Training Program at Medical School of Chieti, Italy

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> **Received:** September 6, 2005
> **Accepted:** March 28, 2006

> **Croat Med J. 2006;47:485-90**

We describe the changes in medical training program offered at the G. D'Annunzio University Medical School in Chieti-Pescara, Italy, which took place over the last decade. The new curriculum differs from the previous one in several important aspects, including limited number of students admitted to school depending on the estimated needs for physicians, obligatory class attendance, student attendance in preclinical laboratories, formative credits as a measure of student activity, and elective subjects. Furthermore, all medical graduates are allowed to take the State exam to obtain the licence to practice, which was not the case previously. As a result of these major changes, a higher number of students graduates in due time. The changes made in the medical education curriculum in Italy have enabled Italian medical graduates to work in European Community Hospitals, because their medical degree is recognized in other EU countries. The main motif that drives the Medical School in Chieti-Pescara is the achievement of high quality in medical education and biomedical research by creating as strong a relationship between education and research as possible.

The Italian Ministry of Education, University, and Research (MIUR) has recently extensively revised the planning and contents of medical training in Italy. Teaching guidelines have been formulated and a reformed course, Medicine and Surgery Magisterial Degree, has been set up. The main teaching guidelines equally support both theoretical and practical medical knowledge and reflect a distinct level of autonomy granted to each medical school in Italy. Indeed, each medical school can partially adapt or modify specific areas within the training program according to profiles of physicians

they produce. In addition to the changes of curriculum, the reform has brought changes in state medical license examination, after which all profiles of physicians are awarded a Medical Doctor degree and are eligible for obtaining a Medical License. In this report, we describe the reformed medical training program adopted by the G. d'Annunzio University Medical School of Chieti, Italy.

Admission criteria

Admission to medical school depends on the score achieved on a National Board of Medicine test, a multiple choice test consisting of 30 questions from general culture, 20 questions from biology, 10 from mathematics, 10 from physics, and 10 from chemistry. The test takes place simultaneously at all Italian medical schools, so each applicant can apply at only one medical school. The admission to a medical school depends on the highest score obtained by applicants in each school and on the number of positions available. The number of positions is determined by the MIUR on the basis of the estimated need for physicians determined by the National Medical Order, a body that maintains a list of all practicing physicians in the country (practicing medicine is not possible by a physician not included in the list), and on the basis of capacity of each university medical school in the country including facilities (eg, number of classrooms and laboratories), joint teaching hospitals, and human resources involved in the teaching process. G. d'Annunzio Medical School in Chieti-Pescara enrolls 160 students from European Union (EU) countries. Ten extra positions are available for students from non-EU countries.

Teaching aims

The Decree No. 509/1999 (1) of the Italian Ministry of Education, University, and Research has provided teaching guidelines (2) and specifically addressed the new content and teaching methodology to be used in medical education in Italy. A special emphasis is put on new teaching models that provide a firm theoretical, practical, methodological, and cultural basis for future physicians, on their professional autonomy, holistic approach to the patient, and continuing medical education (3). All training tasks follow the main rule of "let students achieve what they need to serve patients' needs" (4).

In line with the objectives of the Association of the American Medical Colleges (5), the aims of the medical school training are grouped according to the skills students should acquire during their studies. These include (*a*) gaining skills and experience in recognizing and solving medical problems in terms of prevention, diagnosis, prognosis, and therapy; (*b*) ability to interview patients and relatives; (*c*) ability to collaborate with colleagues and superiors; and (*d*) computer literacy and ability to use PC, experience in self-oriented studying, and development of a critical approach to international scientific literature. Once enrolled, students are divided into small groups assigned to a tutor who meets with the group to discuss and solve possible problems on a regular basis.

Formative credits

Formative credits (FC) are the measure of the student's activity in all courses included in the Curriculum. An FC is defined as 25 hours of student activities, 10 of which include attending classes, seminars, and tutorials, and laboratory and hospital activities, whereas 15-17 hours are dedicated to self-oriented studies, such as going to a medical library, computer training, or doing homework. The Italian Medical Training Program (1) grants 360 FCs: 60 FCs for basic sciences; 180 FCs for preclinical and clinical sciences; 60 FCs for the development of practical and professional skills; 48 FCs for electives, foreign language, and final dissertation; 12 FCs for

the additional activities, such as courses in general pedagogy, informatics, economics, and so on, or courses vocationally oriented toward a particular biomedical field (Table 1). Each School of Medicine has a complete autonomy in deciding on the profile of these additional activities, as they are allowed to partially adapt or modify specific areas of medical education within the training program for up to 12 FC in order to produce particular profiles of medical professionals (Table 2). The number of FCs for each discipline as established by the Medical School Council takes into account general guidelines provided by the MIUR (1) to make medical training as uniform as possible at all Italian universities. Students get FCs for a particular discipline once they have attended the mandatory classes and have passed the exam. Every student is given two booklets, one where attendance of courses (both obligatory and electives), grades obtained on each exam, and the corresponding credits obtained for both obligatory and elective courses are noted, and the other where all practical activities performed by the student are described in detail.

Electives

Electives are taught like mandatory courses, ie, they include seminars, practical activities, and lectures. Electives are an additional and novel part of the medical curriculum. Students can choose the electives from a list of electives proposed by each docent and have to take them during the 6-year course of their medical studies. The content of elective activities should not overlap with the content of the regular mandatory courses, but rather provide students with more detailed knowledge of a particular area of medicine, health care, and biomedical research (Table 1) (5). Fifteen FC are assigned to electives and distributed as follows: 3 FC for each elective taken during the first three years and 2 FC for each elective taken during the last three years of studies. Similarly to credits for obligatory courses, credits for electives are obtained once the students have attended the classes and passed the exam.

Table 1. Main activities of the new medical training program at G. d'Annunzio University of Chieti-Pescara Medical School

Activity	Formative credits (FCs)*
Total FCs over the 6 years of medical program*	360
Regular basic ex cathedra activities	60
Regular preclinical and clinical ex cathedra activities	180
Electives, scientific English language, and thesis	48
Additional activities in general pedagogy, informatics, economics, and other fields	12
Practical activities and professional skills, and attendance in research laboratories and hospital wards	60

*1 FC = 25 h; basic grade = [(sum of all grades) × (11)]/3; final grade = basic grade + thesis grade.

Skills development

In the new medical training program, 60 FC are dedicated to practical and professional activities. MIUR determines the total number of these credits, while the School Council decides on their distribution over the 6 years of medical program. Practical activities are performed in research laboratories (3rd year) and hospital wards (4th-6th year). All practical activities of students are monitored by an appointed tutor responsible for their acquisition of skills and knowledge (Table 1).

Foreign language

The medical school curriculum also includes at least 9 FC for scientific English language. The main aim of this course is to help students acquire a basic command of scientific English to be able to read, understand, and discuss international scientific literature, which is published in English (Table 1).

Student course evaluation

At the end of each semester, students are asked to fill out a standard questionnaire evaluating the courses they have attended that semester. The results of such evaluations are processed by

the Evaluation Nucleus of the University, an interfaculty Committee designed to monitor constantly the quality of education. After the processing of the data, the Evaluation Nucleus informs the offices of the Dean of the School and the Rector of the University about the results of the evaluation. In addition, every teacher receives his or her own evaluation as a feedback from students. The evaluation results, both bad and good, are discussed with the Dean of the School to con-

Table 2. The number of formative credits (FCs) for each discipline at G. d'Annunzio University Medical School, Italy.

Disciplines	Year	CFU*	Disciplines	Year	CFU
Formative activities selected by students I	I	5	General surgery I	V	5
Biology and genetics (integrated course):	I		Radiology	V	4
applied biology		7	Orthopedics (integrated course):	V	
human genetics		3	locomotor diseases		1
Chemistry and preparatory to biochemistry (integrated course):	I		physiatrics and rehabilitation		1
chemistry		7	Nervous system diseases (integrated course):	V	
preparatory to biochemistry		3	neurology		4
Applied physics	I	9	neurosurgery		1
Scientific English I	I	4	Laboratory medicine (integrated course):	V	
Histology (integrated course):			clinical biochemistry and clinical molecular biology		1
histology		6	clinical pathology		3.5
embryology and molecular cytology		3	microbiology and clinical microbiology		1.5
Human anatomy (integrated course):	I	FQ†	Internal medicine and geriatrics (integrated course):	V	
skeleton, muscles, vessels, heart			internal and geriatric medicine		2.6
Medical scientific methodology (integrated course):	I		general and geriatric surgery		0.4
statistics		2	general nursing science		1
story of medicine		2	Odontostomatology	V	1
			Ophthalmology	V	2
Human anatomy (integrated course):	II		Oncology (integrated course):	V	
neuroanatomy		13	medical oncology		3
clinical anatomy		6	general surgery		1
Formative activities selected by students II	II	2	radiology and radiotherapy		1
Biochemistry (integrated course):			Systematic pathology III (integrated course):	V	
applied biochemistry		6	gastroenterology		2
human systematic biochemistry-enzymology		3	endocrinology		4
Physiology and biophysics I (integrated course):	II		nephrology		2
human physiology		6	general surgery		1
neurophysiology and biophysics		3	urology		2
Scientific English II	II	3	Systematic pathology IV (integrated course):	V	
Medical scientific methodology II	II	3	allergology and clinical immunology		2
Microbiology	II	7	dermatology		1
			rheumatology		1
Formative activities selected by students III	III	8	plastic surgery		1
Physiology and biophysics II (integrated course):	III		Psychiatry	V	4
physiology and human physiology		7	Practical training (5th year)	V	15
nutritional physiology		3			
Scientific English III	III	2	General surgery II	VI	7
Medical scientific methodology III (integrated course):	III		Emergencies (integrated course):	VI	
clinical methodology		5	medical emergencies		1
surgical methodology		2	surgical emergencies and first aid		2
epidemiological methodology		2	anesthesiology, intensive care and therapy		2
Pathology and general physiopathology	III	20	Gynecology and obstetrics (integrated course):	VI	
Practical training (3rd year)	III	12	gynecology and obstetrics		4
			medical genetics		1
Pathology	IV	8	Public health – medicine of communities (integrated course):	VI	
Pharmacology	IV	12	general and applied medicine		4
Otorhinolaryngology	IV	4	business economics		1
Systematic pathology I (integrated course):	IV		Internal medicine	VI	7
respiratory system diseases		3	Forensic and laboratory medicine (integrated course):	VI	
cardiovascular diseases		3	forensic medicine		2
thoracic surgery		1	laboratory medicine		3
vascular surgery		1	Pediatrics (integrated course):	VI	
cardiac surgery		1	pediatric surgery		1
Systematic pathology II (integrated course):	IV		general and specialized pediatrics		4
Hematology		2	Degree thesis	VI	15
Infective diseases		5	Practical training (6th year)	VI	21
Practical training (4th year)	IV	12			

*CFU – University formative credits (achieved only when the student has passed the exam).
†FQ – attendance; portion of the program to be attended without an immediate exam (e.g., human anatomy is taught over two years and the exam takes place at the end of the course).

firm or modify programs and contents of the activities of a particular course.

Graduation

The final step of the medical education program is graduation. During the graduation ceremony, all senior students present and defend their Thesis based on a research project they usually start at the fourth or fifth year of the studies. In their research work and thesis development, students are supervised by mentors and receive 15 FCs for the work done. The scientific value and quality of the presentation contribute to the final graduation grade (minimum 66 and maximum 110 points). Thesis is also graded on a scale from 0 to 10 by a Commission consisting of 11 docents appointed for examining students during the Graduation Ceremony. The grade received for the Thesis may influence the final grade, which is calculated as an average grade from all grades obtained on exams included in the program (Table 1).

MD license exam

After graduation, all graduates take a State exam aimed at evaluating both their practical and theoretical knowledge of medicine. Graduates who pass the exam are issued MD licenses and allowed to practice medicine. The State exam takes place twice a year. The practical part of the exam takes place at the departments of medicine and surgery and in General Practitioner's surgery and lasts three months. Graduates spend a month at each department, where different Appointed Evaluators monitor and evaluate their practical knowledge and skills on a scale from 0 to 30. The minimum score the graduate has to receive for each practical activity is 18 in order to pass. The graduate is allowed to take the theoretical part of the State exam (a multiple-choice test) only if he or she has received a minimum total grade of 60 from the practical activities at three departments. Those who do not achieve the minimum score, have to repeat the complete practical part of the exam. The theoretical part of the State exam is a multiple-choice test, which includes two sets of 90 questions. Students have to answer correctly to at least 60 questions from each set to pass the exam.

Table 3. Major differences between the former and the new medical training program G. d'Annunzio University of Chieti-Pescara Medical School

	Medical training program	
Characteristic	former	new
No. of admissions	unlimited	limited for each year
Class attendance	voluntary	obligatory (75% of the classes)
Preclinical laboratory attendance	not required	obligatory
Student activity measurement	none	formative credits
Student choice of course	none	electives

Major modifications of medical training model

Major changes have been done in the former medical training model since the mid-1980s (Table 3). First, the number of admitted students is determined anew each year, depending on the needs, as opposed to the unlimited number of admissions in the former model. Second, class attendance at all courses included in the curriculum is obligatory. Students have to attend to at least 75% of the classes of each course to be allowed to take the exam, whereas in the former training model, the class attendance was not obligatory. The attendance is electronically monitored via personal electronic cards provided to each student by the Medical School Administration office. Third, the new training model requires student attendance in preclinical laboratories at the third year of medical studies, while clinical practical attendance starts from the fourth year. In the former program, practical activities were distributed over the fifth and sixth year, and attendance in laboratories was not included. The fourth novelty of the new medical training program is the introduction of formative credits. In the former training program credits were not assigned, except for practical activities during the fifth and sixth year of the stud-

Figure 1. Center of Excellence on Aging, the major research center at the "G. d'Annunzio" University of Chieti-Pescara, Italy.

Figure 2. Clinical Research Center at the Center of Excellence on Aging, where different clinical and translational studies are performed.

ies. Finally, there is the introduction of electives, which were not offered within the former program. As a result of these major changes, a higher number of students graduates in due time than before, although the precise estimate of the difference in these numbers is not possible because of the overlap between the curricula.

Over the last decade, G. d'Annunzio University of Chieti-Pescara Medical School has invested a lot of effort in developing structures and projects related to basic, translational, and clinical research. Such efforts have led to the creation of the Center of Excellence on Aging, a research center appointed by the United Nations (UN), where undergraduate and postgraduate students, tutored by different research teams from G. d'Annunzio Medical School, have a chance to gain experience in different fields of biomedical research (Figure 1). There are many laboratories equipped with a wide range of highly sophisticated instruments, including electron and confocal microscopy, mass spectrometry, flow cytometry, nuclear magnetic resonance scanner, reverse transcriptase-polymerase chain reaction instrument, and so on. Furthermore, there is a Clinical Research Center where different clinical and translational studies are performed (Figure 2).

The changes made in the medical education curriculum in Italy have enabled Italian medical graduates to work in European Community Hospitals, because their medical degree is recognized in other EU countries. The main motif that drives the Medical School in Chieti-Pescara is the achievement of high quality in medical education and biomedical research by creating as strong a relationship between education and research as possible. The beneficial results of this approach have already been achieved, as evidenced by the first Italian Research Evaluation Exercise (*http://www.civr.it/*) for 2001-2003 research activity that ranked the Medical School of G. d'Annunzio University of Chieti-Pescara among the top-quality small and medium universities of Italy.

References

1 Coggi G, Curtoni SE, Danieli G, Gensini GF, Realdi G, Scandellari C, et al. Guidelines of curriculum reform in Italian medical schools [in Italian]. Ancona: Italian Medical Dean Permanent Conference Notebooks; 1996.

2 Lechi A. Integration among the biomedical courses inside the medical training program. A preliminary analysis. Med Chir. 2005;27:1024-6.

3 Italian Medical Dean Permanent Conference Agreement on Medical Education [in Italian]. Medicine. 2000;8:200-3.

4 Bligh J. Medical teacher and evidence. Med Educ. 2000;34:162-3. Medline:10733696

5 Borgia G. Guidelines for the definition of formative activities selected by students (Electives). Med Chir. 2002;19:720-2.