

## **Harvard Medical School – Portugal**

**An international collaboration in graduate education and biomedical research oriented towards raising public awareness of scientific knowledge leading to improved human behavior and quality of life**

### **Technical Annex to the Memorandum of Understanding towards a long term collaboration**

April 2007

The Government of Portugal and the *Harvard Medical School* (HMS) and *Harvard Medical International* (HMI) agree to perform an assessment of possible areas for collaboration, exploring mutual interests in education and research oriented towards the development and distribution of new medical and health education content, graduate medical education and the advancement of biomedical research, in such a way as to raise the public awareness of scientific knowledge leading to improved human behavior and quality of life. The ultimate goal is to establish a long term collaboration, which requires the prior assessment of specific interests of HMS faculty, as well as of Portuguese faculty and institutions. As a result, this MoU defines the terms of reference for the short term assessment, which is to be performed during a period of up to 4 months looking at long terms goals and objectives, as well as the drafting and discussion of a proposed contract.

Harvard Medical International will be the lead administrative unit for HMS during the assessment period and will also engage others at HMS whenever necessary. The Portuguese Science Foundation, FCT, and the Portuguese Knowledge Society Agency, UMIC, will be the lead units for Portugal during the assessment period and will engage universities and scientific institutions in Portugal as specific areas, research topics, and interests emerge.

The assessment will be led by H. Tom Aretz, M.D., Vice President for Global Programs at HMI.

#### **1. Long term collaborative strategy**

##### **1.1 Goal:**

A strategy to strengthen the country's knowledge base and to enhance the quality of life in Portugal, by exploring international cooperation and science-based relationships with leading institutions worldwide, in a way to sustain strategic investments in people, knowledge and ideas.

##### **1.2 Objectives:**

- To implement specific initiatives with high visibility and impact in select targeted constituencies, with a special focus on new medical and health education content production and delivery, in a way to raise the public awareness of scientific knowledge leading to improved human behavior and quality of life;
- To develop advanced educational and research programs at an international level, oriented towards strengthening the science base, as well as fueling the social well-being and security;
- To make Portugal an attractive setting to study and perform scientific research, so that Portuguese institutions recruit and sustain bright students and scientists from throughout the world and help mobilize them towards emerging challenges facing the knowledge economy, the development of biotechnology, and the delivery of healthcare;
- To develop and reinforce the managerial and entrepreneurial capacity of those students, scientists and healthcare providers through the commercialization of biomedical science and technology and the access to new and dynamic markets worldwide.

##### **1.3 Rationale:**

Portugal is an interesting country in challenging times. The country faces a range of possible futures from the inspiring to the bleak. In general, keeping the industrial status-quo, still heavily geared around a strategy of low-cost production, is not a sustainable option in the face of increasing competition from locations such as Eastern Europe and China. Industry must transform and new and qualified employment must be promoted. In the area of healthcare, local provision of care, the education of healthcare professionals, basic and clinical research and the

management and infrastructure to support these three areas needs to be addressed, developed and improved upon to assure Portugal's role in this expanding portion of the economy. Fortunately, the evidence provided by a range of emerging technology-based firms created in the mid 90's is demonstrating the usefulness of prior investments in the science base. But much more progress is needed. This requires Portugal to learn from international experience and to be engaged with international leaders in innovation systems and organizational transformation. Thankfully, Portugal's unique national challenges are attracting international interest. This proposal aims to build upon that interest for the benefit of both the national economy and our collaborators in this endeavor.

The performance of the Portuguese economy is a complex and multifaceted challenge. It is clear that fostering the science base and the growth of emerging technology based firms, as well as breaking the overall cycle of low productivity/low innovation is beyond the power of any single entity. Still, a focused initiative, building on the reputation and accomplishments of leading institutions worldwide in conjunction with Portuguese universities, research centers and firms could go a long way in meeting three important challenges. First, there is a gap in qualified people and a relative small critical mass of scientific institutions and of innovative enterprises, which exhibit difficult access to new and dynamic markets. Second, there is a gap in understanding about the specific problems, and possible solutions, that affect the performance of the Portuguese economy. Third, there is a gap in the number and effectiveness of concrete initiatives devoted to taking steps to improve the current situation. The program, with a structure outlined below, aims at bridging this triple gap. It will not, by itself, solve the problem, but it will take important steps to do so by itself, by the relationships it will propose, and by the demonstration effect it will provide.

HMS is well-suited to advance a relationship with Portugal. HMS is one of the world's leading research and educational institutions, particularly well known for its scientific and technological achievements, for its interdisciplinary and diverse culture, and for its leading role in the production and distribution of new medical information and contents.

#### **1.4 Strategy:**

It is recognized that any development strategy for Portugal must be understood and enacted in a context of the country in an increasingly open and interconnected world. Several currently disjoint disciplines must join efforts to provide new solutions to mobilize **people, knowledge** and **ideas** to help to catalyze the strong progress in science-based applications and management skills needed to secure Portugal's future.

Thus a program is proposed to promote and raise the public awareness of scientific knowledge leading to improved human behavior and quality of life. This will be accomplished through developing and promoting a consortium involving Portuguese schools of medicine and research laboratories and appropriate industrial partners that will work in close cooperation with HMS in order to achieve the following main deliverables:

- Activities oriented towards the **public understanding of science** and the social appropriation of the knowledge generated
- The development of **research and education programs** aimed at improving competence and capability in three key areas for delivering innovation in biomedical sciences:
  - Knowledge generation and dissemination
  - Biomedical research and product development practices, processes, procedures and infrastructure
  - Entrepreneurship and career development
- Development of **graduate training and education programs for physicians** emphasizing the vertical and horizontal integration of science, clinical medicine and quality management.

The collaborative agreement is to be established between Portuguese universities and research institutions, namely Associate Laboratories, and HMS with support from the Portuguese Government. The proposed program should be implemented in a **evolutionary and stepwise approach**, including short- and medium-term initiatives, in a way to guarantee current opportunities at a launching phase (i.e. 1st year), but also to sustain their competitive growth

and the future development of other potential emerging opportunities that may appear in the years to come (from 2<sup>nd</sup> to 5<sup>th</sup> year, and beyond). The contractual arrangements to be made should make possible this approach.

### **1.5 Lines of Action:**

The proposed program emphasizes three key aspects in the emerging society, namely:

1. *People*, by fostering **tools for understanding** and **building skills**
2. *Knowledge*, by developing **understanding for action**
3. *Ideas*, by promoting **action for results**

Each of these aspects is to be implemented through a specific line of action and in order to achieve a set of specific goals, including:

- *Attract people for knowledge based activities*, by fostering new advanced training actions;
- *Enhance the science base*, by promoting new research activities at the highest international level;
- *Create management and quality systems* by the creation of incentives, supportive infrastructures, and human resource development;
- *Engage Business*, by involving key corporate leaders with entrepreneurs and researchers;
- *Connect Universities*, by promoting institutional networking and industry-science relationships;
- *Promote Internationalization*, by fostering links with US and European collaborators, at university and corporate levels and by attracting foreign direct investments;
- *Improve intermediaries*, by supporting interface activities fostering industry-science relationships;
- *Foster Entrepreneurship*, by promoting entrepreneurial culture at the University system, identifying and helping nurturing new ideas, and by supporting the creation of new businesses;
- *Change culture*, by promoting exchange of ideas and the discussion of good and bad practices.

### **1.6 Main areas of application:**

The proposed program will focus on a systems approach with cross-disciplinary research and education relevant to challenges for Portugal and of interest to HMS at operational and strategic levels. It will foster biomedical and management skills, through activities in specific fields to be determined through the assessment exercise by involving faculty and researchers in Portuguese institutions and at HMS.

The potential areas of application are to be agreed and any collaborative efforts should be implemented in a way to allow the continuous monitoring and evaluation of the program, as well as launching new areas of application, whenever they rely in well documented scientific principles and relevant problems for Portugal and HMS. This includes considering the production and distribution of new medical and health education content for different constituencies, namely the public at large and medical specialists, the advancement of biomedical research and graduate education programs for physicians.

## **2. The terms of a “quick assessment”**

HMS will undertake with Portugal an assessment of possible areas for collaboration, exploring areas of mutual interest for the development of the strategic areas and activities mentioned above. The assessment will start by a written critical analysis of existing education and research skills and infrastructure in Portugal, to be developed in a way to explore the potential for collaboration, and will involve visits between faculty/researchers at HMS and in Portugal during a **period up to 4 months (April - July 2007)**. These include workshops, seminars or other interactions to explore mutual intellectual interests. The goal will be to determine what desirable areas of collaboration are and what would be required to frame successful projects.

As part of this assessment, the Government of Portugal and HMS will also explore ways to structure a possible long-term collaboration including legal, governance, and institutional aspects. If agreed by both parties, the goal will be to develop a proposal for initiatives that can be considered as the basis for a 5 Year -Agreement.

## **2.1. Proposed activities (April-July 2007)**

### **2.1.1 Production and distribution of new medical contents**

The production and distribution of new medical and health education content for different constituencies, namely the public at large and designated medical specialties, should involve a consortium of medical schools and research laboratories in Portugal working together with HMS, in order to adapt existing materials and create new materials, with a particular focus on delivering the medical and health information in Portuguese. The infrastructure for information delivery will be managed in Portugal through the Portuguese Knowledge Society Agency, UMIC. Other entities to be involved in Portugal and at HMS should be identified and clearly assessed.

### **2.1.2 Advancement of biomedical research**

The establishment of “collaborations for biomedical research” should be assessed and the commitment of Portuguese institutions together with HMS counterparts discussed in detail. The goal will be to design a framework for collaborative research in selected areas in close collaboration with medical doctors and the involvement of Portuguese hospitals.

For this area, the assessment should consider the development of an advanced clinical research program, to be conducted according to the highest scientific demands, including publications in leading international peer reviewed journals, and in a way to facilitate strengthening Portuguese research institutions.

### **2.1.3 Preparation of main areas for advanced education for medical doctors**

Inspired by professional graduate programs at HMS, it is proposed to attempt preparing a set of degree and/or non-degree programs, aimed to train future medical doctors. The study to be conducted will include the analysis of the possibility that one to two researchers/teachers from HMS will be placed full time in Portugal to help developing each of these programs.

### **2.1.4 Institutional building, governance and institutional mechanisms**

The assessment should critically evaluate the possibility of launching a process of institutional building in Portugal aimed at creating with HMS a public-private collaboration to develop and deliver medical information and to educate individuals at all levels, including the public at large and different targeted medical specialties.

The assessment will involve analyzing ways to structure a collaboration including legal, governance, and institutional aspects:

- **Governance**

The institutional framework governing the HMS-Portugal collaboration should be discussed and assessed, namely in terms of other practices followed by HMS worldwide. In particular, the establishment of a “collaborations for biomedical research” and/or a private foundation should be carefully assessed and adequate whenever necessary, as well as its organization and structure;

- **Legal issues of property protection**

Legal issues associated with the HMS-Portugal collaboration, including intellectual property protection aspects, should be discussed and defined;

- **Continuous monitoring and evaluation**

The overall collaborative program, as well as specific tasks, is to be monitored and evaluated making use of an external peer-review committee. An overall biannual review will be planned to guide the development of the program, as well as its restructuring whenever necessary. In addition, the launching of new actions is subject to the analysis of the external committee.

### **2.1.5 Other potential instruments to be assessed for the medium-term**

The aim is to study the feasibility of expanding the areas for collaboration mentioned above to other emerging fields and areas of medical knowledge, as well as instruments for collaboration. The following instruments may be considered for the assessment exercise:

- Student exchange: a scheme to offer undergraduates in Portuguese institutions and HMS the opportunity to study at the other institution for 6 to 12 months. It may involve a program for internships of Portuguese and HMS students at leading American and Portuguese hospitals and research centers, in a way to promote new experiences to quality graduates;
- Research opportunities for students (undergraduate and postgraduate): to encourage students at Portuguese Institutions and HMS to step outside the classroom and engage in faculty research projects, respectively at HMS and at Portuguese Institutions;
- One-year post-graduate degree programs: expand the offerings of professional graduate programs, to be inspired in those at HMS in order to promote training of future medical doctors;
- Joint Ph.D. Program: develop a joint program at the Ph.D level, to be conducted according to the highest scientific and educational demands, bringing together key players in various Portuguese universities and research centers, that will work in close collaboration with colleagues at HMS;
- “Research Chairs”: a scheme for fellowships for HMS and Portuguese Professors to exchange experiences and teach and guide research, through visits from 6 to 12 months;
- Fellowships: practical training programs for 3-6 months duration in areas of medical education and research management, medical education and public relations in academic, clinical and commercial institutions;
- Curriculum Development: a scheme to sponsor projects that transfer successful course materials and faculty expertise from HMS to Portuguese institutions, and vice versa, or establish new courses to be taken at both;
- Executive Education: create an “Executive Development Series” of short courses open to executives in biomedical and healthcare industries and systems;
- Develop knowledge integrated communities: by expanding research programs to other areas, deepening knowledge generation processes and enlarging the network of Portuguese research groups working with researchers at HMS. The work to be developed in this area aims to foster projects through which universities, healthcare entities and firms can engage in research and development activities, both in house and through tight collaborations with the research system in Portugal and at HMS. They focus on new ideas in applied biomedical sciences and their relationship to other scientific, engineering and broader technologies. Attention should also be focused on:
  - Working in broad-based problems which require innovative solutions, or a better understanding, in order for policy recommendations to be suggested;
  - Choosing areas where comparison and knowledge sharing with the US reality may be of particular relevance to Portugal;
  - Promoting relationships with leading US and European companies, broadening the HMS-Portugal collaboration to international leaders and corporations;
  - Analyzing and attempting to solve the problems with research conducted according to the highest scientific demands, with publications in leading international peer reviewed journals;
- Develop joint research activities of public interest in a way to provide new and advanced knowledge for the **governance of public risks**, by involving researchers at HMS with those in Portuguese research centers and state laboratories;
- Develop biomedical science communications and public affairs capacity within medical faculties: public affairs and communications training workshops in Portugal; Writer/Journalist Fellowships for Portuguese science writers to work with their counterparts in the US and with the Office of Public Affairs at Harvard Medical School

and the leadership from the Association of American Medical Colleges and the establishment of an international communications network;

- Extend the activities above to biomedical **science and healthcare education for youngsters** in secondary schools by promoting the cooperation between schools and university research centers in Portugal and at HMS. Potential actions may include:
  - Supporting a national program for developing **new skills for secondary schools teachers**, namely in biomedical sciences and healthcare promotion;
  - Supporting a national **annual prize for collaborations** between secondary schools and research centers working cooperatively on biomedical and healthcare products;
  - Supporting and promoting a “**Technology-enabling Learning Center**” for disseminating ideas and tools for secondary schools through the internet;

### **3. Action Plan and Timing**

The objectives mentioned above require the establishment of an action plan. The parties' goals for the timing of the discussions and negotiation contemplated under this Technical Annex are as follows:

1. April-July 2007: Assessment of the potential areas of collaboration and the preparation and design of the potential terms of reference for a future contract;
2. May-July 2007: Discussion, preparation and design of governance system for a future contract;
3. May-July 2007: Discussion and design of legal issues for a future contract;.
4. July-August 2007: Drafting and negotiation of a proposed contract;
5. August 2007: signature of official contract and public presentation of detailed action plan.

### **4. Outcomes**

Before the end of the 4 month period specified for the assessment (and expected to occur before the end of August, as described in the proposed timeline above), HMS will submit to the Portuguese Government a report with the results of the work in the various topics described in 2.1 above, and including the following details:

- Preparation of potential areas for production and distribution of new medical contents;
- Assessment of other areas and programs for potential collaboration, including advanced education and research;
- Planning governance and institutional mechanisms.

The report should include the identification of the various consortia of Portuguese institutions and teams to be involved in each activity to be considered. It should also include a draft of the proposed contract and related technical annex for the expected long term collaboration to be established between the Government of Portugal and HMS. The parties will then discuss HMS's report and proposed draft contract with the goal of finalizing a mutually-acceptable contract by August 2007.

**Table 1: Portuguese Medicine Schools**

Medicine Schools	City	Webpage	Nr. Students 2005/06			Faculty (December 2005)		
			Undergraduate ("licenciatura")	Master	PhD	FTE PhD	FTE Master	Total FTE faculty
Universidade da Beira Interior - Escola de Ciências da Saúde	Covilhã	<a href="http://www.ubi.pt/faculdades/faculdade.php?fac=SA">http://www.ubi.pt/faculdades/faculdade.php?fac=SA</a>	337	14	9	18,4	2,8	21,2
Universidade de Coimbra - Faculdade de Medicina	Coimbra	<a href="http://www.fmed.uc.pt/home_files/index.php3">http://www.fmed.uc.pt/home_files/index.php3</a>	1391	38	36	103,7	16,5	120,2
Universidade de Lisboa - Faculdade de Medicina	Lisbon	<a href="http://www.fm.ul.pt/">http://www.fm.ul.pt/</a>	1544	79	162	104,2	6,1	110,3
Universidade do Minho - Escola de Ciências da Saúde	Braga	<a href="http://www.ecsaude.uminho.pt/">http://www.ecsaude.uminho.pt/</a>	272	0	35	12,5	0,0	12,5
Universidade do Porto - Faculdade de Medicina	Oporto	<a href="http://sigarra.up.pt/fmup/web_page.inicial">http://sigarra.up.pt/fmup/web_page.inicial</a>	1315	78	84	129,0	16,0	145,0
Universidade do Porto - Instituto de Ciências Biomédicas de Abel Salazar	Oporto	<a href="http://sigarra.up.pt/icbas/web_page.inicial">http://sigarra.up.pt/icbas/web_page.inicial</a>	852	107	241	111,3	0,0	111,3
Universidade Nova de Lisboa - Faculdade de Ciências Médicas*	Lisbon	<a href="http://www.fcm.unl.pt/">http://www.fcm.unl.pt/</a>	1190	0	3	56,8	8,8	65,6

Source: OCES (Observatório da Ciência e do Ensino Superior) and DGES (Direcção Geral do Ensino Superior)

\* Data excludes Instituto de Higiene e Medicina Tropical and its Associated Laboratory Centro de Malária e Outras Doenças Tropicais (CMDT)

FTE: Full Time Equivalent

**Table 2: Main Associate Laboratories with activities in the area of Health Sciences**

<b>Associated Laboratories</b>	<b>Host Institution</b>	<b>City</b>	<b>Webpage</b>	<b>Scientific Coordination</b>	<b>Researchers</b>	<b>Sum of eligible PhDs</b>	<b>Bolseiros (scholarship staff)</b>	<b>Employees</b>
Centro de Neurociências e Biologia Celular (CNC)	Universidade de Coimbra	Coimbra	<a href="http://www.uc.pt/cnc/">http://www.uc.pt/cnc/</a>	Catarina Resende de Oliveira	192	85	104	5
Instituto de Biologia Molecular e Celular (IBMC), including INEB	Universidade do Porto	Porto	<a href="http://www.ibmc.up.pt/">http://www.ibmc.up.pt/</a>	Alexandre Quintanilha	398	171	127	50
Instituto de Medicina Molecular (IMM)**	Universidade de Lisboa	Lisboa	<a href="http://www.imm.ul.pt/">http://www.imm.ul.pt/</a>	Maria do Carmo Fonseca	250	110	84	10
Instituto de Patologia e Imunologia Molecular da Universidade do Porto (IPATIMUP)	Universidade do Porto	Porto	<a href="http://www.ipatimup.pt/">http://www.ipatimup.pt/</a>	Manuel Sobrinho Simões	100	46	12	7
Instituto de Tecnologia Química e Biológica (ITQB), including IBET and IGC	Universidade Nova de Lisboa	Lisboa	<a href="http://www.itqb.unl.pt/">http://www.itqb.unl.pt/</a>	Miguel Teixeira	566	220	210	11

Source: FCT (Foundation for Science and Technology)

\*\* includes Centro de Biologia e Patologia Molecular (CEBIP)