

## Thirty Years of Postgraduation in Cardiology

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The concept of postgraduation refers to the amount of knowledge, formal and continually updated, acquired after the completion of a regular graduate program at a university or college. However, in order to better understand this term, it is necessary to make a distinction between a *lato sensu* postgraduate program and a *stricto sensu* postgraduate program. In the medical field, a *lato sensu* postgraduate program refers to the activities and courses that follow graduation from medical school, such as: rotation training, complementary speciality studies and medical residency. A *stricto sensu* postgraduate program, on the other hand, refers to the specific learning system a student undertakes after graduating from medical school. This program has broader and more in-depth scientific research objectives which are needed to prepare a physician for a career as an academic faculty member and researcher<sup>1</sup>.

According to these concepts, postgraduate training has become mandatory and it has spread to all disciplines, as a natural consequence of the extensive advancement in knowledge. Today, it is virtually impossible to undergo a complete and adequate training in the different areas within the limits of the graduate program.<sup>1</sup> Due to the overwhelming amount of knowledge in each subspecialty of medical science, and the increasing demand for medical specialization in each specific area, the standard graduate program can provide only basic knowledge of the medical profession<sup>2</sup>.

Therefore, the postgraduate program in the modern university, is the highest point of studies, a special system of courses required to comply with scientific research and advanced training requirements. Its main objective is to provide physicians with a deeper knowledge so they can attain high standards of competence and full scientific evolution, impossible to be attained within the limits of medical school. Moreover, the program aims to offer an appropriate environment and resources for scientific investigation and total involvement in research designing. It also aims to establish cultural ideals within the university<sup>3</sup>.

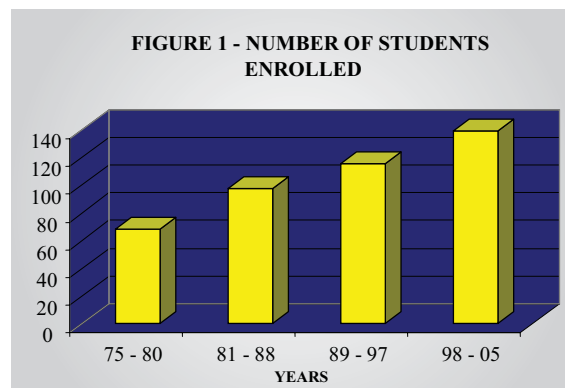
According to the above reasons, the postgraduate program in cardiology of the *Instituto do Coração da*

*Faculdade de Medicina da Universidade de São Paulo – USP* (InCor - Heart Institute of the University of São Paulo's Medical School) was created under *Conselho Federal de Educação's* Cesu Opinion no. 977/65 (CESU is the Higher Education Chamber of the Federal Council of Education), in the beginning of the 1970s. The first postgraduate classes, master's degree level, were implemented by then Professor Luiz V. Decourt, generating a standard of excellence that still constitutes the intellectual foundation of the institution today<sup>4</sup>. After this initial experience and under Professor Fulvio Pilleggi's orientation, the master's program was discontinued and the medical doctor's degree course was established in the 1980s, with a major in cardiology.

After more than 20 years, the program was modified both in its format and content, with structural changes made to the system of credits, the transmission of knowledge and also the qualification exam.

The postgraduate program continued to be improved within USP and also at InCor, and the transmission of knowledge at doctoral levels was also extended to non-medical health-care professionals. As a consequence, the degree of all postgraduates was changed to Doctor of Sciences. Figure no. 1 displays the linear advancement of our postgraduate program from its beginning.

Advancements were taking place on a continued basis. At the end of the 1990s, in an effort to initiate partnerships with other teaching and research-oriented institutions of the same high level of excellence, InCor joined the



*Instituto Dante Pazzanese de Cardiologia* (Dante Pazzanese Heart Institute) to exchange experiences. As most faculty members in this institution did not have an academic degree, at the beginning it was necessary to make adjustments so they would be able to enroll in the postgraduate programs in both institutions. However, once again, InCor led the way. Welcoming all faculty members who had teaching and research skills, InCor provided them with the resources to obtain their doctors' degrees and, for some of them, that of associate professors.

Therefore, InCor's postgraduate program has fulfilled one of the most important tasks for which it was created: to produce and export knowledge to other institutions. It is worth mentioning that the transfer of knowledge alone does not complete such noble task. The very environment to where knowledge is transferred must have within itself the spirit of scientific diversity, the questioning involved in research, as well as an innovative mentality.

Our postgraduate program has strived day and night to attain exactly this objective. Today, InCor has 144 full-time researchers with doctor's degrees, part of them exclusively dedicated to their research. In addition, it has 65 full-time researchers with associate professor degrees, (there is no other medical teaching and research institution in the cardiology field with this many large number of faculty members)<sup>5</sup>.

On the other hand, the postgraduate program at InCor aims not only to provide the researcher with a degree. It also encourages the growth of the degree holder within InCor, as well as within the originated institution, by offering postdoctoral programs. Therefore, out of the researchers who obtained the associate professor degree, four of them obtained also their full professor degree at other institutions.

Such achievements were based on the diversity of the research, the quality of the human factor, as well as the institution's capacity to provide the necessary tools for these objectives.

Chart I displays the set of current research lines, the number of studies published by InCor and the quality of the journal in which the research was published. The broad scope of such research indicates the magnitude of the program, which covers all different areas of knowledge related to cardiology. Moreover, by analyzing the development of the research projects undertaken by both institutions - *InCor and Instituto Dante Pazzanese de Cardiologia* - it is possible to see that the majority of the research focuses on the hemodynamics laboratory of the latter institution. Most probably, this production reflects the predominance of this service when compared to the others (Chart II).

Chart I - Thesis published – InCor / HCFMUSP

Line of research	Journals			
	Internacional		Nacional	
	QA	QB	QA	QB
Hospital administration			1	
Bioengineering	2			
Molecular biology	4	2	2	
Experimental cardiology	3	2	2	
Cardiomyopathy	6	3	11	
Congenital cardiopathies	3	2	6	
Image diagnostic	4	2	2	
Disorders in lipid metabolism			4	
Hemostatic disorders	4			
Heart valve diseases	1	1	8	1
Coronary artery disease	4	3	9	
Epidemiological studies		6	4	1
Electrophysiology and artificial cardiac stimulation	4		6	
Experimental physiology	5	3		
Exercise physiology	1	1	3	
Endothelial function	3	5	3	
Hemodynamics	5		3	
Congestive heart failure	1	3	5	
Immunology	3	2	1	
Nuclear medicine	1	3	3	
Graphic diagnostic methods	3	3	11	
Morphology and pathological anatomy	1	2	1	
Clinical therapeutics	3	5	2	
Cardiac transplant	3	1	2	

QA = *Qualis A*; QB = *Qualis B*

Chart II - Thesis published – Dante Pazzanese

Line of research	Journals			
	Internacional		Nacional	
	QA	QB	QA	QB
Hospital administration				
Bioengineering				
Molecular biology				
Experimental cardiology			1	
Cardiomyopathy				
Congenital cardiopathies				
Image diagnostic			1	
Disorders in lipid metabolism				
Hemostatic disorders				
Heart valve diseases			3	
Coronary artery disease			2	
Epidemiological studies			1	
Electrophysiology and artificial cardiac stimulation				
Experimental physiology				
Exercise physiology				
Endothelial function				
Hemodynamics	1		13	
Congestive heart failure				
Immunology		1		
Nuclear medicine				
Graphic diagnostic methods				
Morphology and pathological anatomy				
Clinical therapeutics				
Cardiac transplant				

QA= *Qualis A*; QB= *Qualis B*

Thus, although we have only begun and there is still much progress to be made, it is evident that the InCor postgraduate program is highly productive when compared to other medical institutions or even to several other institutions in the country, be in the generation of

the final product or the research process. This structure of postgraduate program can serve as the basis for several similar institutions. It cooperates with some Brazilian federal universities, promoting the development of scientific research in cardiology in several states of our country.

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