- The Ministry of Health, as well as the Ministry of Finance and the Ministry of Education - responsible for the definition and the implementation of policies.
- Direção Geral de Saúde (DGS) – Directorate-General of Health- regulates, guides and coordinates the activities of health promotion and disease prevention, planning and scheduling national policy for quality in health care and ensures the elaboration and execution of the National Health Plan.
- Serviços Partilhados do Ministério da Saúde (SPMS) - The shared services of the Ministry of Health are responsible for the maintenance and development of the information systems;
- Administrações Regionais de Saúde (ARS) - Regional Health Administrations - Responsible for regional planning and Primary Health Care;
- Hospitals and health units - Responsible for providing health care.

Outside the Ministry of Health, the main actors are professional organizations, which in Portugal have different assignments depending on the professional group (e.g., in the case of doctors, the Order has an important role, set up on the law, relating to the definition of the training capacities of the institutions – hospitals and health centres).

The national partners and stakeholders of the health workforce planning process are numerous and belong to different sectors, as represented in the following figure

National Partners/Stakeholders



2.2 Health Human Resources planning process

The health human resources planning process in Portugal is a systematized process for doctors, and it covers the management process for determination of internship places in the health system.

This process depends on the reported capacity of national health care facilities (NHS primary care centres and hospitals). The definition of the criteria for determining the training capacity of establishments and services are approved by the Ministry of Health, upon proposal of the Medical Order and approval by the National Commission for Medical Internship (CNIM). In the CNIM are represented, among other elements, the seven regional commissions of the medical internship, the Medical Order, and representatives of the different medical careers.

Furthermore, ACSS has developed several initiatives, which were not systematic, but allowed the identification of the main future problems of doctor's intake in the NHS:

- **Studies** in order to know the future needs of health professionals in the NHS. These studies identified two main problems in the NHS: **i)** the first was medical education, in the first decade of the XXI century, which concluded that the restrictions introduced in 1977, limiting the number of places available in medical schools, would create a shortage of doctors in the near future. That conclusion led both to the creation of new medical schools and large increases in the existing school intakes; **ii)** the second problem identified was the shortage of GPs, which led to:
 - Attribution of incentives for recently retired physicians to come back to the NHS;
 - Attribution of temporary incentives (monetary, family school facilities, etc.) for doctors who accept places that were declared as priorities;
 - Changes in the process of placement of GP, in order to accelerate it, and favour a more equilibrated geographic distribution.

In the context of those studies, in 2009, we developed a forecasting model that was able to forecast the supply and demand of doctors and nurses in the NHS, based in scenarios. That forecasting model was supported in excel, and was not easy to update and operate, and, consequently, had no further developments.

- **RRH - Hospital Referral Networks**, in order to determine the adequate number of specialist doctors (by medical speciality) in NHS hospitals. The RRH constitute an integrated and hierarchical system that aims to satisfy the hospital care needs in diagnosis, training, research, interdisciplinary collaboration and quality assurance within a given medical specialty. With that purpose, many of them indicate the number and type of experts recommended for proper operation of the hospital network. There are 24 RRH at the present and some of them are under actualization and others need to be updated.

Furthermore, although the private sector is of some importance in Portuguese health sector (around 30% of the outpatient activity, 20% of hospitalisations, 25% of major and medium surgeries and 12% of emergencies in 2013), there is scarce information both on the workforce in the private health system and on its needs of human resources. In 2011 a report estimated that about half of the NHS salaried Portuguese doctors had some form of activity in the private sector¹. Therefore, the initiative of the National Inventory of Health Professionals is essential for the knowledge of the private and social sector's health workforce.

So, although there is a solid information base on the NHS workforce and a planning process to determine internship places in the health system for doctors, there is no regular and systematic national planning process of health workforce, including both public and private sector and all the health professions.

¹ Health Systems in Transition – Portugal, 2011, European Observatory of Health System and Policies, p.76.

2.3 Strengths and Weaknesses of the national Health Human Resources planning process

As to the main strengths and weaknesses of the national health workforce planning system, we can identify the following:

Strengths and weaknesses of the national health workforce planning system

STRENGTHS	WEAKNESSES
Universal and strong NHS, with a high degree of centralization of decision and information	Very limited information on the private and social sectors, which also include doctors and nurses working in the NHS, all the dentists and almost all the pharmacists
Reliable and sound individual data on doctors and nurses in the public sector (ACSS)	Difficulty in accessing data on real emigration of health professionals (like in almost every country)
Reliable aggregated data on education and graduation of health professionals (Ministry of Education)	Delay in the National Inventory of Health Professionals implementation
Qualified human resources with high technical knowledge on Health Workforce (regulation, careers, hiring, training, professional registries, data, information and also in planning for doctors)	Necessity of Team work at macro or top level Health Workforce Planning and Forecasting, namely deepening the accuracy of the Demand Model (through the incorporation of the private sector needs and the development of other dimensions, such as Service's Organization or Service's Use Patterns)
Some experience in health human resources planning, although limited to medical internship	Inexistence of a "platform" bringing together all the relevant stakeholders with the specific purpose of health workforce planning.
Active participation of stakeholders in processes related with Health Workforce subjects (regulation, careers, hiring, training, professional registries, data, information and also in planning)	
National Inventory of Health Professionals was published and legislation for Advisory Board of Inventory is for publishing.	

2.4 Future Challenges and areas to develop in the Health Human Resources planning process

The future challenges and areas to develop in the national health workforce planning system are designed to overcome the weaknesses identified, and are de following:

- To extend the forecasting model to the private sector doctors and nurses. For that purpose, it is necessary to implement and set up the National Inventory of Health Professionals. In August 2015 the National Parliament issued a bill giving ACCS the responsibility of collecting data for the National Inventory of Health Professionals, including the public, private and social sectors. In terms of implementation of the Inventory, currently we are answering to the reservations of the recently created National Council of Professional Bodies (representing all the professional bodies) and also giving some clarifications to the National Commission of Data Protection about specific technical aspects of the Data Transmission Agreement.
- To know the concrete numbers and fluxes of emigration of health professionals, through the development of specific protocols with the professional orders. Emigration of doctors and nurses is generally perceived as a phenomenon with a significant potential impact in health workforce in Portugal, but its exact dimension is unknown.
- Ensure the continuous involvement of regional health authorities and of national partners (including the autonomous regions and the private and social sector), in order to assure an increasing accuracy of the health workforce planning system (namely promoting the activity of the Advisory Board that will function in the context of the National Inventory of Health Workforce).
- To develop an in-depth work of enriching the Demand Model, through the development of other dimensions of the model, such as Service's Organization or Service's Use Patterns. For that purpose, we need to develop team work at top level coordination between ACSS and the stakeholders in the health sector.

3. Presentation of the Pilot Project

3.1 Objectives of the Pilot Project

Portugal is investing to improve the existing planning system with an ambitious programme. However, it is important to distinguish the ambitions regarding the implementation of the «best planning system» in the country and what can be achieved during the period provided for the pilot-project lifetime, within the JAHWFPF.

The pilot project goals have a shorter range than those established by ACSS. It is clear that it is not possible to achieve such a wide range of results and outputs within the provided period for the pilot project implementation.

The following figure shows the place of the pilot project in the health human resources planning system in Portugal.

Place of the pilot project in the health workforce planning system in Portugal



3.2 Implementation of the Objectives of the Pilot Project

Regarding the overall strategy of the ACSS in planning system implementation, the goals set and the result of its implementation are as follows:

Strategic Goals:	Outcome	Observations
Provide the system with the necessary HWF to satisfy the healthcare demand/needs;	Ongoing	Continuous process
Ensure greater efficiency of public resources, and contribute to the system sustainability.	Ongoing	Continuous process
Specific Objectives:		
Anticipate imbalances (Supply vs Demand) in the medium and long term;	Done	Pilot Project
Improve the professionals' mobility within the system, in order to achieve a better resources allocation;	Ongoing	Regulation Law
Build tools that allow to manage and adjust training capacity (pre and post graduate).	Done	Pilot Project
Operational Objectives:		
Stocks characterization (doctors, nurses, dentists and pharmacists).	Done	Pilot Project
Imbalances characterization (doctors and nurses);	Done	Pilot Project
Human resources' stock projections for a specific time frame (doctors and nurses);	Done	Pilot Project
Calculation and forecast of health care demand/needs;	Done	Pilot Project
In case of imbalances detected, prepare and propose measures to the political level (eg. , hiring foreign professionals, intervention in retirement age, hiring retired professionals, extra-time, and so on);	Ongoing	Regulation Law
Provide the ministry of education with information about <i>numeri clausi</i> needed for the training of health professionals.	Ongoing	Health and Education Ministries are working in deep collaboration. Currently there are some imbalances in certain specialties as shown by the results (for example, in Family Doctors). The proposal of additional measures also depends on the results of the National Inventory of Health Professionals (to understand the amount of needs in the private sector). In the case of nurses the education system has been adjusted naturally (less demand of students, less graduate's production, (see chapter 4. Results).

3.3 Planning of the Pilot Project

The planning of the Portuguese pilot project was set up considering the discussion held in the JA workshop in Lisbon (2014, June 18th)

In this workshop, the discussion was based upon the step by step approach through three ambitions, namely:

1. Know the exact current HWF situation (Ambition 1);
2. Identify current and future imbalances (Ambition 2);
3. Build a policy and plan (Ambition 3).

The step by step approach could be applied in various dimensions, for instance:


- a) Professional groups;
- b) Data about the public and private sectors;
- c) Current situation and forecasting;

This approach can, naturally, lead to different ambitions for each one of the dimensions.

To support the discussion and the working session, participants made a matrix with different dimensions of analysis and different ambitions. The different dimensions of analysis are represented in the first 3 columns (grey columns) and ambitions in the last 4 (blue columns).

The results of the work are presented in the following matrix:

Planning of the Pilot Project (Contents)



Professionals Groups	Data Source	Stock or Forecast	Supply	Demand	Stakeholders Involvement	Link with Education
Doctors	Public	Stock	OK	OK	OK	2015
		Forecast	2015	2015		
	Private	Stock	2015	2015		
		Forecast	2015	2015		
Nurses	Public	Stock	OK	OK	OK	2015
		Forecast	2015	2015		
	Private	Stock	2015	2015		
		Forecast	2015	2015		
Pharmacists	Public	Stock	OK	OK	2015	2018
		Forecast	2017	2018		
	Private	Stock	2015	2018		
		Forecast	2017	2018		
Dentists	Public	Stock	-	-	-	-
		Forecast	-	-		
	Private	Stock	2015	2018		
		Forecast	2017	2018		

(In Portugal there are nurses specialized in maternal health and obstetrics, that's why, the implementation of the pilot project was based on 4 professional groups: Doctors, Nurses, Pharmacists and Dentists)

As in Portugal midwives are not a separate professional group, there are nurses specialized in maternal health and obstetrics, the implementation of the pilot project will be based on 4 professional groups: Doctors, Nurses, Pharmacists and Dentists.

Planning of the Pilot Project (Process)



3.4 Results of the Pilot Project's execution

The results of the pilot project's execution didn't quite achieve the planned actions, essentially due to the lack of access to the health professional's data in the private sector. As the data from the Ministry of Employment and Social security revealed to be of scarce representation, as well as the currently stage of the process of the National Inventory of Health Professionals deferred this intention (already described previously), we couldn't produce results concerning the private sector in the time frame of the Pilot Project.

The results of the pilot project's execution in relation with the planned activities is summarized in the next table:

Results of the Pilot Project's Execution

Professional Groups	Data Source	Stock/ Forecast	Supply	Demand	Stakeholders Involvement	Link with Education
Doctors	Public	Stock	Done	Done	Done	<p>Regarding a different annual intake of students in health professions is under consideration by both Health and Education Ministries.</p> <p>Still, we would like to wait for the results of the implementation of the National Inventory of Health Professionals to get a more reliable knowledge of present and future imbalances within the NHS and also the foreseeable necessities of the private sector.</p> <p>The involvement of the stakeholders of all sectors is to proceed continuously.</p>
		Forecast	Done	Done	Done	
	Private	Stock	Awaiting for the NIHP implementation	Awaiting for the NIHP implementation	Awaiting for the NIHP implementation	
		Forecast	Awaiting for the NIHP implementation	Awaiting for the NIHP implementation	Awaiting for the implementation of the NIHP	
Nurses	Public	Stock	Done	Done	Done	
		Forecast	Done	Done	Done	
	Private	Stock	Awaiting for the NIHP implementation	Awaiting for the NIHP implementation	Awaiting for the NIHP implementation	
		Forecast	Awaiting for the NIHP implementation	Awaiting for the NIHP implementation	Awaiting for the NIHP implementation	
Pharmacists	Public	Stock	Done*	2018	Done	
		Forecast	2017	2018	-	
	Private	Stock	Done*	2018	Done	
		Forecast	2017	2018	-	
Dentists	Public	Stock	There are no public dentists	-	-	
		Forecast	-	-	-	
	Private	Stock	Done*	2018	Done	
		Forecast	2017	2018	-	

Note: NIHP - National Inventory of Health Professionals

* Aggregate data from the Professional Order

3.5 Management of the Pilot Project

The management of the Pilot Project was done in the framework of Joint Action and our active participation on the Work Package 4 and the Work Package 5 (workshops, meetings and testing templates) attentive to: the Grant agreement (PT obligations and expectations); Workshops/Meetings (working process at EU level); development and conclusion of Handbook (period/time); testing the handbook with a PP (theoretical vs practical approach); chronogram for PP (follow up); steering committee (changes along the process); Information flow (between the JA/WP5/PT team); PT/PP (WP5 follow up & supervision); linking results (JA/WP5/PT) and as conclusions: the Lessons learned from the Handbook and the Recommendations for the Handbook.

3.5.1 National Inventory of Health Professionals and its Advisory Board

In August 2015 the National Parliament issued a bill giving ACSS the responsibility of collecting data for the National Inventory of Health Professionals, including the public, private and social sectors.

The legislation that regulates the National Inventory of Health Workforce establishes the nomination of an Advisory Board by the Ministry of Health and other specific legislation will forms the composition and functioning of the Advisory Board referred to in paragraph 1 of article 8 of Law No. 104/2015, of August 24. The one related with the Advisory Board is now for publishing.

This Advisory Board will have collaborative purposes in the planning of health professionals needs. It is also a supportive body to the implementation and monitoring of the law on the National Inventory of Health Professionals. In order to assure that role, its members should be assigned as representatives of relevant entities, of the Orders and other stakeholders, as well as having a profile of dialogue with other different health professionals allowing the definition of a baseline of needs/demand in the health system.

In terms of implementation of the Inventory, we are currently answering to the concerns of the recently created National Council of Professional Bodies (representing all the professional bodies) and also providing some clarifications to the National Commission of Data Protection about technical aspects of the Data Transmission Agreement.

3.5.2 Result's dissemination

ACSS has already promoted two meetings with national partners and experts, where the pilot project and its developments and results were presented and discussed. Those meetings took place in January 2014 and in September of 2015 and had the participation of the General Direction of Health, and other partners from health and education sectors, such as the regional health administration bodies, the professional health orders, the General Directorate of Education and several experts in the health field.

4. Results

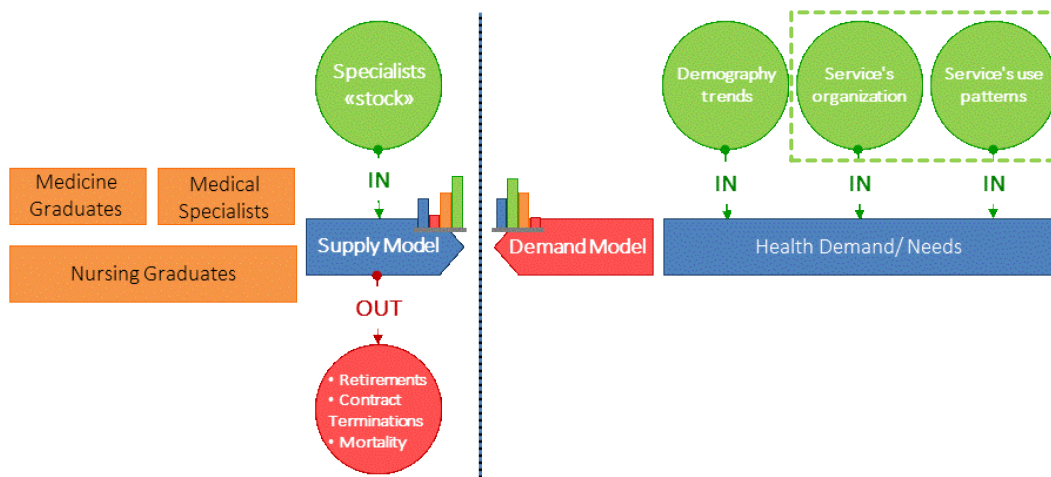
The activities included in the pilot project and its results are the following:

4.1 Methodological approach for the Projection Model

4.1.1 The Projection Model

The Projection Model adopted in the Portuguese Pilot Project aims to identify any imbalances between the number and the professional mix necessary for an adequate functioning of the health system, based on the population healthcare needs, and the professionals in the system, on a medium and long time horizon (2030).

The adopted projection model includes two main components - the Supply and the Demand / Needs.



The dimensions Service's organization and Service's utilization patterns were not developed in this stage and were postponed till a more mature stage of development of the projection model, as explained in this chapter.

The Supply Model provides allocation scenarios for health system professionals. It is based, in one hand in the production capacity of education systems (pre and post graduate); in the other, it considers outflows of the health system (based on past and anticipated trends) such as retirements, contract terminations and mortality.

The Demand/ Needs Model builds predictable scenarios of professional needs, based on demographic trends of the Portuguese population and, desirably, on healthcare needs of the population.

The confrontation between the results of the implementation of the Supply Model with scenarios developed under the Demand / Needs Model, shows the potential gaps between

the installed capacity in the professional production system and the expected needs of professionals in the health system.

4.1.2 Why this Projection Model?

The methodological approach developed for the projection model was established from two main sources:

- The methodological model already developed (in 2009) in the ACSS for the projection of doctors and nurses in the NHS (see chapter 2 – National Context);
- The recommendations of the Handbook on Health Workforce Planning Methodologies across EU countries.

It's final configuration was validated in the JA Brussels expert meeting that took place in June 24 of 2015 (namely, the recommendation of keeping the demand side simple, as the projection model was in an early stage of development).

4.1.3 Difficulties in the implementation of the Projection Model

The main difficulties in the implementation of the Projection Model were:

- the lack of reliable and comprehensive data regarding doctors and nurses in the private sector;
- the incorporation of the dimensions of Services' Organization and Services' Utilization Patterns in the Demand component of the Projection Model.

We intended, in the course of the Joint Action, to extend the projection model to the private sector. However, the poor representativeness of the data of the Ministry of Employment and Social Security (see next chapter), as well as the currently stage of the process (already described previously) of the National Inventory of Health Professionals deferred this intention.

Since the National Inventory of Health Professionals was to be completely operational presumably within the timeframe of the Pilot Project, we considered, at the time, that, for instances, the conducting of surveys in order to know the main characteristics of the professionals of the private sector was not feasible in the time available. So we decide to wait for the implementation of the National Inventory.

In face of the recommendations of the expert meeting held in Brussels in 2015 that pointed out to a steadily evolution of the projection model, from a simple demand model (for example, based on the demographics), to a progressively more sophisticated model incorporating other variables and more complex dimensions, it was decided not to develop, in this stage, the components of "Service's Organization" and "Service's Use Patterns" of the Demand Model. The inclusion of these components would be probably too much ambitious in the present state of the model's development.

Given this, the Demand Model which we developed is based on the demographic trends of the Portuguese population.

4.2 Stock characterization - doctors, nurses, dentists and pharmacists

Hence the methodological approach defined, we proceeded to the stock characterization.

4.2.1 Difficulties in the implementation of the Stock characterization

As already stated, we had difficulties in esteeming the health professionals working in the private sector, since there is no detailed information and the statistical source available (data from Orders and from the Ministry of Employment and Social Security) has numerous limitations:

- is of poor representativeness (the information from the Ministry of Employment represented 15% of the licensed to practice doctors, 29% of the professionally active nurses, 9% of the professionally active dentists and 41% of the licensed to practice pharmaceuticals);
- does not include the self-employed workers;
- overlaps the data on public sector employees in what concerns those who have “individual working contracts”;
- accounts “jobs” and not “headcounts”, which means that if someone has more than one job, can be counted more than once.

In consequence, and since the implementation of the National Inventory of Health Professionals was pending, it was decided to wait for that data, in order to strengthen the stock characterization and the accuracy of the stock projections.

The situation of the information sources for all professional groups included in the Pilot Project is presented in the next table.

Professions	Licensed to practise	Professionally active	Practicing
Medical Doctors	Aggregated data on registered Doctors, provided by the Professional Order.	-	<p>Public Sector - RHV2 data bases, ACSS' central processing wage information system. It has individual data on doctors and covers 100% of NHS institutions.</p> <p>Private Sector - as the aggregated data from GPE (Department of the Ministry of Employment and Social Security) revealed to be of poor representativeness we will use the results of the implementation of the National Inventory of Health Professionals.</p>
Dentists	Aggregated data on registered dentists provided by the Professional Order.	Aggregated data on registered dentists provided by the Professional Order.	<p>Public Sector - There are no dentists in the NHS.</p> <p>Private Sector - as the aggregated data from GPE (Department of the Ministry of Employment and Social Security) revealed to be of poor representativeness we will use the results of the implementation of the National Inventory of Health Professionals.</p>
Nurses	-	Aggregated data on registered active nurses provided by the Professional Order.	<p>Public Sector - RHV2 data bases, ACSS' central processing wage information system. It covers 100% of NHS institutions.</p> <p>Private Sector - as the aggregated data from GPE (Department of the Ministry of Employment and Social Security) revealed to be of poor representativeness we will use the results of the implementation of the National Inventory of Health Professionals.</p>
Pharmacists	Aggregated data on registered pharmacists provided by the Professional Order.	-	<p>Public Sector - As the RHV2 data bases don't allow the identification of pharmacists in the public sector we will use the results of the implementation of the National Inventory of Health Professionals.</p> <p>Private Sector - as the aggregated data from GPE (Department of the Ministry of Employment and Social Security) revealed to be of poor representativeness we will use the results of the implementation of the National Inventory of Health Professionals.</p>

We proceeded to doctors and nurses' characterization in the National Health Service (NHS) in Portugal (Mainland), between 2010 and 2014, based in the data provided by RHV2 data bases.

With this aim we analysed different dimensions of these professional groups, from their quantitative evolution to their demographic structure and the main issues related to their employment in the public sector. We also analysed doctors and nurses training (pre graduate and, in the case of doctors, also post graduate), and the dropout of these professionals from the public system.

We also continued with the characterization of dentists and pharmacists in Portugal and to the assessment of the adequacy of the number of these professionals to the country's needs in the medium term (2020).

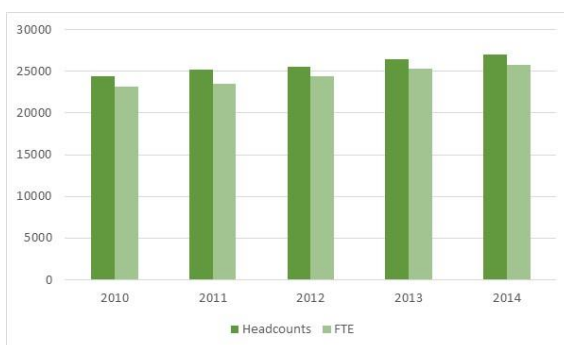
The sources used for the characterization of dentists and pharmacists were: i) on the one hand, the information available by the Professional Orders, which has a universal character and an evolutionary perspective; ii) on the other, information provided by the Ministry of Employment, regarding workers employed in private companies (not including self-employed workers) in the year 2013.

The main conclusions, by professional group, are the following:

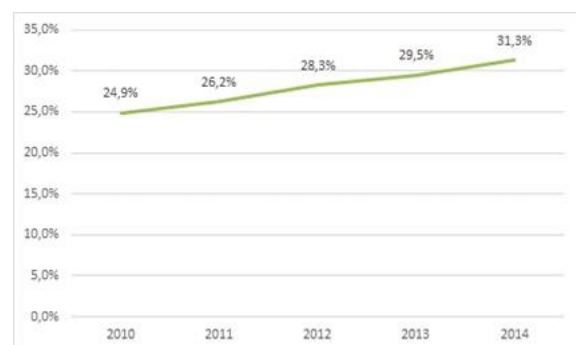
4.2.2 Stock Characterization NHS - Doctors

- In December 2014 the NHS (Portugal's mainland) employed 27,046 physicians (60% of total doctors licensed to practice), of which about a third (31.3%, representing 8,477 individuals) were interns attending the Medical Internship, at different levels of knowledge and expertise.

Doctors in the NHS, Headcounts and FTE (2010-2014)



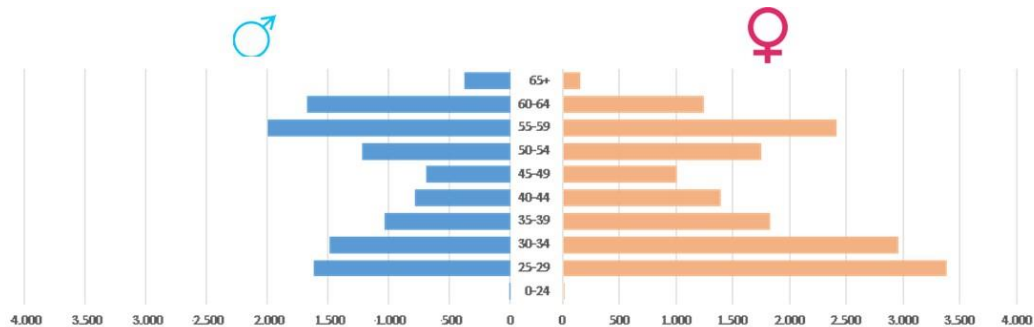
Weight of doctors in training in the total doctors in the NHS, (2010-2014)



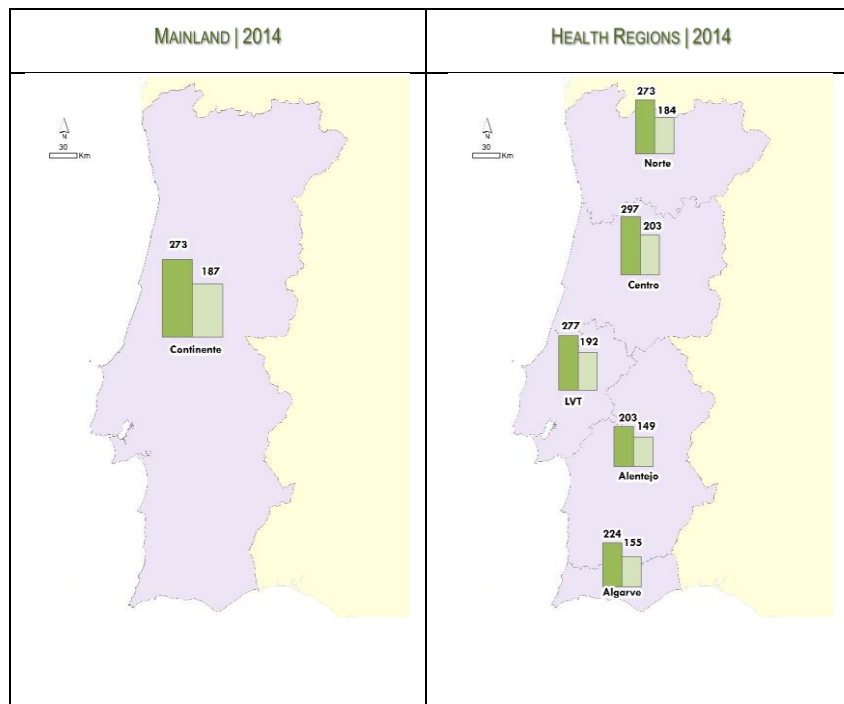
- As to the medical doctors age structure in the NHS there are three essential features:
 - The age pyramid base is relatively young, due to the increase in the number of doctors attending the medical internship, but also as a result of the increase of professionals in the age groups between 35 and 44 years;
 - There is a pronounced professionals thinning in the intermediate levels, between 45 and 54 years, which has a tendency to increase;

- There is a significant increase in the NHS retention capacity in the higher age groups (over 60 years), probably due to legislation changes regulating retirements in the public administration;
- The medical profession in the NHS is mostly feminine (feminization rate of 60% in 2014), accentuating up this trend in the younger age brackets, which means that in three new professionals entering the system, two are female;

Age Structure of Doctors in the NHS, by sex, in 2014 (Mainland)



- In 2014 around 1,700 foreign doctors worked in the NHS, corresponding to 6.3% of these professionals, a figure that represents an increase of 12% when compared to 2010. The most represented nationality is Spanish, with 2.3% of all physicians in the system;
- The population ratio of doctors in the NHS was 273 (including doctors in internship) or 187 (excluding doctors in internship) doctors per 100,000 inhabitants in 2014, having increased since 2010 (243 or 182 doctors per 100,000 inhabitants, including or excluding professionals in the medical internship).



LEGEND:

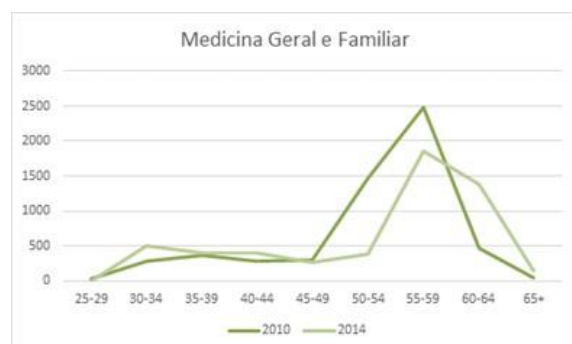
■	With doctors in intersiph
■	Without doctors in intersiph

- Concerning the type of employers, most doctors worked in hospitals (62%), followed by Regional Health Administration (ARS) with 24% of the professionals, Local Health Units (ULS) with 9% and Public-Private Partnerships (PPP) with 5%.
- Analyzing doctors' allocation to professional practice areas it turns out that 68% work in the hospital area, 30% in general practice and 2% in the public health area. The hospital area has grown (3 percentage points between 2010 and 2014), at the expense of general practice area, which declined in the same period;
- The general practice area has a very high aged structure, where 64% of doctors are older than 55 years, and this trend grows between 2010 and 2014;

Age Structure of Hospital Doctors (2010-2014)



Age Structure of GP (Primary Care) (2010-2014)



- The analysis of medical specialties through a series of indicators - the number of professionals growth gross rate, feminization rate, aging rate and replacement rate - identified the following specialties as being at risk of, in the near future, experience difficulties in the maintenance of its personnel in order to ensure the proper provision of services: Family Medicine, Clinical Pathology and Public Health;

Professional Career	Medical Speciality	N. of Specialists 2014	Growth Rate 2010/2014	Feminization Rate (1)	Aging Rate (2)	Replacement Rate (3)
Hospital	Pathologic anatomy	141	-3%	70%	60%	47%
	Anaesthesiology	1.163	1%	73%	47%	26%
	Cardiology	413	0%	37%	49%	36%
	Paediatric Cardiology	33	-3%	73%	42%	73%
	Cardiothoracic surgery	65	-13%	14%	58%	60%
	General surgery	947	-4%	36%	57%	37%
	Maxillofacial Surgery	35	3%	26%	54%	66%
	Paediatric surgery	71	1%	51%	61%	34%
	Plastic Reconstructive Surgery	94	-1%	33%	56%	52%
	Vascular surgery	98	5%	24%	40%	51%
	Dermato-venereology	164	9%	64%	43%	27%
	Endocrinology	106	2%	72%	49%	72%
	Stomatology	115	-7%	39%	87%	28%
	Clinical pharmacology	1	0%	100%	100%	-
	Gastroenterology	241	-2%	49%	44%	47%
	Medical genetics	15	67%	67%	27%	113%
	Obstetrics / Gynaecology	768	1%	69%	64%	37%
	Clinic haematology	124	8%	69%	51%	65%
	Allergy and Immunology	82	21%	77%	37%	52%
	Imunohemotherapy	163	4%	78%	75%	41%
	Infeciology	106	10%	61%	55%	73%
	Physical Rehabilitation Medicine	238	3%	67%	57%	47%
	Internal medicine	1.471	10%	61%	49%	67%
	Nuclear medicine	33	10%	70%	39%	52%
	Nephrology	210	17%	52%	40%	46%
	Neurosurgery	117	-5%	21%	48%	42%
	Neurology	285	10%	54%	50%	43%
	Neuroradiology	108	16%	59%	36%	35%
	Ophthalmology	401	-2%	45%	48%	34%
	Medical oncology	131	42%	69%	31%	118%
	Orthopaedics	559	1%	12%	64%	46%
	ENT	272	-3%	37%	55%	40%
	Clinical pathology	323	-10%	71%	77%	24%
	Paediatrics	1.034	8%	78%	45%	39%
	Paediatric psychiatry	90	7%	80%	42%	62%
	Pulmonology	347	-4%	65%	51%	37%
	Psychiatry	469	13%	54%	64%	62%
	Radiology	381	6%	56%	50%	33%
	Radiotherapy	65	10%	75%	43%	54%
	Rheumatology	76	7%	59%	30%	67%
Urology	209	-1%	5%	54%	38%	
Hospital Total		11.768	3%	56%	53%	45%
Occupational Health	Occupational Health	22	10%	59%	77%	45%
General Practice	General Practice	5.308	-7%	61%	71%	32%
Public Health	Public Health	327	-4%	60%	86%	30%

Legend:

(1) FEMINIZATION RATE — WEIGHT OF FEMALE DOCTORS IN TOTAL DOCTORS, BY MEDICAL SPECIALITY.

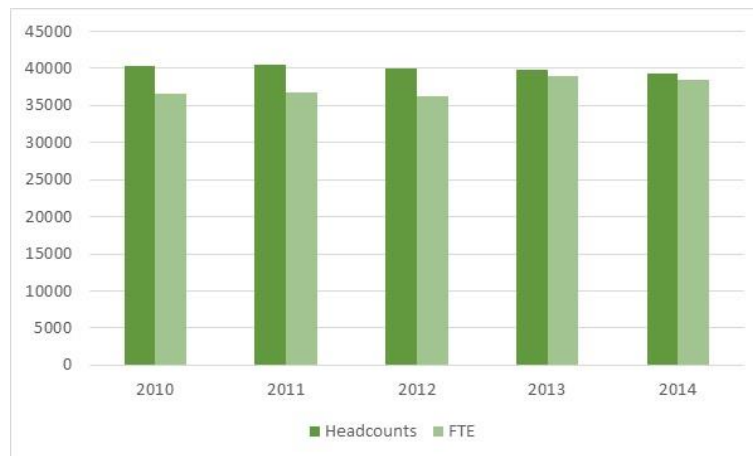
(2) AGING RATE — WEIGHT OF DOCTORS WITH MORE THAN 50 YEARS IN TOTAL DOCTORS, BY MEDICAL SPECIALITY.

(3) REPLACEMENT RATE — WEIGHT OF DOCTORS IN TRAINING IN TOTAL DOCTORS, BY MEDICAL SPECIALITY.

4.2.3 Stock Characterization NHS - Nurses

- In December 2014, 39,355 nurses worked in the NHS in Portugal's mainland, representing a decrease of 2.3% in the number of these professionals compared to 2010;

Nurses in the NHS, Headcounts and FTE (2010-2014)

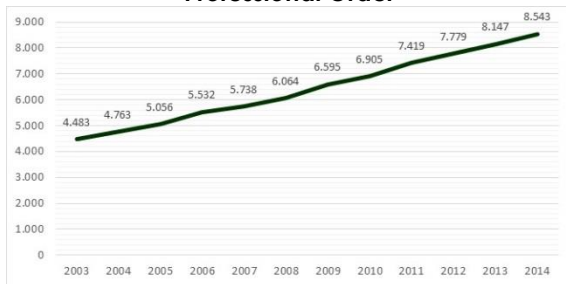


- The nursing profession is strongly feminized in the NHS, registering a feminization rate with a slight increase from 82.5% in 2010 to 82.8% in 2014;
- It is also a relatively young profession, with more than 56% of the professionals in the age groups between 30 and 44 years;
- The number of foreign nurses in the NHS is very low, representing 1.7% of all the professionals in the NHS in 2014;
- The population ratio of these professionals was 399 nurses per 100,000 inhabitants in 2014, having decreased slightly since 2010 (401 nurses per 100,000 inhabitants);
- In 2014 66% of all the employed nurses were in hospitals facilities (they were 73% in 2010), 17% in ARS, 12% in ULS and 5% in PPPs;
- The specialist nurses' number stood at 5,328 in 2014, representing 13.5% of all the nurses in the NHS and corresponding to an increase of 22% compared to 2010. The most significant specialty over the period was Maternal and Obstetric Nursing (20.5% of total specialist nurses in 2014). The specialty that showed the most significant increase in the period was Community Nursing (57.6% between 2010 and 2014);

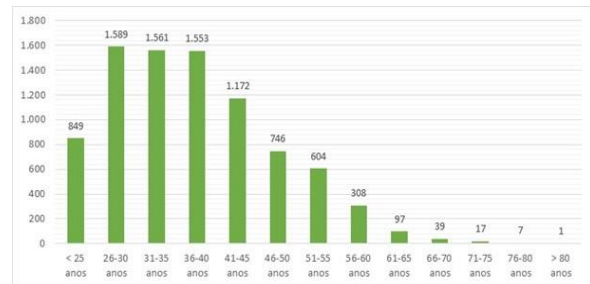
4.2.4 Stock Characterization - Dentists

- In 2014 there were 8,543 active members enrolled in the Order of Dentists, what corresponded to a net growth rate of approximately 91% since 2003.
- The profession was mostly female (58% of feminization rate) and young (55% of professionals stood at age groups up to age 40, with an average age of 38 years). 92% of dentists had Portuguese nationality.

Evolution of Active Dentists registered in the Professional Order



Active Dentists by age group (2014)

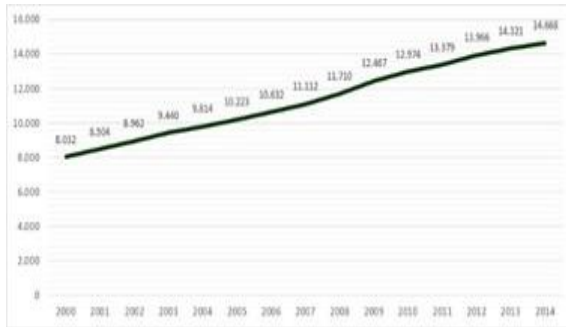


- In 2014 the population ratio of dentists in Portugal, estimated by the Order of Dentists, was 1 dentist per 1.236 inhabitants, although we can find ratios below the national average (including the Lisbon and Porto metropolitan areas).
- The position of Portugal in relation to other European countries in 2012 was at an intermediate level (1.348 inhabitants per dentist), when compared with the best value of 771 inhabitants per dentist in Liechtenstein and the worst of 2.479 inhabitants per dentist in Malta.
- Regarding the dentists employed in private companies on the mainland in 2013, they represented only 9% of active professionals registered in the Order of Dentists in the same year (710 professionals).
- 91% of these professionals are linked to their employing institutions through permanent employment contracts and 87% have full-time working hours.
- With regard to the education of dentists in Portugal there was a significant increase in the number of graduates between 1996 and 2014 - around 116% (from 236 graduates in 1996 to 510 in 2014). However, after a maximum record in 2008 (601 graduates), there was a slight decrease by 2014 (510 graduates). This drop corresponds to a slight reduction in the number of places available in the general system of access from 2010 (2%), which reached 5% in the subsystem of private education and 10% in the public subsystem.

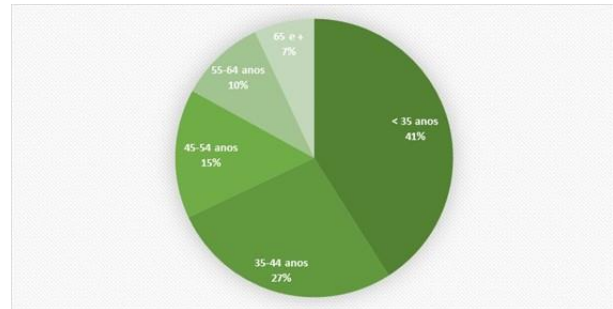
4.2.5 Stock Characterization - Pharmacists

- The 1st of January 2015, and according to the information provided by the Order of Pharmacists, there were in Portugal 14.668 pharmacists that correspond to a growth rate of 83% since 2000. Since 2009 we can see, however, a slight tendency of decrease in that annual average growth rate.
- The profession is strongly feminized (79% of the regular members are women), and young (68% of the professionals belong to the age groups up to age 44).

Evolution of Exercising Pharmacists registered in the Professional Order



Exercising Pharmacists by age group (2014)



- The analysis of professional areas highlights the predominance of pharmacists who work in Community Pharmacy area (59% of total), followed by the area of Hospital Pharmacy (9%).
- Regarding the pharmacists working for private companies on the mainland in 2013, they represented 41% of all the working professionals in 2013, what corresponds to 5.880 professionals.
- Their dominant contractual relationship was "employment contract of indefinite duration" (79% of total) and the most significant regime of working schedule was "full time job" (96% of total).
- The number of graduates in Pharmaceutical Sciences registered a strong increase between 1996 and 2014, over 250%, having been formed in this period about 12.000 graduates.

4.3 Stock projections and forecast for doctors and nurses (NHS)

4.3.1 Difficulties in the Stock projections and forecast for doctors and nurses (NHS)

Since the Projection and Forecast Model is restricted, at the moment, to doctors (and nurses) in the NHS (in Portugal's mainland), there is a gap between NHS' necessities of doctors and nurses and the necessities of the whole health system (including the autonomous regions of Portugal and the private and social sectors). That gap is relevant since it's ACSS's responsibility to determine the number of places, each year, for training in medical internships, and the future specialists will have to fulfil the necessities of the whole health system (including the autonomous regions of Portugal and the private and social sectors) in the future (2030).

Furthermore, we know that the phenomenon of emigration of Portuguese doctors and nurses seems to be increasingly more significant in the last few years, but we don't know the exact dimension of that flux.

So, to esteem, the present, whether the number of medical specialists (by medical speciality) is produced by the system will be enough in the future, presents some challenges.

In the future, in order to produce more accurate forecasts, and besides the implementation of the already mentioned National Inventory of Health Professionals, we need a closer interaction with the stakeholders of Azores and Madeira Regions and of the private and social sectors, in order to determine their strategic plans and their future needs in terms of doctors and nurses. We will have to know more precisely the dimension of the emigration phenomena, in collaboration with the professional orders of doctors and nurses.

4.3.2 Stock projections and forecast for doctors (NHS)

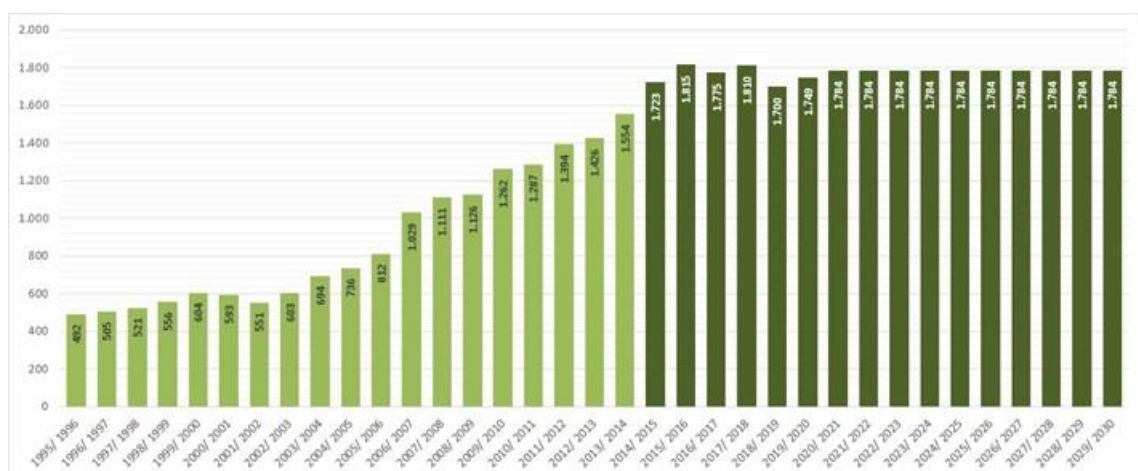
The projection model includes two main components - the Supply and Demand/ Needs. The Supply Model projects the number of health care professionals through scenarios based on past trends or in variations of these trends, while the Demand/ Needs Model considers the foreseeable or desirable scenarios of professionals corresponding to population's needs.

The Supply Model is based in the modeling of in-flows and out-flows movements for the doctors' stock in the NHS.

As **in-flows** we estimated:

- The **projection of Medicine graduates** by the national training system. According to the methodology followed, this estimate is based on the calculation of the Average Success Rate (moving average of the last five years) and its projection between 2015 and 2030, based on the maintenance of the number of vacancies and of the enrolled in the first year of the last known year (2014/2015). By applying the described methodology, we estimated a cumulative result of around 28,417 graduates in medicine in Portugal in the projection period (2015/2030).

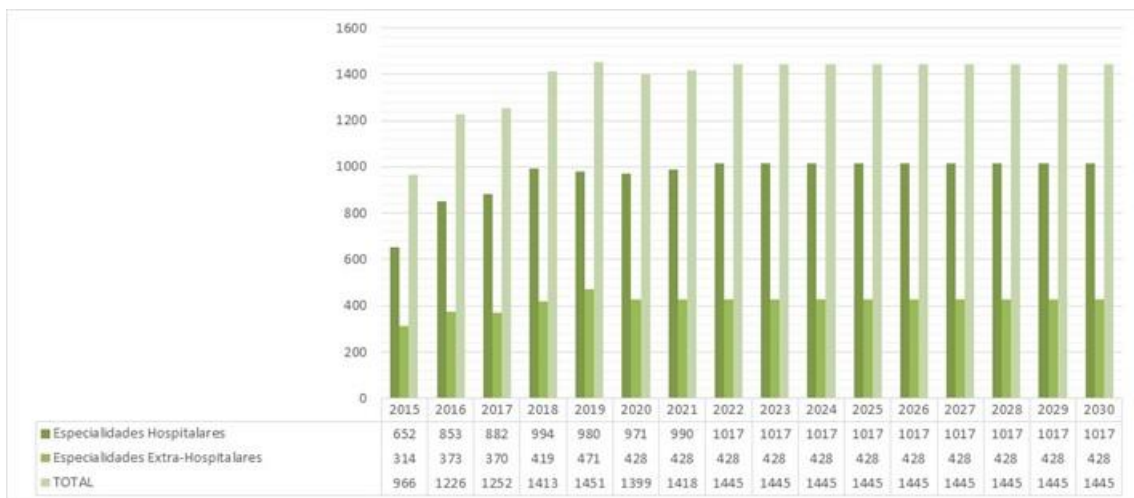
Evolution of Graduates in Medicine (1995/2014) and Projection of Graduates in Medicine (2015/2030)



- The **projection of medical specialists** formed by the postgraduate training system (medical internship), for all the 47 medical specialties which responsibility for training

falls into the Ministry of Health. This projection takes into account the entries in the Basic Year (including graduates abroad who apply to the Medical Internship in Portugal), entries in specific training in the various specialties (with a capacity limit of 1,600 intakes per year) and the respective outputs according to the calculation of the Survival Index by medical specialty. Its cumulative result is the training of 22,130 medical specialists over the projection period - between 2015 and 2030.

Projection of Medical Specialists (Hospital and extra-hospital medical specialties) (2015/2030)



Also under the Supply Model the following NHS doctors' **outflows** were estimated:

- **Retirement** - based on the application of an estimated Weighted Retirement Age of 64.75 years for NHS doctors. The cumulative total of retirements estimated in the period reaches 10,647 doctors, which corresponds to 61% of all specialists in the NHS in 2014. Of this total, 61% are doctors of hospital medical specialties (a cumulative total of 6,537 professionals) and 39% non-hospital medical specialties (a cumulative total of 4,107 physicians); the overwhelming majority of retirements in non-hospital specialties consists of general practitioners (36% of all retirements in the period) corresponding to 3,805 professionals. These dropouts represent 72% of all general practitioners in 2014.

Projection of Retirement of Doctors in the NHS (Hospital and extra-hospital medical specialties) (2015/2030)



- **Mortality Rate** - based on a specific mortality table for NHS doctors, resulting from the application of the mortality rate for the active population estimated by INE, adjusted to the age structure of the NHS doctors (calculated at 0, 22% per year);
- **Stock Renewal Rate** - estimated from the historical dropouts recorded between 2010 and 2014 - of Contract Termination, mobility, etc. (calculated at 1.26% per year).

Based on these projections was developed the **Supply Model**, comprising two extreme scenarios:

The first one, **Scenario of Dropouts without Stock Replacement**, in order to demonstrate a tendency, that is, what would happen if nothing was to be done; this scenario is intended to isolate the out-flows and monitor its effects on the NHS doctors stock. The projection of this scenario estimates that by 2030, the NHS would have lost 74% of its medical specialists in 2014, corresponding to a net loss of 12,875 medical specialists. This is particularly critical in non-hospital specialties, where it is estimated that between 2015 and 2030 the system would lose 82% of the specialists it held in 2014, mainly in the specialties of Family Medicine (81% break) and Public Health (97% break).

Projection of Doctors in the NHS in the Scenario of Dropouts, without Stock Replacement (2014 base year-2030)



A second scenario, the **Total Supply Scenario**, considers, upon the planned withdrawals, the incorporation in the NHS of all the graduates produced by the national training system (pre and post-graduate, the latter with a limit of 1,600 vacancies per year) in the period. This scenario represents the total recruitment potential by the NHS. In this scenario it turns out that if the mainland NHS was able to recruit all the medical specialists produced nationwide by 2030, the growth of medical specialists in the NHS would reach 42% of the 2014 workforce, representing a net increase of around 7,389 professionals. While in hospital specialties this scenario translates into a steady annual growth, in non-hospital specialties there is a professional downward trend until 2022, after which an upward trend consolidates until the end of the period.

Projection of Doctors in the NHS in the Total Supply Scenario (2014 base year-2030)



As opposed to the Supply Model was then developed the **Demand/ Needs Model**, which aims at identifying the number of medical specialists required for the public health system on

the horizon of the project, according to the health needs in that same horizon. The predictive variables susceptible to integrate a health needs model are diverse and possess different degrees of complexity. In the context of this project, and in view of the maturity of the HR planning system in Portugal, it was decided to consider at this first stage only the demographic evolution.

Under this project we consider two different scenarios for the doctors Needs Model.

The first is a traditional **scenario of maintaining** doctors' ratios per 100,000 inhabitants. In view of the planned reduction in the population residing in Portugal in the near future, this scenario translates into a reduction of doctors in the project horizon. The other scenario is a **scenario of growth** in the number of physicians in 2030, based on the analysis of the position of Portugal with regard to other countries, in both OECD and EU, as well as on the analysis of current and future trends of evolution of doctors in developed countries, which demonstrates a tendency to increase.

In the **Maintenance Scenario** the total number of doctors projected between the base year (2014) and the target year of the projection (2030) would register a decrease of around 8.2%, corresponding to a net reduction of about 1,433 medical specialists in the NHS. This decrease corresponds to the decline estimated for the population of the mainland in 2030, and presents different trends depending on the type of medical specialties: while in hospital specialties the estimated reduction reaches 13.2%, in non-hospital specialties the scenario estimates, on the contrary, the need for an increase of 2.2%.

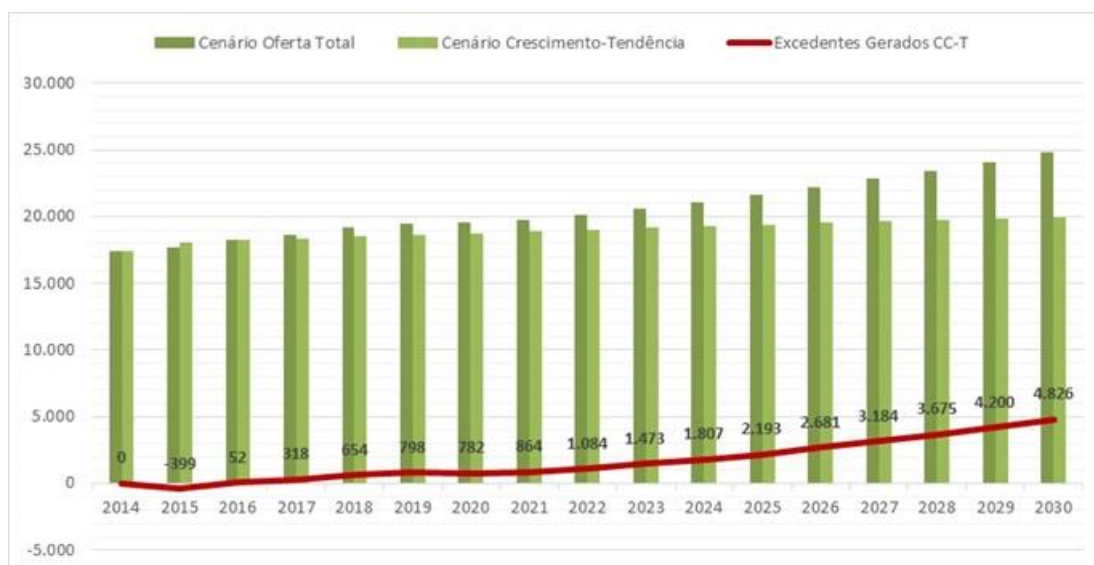
Integrated Projection of Total Supply Scenario with Maintenance Scenario and Surplus of Medical Specialists Generated (2015-2030) 2014 base year



The **Growth Trend Scenario** is based on the reproduction of the average growth rate of the number of doctors in OECD countries between 2000 and 2013, therefore applying an annual growth rate of 1.5% to the existing specialists in the NHS in 2014. Its implementation estimates

an overall increase of specialists in 2030, of around 14.7%, corresponding to a net increase of 2,563 medical specialists. This overall increase corresponds to differentiated growth rates, depending on the types of the medical specialties. While in hospital specialties the estimated increase reaches 8.5% (that is, a positive net balance of 998 specialists) in non-hospital specialties the scenario estimates the need for an increase of 27.8%, corresponding to a positive net balance of 1,569 medical specialists

Integrated Projection of Total Supply Scenario with Growth-trend Scenario and Surplus of Medical Specialists Generated (2015-2030) 2014 base year



Through the intersection of the two scenarios developed in the Demand/ Needs Model with the Total Supply Scenario (representing the national potential for medical recruitment) we can draw the following conclusions:

- Even with the introduction of restrictions on post-graduate training capacity (that we estimate in 1,600 intakes per year), the overall quantity of medical specialists produced over the projection period shows capacity to meet the needs of the demand scenarios modeled (both in the Maintenance scenario as in the Growth-trend), showing a hypothesis of surpluses in both. These surpluses range between about 8,800 or 4,800 medical specialists at the end of the projection period, depending on the projected scenario;
- The aforementioned supply capacity and the generation of surplus is not the case, however, for the non-hospital specialties, with emphasis on Family Medicine and Public Health. With regard to general practice the deficit tends to worsen until 2022, after what there is a steady recovery that in the Maintenance Scenario turns to a professional surplus in 2030 (around 1.300) and in the Growth-trend Scenario achieves, in 2030, the balance between supply and needs;

- The assumption of allocating around 30% of all postgraduate training places for general practice revealed itself insufficient to meet the needs for specialists in the short and medium term, mainly due to the aging structure of the NHS general practitioners.

Based on the principle of desirable national autonomy in the training of health professionals in order to meet the country's needs, we must take into consideration the following factors:

- Doctors trained in Portugal should meet the needs of all labor market sectors - public, private and social - regarding the provision of care and other functions - management, research, education, etc.;
- Doctors trained in Portugal should meet the needs of the labor market of the Azores and Madeira Regions, which are not considered in the Demand/ Needs scenarios developed under this project;
- Recent limit of the number of places for postgraduate training introduces a new phenomenon (in recent history), which is the formation of a contingent of doctors with no specialty (because they overpass the number of vacancies for specialty training within the system);
- The last few years, at least since the onset of the economic and financial crisis of 2011, have seen the emergence of another new phenomenon that is the medical emigration, whose exact contours are not known, but that the Medical Order esteems in about 380 doctors in 2014.

Considering these issues, it is necessary to mitigate the conclusions relative to the size of the surplus generated by the developed scenarios. These surpluses will have to meet the needs of the overall national labor market - in all the activity sectors and in all the regions of the country-, in the context of unidentified migratory flow.

In this context it turns out to be even more urgent to face the situation of expected deficit in the specialty of family medicine, which will require varied and complementary measures, in a short and medium term.

In conclusion, we will need to carefully monitor the training flows (pre and post graduate) and the medium and long-term needs of the labor market, while maintaining the phenomenon of emigration under close observation, in order to ensure the country's self-sufficiency with regard to medical professionals.

4.3.3 Stock projections and forecast for nurses (NHS)

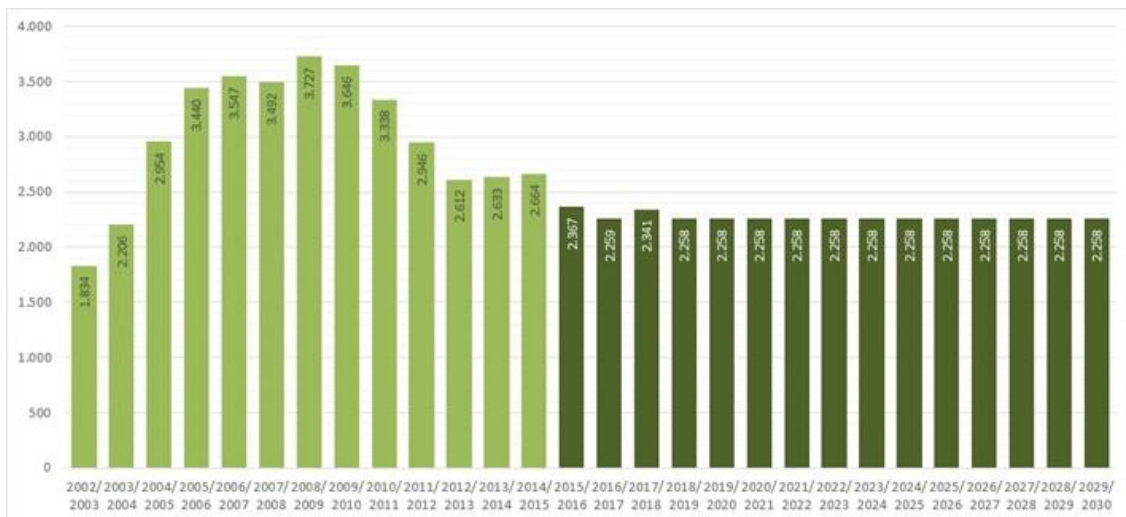
In about a decade and a half Portugal went from being a country with a severe shortage of nursing resources to an exporting country of nurses to other countries, especially European ones. According to the OECD, in 2014 worked in the UK about 4,000 Portuguese nurses. The Portuguese Nurses Order estimates that between 2009 and 2015, between 10,000 and 12,000 Portuguese nurses have emigrated. The need to monitor and quantify this phenomenon, as accurately as possible, constitutes a fundamental dimension to be considered when modeling future scenarios for the allocation of nursing resources in Portugal.

The projection model includes two main components - the Supply and the Demand/Needs. The Supply Model projects the number of health care professionals through scenarios based on past trends or variations of these trends, while the Demand/Needs Model considers the foreseeable or desirable scenarios of professionals corresponding to population's needs.

The starting point for the construction of the **Supply Model** is an estimate of the **production of graduates** in nursing in the country. According to the methodology followed, this estimate is based on the calculation of the Average Success Rate (moving average of the last five years) and its projection between 2015 and 2030, based on the maintenance of the number of vacancies and of the enrolled in the first year of the last known year (2014/2015).

This methodology results in an estimated annual production of 2,258 graduates in nursing from 2019, resulting in a cumulative result of around 34,064 graduates in nursing in Portugal in the projection period (2015/2030).

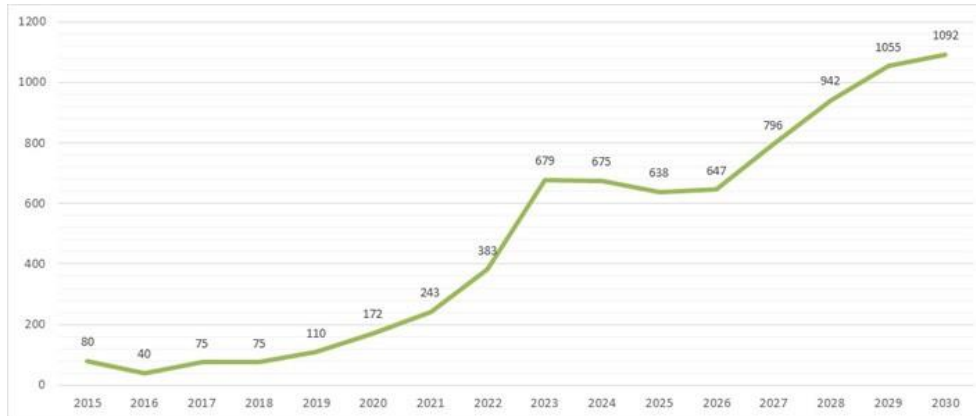
Evolution of Graduates in Nursing (1995/2015) and Projection of Graduates in Nursing (2016/2030)



Still under the Supply Model, NHS nurses' **outflows** were estimated considering the following:

- **Retirement** - based on the application of an estimated Weighted Retirement Age for NHS nurses of 64.87 years. The estimate retirement of nurses was calculated at about 7,700 accumulated retirements between 2015 and 2030, corresponding to 20% of all nurses in the NHS in 2014;

Projection of Retirements of Nurses in the NHS (2015/2030)

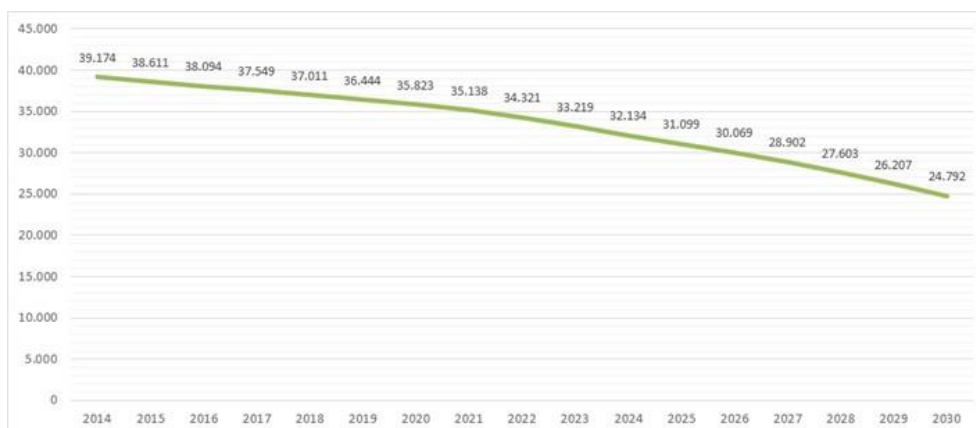


- **Mortality Rate** - based on a specific mortality table for NHS nurses, resulting from the application of the death rate for the active population estimated by INE, adjusted to the age structure of the NHS nurses (calculated at 0, 10% per year);
- **Stock Renewal Rate** - estimated from the actual historical dropouts recorded between 2010 and 2014 - of Contract Termination, mobility, etc. (calculated at 1.1% per year).

Based on these projections it was developed the **Demand/Needs Model**, comprising two extreme scenarios:

The first, **Scenario of Dropouts without Stock Replacement**, in order to demonstrate a tendency, that is, what would happen if nothing was to be done; this scenario intended to isolate the out-flows and monitor its effects on the nurses' stock. The projection of this scenario estimates that by 2030, the NHS would have lost 37% of the workforce existing in 2014, corresponding to a net loss of 14,382 nurses.

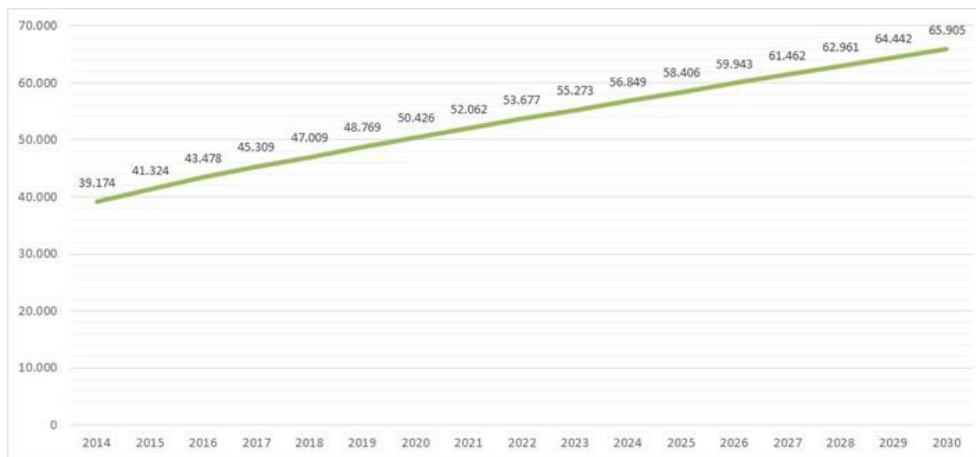
Projection of Nurses in the NHS in the Scenario of Dropouts, without Stock Replacement (2014 base year-2030)



A second scenario, the **Total Supply Scenario**, considers, upon the planned withdrawals, the incorporation in the NHS of all graduates produced by the national training system in the

period. This scenario represents the total recruitment potential by the NHS. In this scenario it turns out that if the mainland integrated all nurses graduated nationwide by 2030, the growth of nurses in the NHS would reach 68% of the workforce existing in 2014, representing a net increase of around 26,731 professionals.

Projection of Nurses in the NHS in the Total Supply Scenario (2014 base year-2030)



As opposed to the Supply Model was then developed the **Demand/ Needs Model**, which aims at identifying the number of nurses required for the public health system on the horizon of the project, according to the health needs in that same horizon. The predictive variables susceptible to integrate a health needs model are diverse and possess different degrees of complexity. In the context of this project, and in view of the maturity of the HR planning system in Portugal, it was decided to consider at this stage only the demographic evolution.

Under this project we considered three different scenarios for the nurses Needs Model.

The first is a traditional scenario of maintaining the existing nurses' ratios per 100,000 inhabitants. In view of the planned reduction in the population in Portugal in the near future, this scenario, translating into a reduction of nurses in the project horizon.

The two other scenarios are of a growing number of nurses by 2030. The option for the consideration of two growth scenarios – one of a moderate growth, another of sharp increase - lies on the one hand, the analysis of the positioning of Portugal in relation to other countries, both OECD and EU (Portugal has a ratio of 6.1 nurses per 1,000 population compared with the ratio of 9.1 nurses per 1,000 inhabitants of the OECD average); On the other hand, the analysis of the trends for future development of nursing resources in developed countries are moving towards the respective increase.

In the **Maintenance Scenario** the total number of nursing professionals between the base year (2014) and the target year of the projection (2030) would register a decrease of around 10%, corresponding to a net reduction of about 3,979 nurses in the NHS. This decrease corresponds to the decline estimated for the population of the mainland in 2030.

The **Moderate Growth Scenario** is based on the attempt to reach, in 2030, the average ratio of nurses per doctor in health systems of the European Union (which in 2013 stood at 2.5

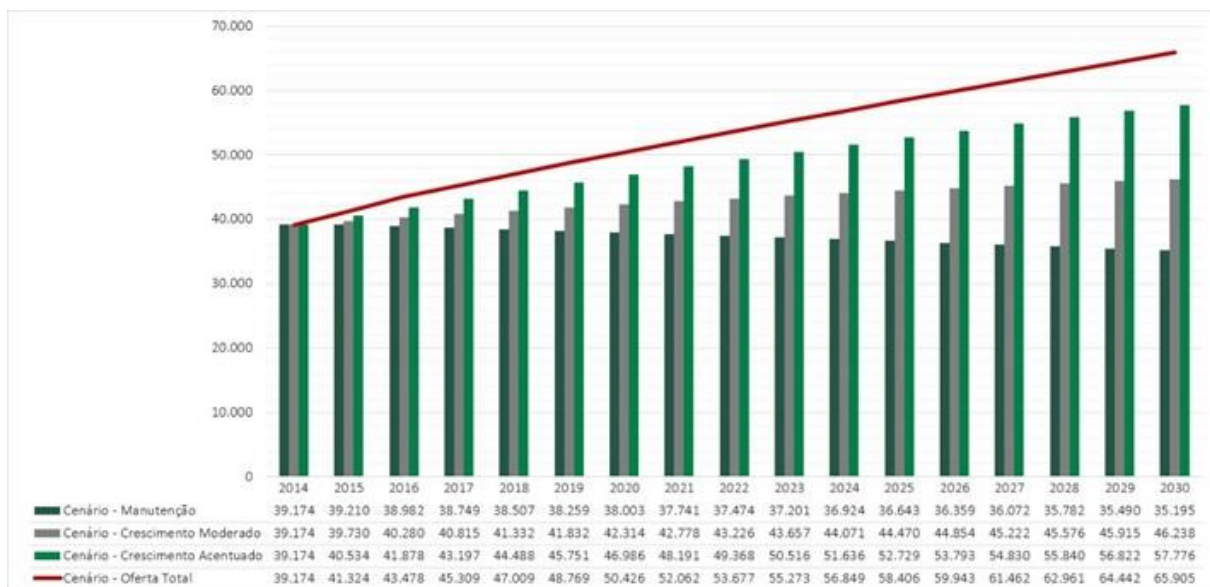
nurses per doctor), establishing an intermediate goal of two nurses per doctor in the NHS. The projection of this scenario translates into a net increase of around 7,064 nurses between 2014 and 2030, representing a rise of 18% in the total of professionals in the NHS.

The **Strong Growth Scenario** sets as target for 2030 achieving a ratio of 2.5 nurses per doctor, which would put the Portuguese ratio close to the average ratio of the European Union in 2013 (for the entire health system). With this scenario the total number of nurses in the NHS between 2014 and 2030 would register an increase of around 47%, corresponding to a net growth of 18,602 professionals.

Through the intersection of the three scenarios developed in the Demand/Needs Model with the Total Supply Scenario, we can draw the following conclusions:

- That the Total Supply Scenario (which considers the annual intake of all graduates in nursing over the projection period in the NHS) is able to produce a surplus of nurses in relation to the needs estimated in each of the three Needs Scenarios;
- That the size of that surplus varies, depending on the modeled scenarios. In the Maintenance Scenario, the surplus generated at the end of the period, for the scenario of Total Supply, would amount to about 30,710 professionals, while in the Moderate Growth Scenario this surplus would reach about 19,667 nurses and in Strong Growth Scenario only 8,129 nurses.

Integrated Projection of the Total Supply Scenario with the 3 Demand Scenarios (Maintenance, Moderate Growth and Strong Growth) (2014 base year-2030)



However, if the country wants to be self-sufficient concerning the filling of its needs in nursing professionals, should be taken into account that:

- The number of professionals trained in Portugal should meet the needs of all labor market sectors - public, private and social -, with regard to the provision of care and other functions - management, education and research, etc. A rough estimate puts the likely size of the private and social labor market in 2013 in about 30-35% of all active nurses that year.
- Trained professionals in Portugal should also meet the needs of the labor market of the Autonomous Regions, which are not considered in the Needs Scenarios developed, and accounted for about 7% of total NHS nurses in 2014;
- The phenomenon of emigration of Portuguese nurses took on, in recent years, a significant dimension, having absorbed a considerable part of newly graduated nurses (but not only those).

The existence of a nurse's surplus that allow to meet the identified needs (public and private labor market, in the mainland and Autonomous Regions), particularly in the context of the NHS Strong Growth Scenario, while keeping up the trend of emigration of nurses, is not guaranteed.

In conclusion, we will need to carefully monitor the training flows (which declined significantly in the recent past) and the medium and long-term needs of the labor market (which are likely to increase in this timeframe), while maintaining the phenomenon of emigration on close observation, in order to ensure self-sufficiency of the country with regard to nurses.

4.4 Forecast for dentists and pharmacists

Although it was not foreseen the forecast for dentists and pharmacists in the JA Pilot Project, we did a very simple exercise, based on the estimation of the number of graduates of dentists and pharmacists' schools in Portugal in the time frame of 2020, in order to anticipate any possible shortage of professionals in the near future.

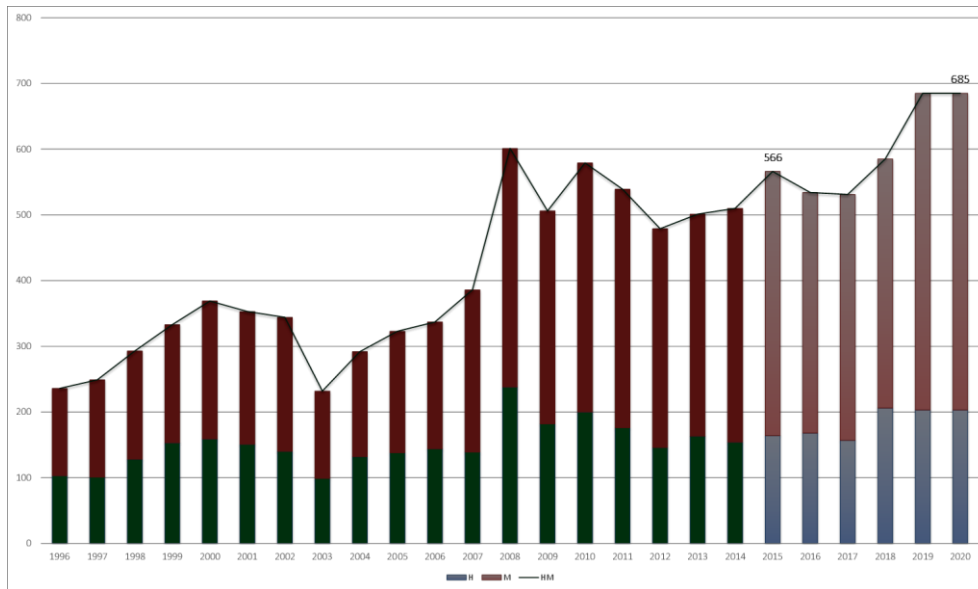
Although this simple exercise does not take into account the attrition rate in these professions, nor retirements or any other reasons for leaving, it's a proxy for the intake of professionals in the labour market, in a context of relatively young professions (see chapter 4.2 - Stock characterization of dentists and pharmacists). It represents **the potential for dentists and pharmacists in Portugal**.

The results of that exercise are presented in the following graphics that represent:

- The evolution of graduates in Dentistry and Pharmaceutical schools between 1996 and 2014 (real data) and the projection of graduates between 2015 e 2020 (according to the same methodology of the calculation of the Index of Success described earlier for the projection of graduates in medical and nursing schools).
- The annual addition of the projected graduates to the stock of professionals existing in 2014 (real data), till 2020, bearing in no consideration the abandonments in that period (retirements, and others).

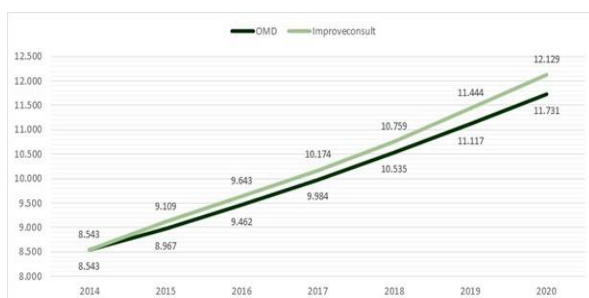
- The projected ratio of inhabitants per dentist and pharmacist till 2020.

Evolution of graduates in Dentistry Schools in Portugal (1996/2014) and Projection of Graduates (2015/2020)

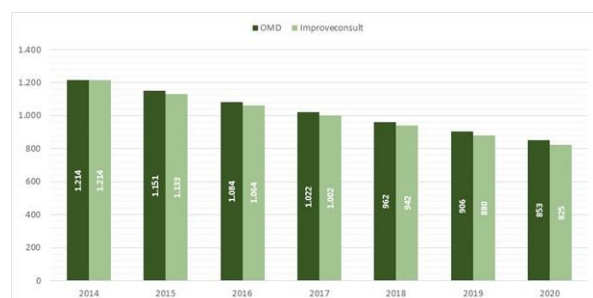


- International statistics on the density of dentists (including dentists, maxillofacial surgeons and stomatologists) places Portugal in an intermediate layer among the countries analyzed, with 0.85 dentists per 1,000 inhabitants, compared with a maximum value of 1,71 in Sweden, and with a minimum of 0,58 in Ireland.
- According to the different methodologies used – developed by the Order of Dentists or by the consulting team in the project - the projection of dentists by 2020 ranges between 11.731 and 12.129, corresponding to a ratio of resident population by dentist among 853 (Order of Dentists) and 825 (consulting team) in 2020.
- This ratio exceeds the ratio recommended by the World Health Organization for Western Europe that stands at 2.000 people per dentist.

Projection of the Potential of Dentists (2014/2020)

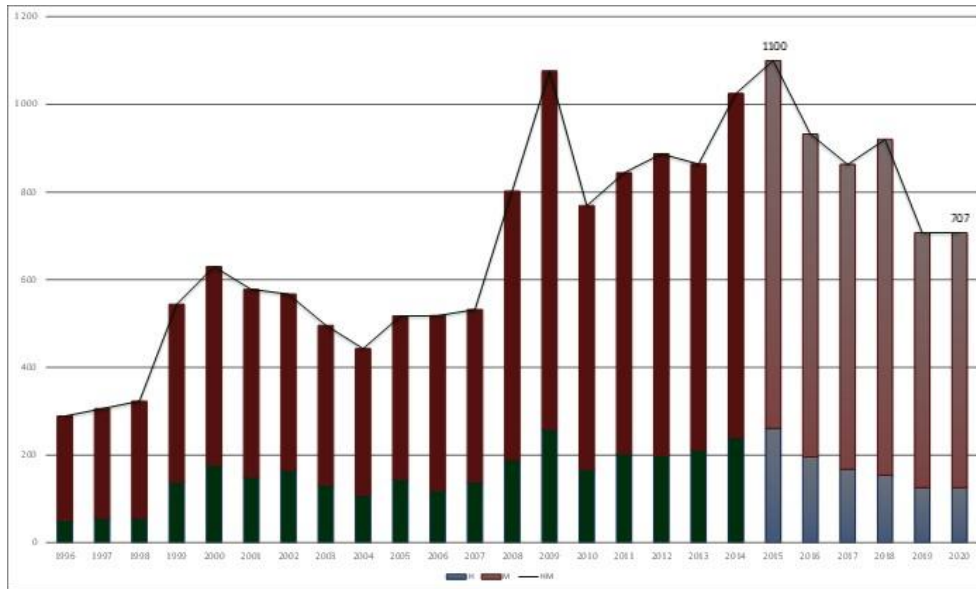


Projection of the Potential ratio of population for Dentist (2014/2020)



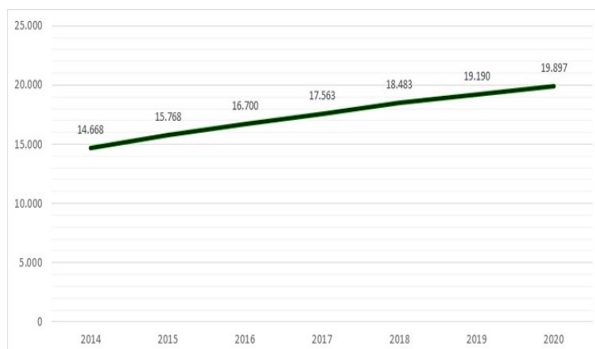
The situation is quite similar as pharmacists are concerned.

Evolution of graduates in Pharmacy Schools in Portugal (1996/2014) and Projection of Graduates (2015/2020)

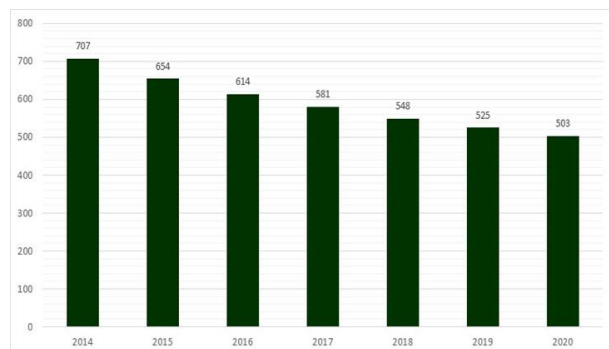


- Compared to other European countries, Portugal, in 2012, was in an intermediate position with respect to the density of pharmacists per 1.000 inhabitants – 1,04 pharmacists per 1.000 inhabitants. This density compares with Denmark and Finland (both with 1,49 pharmacists per 1.000 inhabitants) in the most favorable position, and the Netherlands (0,26 pharmacists per 1.000 inhabitants) in the most unfavorable position in the analyzed countries.
- The esteemed projection of pharmacists reaches 19.897 professionals in 2020, corresponding to a ratio of 503 inhabitants per professional, which indicates the absence of pharmaceutical shortages in Portugal to meet the needs of these professionals in the medium term (2020).

Projection of the Potential of Pharmacists (2014/2020)



Projection of the Potential ratio of population for Pharmacist (2014/2020)



5. Lessons Learned and Recommendations

5.1 Lessons Learned

The existence of a **Handbook on Health Workforce Planning Methodologies Across EU countries** enhances the possibility for both reflection and experience.

The most important features of Portuguese participation both in the Joint Action and on the Pilot Project, that constitute the main lessons we learned and can be of importance for future participants in that kind of projects and experiences. The material contained in the Handbook was especially useful:

1. In order to get ideas as to organize and develop the different components of the health workforce planning system as a whole – for instances, with regard to the **stakeholders' involvement**, as an important dimension. From where we stand, and considering the experiences described in the Handbook, our next challenge will be the **systematic participation of stakeholders** in the HWF Planning System. In a broad sense, we can say that what we would like to achieve is the model described in the Handbook as the involvement of the stakeholders in Belgian planning system. From the brief description contained in the Handbook, the Belgian system is the one that seems closest to the Portuguese reality. At the same time, that description enhances aspects like the political weight of the planning Commission, or the characteristics of the whole system (highly qualified supporting staff, multiple working groups, adequate funding, and so on), that is consistent with a mature planning system, with quite some time of development. Also in relation with the involvement of stakeholders in the projection models, the Danish experience was important to us. The Danish projection model involves a strong participation of stakeholders and, as far as we can understand it, that is the cornerstone of the model. In Portugal we aim to promote participation, and we are creating the conditions for a more active participation of the stakeholders (through the Advisory Board of the National Inventory of Health Professionals) to develop and support a HWF Planning System according to the good practices described on the Handbook. We aim also at using expert panels and others (for instance in the internship) for discussion and validation of assumptions and results of the forecasting model used.

Portuguese stakeholders' meetings occurred in January 2014, for the presentation of Portuguese participation on the Joint Action and in

September 2015, for the presentation of the Portuguese pilot project (see Chapter 3.5.2 Result's dissemination) allowed the involvement of the national and regional relevant stakeholders in the construction of an effective national system of health workforce planning, allowing also the discussion of the configuration of the Projection Model.

2. **Considering the mobility**, it was one of our goals, not the initial ones, trying to find a way of measuring the outflows of health professionals, not from the NHS, but from the country, what would give us an idea of the loss of the entire system.

For instance, we know that Portuguese professionals are leaving the country, namely doctors and nurses. Doctors and nurses professional associations are esteeming numbers based on the documents they must produce to the ones searching work outside the country, but no one knows for sure how many of them really go, or for how long. The simple fact that Professional Associations are the ones to do the esteem, being part interested, introduces a bias in any analysis to be made.

WP4 was a learning ground in all the matters related to mobility. It is a "university" WP, in the sense that it shows us not only different perspectives, but also different slices of the whole question, from a totally different point of view, considering we are in the field of operating and decision making.

And we know this is a highly complex situation, bringing together individual interests and rights with difficult political assumptions and decisions.

It has been referred that a snapshot into some countries known as being destination countries for our health professionals, would have been useful, in order to have a sign of what's going on in this field, a starting point to get information, on which to build a proposal to get more information, from more countries. That could also help us to design and discuss *numerus clausus* into the several schools/universities training health professionals.

Unfortunately, that was not possible within the scope of this JA; neither our partners, nor us, had time enough to dedicate to this specific point. Indeed, one of our weaknesses is the dimension of our team and the appeal from many other tasks, depriving us to give more time and attention to the planning issue.

3. In order to consider aspects as the necessity of a **systematic evaluation of the HWF planning system**, we had tested the WP4 Toolkit with regard to a particular profession (doctors). In this case we have a well settled process,

with high level of regulation and participation of stakeholders. Gradually from nurses to others.

4. **The joint participation** of different partners, belonging to different countries, with different models of workforce planning and instruments, offers a wide variety of possibilities for reflection and experience to new participants. In that context, the **Expert Meeting** that took place in Brussels in the 24th June, where the Portuguese Pilot Project was object of analysis and discussion with experts belonging to different countries, with different methodologies and experiences, was most helpful. That is true especially for the specific sessions on the Portuguese Project. The discussion within the scope of the experts meeting was of great value for the development of the Forecasting Model. We found particularly useful the recommendations regarding:

- The methodologies to esteem dimensions such as workload of professionals in the private sector (surveys and expert panels, for example);
- The recommendation of keeping the forecast model simple in the beginning, for instance based only in demographic trends, adding layers of complexity with time;
- The recommendation of not considering any financial constraints in the model.

It would also had been most useful if that kind of meeting had been repeated, in a more mature stage of development of the pilot project, in order to discuss with the experts the concrete and specific results of the implementation of the projection model.

5. Handbook is also useful in order to get experiences and **specific methodologies on how to solve specific problems** – for instance methodologies to **estimate FTE or workloads in health professions**, in a national context was there are constraints mainly related to access to insurance or financial information. So we are considering the possibility of conducting surveys, much in the path adopted in the Dutch Planning System that is described in the Handbook, with the necessary adaptations to the Portuguese reality.

5.2 Recommendations

The main recommendations we consider of being eventually important to others are the following:

- **All international experiences and models have to be adapted to, and are limited by, the concrete conditions of the country building the planning system and the projection model.** Those conditions depend, in a great extent, on aspects such as the political context and the institutional framework, the collaborative institutional tradition, or the data availability and their access. Designing the projection model according: **type of health system, the maturity of the planning process or planning system** and the **involvement of stakeholders. Use a step by step approach to complexity.**
- The national specific conditions to develop a whole planning system demands much **more time**. So, we favored the development of the Projection Model, within the timeframe of the Pilot Project.
- At the same time, we launched the basis for the construction of the planning system, with the **legislation** on the National Inventory on Health Workforce, including an Advisory Board and also a specific team dedicated to HWFPF.
- Take advantage in the different phases of the process: construction, implementation and monitoring the contributions of the stakeholders and decision makers'.

There is a specific recommendation, on the structure and presentation of the handbook. It should allow a group of "search motors", if possible, with cross tables for: Country (n° of inhabitants); Profession (integration and eventually skill mix); Type of health system (NHS, other's); Type of coverage (universal/partial); Mobility needs (more or less) and others.

6. Sustainability of Portuguese Experience and Conclusions

The main concerns we have relating the sustainability of the Portuguese Experience in Joint Action and in Pilot Project are the following:

- The **future sustainability of the planning model**, as said before (see Chapter 2.2. Health Human Resources Planning Process), Portugal as not a real and complete health workforce planning system, but as the ambition to build one and the participation in this project provides the leverage to that purpose. We aim to build that system in small and secure steps.
 - Create a **specific and dedicate team for HWFPF** to link the strong expertise that exists in ACSS but is scattered through various areas (regulation, careers, hiring, training, professional registries, data, models) and with the incorporation of new skills.
 - Implement **the NIHP Implementation (Public, Private and Social sector's)** – that is undergoing - currently we are answering to the doubts presented by the recently created National Council of Professional Orders - representing all the Orders - and also to those put by the National Commission of Data Protection (Protocol for data transmission).
 - The **Advisory Board** that will be functioning in the context of the National Inventory of Health Workforce (see Chapter 3.5.1 Advisory Board), and will **gather the significant stakeholders** in an effective health human resources planning system – national and regional authorities, public, private and social sectors, professional orders and others).
 - The **establishment of the evaluation model** to monitor the implementation and adjust the results of the planning system. That model is under discussion at this moment within ACSS.
 - Promote **a snapshot, for mobility proposes**, into some countries known as being destination countries for our health professionals to have a sign of what's going on in this field, a starting point to get information, on which to build a proposal to get more information, from more countries. That could also help us to design and discuss *numerus clausus* into the several schools/universities training health professionals.