Educational and labour wastage of doctors in Mexico. Towards the construction of a common methodology

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Abstract

Background, The paper addresses the problem of the wastage of a qualified labor force both in the training stage and in the stage of labour market incorporation in Mexico. There is an initial source of wastage which happens during the education process. The second source of wastage takes place when graduates look for job positions in the labour market. **Methods.** A search of secondary sources was carried out, mainly in the Statistical Yearbooks of the National Association of Universities and Higher Education Institutions (ANUIES in Spanish). 2000 Population Census was used to estimate the different sources of labour market wastage. Formulas proposed by Frenk et. al. (1992 and 1999) were modified to estimate educational and labour wastage rates. **Results.** From every 1,000 students that started the medical training in 1996, by 2000 a little more than 20% were not able to finish the training. Furthermore, from every 1,000 graduates, 31% were not able to find a paid position in the labour market putting in practice the abilities and capacities obtained at school. There are important differences between generalists and specialists and men and women. Specialists and men have lower wastage rates than generalists and women. A large percentage of women dedicate exclusive time to household duties wasting, in labour terms, their capacity to be involved in the production of formal health services. **Conclusions**. Women are becoming majority in most medical schools but their participation in the labour market is not reflecting the same trend. Among men, policies should be addressed to incorporate to those contingents of doctors that are working in areas different to health. Among women, specific policies should target those women who are fully dedicated to household activities in order to open the possibility of combining a paid job with household for those who are willing to do so. Reducing wastage both at the educational and labour dimensions should improve the capacity of social investment to increase the capacity of the health system as a whole to provide services particularly to those populations who are more in need.

Background

The medical manpower has been studied from diverse points of view using a wide variety of methodologies and with distinct levels of depth. There are investigations that approach the subject from the formal education standpoint, the problems encountered in the updating of knowledge, the number of human resources available, their distribution and the proportion of resources according to population. There are also inquiries into the working conditions, ethical codes and productivity, among other topics.

In a first revision of the available specialized literature, very few studies were found dealing in a systematic manner with the incapacity of individuals trained in the health field to put into practice the acquired knowledge for the production of services[1].

In many countries a supply of doctors is being generated, without any planning and, very frequently without, any regulation at all. Doctors are being educated in schools that provide them with a professional degree; in spite of this, they will face difficulties to find a job. This problem is related to the wastage of a qualified labor force, and is also related to a specific market configuration. Nonetheless, there is also another source of wastage which happens during the education process itself that is reflected in the demand for medical education, in the number of drop outs and in the rates of final efficiency at a national level as well as in the organization and location of medical schools.

Apart from the signs mentioned above, the problem of scholar wastage has various facets that are not easy to identify, study and solve. One of these, perhaps the most important, is the enormous economic cost that it represents for a country to spend in an inconclusive education process that does not allow the medical students that have dropped out to practice at some extent their acquired knowledge. They represent useless expenses; and wasted economic resources that no nation can have the luxury of minimizing, particularly those in the developing world.

Therefore, human resources are in a constant dynamics between the supply and the requirements of institutions, all of which cause breakdowns that are expressed as labor wastage; that is to say, time and capabilities that graduate doctors do not put in practice either directly or indirectly for the production of health services.

One of the central aims of the present study is to carry out an initial exploration of the problem and to set forth methods to study it in depth. The paper puts emphasis in the participation of women as it has been made evident that their enrolment to medical schools grew importantly in the last 15 years but still engaging the labour market in different conditions than men[2]. The contents of the study are divided in the following way: after the introduction, the exposition of its objectives is set forth. Immediately after this, a brief framework follows where the main concepts used both for the educational and the labor fields are defined. The next section is dedicated to the first results obtained for the two aforementioned fields. The article ends with the presentation of the main conclusions of the study that can be useful in the research and analysis of the educational and labor wastage among health personnel, based on the use of common methodology that can be applied in different countries.

Objectives

The paper pursues the following objectives:

a) To carry out a general identification of the problem doctors wastage during their education process and in the labor market. b) To begin the construction of a methodology that allows for the study of the problem in Mexico and, that could be replicated in other countries. c) To contribute to the discussion of the wastage of human resources in the health sector at the national and international levels; d) Following the initial diagnosis about the wastage found in medical personnel, to use the variable sex to explore a relevant dimension of the problem.

Conceptual framework

The purpose of this section is to establish a series of definitions that will integrate the foundations for the presentation of results based on the information gathered. Due to the particularities of each field and for the sake of the exposition, the educational and labor market subjects are addressed separately.

Wastage during education

There is a large number of studies in Mexico that have dealt with the problems of school drop outs, final efficiency, repetition, exclusion, effectiveness and efficiency of training institutions. However, both at national and international levels little has been done to study the problem of specific professions (such as medicine) in a comprehensive way so as to integrate the details of the causes and effects of the wastage of human and economic resources during the educational process[3].

Data presented in following sections was obtained mainly from the National Association of Universities and Higher Education Institution (ANUIES in Spanish) which is a non-governmental agency that for more than 35 years has been responsible of compiling and systematizing information provided by 138 institutions both public and private[4]. This steadiness in the process of data collection, makes highly trustable the information obtained from this source.

The following concepts have been taken from some of the above mentioned studies:

Global attrition. This is a condition experienced by a group of persons that do not comply with the timelines and do not complete the corresponding stages of the plan of studies of an institution in a specific year[5]. The student voluntarily or involuntarily interrupts his/her studies in a definite manner without having totally covered the study plan of his/her respective career. Interruption is not an spontaneous act as there are a series of family, social, and institutional factors determining its causality[6]. Among the main causes of definite interruption of studies are family approval, economic conditions, study habits, inadequate selection of career, motivation, age, civil status, and employment[7].

Graduates. Students that have completed the total number of credits or and procedures (eg. thesis) included in the plan of studies and that have received a degree certificate from an university of higher education institution.

Wastage in the labour market

There are different factors affecting the labor market that are difficult to identify and much more to quantify. The issue of unemployment and its varied manifestations in shape and time make it a somewhat polemic topic when dealing with secular variations. Although on the international level parameters to measure unemployment have been established, this has not enabled to count on timely information that might be comparable among countries and even among regions and states within a country. In the case of professional groups, quantifying unemployment is not enough to understand labour market unbalances.

In the case of Mexico, the National Institute of Statistics, Geography and Informatics - INEGI - carries out two important data collections reporting results on various aspects related to employment at the national level: every ten years the General Census on Population and Housing is carried out and every three months a National Survey of Urban Employment is collected.

Periodically INEGI reports a series of statistics about the employment situation across the country; one of these is the rate of open unemployment at the national level. However, this rate alone is not the most adequate indicator to establish the dimension of labor wastage, among other reasons because it is a macro indicator that shadows other levels of participation in the labour market that could be considered inadequate for an individual with professional training.

As part of the conceptual and methodological definitions of the present work we propose to estimate the rate of wastage among doctors which includes all conditions in which a graduate from a medical school do not put in practice the knowledge obtained in the school in the production of health services. Some conditions such as unemployment are easy to be considered as part of wastage but some others (eg. those individuals who work less than 20 hours a week) are difficult to be considered in such condition. We quantify wastage through the number of individuals that fall in categories that do not appropriately match their training with their labour activity.

For the purpose of this study, it is convenient to take into consideration the following concepts[8]:

Employment. This is the condition of graduates that work as general practitioners, or as students of a specialization degree which undertake full–time clinical practice at a hospital. It also includes specialist doctors with a labour position in health institutions according to the degree obtained. The category also comprises those doctors that are dedicated to research and/or teaching activities and those in managerial positions in health institutions.

Unemployment. Individuals without employment including those who are waiting a reply about a job application (and they are not looking for any other job elsewhere), those that are discouraged to continue looking for a job and those who are actively seeking one.

Underemployment. These are individuals who have finished their studies and carry out activities completely different to their training, which take place outside the health sector or in activities that are not directly related to the production of health services.

Household activities. Individuals that do not have a paid work because they are dedicated full time to household activities

Inactive not available. Group of individuals who are retired, pensioned or suffer a permanent disability.

Labour wastage. Qualified human resources who do not practice activities related to their education because they are not employed (including those dedicated to household activities) or because they carry out activities that do not correspond to their training (Figure 1 and Table 1 around here).

4. Methods

In respect to the wastage during the years of study, the *Anuario Estadístico* (Annual Statistical Book) published by ANUIES between 1976 and 2001, was used as the main source of information. It was necessary to carry out our own calculations to define enrolment, incoming students, graduates and abandonment per group pertaining to a same whole period of study, *with a cohort* of five years each one.

Because there is no information disaggregated by sex of the incoming students, the drop outs and the graduates for the years previous to 1996, it was only possible to calculate rates of abandonment and final efficiency for two graduating classes.

To calculate the wastage in the education of the medical students, the following formulas were established:

$$\frac{\text{Total drop outs per graduating cohort}}{\text{Total incoming students in the cohort}} = \text{global rate of attrition}$$

As to the wastage in the labour market, the data base of the *XII Censo General de Población y Vivienda, 2000*[9] (XII General Census of the Population and Housing, 2000) was explored in looking for information about the following variables: sex, age, education and persons who had studied the career of medicine. Limited information about specialists was available in the Census database. Thus, we decided to focus our exercise on generalists (In Mexico, generalists are those graduated from medical schools which have not obtained a specialist degree.).

As to the latter ones, census codes were intersected to find out their activity status (their own or far from their education) and occupation (making explicit if they were dedicated to household activities), and whether they were unemployed, retired, pensioned or permanently disabled.

Codes used to classify activity area were taken from the North American Industry Classification System (NAICS) used by the 2000 National Census of Population and Housing. Category 6 corresponds to health services (See table in Annex). Codes used to classify educational level correspond to a classification developed by the National Institute of Statistics, Geography and Informatics.

Once this information was processed, the following formulas were elaborated. To calculate the rate of employment among persons who studied medicine:

$$\frac{\text{Employed}}{\text{Total of graduates – those studying - inactive}} = \text{rate of employment}$$

For the rate of unemployment, the formula used was:

$$\frac{\text{Unemployed + dedicated to household activities}}{\text{Total of graduates – those studying - inactive}} = \text{rate of unemployment}$$

And for the rate of wastage it was established that:

$$\frac{\text{Unemployed + household + other jobs}}{\text{Total of graduates – those studying - inactive}} = \text{rate of wastage}$$

Results and discussion

Wastage during education

In general, enrolment in the career of medicine in Mexico has shown a non lineal behavior in the last 25 years. It was at the beginning of the nineties decade when it showed a trend to drop, mainly because of the official policy started in the mind 1980s that looked for a way to halt the high demand that was evident at that time. However on average enrolment has increased in 22.8% during the period of 1990 – 2001 (Table 2 around here).

Throughout the above mentioned period, the proportional participation of women maintained a constant growth. According to the annual statistical book from ANUIES, the percentage of women enrolled in medicine jumped from 43.9% in 1990 to 50.4% in the year 2001. It was in the year 1999 when women enrolled outnumbered men for the first time by 1, 038 students (Figure 2 around here).

An indicator that allows us to observe the wastage is the rate of final efficiency in the career of medicine at the national level. In the same manner, the series of graduating classes with the same cohort was constructed and it was seen that the highest final efficiency was achieved in the graduating class of 1985 and that of 1995 with a rate of 834.9 and 804.3, respectively. After ten years a second highest rate was reached during the period of 1995 – 1999 (Figures 3 and 4 around here).

Although it is true that the final efficiency varies from one medical school to another (which also would be important to investigate more deeply), there is no doubt that at the national level, the registered rates are worrisome, given the amount of medical students that do not conclude their studies.

On the other hand, the proportion of incoming students in relation to the total graduates of medicine in Mexico during the period of 1997 -2001 was calculated. The result for the first year was 21.9 and for the second it was 21.8. However in certain periods the proportion decreased (13.9 and 14.0 in 1986 and 1982) and in others increased, as in the years of 1997 and 1998 with 23.6 and 23.3, respectively.

The outstandingly high rate of attrition of 1990-1994 may be well related to the economic crisis that Mexico was facing by the end of the period which made very difficult to students and their families to afford attending the medical school. The rate of efficiency shown in figure 3 is mirroring the capacity of schools, students and families to reduce the volume of drop outs. [10]

Figure 4 presents another way to express wastage in medical education. The proportion of drop outs in the period 1990 – 1994 is the highest of all periods (50%). The volume of drop outs in that period is similar to those of 1977-1981 and 1978-1982 but the volume of new enrolments in those two periods was 40% higher.

As can been seen in Table 3, the information about drop outs, graduates and final efficiency does not show any significant differences if the sex variable is included. However, given that it was only possible to obtain information by sex for two classes pertaining to the same period of study, it would be difficult to reach any final conclusion in this respect. (Table 3 around here)

Upon constructing series of data by year, it was found that women have moved from representing 19% of the graduate students in 1970 to almost half of the graduate students in the year 2001 (49.3%). Since 1996, the number of women's medical graduates has been very similar to that of men. Something similar occurs when comparing the information about incoming students and drop outs (Table 4 around here). The number of graduate students who received their degree has not shown big changes in the recent years: in 1996, 45.9% were women, a figure that went to 49.3% in the year 2001. (Figure 5 around here).

Wastage in the labour market

Out the total number of general physicians and specialist in 2000, 58% were working in medical care and 13% were studying. Focusing through gender perspective, 5% of the group of men was not working and 8% of the women were inactive, while the percentage of men and women working in medicine was 63% and 49%, respectively; that is to say, there was a difference of 14 points in favor of the number of men employed.

Of the population with education in general medicine that was dedicated to household activities, only 1% was men while 12% were women. Another piece of information that stands out is the one regarding the personnel who are inactive and not available; in fact, there are more men than women as such, which can indicate that there are fewer women retired and pensioned[11] (Table 5 around here).

Based on the definitions set forth in the framework for this work and the formulas set out in the methodology section, the following results for the total of the medical personnel were obtained.

After repeating the same operations, but taking into account the variable sex, the results obtained were the following (Tables 6, 7 and 8 around here).

Discussion

- The highest levels of medical unemployment and labour wastage in Mexico are registered in urban areas[12]. It would be convenient that starting from medical schools, students would be sensitized about the problem and the need to move to not saturated areas. On the other hand, health policy should strengthen incentives for doctors to move to underserved areas including higher payments and possibilities of further training for those doctors that show readiness to take that option.

- Results presented can be reproduced in other countries if the Population Census database is available. WHO should encourage countries to estimate medical (and other occupational groups) wastage rates in order to start finding ways to reduce this phenomenon and to make the most of social and private investments[13, 14].

- To encourage the link and interaction between training and health services institutions with the aim of helping a better planning process according to country-specific characteristics. It would be convenient to revise the Mexican case where an Inter-institutional Commission for the Training of Human Resources for Health, an entity created by highest educational and health authorities to plan the supply, demand and distribution of human resources for health in the country, has been working almost 30 years.

- The wastage of resources during the education of medical students is significant as was shown in the results. This problem should be studied in detail enabling us to arrive at an estimation of the economic cost that this presents at the individual, family and social level.

- Top decision - making levels of the health system should be supporting the design and performance of studies which allow understanding in detail the issues of labour wastage in order to produce policy recommendations that stress the need of a wide and coordinated institutional participation[15].

- The methodology followed to calculate the wastage in education as well as in the labor market showed to be adequate to support these kinds of tests. Then, based on the information from population census and the management of similar variables, it would be possible to replicate this method in other countries, trying to carry out comparative and complementary studies that allow us to know the problem in more detail and to assist in the formulation of alternative policies within the health sector.

- Such methodology can be applied without further difficulties in the exploration of the situation that prevails in the development and labor conditions of other occupational categories such as nursing and dentistry.

Conclusions

- Although it can be said that the assessment of the phenomenon can be made with more accuracy if data is available, it can be claimed that in Mexico the wastage of human resources in the health sector is a major problem. In the year 2000, from every 1000 enrolled students 310 did not finished the training. This represents an important source of wastage of human resources.

- The wastage of highly qualified manpower without a doubt has a negative effect on the economy of any country. Governments and families invest huge amounts of material and financial resources to train professionals who cannot be placed on the labour market and as such cannot carry out the functions that correspond to a training that took long periods of time[16]

- By the end of the 1990s out of every 1,000 enrolled medical students, 720 finish the training and out of 1,000 doctors available in the labour market, only 58% find a paid employment to put in practice the abilities obtained in the training stage.

- As part of the problem, the experience which individuals have to face to fully incorporate into the labour market as well as the barriers and opportunities to get a job have to be taken into account. Finally, health systems, including their educational components, have to look for ways to reduce the wastage in order to increase the efficiency of the system as a whole, and this should be considered as a social imperative.

- Unemployment and the rate of wastage among women are very much higher than the one presented for men[17]. This summarizes an unequitable labour situation which is added to a series of disadvantages that are related to the male-centered social structure that is prevalent in Mexico; for example, in general terms men receive higher incomes for doing the same labour as women, and the administrative positions are usually assigned to them[18].

- It is clear that doctor's wastage is part of a crude paradox that does not allow millions of citizens to have ready access to professional care. In remote regions of the country doctors are still lacking. Information of one of the poorest states is quite eloquent. In Chiapas 22.94% of the population is illiterate (9.46% is the national average); 29.99% have not access to potable water (11.22% national average); 40.9% have dirty soil floor in their houses (14.79% national average); the availability of doctors is 0.76 per one thousand inhabitants (11.5 per thousand national average)[19].

- In Latin America and in Mexico, the wastage of human resources in the health sector is a problem that has not been studied deeply and to which no institutional answers have been found.

Competing interests:

None declared

Author's contribution:

Gustavo Nigenda. Designed the original idea of the paper. Wrote some sections of the paper, generated the conclusions and recommendations, and corrected all the contents.
José Arturo Ruiz. Wrote some sections of the paper and generated the conclusions and recommendations.
Rosa Bejarano. Wrote some sections of the paper, compiled the information and generated tables and graphs.

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Figure legends

Figures 1,2,3,4,5

Figure 1. Labour market participation categories

Categories used to describe the occupational situation of graduate from medical schools are shown.

Figure 2. Total enrolment in the career of medicine by sex, 1990-2001

Throughout the above mentioned period, the proportional participation of women maintained a constant growth. According to the annual statistical book from ANUIES, the percentage of women enrolled in medicine jumped from 43.9% in 1990 to 50.4% in the year 2001. It was in the year 1999 when women enrolled outnumbered men for the first time by 1, 038 students.

Figure 3. Global rate of attrition (GRA) in medicine by group pertaining to the same period of study, 1977-2001

To calculate the rate of attrition of the medical career, a series for each graduating group from the first admission in 1997 up to the graduating class 1997 – 2001 was constructed. Having the complete series it could be established that it was in the period of 1985-1989 where the lowest level of drop outs was found, with a rate of 165.0 per thousand students, while the highest level was registered 1990-1994 class, with a rate of 493.5.

Figure 4. Incoming students and attrition by cohort, 1977-2001

An indicator that allows us to observe the wastage is the rate of final efficiency in the career of medicine at the national level. In the same manner, the series of graduating classes with the same cohort was constructed and it was seen that the highest final efficiency was achieved in the graduating class of 1985 and that of 1995 with a rate of 834.9 and 804.3, respectively. After ten years a second highest rate was reached during the period of 1995 – 1999.

Figure 5. Trajectories from medical schools to labour market

The diagram shows that the total number of doctors enrolled at medical schools can follow two routes; the first is that students obtain their grade, the second that students drop out or do not finish the procedures to graduate. Once in the labor market, graduate can be divided in two sub-groups; those who are ready to be immediately employed and those who are not. In turn, those who are ready can be:

employed, unemployed, under-employed and dedicated to household activities. Those who are not ready to be immediately employed are divided in: students and inactive.

A proportion of the initially enrolled will become the total drop out

Table legends

Tables 1,2,3,4,5,6,7,8

Table 1. Sources of training and labour wastage.

Categories used to estimate labour wastage are: unemployment, household activities, y other job (working in activities foreign to the field of training).
Categories used to estimate wastage in training are: attrition and non-graduate

Table 2. Total Enrolments. Medical Schools in Mexico, 1990 – 2001

In general, enrolment in the career of medicine in Mexico has shown a non lineal behavior in the last 25 years. It was at the beginning of the nineties decade when it showed dropping trend, mainly because of the official policy started in the mid-1980s that looked for a way to halt the high demand that was evident at that time. However on average enrolment has increased in 22.8% during the 1990 – 2001 period.

Table 3. Global rates of attrition and final efficiency of the medical graduates per thousand students by sex and groups pertaining to the 1996-2000 and 1997-2001 periods.

The information about drop outs, graduates and final efficiency does not show any significant differences if sex is included. However, given that it was only possible to obtain information by sex for two classes pertaining to the same period of study, it would be difficult to reach any final conclusion in this respect.

Table 4. Incoming students, drop outs and graduate students in the medical career by year and sex, 1996 -2002

Since 1996, the number or women's medical graduate has been very similar to that of men. Something similar occurs when comparing the information about incoming students and drop outs. The number of graduate students who received their degree has not shown big changes in recent years: in 1996, 45.9% were women to 49.3% in the year 2001

Table 5. Occupational status of physicians by sex, 2000

Of the population with education in general medicine that was dedicated to household activities, only 1% was men while 12% were women. Another piece of information that stands out is the one regarding the personnel who are inactive and not available; in fact, there are more men than women as such, which can indicate that there are fewer women retired and pensioned.

Table 6. Rate of employment, unemployment and wastage, 2000

To estimate the rate of employment, the following categories were used: total of employed divided by the total number of doctors minus students and inactive. For the case of unemployment the following formula was used: unemployment plus household divided by employed plus other jobs plus underemployed. For wastage, the formula is the following: unemployed plus household plus other jobs divided by the total number of doctors minus students and inactive.

Table 7. Rate of employment in health sector, employed in non-health activities and studying, 2000

Data used to estimate the rate of employment within the health sector are the following: the total number of employed divided by the total number of doctors minus the inactive. For students the formula used was: total number of students divided by the total number of doctors minus inactive. To estimate the number of doctors working outside the health sector we used the following formula: other jobs outside the health sector divided by the total number of doctors minus inactive.

Table 8. Rates of labour participation (x thousand doctors) by sex, 2000

To estimate the rates of labor participation between men and women, both groups we separated. Formulas were estimated in the same way as for the total population.

FIGURES

Figure 1. Labour market participation categories

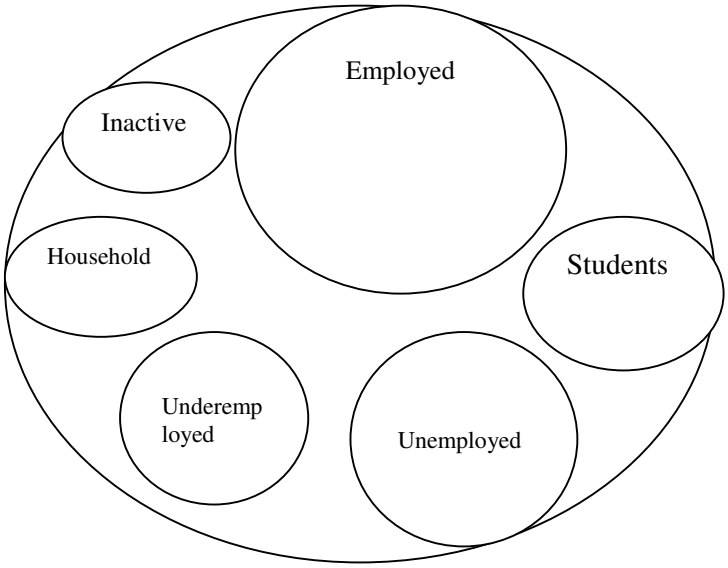
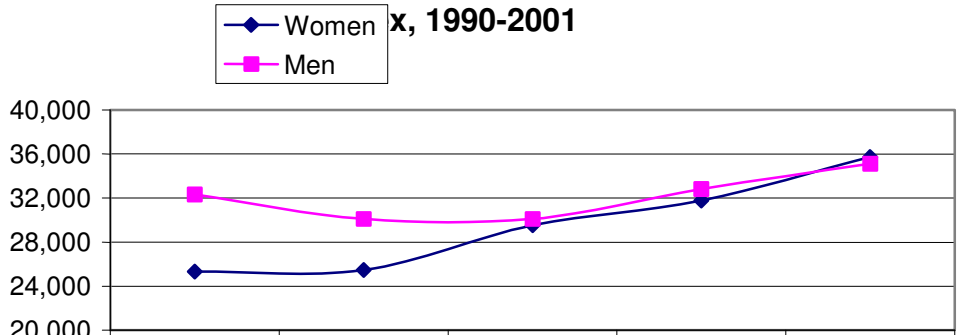


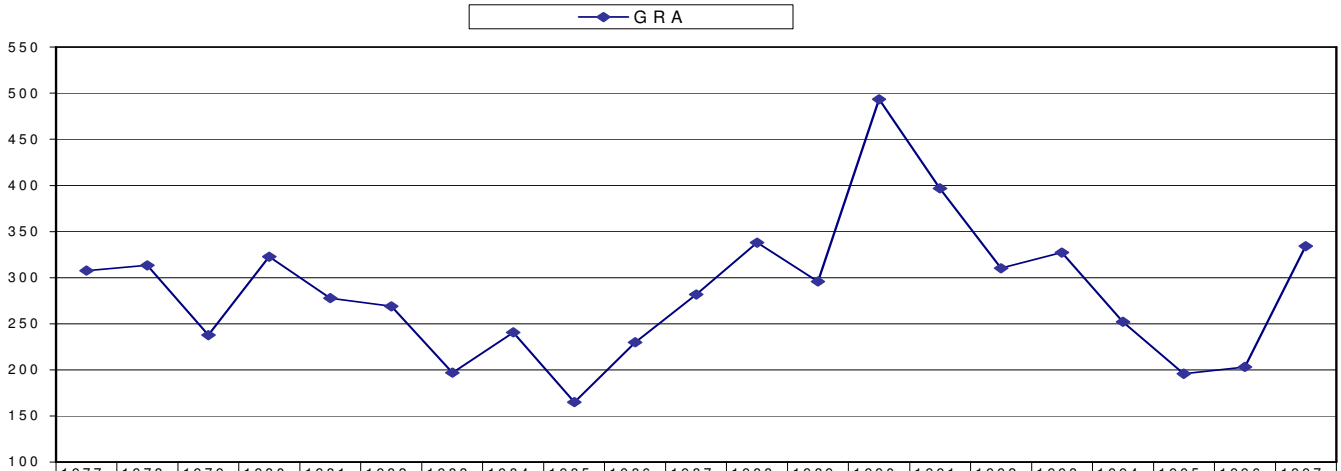
Figure 2. Total enrolment in the career of medicine by sex, 1990-2001



	1990	1993	1996	1999	2001
Women	25,337	25,479	29,536	31,778	35,715
Men	32,330	30,112	30,109	32,816	35,115

Source: ANUIES, *Anuarios estadísticos, 1990-2001*

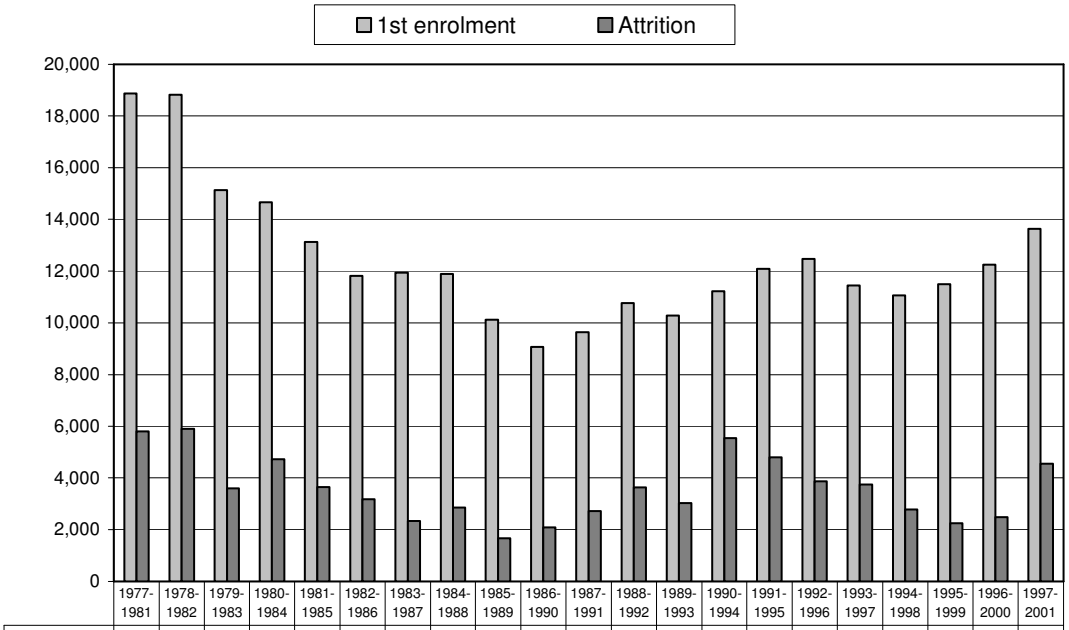
Figure 3. Global rate of attrition (GRA) in medicine by group pertaining to the same period of study, 1977-2001



	1977-1981	1978-1982	1979-1983	1980-1984	1981-1985	1982-1986	1983-1987	1984-1988	1985-1989	1986-1990	1987-1991	1988-1992	1989-1993	1990-1994	1991-1995	1992-1996	1993-1997	1994-1998	1995-1999	1996-2000	1997-2001
GRA	307.5	313.4	237.8	322.7	277.7	268.9	196.8	240.7	165.0	229.8	281.7	338.0	295.7	493.5	396.8	310.2	327.3	251.9	195.7	203.2	334.2

Source: ANUIES, *Anuario estadístico, 1977-2001*

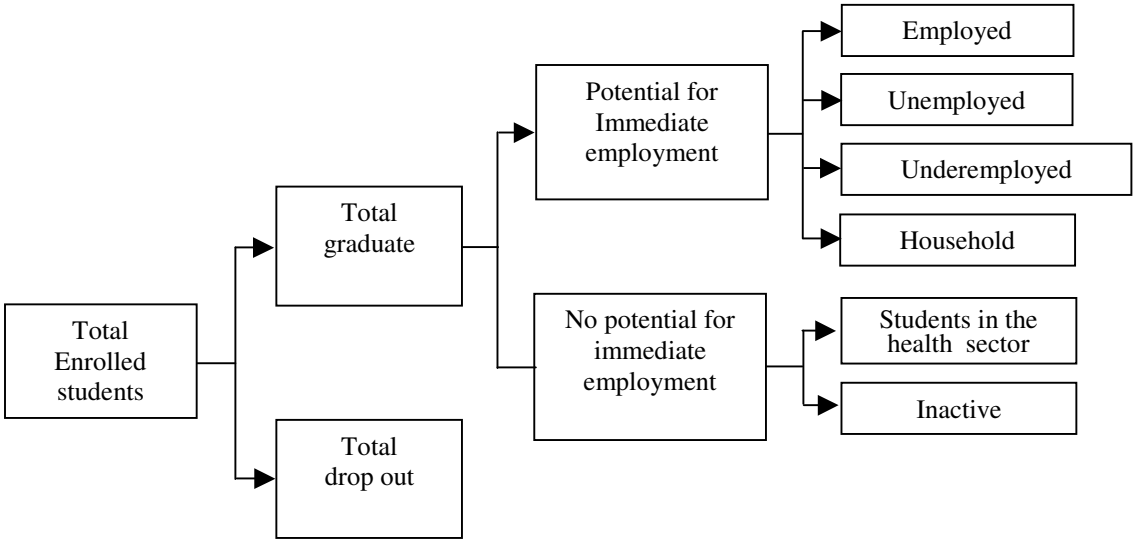
Figure 4. Incoming sudents and attrition by cohort, 1977-2001



	1977-1981	1978-1982	1979-1983	1980-1984	1981-1985	1982-1986	1983-1987	1984-1988	1985-1989	1986-1990	1987-1991	1988-1992	1989-1993	1990-1994	1991-1995	1992-1996	1993-1997	1994-1998	1995-1999	1996-2000	1997-2001
1st enrolment	18,871	18,824	15,140	14,661	13,135	11,816	11,934	11,895	10,113	9,076	9,642	10,765	10,280	11,226	12,090	12,480	11,449	11,059	11,493	12,254	13,639
Attrition	5,802	5,899	3,600	4,731	3,647	3,178	2,342	2,863	1,669	2,086	2,716	3,639	3,039	5,540	4,797	3,871	3,747	2,786	2,249	2,490	4,558

Source: ANUIES, A*nuario estadístico, 1977-2001*

Figure 5. Trajectories from medical schools to labour market



TABLES

Table 1. Sources of training and labour wastage.

Training wastage*

Attrition	Non-graduate

Labour wastage

Unemployment	Household	Other jobs (working in activities foreign to the field of training)

* Those who temporarily withdraw from studying and those who return to study are not included.

Table 2. Total Enrolments. Medical Schools in Mexico, 1990 – 2001

Year	Total
1977	85,822
1980	77,474
1983	76,424
1986	64,853
1990	57,667
1993	55,591
1996	59,645
1999	64,594
2001	70,830

Source: ANUIES, *Anuarios estadísticos*, *1990-2001*

Table 3. Global rates of attrition and final efficiency of the medical graduates per thousand students by sex and groups pertaining to the 1996-2000 and 1997-2001 periods.

Cohort	Incoming students		Attrition		Graduate students		Global rate of attrition x thousand students		Rate of final efficiency x thousand students	
	M	W	M	W	M	W	M	W	M	W
1996-2000	6,200	6,054	1,390	1,100	4,810	4,954	224.2	181.7	775.8	818.3
1997-2001	6,819	6,820	2,215	2,343	4,604	4,477	324.8	343.5	675.2	656.5

Source: ANUIES, *Anuario estadístico, 1996-2001*

* There are no available data for the year 2002

Table 4. Incoming students, drop outs and graduate students in the medical career by year and sex, 1996 -2002*

Year	Incoming students		Percentage of total attrition		Percentage of total graduate students	
	Men	Women	Men	Women	Men	Women
1996	6,200	6,054	47	53	51	49
1997	6,819	6,820	49	51	51	49
1998	7,456	7,064	53	47	50	50
1999	7,331	7248	51	49	50	50
2000	7,655	7,858	51	49	49	51
2001	7,501	7,962	45	55	51	49
2002	7,746	8,631	n/a	n/a	n/a	n/a

Source: ANUIES, *Anuario estadístico, 1996-2002*

* There are no available data for the year 2002

Table 5. Occupational status of physicians by sex, 2000

	Total	%	Men	%	Women	%
National total	362,905	100	225,426	100	137,479	100
Employed	210,129	58	142,688	63	67,441	49
Studying	47,460	13	22,435	10	25,025	18
Unemployed	21,430	6	10,518	5	10,912	8
Dedicated to household activities	15,895	4	163	1	15,732	12
Working in activities not related to the field of training	57,177	16	41,730	18	15,447	11
Inactive non available	10,814	3	7,892	3	2,922	2

Source: Data generated by FUNSALUD from the XII General Census on Population and Housing, 2000.

Table 6. Rate of employment, unemployment and wastage, 2000

<table>
<tr><td colspan="2">Rate of employment = A/ (T – B – F)

$\frac{210,129}{362,905 – 47,460 – 10,814}$ = 689 x thousand doctors</td></tr>
<tr><td>Rate of wastage =
(C+D+E) / (T –B –F)

$\frac{21,430+15,895+57,177}{362,905 – 47,460 – 10,814}$ = 310 x thousand</td><td>Rate of unemployment = (C+D) / (A+E + C)

$\frac{21,430 + 15,895}{210,129+57,177+ 21,430}$ =129 x thousand</td></tr>
</table>

Source: Data generated by FUNSALUD from the *XII* General Census on Population and Housing, 2000.
Where: A =Employment, B = Studying, C = Unemployed, D = Household, E =Others jobs, F = Inactive, T = Total

Table 7. Rate of employment in health sector, employed in non-health activities and studying, 2000

<table>
<tr><td colspan="2">Rate of employment in the health sector = A/T-F
$\frac{210,129}{362,905 – 10,814}$ = 597 x thousand doctors</td></tr>
<tr><td>Rate of employment in non-health sector = E/T - F
$\frac{57,177}{362,905- 10,814}$ = 162 x thousand</td><td>Rate of studying = B/T- F
$\frac{47,460}{362,905 – 10,814}$ = 134 x thousand</td></tr>
</table>

Source: Data generated by FUNSALUD from the *XII* I General Census on Population and Housing, 2000.
Where: A =Employment, B = Studying, C = Unemployed, D = Household, E =Others jobs, F = Inactive, T = Total

Table 8. Rates of labour participation (x thousand doctors) by sex, 2000

Rates	Women	Men
Rate of employment	$\frac{67,441}{137,479 - 25,025 - 2,922} = 615$	$\frac{142,688}{225,426 - 22,435 - 7,892} = 731$
Rate of unemployment	$\frac{10,912 + 15,732}{67,441 + 15,447 + 10,912} = 284$	$\frac{10,518 + 163}{225,426 + 41,730 + 10,518} = 38$
Rate of wastage	$\frac{10,912 + 15,732 + 15,447}{137,479 - 25,025 - 2,922} = 384$	$\frac{10,518 + 163 + 41,730}{225,426 - 22,435 - 7,892} = 268$

Source: Data generated by FUNSALUD from the XII General Census on Population and Housing, 2000.

Figure 7

Additional files provided with this submission:

Additional file 1: coverpagewastage.doc : 279KB
http://www.human-resources-health.com/imedia/3630128139423732/sup1.doc