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## RESEARCH

# Curricular reform and the professional intention of medical specialization

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**Abstract**

The reform determined by the National Curricular Guidelines of the Medical Graduation Course established primary health care as the axis of the teaching-care model. However, the option of specialization may be influenced by individual, cultural and socioeconomic factors. The objective of this study was to evaluate the factors that motivate students in their career choice, and the impact of the curricular reform on this decision. This was a cross-sectional, descriptive and quantitative research. It consisted of questionnaires applied through the internet to 1,006 medical students from the five regions of Brazil. It was concluded that there was little interest in family and community medicine (1.5%; n=15), gynecology and obstetrics (3.1%; n=31) and pediatrics (4.7%; n=47). Affinity for the field was the main factor in this choice, being considered “very important” by 91.1% (n=916) of the students, followed by the intended lifestyle (56.8% n=571).

**Keywords:** Medicine. Curriculum. Primary health care.

**Resumo****Reforma curricular e intenção profissional de especialização médica**

A reforma determinada pelas Diretrizes Curriculares Nacionais do curso de graduação em medicina estabeleceu como eixo do modelo didático-assistencial a atenção primária à saúde. Contudo, a escolha pela especialização pode ser influenciada por fatores individuais, culturais e socioeconômicos. O objetivo deste estudo foi avaliar os aspectos que motivam estudantes na escolha da carreira e o impacto da reforma curricular nesta decisão. Trata-se de pesquisa transversal, descritiva e quantitativa, com aplicação de questionários pela internet a 1.006 alunos de medicina das cinco regiões do Brasil. Concluiu-se que houve pouco interesse por medicina de família e comunidade (1,5%; n=15), ginecologia e obstetria (3,1%; n=31) e pediatria (4,7%; n=47). A afinidade pela área foi o principal fator nessa escolha, sendo considerada “muito importante” por 91,1% (n=916) dos discentes, seguida pelo estilo de vida pretendido (56,8% n=571).

**Palavras-chave:** Medicina. Currículo. Atenção primária à saúde.

**Resumen****Reforma curricular e intención de especialización médica**

La reforma determinada por las Directrices Curriculares Nacionales de la carrera de grado en Medicina, estableció como eje del modelo didáctico-asistencial la Atención Primaria de la Salud. No obstante, la elección de la especialización puede verse influenciada por factores individuales, culturales y socioeconómicos. El objetivo de este estudio fue evaluar los aspectos que motivan a los estudiantes en la elección de la carrera y el impacto de la reforma curricular en esta decisión. Se trata de una investigación transversal, descriptiva y cuantitativa, con la aplicación de cuestionarios, a través de internet, a 1.006 estudiantes de medicina de todas las regiones de Brasil. Se concluyó que hubo poco interés por la medicina de la familia y la comunidad (1,5%; n=15), ginecología y obstetricia (3,1%; n=31) y pediatria (4,7%; n=47). La afinidad por el área fue el principal factor en esa elección, siendo considerada “muy importante” por el 91,1% (n=916) de los estudiantes, seguida por el estilo de vida deseado (56,8% n=571).

**Palabras clave:** Medicina. Curriculum. Atención primaria de salud.

Declaram não haver conflito de interesse.

With nearly 300 medical schools, Brazil has become the country with the largest number of medical courses in the world and has annually trained thousands of professionals who can specialize in one of the nearly 60 options recognized by the Conselho Federal de Medicina (CFM) (Federal Council of Medicine)<sup>1,2</sup>. However, there is considerable disparity in the distribution of professionals in these specialties, as shown by the preference of undergraduates for the areas of dermatology, anesthesiology and radiology, in contrast to the low interest in family medicine and infectology<sup>1,3</sup>.

The choice of medical specialty is complex and subject to cultural, social and mental factors of students, and is also influenced by the pursuit of higher quality of life, experiences during the course and the desire for social and economic prestige<sup>1,3,4</sup>. Early definition of the area of medical practice often implies embarrassment of training as a generalist, weakening knowledge in basic areas such as general practice, pediatrics, gynecology and obstetrics. Consequently, the medical student conceives the profession in a fragmentary and discontinuous way, sometimes excessively segmented into different niches<sup>1,4,5</sup>.

Despite undergoing transition, with a greater focus on primary care and general medical practice, the Sistema Único de Saúde (SUS) (Unified Health System) still carries much of its hospital-centered, specialists-dependent past. This impels many students to choose a specialty during undergraduate<sup>6-8</sup> and, as a result, is a considerable cause of the interest of more than 80% of recent graduates to enter a medical residency program<sup>1</sup>. Since the knowledge and skills acquired on graduation are not sufficient to ensure safe practice, it is advisable that all physicians reside in the area in which they wish to work, including family and community medicine, which already have this program.

The newcomer to medical school brings expectations arising, for example, from the social status that accompanies the profession. Probably this conception is related to the doctors' financial income, higher in comparison to the average income of other Brazilians<sup>3</sup>. However, better knowing the routine of certain specialties, or due to personal changes in desires over time, students choose to change their field of activity<sup>8,9</sup>.

To train new human resources, the Ministry of Education and the Ministry of Health sought

to change the prevalence of these characteristics by creating the Diretrizes Curriculares Nacionais (DCN) (National Curriculum Guidelines)<sup>10</sup> of the undergraduate medical degree, issued by the Conselho Nacional de Educação (CNE) (National Education Council). The DCN aimed at training the physician at different levels of care, especially primary and secondary, fostering the ability of these professionals to promote, recover and rehabilitate health in order to prevent health problems.

From the perspective of comprehensive care, the physician should, regardless of his or her choices, be endowed with skills that enable multiprofessional interaction for the benefit of the community<sup>5</sup>. Hence the concern and government policy regarding the student's trend to choose: they still prioritize the search for medical specialty or continue the generalist career, corresponding to the current demand of the Brazilian health system<sup>8</sup>?

Understanding the process of career choice by students is a relevant topic in medical education, since it allows the development of measures to sustain the balance of distribution of professionals in the specialties<sup>6</sup>. In addition, it collaborates with the curriculum profile and the demand for postgraduate courses, as well as making it possible to subjectively monitor students' intention to pursue a generalist career, a government project.

In the context of high demand for general practitioners in various regions of Brazil, Law 12.871/2013<sup>11</sup> emerges. The text establishes the Programa Mais Médicos (More Doctors Program) and proposes changes in different axes, but mainly in medical residency places, requiring the practice of medicine, family and community policies as a requirement to join most programs. The law also addresses new parameters in the training of doctors, with the implementation of DCN by the CNE<sup>12-14</sup>. Therefore, these points also influence the daily life of the medical student and their decision on which career to pursue.

This article aims to evaluate the factors that influence the choice of specialty by medical students and the impact of curriculum reform on this decision. We wish to analyze the degree of satisfaction of students with the reform in the medical curriculum and to know their professional intention to become general practitioners or specialists.

## Method

The study design is cross-sectional and descriptive, with quantitative characteristics. This is an original applied research carried out with students from the first to the last year of medical courses in Brazil, divided by geographic regions. The data were collected between september and december 2017.

The sample number was calculated by the confidence interval for prevalence with the following equation:  $n = z^2 \cdot \hat{p} \cdot (1 - \hat{p}) / (E^2)$ . The prevalence of 37% of students who had not yet decided on medical specialization was considered, according to Corsi and collaborators<sup>7</sup>; error of 3%, plus 1% for possible typing losses, totalling 1,005 individuals. After that, this number was proportionally divided by the number of medical schools by geographical region.

The inclusion criterion was to be enrolled in a medical course of the researched colleges or universities, public or private, in accordance with the Informed Consent Form (ICF). The research included institutions whose communication channels were available after the search and which agreed to participate voluntarily.

To collect the information, a structured questionnaire was used, consisting of 19 questions about sociodemographic data, perspectives of professional future, individual, cultural and economic questions, which were answered based on the experiences lived by the students. The questionnaires were sent by email and WhatsApp to students from public and private medical schools in the five regions of the country (North, Northeast, Midwest, South and Southeast). The upload was repeated three times, one month apart, to increase the likelihood of viewing and response.

The online platform SurveyMonkey was used, which requires identification via Internet Protocol (IP) recognition from the computer or mobile device. This prevented a person from answering the same questionnaire more than once. When accessing SurveyMonkey, each student read the informed consent form and indicated that it was in agreement with the document so that the questions could be answered. The data obtained were tabulated by the platform itself, for further analysis of the researchers. Questionnaires with incomplete answers do not compose the data analyzed in this work, thus, there is no sample loss.

## Results

The study evaluated 1,006 medical students from higher education institutions in the five Brazilian geographic regions. Participants answered the questionnaire through an online software until they reached the calculated "n". The distribution of students among the three teaching cycles was: 37.3% (n=375) of the basic cycle (1st to 4th period); 45.5% (n=458) of the clinician (5th to 8th); and 17.2% (n=173) of the internship (9th to 12th). Of the total, 11.3% (n=114) reported that their college belonged to the Northern region; 21% (n=211) in the Northeast, 12.5% (n=126) in the Midwest; 13.9% (n=140) in the south; and 41.3% (n=415) to the Southeast region. Of the institutions involved, 74.2% were publicly owned (n=746), while 25.8% (n=260) were private colleges.

When asked if they had already decided on their specialty before entering college, 26.24% of students said yes (n=264), 39.8% (n=105;  $p < 0.034$ ) from Southeast and 22% (n=58) from the Northeast. When asked if they had already made such a decision, almost half answered positively (48.5%; n=488;  $p < 0.0001$ ). Of these, we highlight the students of the clinical cycle, with 44.9% (n=219;  $p < 0.0001$ ), compared with the basic cycle (30.7%; n=150;  $p < 0.0001$ ) and with internship (24.4%; n=119,  $p < 0.0001$ ).

There was a low preference for gynecology and obstetrics (3.1%; n=31), family and community medicine (1.5%; n=15) and pediatrics (4.7%; n=47). Considering the current moment of the course, it was asked if they had already ruled out any of the major areas, and 85.3% answered yes (n=858), with 47.7% (n=409;  $p < 0.0001$ ) from the 5th to the 8th period. The most ruled out specialties were gynecology and obstetrics (20.4%; n=205), family and community medicine (22.7%; n=228) and surgery (20%; n=201).

The major criterion for professional choice was "affinity with the specialty", a factor that 91.1% of students (n=916) considered "very important", with prevalence between those between the 5th and 8th period (35.4%; n=324;  $p < 0.0001$ ). The second largest criterion was "style/quality of life", with 56.8% of the answers (n=571). In assessing family influence in this decision, the majority (86.1%; n=866) considered it "unimportant" or "of little importance". In contrast, the role of the teacher or advisor was considered relevant by most students (67.5%; n=679), as shown in Table 1.

Regarding the importance of certain topics for the medical curriculum, some variables deserve to be highlighted. The most relevant was “quality in health care”, considered by 91.3% of students (n=918) as “important” or “very important”, followed by “medical representation in hospital management” (90.1%; n=906). On the other hand, the criterion of least impact was “medical entrepreneurship”, evaluated as “unimportant” or “of little importance” (21.9%; n=220), as well as “public health management” (15.9% n=160).

When asked if they would choose specialization in primary health care, 44.7% (n=450) answered yes, with 44.2% (n=199;  $p<0.0001$ ) from the 1st to the 4th period. In the three cycles the main reason for negative response was “affinity” (37.3%; n=375). In addition, more than half (50.4%; n=507) answered that they would be a family medicine professional if there was a federal public career plan (Table 2).

Regarding the workload of subjects related to primary health care in the curriculum, more than half of the students (54.2%; n=545) answered that they

agreed; of these, 44% (n=240;  $p<0.001$ ) were in the clinical cycle. On the other hand, most disagreed with the requirement of two years of service in family and community medicine after graduation (82.5%; n=830), with 46.5% (n=386;  $p<0.0001$ ) from the 5th to the 8th period. Among those who reported having doctors in their families (31.6%; n=318), 23.9% (n=76) reported influence from relatives.

Demographic differences between Brazilian regions, as well as their health care needs, were expected to explain the choice of specialization and, indirectly, the variables capable of retaining future doctors in the workplace. However, this association was low. Only the Southeast presented high prevalence of affirmative answers and, even so, in few evaluated items: newcomers to the course already with a defined specialty (39.8%); students with doctors in their families (48.7%); and those who declared themselves influenced by relatives in the choice of specialty (65.8%). These variables were statistically significant ( $p<0.05$ ).

**Table 1.** Factors influencing the choice of medical specialty

|                                                                                      | Unimportant |      | Of little importance |      | Important |      | Very important |      |
|--------------------------------------------------------------------------------------|-------------|------|----------------------|------|-----------|------|----------------|------|
|                                                                                      | n           | %    | n                    | %    | n         | %    | n              | %    |
| Lifestyle, quality of life (working hours, shifts, salary)                           | 7           | 0,7  | 64                   | 6,4  | 364       | 36,2 | 571            | 56,8 |
| Affinity with specialty, personal/professional satisfaction                          | 1           | 0,1  | 0,0                  | 0,0  | 89        | 8,8  | 916            | 91,1 |
| Contact with the specialty during graduation, exposure to the area during the course | 8           | 0,8  | 162                  | 16,1 | 568       | 56,5 | 268            | 26,6 |
| Knowledge of teacher/advisor who has aroused interest in the specialty               | 34          | 3,4  | 293                  | 29,1 | 475       | 47,2 | 204            | 20,3 |
| Family influence                                                                     | 432         | 42,9 | 434                  | 43,1 | 110       | 10,9 | 30             | 3,0  |
| Social trend/commitment                                                              | 94          | 9,3  | 284                  | 28,2 | 419       | 41,7 | 209            | 20,8 |
| Urgency to earn money/short residency time                                           | 221         | 22,0 | 467                  | 46,4 | 262       | 26,0 | 56             | 5,6  |

**Table 2.** General distribution of variables

| Questões/categorias                                                                  | Escala                    | n   | %    |
|--------------------------------------------------------------------------------------|---------------------------|-----|------|
| Currently undergraduate                                                              | 1st to 4th                | 375 | 37,3 |
|                                                                                      | 5th to 8th                | 458 | 45,5 |
|                                                                                      | 9th to 12th               | 173 | 17,2 |
| What region of the country does your college belong to?                              | North                     | 114 | 11,3 |
|                                                                                      | Northeast                 | 211 | 21,0 |
|                                                                                      | Midwest                   | 126 | 12,5 |
|                                                                                      | South                     | 140 | 13,9 |
|                                                                                      | Southeast                 | 415 | 41,3 |
| Percentage of public and private institutions                                        | Public                    | 746 | 74,2 |
|                                                                                      | Private                   | 260 | 25,8 |
| Upon entering medical school, had you already decided on a medical specialty?        | Yes                       | 264 | 26,2 |
|                                                                                      | No                        | 742 | 73,8 |
| At this point in the course, have you defined a specialty in one of the major areas? | Yes                       | 488 | 48,5 |
|                                                                                      | No                        | 518 | 51,5 |
| In which of these major areas does your specialty best fit?                          | No answer                 | 517 | 51,4 |
|                                                                                      | Surgery                   | 208 | 20,7 |
|                                                                                      | Medical clinic            | 188 | 18,7 |
|                                                                                      | Gynecology and Obstetrics | 31  | 3,1  |
|                                                                                      | Family medicine           | 15  | 1,5  |
|                                                                                      | Pediatrics                | 47  | 4,7  |
| At this point in the course, have you ruled out any of the major areas?              | Yes                       | 858 | 85,3 |
|                                                                                      | No                        | 148 | 14,7 |
| Which one?                                                                           | No answer                 | 146 | 14,5 |
|                                                                                      | Surgery                   | 201 | 20,0 |
|                                                                                      | Medical clinic            | 29  | 2,9  |
|                                                                                      | Gynecology and obstetrics | 205 | 20,4 |
|                                                                                      | Family medicine           | 228 | 22,7 |
|                                                                                      | Pediatrics                | 197 | 19,6 |
| Why have you already ruled out this area?                                            | Not ruled out             | 152 | 15,1 |
|                                                                                      | Affinity                  | 656 | 65,2 |
|                                                                                      | Lifestyle                 | 154 | 15,3 |
|                                                                                      | Family influence          | 3   | 0,3  |
|                                                                                      | Little contact            | 11  | 1,1  |
|                                                                                      | Relationship/knowledge    | 11  | 1,1  |
|                                                                                      | Trend                     | 13  | 1,3  |
|                                                                                      | Financial                 | 6   | 0,6  |
| Would you be a family medicine professional with a federal public career plan?       | Yes                       | 507 | 50,4 |
|                                                                                      | No                        | 499 | 49,6 |
| Do you consider choosing a specialization in primary health care?                    | Yes                       | 450 | 44,7 |
|                                                                                      | No                        | 556 | 55,3 |

continues...

**Table 2.** Continuation

| Questões/categorias                                                                                                       | Escala                      | n   | %    |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----|------|
| Why?                                                                                                                      | Not ruled out               | 450 | 44,7 |
|                                                                                                                           | Affinity                    | 375 | 37,3 |
|                                                                                                                           | Lifestyle                   | 126 | 12,5 |
|                                                                                                                           | Family influence            | 3   | 0,3  |
|                                                                                                                           | Little contact              | 14  | 1,4  |
|                                                                                                                           | Relationship/knowledge      | 18  | 1,8  |
|                                                                                                                           | Trend                       | 10  | 1,0  |
|                                                                                                                           | Financial                   | 10  | 1,0  |
| Do you have doctors among your close relatives (father, uncle, grandfather)?                                              | Yes                         | 318 | 31,6 |
|                                                                                                                           | No                          | 688 | 68,4 |
| Are you supportive of the workload related to primary health care subjects in your college curriculum?                    | Yes                         | 545 | 54,2 |
|                                                                                                                           | No, I would like it bigger  | 165 | 16,4 |
|                                                                                                                           | No, I would like it smaller | 296 | 29,4 |
| Are you in favour of establishing two years of service in family and community medicine as a requirement upon graduation? | Yes                         | 176 | 17,5 |
|                                                                                                                           | No                          | 830 | 82,5 |

**Table 3.** Distribution of variables by undergraduate cycles

| Explanatory variable                                     | Total | Basic cycle<br>1st to 4th |      | Clinical cycle<br>5th to 8th |      | Internship cycle<br>9th to 12th |      |
|----------------------------------------------------------|-------|---------------------------|------|------------------------------|------|---------------------------------|------|
|                                                          |       | n                         | %    | n                            | %    | n                               | %    |
| Did you decide on the specialty before entering college? |       |                           |      |                              |      |                                 |      |
| Yes                                                      | 264   | 116                       | 43,9 | 105                          | 39,8 | 43                              | 16,3 |
| No                                                       | 742   | 259                       | 34,9 | 353                          | 47,6 | 130                             | 17,5 |
| p<0.030                                                  |       |                           |      |                              |      |                                 |      |
| Have you decided at this point in the course?            |       |                           |      |                              |      |                                 |      |
| Yes                                                      | 488   | 150                       | 30,7 | 219                          | 44,9 | 119                             | 24,4 |
| No                                                       | 518   | 225                       | 43,4 | 239                          | 46,1 | 54                              | 10,4 |
| p<0.0001                                                 |       |                           |      |                              |      |                                 |      |
| The chosen specialty fits in:                            |       |                           |      |                              |      |                                 |      |
| Not defined yet                                          | 517   | 225                       | 43,5 | 238                          | 46,0 | 54                              | 10,4 |
| Surgery                                                  | 203   | 74                        | 36,5 | 82                           | 40,4 | 47                              | 23,2 |
| Medical clinic                                           | 188   | 42                        | 22,3 | 94                           | 50,0 | 52                              | 27,7 |
| Gynecology/obstetrics                                    | 36    | 9                         | 25,0 | 21                           | 58,3 | 6                               | 16,7 |
| Family medicine                                          | 15    | 3                         | 20,0 | 7                            | 46,7 | 5                               | 33,3 |
| Pediatrics                                               | 47    | 22                        | 46,8 | 16                           | 34,0 | 9                               | 19,1 |
| p<0.0001                                                 |       |                           |      |                              |      |                                 |      |
| Have you ruled out any areas at this time?               |       |                           |      |                              |      |                                 |      |
| Yes                                                      | 858   | 284                       | 33,1 | 409                          | 47,7 | 165                             | 19,2 |
| No                                                       | 148   | 91                        | 61,5 | 49                           | 33,1 | 8                               | 5,4  |
| p<0.0001                                                 |       |                           |      |                              |      |                                 |      |
| Which area did you rule?                                 |       |                           |      |                              |      |                                 |      |
| Have not ruled out yet                                   | 146   | 90                        | 61,6 | 48                           | 32,9 | 8                               | 5,5  |
| Surgery                                                  | 201   | 55                        | 27,4 | 97                           | 48,3 | 49                              | 24,4 |
| Medical clinic                                           | 29    | 9                         | 31,0 | 10                           | 34,5 | 10                              | 34,5 |

continues...

**Table 3.** Continuation

| Explanatory variable                                                      | Total | Basic cycle<br>1st to 4th |      | Clinical cycle<br>5th to 8th |      | Internship cycle<br>9th to 12th |      |
|---------------------------------------------------------------------------|-------|---------------------------|------|------------------------------|------|---------------------------------|------|
|                                                                           |       | n                         | %    | n                            | %    | n                               | %    |
| Gynecology/obstetrics                                                     | 205   | 69                        | 33,7 | 99                           | 48,3 | 37                              | 18,0 |
| Family medicine                                                           | 228   | 96                        | 42,1 | 101                          | 44,3 | 31                              | 13,6 |
| Pediatrics                                                                | 197   | 56                        | 28,4 | 103                          | 52,3 | 38                              | 19,3 |
| $p<0.0001$                                                                |       |                           |      |                              |      |                                 |      |
| <b>Why did you rule it out?</b>                                           |       |                           |      |                              |      |                                 |      |
| Have not ruled out yet                                                    | 152   | 94                        | 61,8 | 50                           | 32,9 | 8                               | 5,3  |
| Affinity                                                                  | 656   | 225                       | 34,3 | 324                          | 49,4 | 107                             | 16,3 |
| Lifestyle                                                                 | 154   | 41                        | 26,6 | 62                           | 40,3 | 51                              | 33,1 |
| Others*                                                                   | 44    | 15                        | 34,1 | 22                           | 50,0 | 7                               | 15,9 |
| $p<0.0001$                                                                |       |                           |      |                              |      |                                 |      |
| <b>Do you consider choosing a specialization in primary health care?</b>  |       |                           |      |                              |      |                                 |      |
| Yes                                                                       | 450   | 199                       | 44,2 | 190                          | 42,2 | 61                              | 13,6 |
| No                                                                        | 556   | 176                       | 31,7 | 268                          | 48,2 | 112                             | 20,1 |
| $p<0.0001$                                                                |       |                           |      |                              |      |                                 |      |
| <b>Do you agree with the workload of primary health care disciplines?</b> |       |                           |      |                              |      |                                 |      |
| Yes                                                                       | 545   | 224                       | 41,1 | 240                          | 44,0 | 81                              | 14,9 |
| No, I wish it were bigger                                                 | 165   | 69                        | 41,8 | 67                           | 40,6 | 29                              | 17,6 |
| No, I wish it were smaller                                                | 296   | 82                        | 27,7 | 151                          | 51,0 | 63                              | 21,3 |
| $p<0.001$                                                                 |       |                           |      |                              |      |                                 |      |
| <b>Do you agree with internship in family medicine?</b>                   |       |                           |      |                              |      |                                 |      |
| Yes                                                                       | 176   | 91                        | 51,7 | 72                           | 40,9 | 13                              | 7,4  |
| No                                                                        | 830   | 284                       | 34,2 | 386                          | 46,5 | 160                             | 19,3 |
| $p<0.0001$                                                                |       |                           |      |                              |      |                                 |      |

\*Others: family influence, little contact, relationship/knowledge, trend, financial.

## Discussion

Law 12,871/2013<sup>11</sup>, as already pointed out, created the Programa Mais Médicos (More Doctors Program), an initiative of the federal government to address the lack of generalist professionals in the interior of Brazil, seeking to train human resources for SUS and strengthen the provision of primary health care services. health in the country. Added to this are the new parameters for medical training, with the DCN implemented by CNE<sup>12-14</sup>.

The breadth of reforms has given rise to different positions on the part of civil society and medical entities. For example, the Associação Médica Brasileira (AMB) (Brazilian Medical Association) and CFM alleged possible illegality in the entry of foreign doctors in the country without approval in the National Examination for Revalidação de Diplomas (Revalida) (Revalidation of Diplomas), which would make the illegal exercise of the profession possible<sup>15,16</sup>.

Mais Médicos' emphasis on primary care is in line with the principles of the *Alma-Ata Declaration*<sup>17</sup>, which guides international health policies. In late 2018, Brazilian doctors began to occupy this function, which became another job opportunity. However, they still await the longed-for *internalization of medicine*, not just doctors, as well as better working conditions, wages and quality of life for the less-assisted brazilians.

As for the medical undergraduate curriculum, art. 4 of Law 12,871/2013<sup>11</sup> defines that the operation of the courses is subject to the implementation of the DCN defined by the CNE. The technical-scientific advancement, added to the Flexnerian influence, structured the hospital-centric model of medical education and strengthened the conception of the health-disease process excessively restricted to biological factors<sup>18</sup>. In this scenario, strategies have been adopted for many years to improve the articulation between health training institutions and health system.

This is exemplified by the reforms of DCN and government programs that encourage curriculum change. Among them we highlight the Incentive Programa de Incentivos a Mudanças Curriculares em Medicina (Promed) (Program for Curriculum Changes in Medicine), signed in 2002; the Programa Nacional de Reorientação da Formação Profissional em Saúde (Pró-Saúde) (National Program for Reorienting Vocational Training in Health), 2005; the Programa de Educação pelo Trabalho para a Saúde (PET) (Saúde Education of Work for Health Program), 2010; and the Programa de Valorização do Profissional da Atenção Básica (Provab) (Basic Care Professional Appreciation Program). On June 20, 2014, Resolution CNE/CES 3<sup>12</sup> was issued, defining new guidelines for Brazilian medical degrees and pointing out the axes “attention”, “management” and “health education” as central to student education.

In the first axis, it is expected that the undergraduate student considers the multidimensionality of each human being, in a contextualized way, to promote universal and equitable access to health, with integral, humanized, qualified and ethical attention, centered on the person under care, their family and community. In addition, there are expectations that the graduate will preserve biodiversity for sustainability; articulate with the health policies of Brazil, by promoting health in an inter-professional manner; and possess appropriate verbal and nonverbal communicative skills for the interpersonal relationships inherent in their profession.

The second axis encompasses the formation of professionals capable of understanding SUS policies, guidelines and principles and promoting community well-being through managerial and administrative actions. The focus is on a predominantly public and multiprofessional health system, whose pillars are: care management to develop individual and collective therapeutic plans; valuation of life, purposefully and resolutely seeking better indicators of quality of life, morbidity and mortality; teamwork in order to integrate different entities and build participatively the health system; leadership, based on the horizontality of personal relationships and values such as empathy and commitment, with a view to community well-being; considering the new technologies available.

Converging with proposals from other countries<sup>19</sup>, Health Management contributes to a broad medical curriculum, encompassing various competencies and skills for acting in the public health system. However, as observed in countries of similar

curriculum structure<sup>20</sup>, many topics along this axis receive little or no emphasis on the document. If integrated with medical education, these elements could increase the administrative quality of the Brazilian system, with even better trained human resources in activities such as political, social and economic conjuncture analysis; strategic surveillance; financial management and trading.

In addition to aspects of strategic management, career planning, hospital practice, and quality management tools, students assessed in this research also find, as relevant topics for their career, management and finance; public health management; medical representation; quality of care; medical practice in hospital management and entrepreneurship.

The third axis of the document postulates some principles to the undergraduates: co-responsibility for one's initial, continuing and in-service training; intellectual autonomy; social responsibility; and commitment to the training of future health professionals. Participatory, interprofessional learning in diverse contexts is determined, mediated by SUS professionals since the first year of the course. The aim is to involve the student in research and extension, encourage them to master another language, enabling academic mobility and favouring the recognition of new career challenges.

Lindeman argues that the experience is the *adult learner's textbook*<sup>21</sup>. Some experts point out that the adult learner requires challenges and needs to manage their own learning. This conception of education contemplates the principles of the current oriented to adult education called andragogy<sup>22,23</sup>, which are evidenced in the following curricular guidelines: inserting the undergraduate student in the multiple contexts of action of SUS; encourage contact with new scenarios through academic mobility; point out the importance of research and extension during professional training, favouring greater scientific development and criticality; stimulate the updating of individual knowledge in face of intense academic production in the area, and encourage mastery of other languages to broaden sources of learning.

Article 26 of DCN<sup>12</sup> emphasizes the need for a teaching practice that favours student-centered teaching, making them the protagonists of their learning process. As Aquino<sup>22</sup> points out, this foundation represents an alternative pillar to classical pedagogy. Perissé<sup>23</sup> also stresses the importance of enabling teachers to practice andragogy so that the

treatment given to students corresponds to that of truly free and responsible people.

This is significant in the research, as 67.5% of students (n=679) referred to the influence of the teacher on career as “important” or “very important”. However, this reference can become an obstacle, due to the resistance of teachers to renew their methods and also the difficulty of forming new human resources among teachers.

The new pedagogical conception is also contemplated by the Health Teaching Training and Development Program, mentioned in article 34 of the DCN<sup>12</sup>, seeking to encompass active and interdisciplinary teaching to transform medical schools. However, even with all the guidelines, norms and proposals of teaching focused on SUS and primary and secondary care of the population, implemented for years, there is no greater interest of students in pursuing this career.

The low choice for family and community medicine deserves to be reevaluated by education managers and investigated by new national surveys. In this sense, this article brings some contributions to this reflection. In order to alleviate the fragmentation of medical practice in multiple specialties, prioritizing attention has become the goal of health managers in Brazil in recent decades. However, infrastructure problems and lack of organizational investment in primary network units have been a major obstacle to attracting medical professionals to this field.

In the current scenario, the family health specialist is subject to excessive workload, incompatible pay, low social and professional status, poor integration with other levels of complexity and difficulty in delimiting their own roles<sup>3,24</sup>. In primary health care, this study highlights family and community medicine for the importance of these professionals for the functioning of the public system. However, the sample shows very low interest in the specialty (Table 3), which was the least chosen, considered by only 1.5% of participants, a percentage also observed in another recent study<sup>1</sup>.

Among the medical specialties evaluated in this study, family and community medicine were ruled out by 22.7% of respondents and, in a broader context, 82.5% are not in favour of the requirement of two years of service in the area after graduation. Although 55.3% of students rule out the option of specializing in primary health care (Table 2), if there were a possibility of a federal public career, 50.4% would consider the area.

The data indicate that the government needs to encourage and value more the professional practice in primary care, in order to encourage the future physician to play a role in this area, since the Primary Care Units are the gateway to SUS and are responsible for solving the majority of the health problems of the population. Thus, it would be possible to decongest secondary care, reducing costs and eliminating bureaucracies that make patients wait years for consultations with specialists to solve cases that can often be treated in primary care.

Although during the first periods of undergraduate, students have greater contact with disciplines on primary care, SUS organization and other key topics, throughout the course and homogeneously there is low interest in family medicine. Possible explanation for this lack of interest would be “low affinity with specialty, personal and/or professional satisfaction” (Table 1). Regarding the workload currently allocated to primary care, 545 students declared themselves to be favourable, the majority (44%) from the 5th to the 8th period.

Regarding family influence, 68.4% of students do not have doctors among their close relatives. Socially, the decision of medical specialization is due more to the performance assessments of social class in which the individual is inserted than directly to the profession of relatives.

With regard to compulsory public service, Senate Bill 168/2012<sup>25</sup>, authored by Senator Cristovam Buarque, proposes that the newly graduated doctor at a publicly or privately funded public university should exercise two years of their profession in municipalities with less than 30,000 inhabitants or in deprived communities in metropolitan regions.

This theme is the subject of great debate in Brazil. While part of society is in favour of the “social exercise of medicine”, defending the competence of the public power to regulate health policies, many argue that the idea runs counter to the principle of free education, provided for in the Constitution<sup>26</sup>. Most students (82.5%; n=830) disagrees with compulsory public service, and almost half (46.5%; n=386) were in the 5th to 8th period, that is, they already knew the functioning of the SUS.

Low adherence to this project by undergraduates is a gap to be filled in future studies. However, it is worth starting the discussion by highlighting that to oblige any professional category to perform their activity in a certain place and time, even if it happens in the best way, is at least to

curtail the freedom of the individual, overriding their individuality and autonomy.

The new Code of Medical Ethics<sup>27</sup>, in force since April 2019, in Fundamental Principles III, VII and VIII, mentions the autonomy of the physician in the exercise of the profession. In bioethics, “autonomy” means freedom to decide both the public to whom to attend and the working conditions, seeking in the care ethics the professional bases. Any obligation established to pursue a profession must be thoroughly evaluated ethically before being implemented.

Just to finish, the possible limitation of this research is observed. As it is a national study, aiming to cover a larger number of universities and different regions, the *online* questionnaire was applied, which can weaken the veracity of the data sent by the participants.

## Final considerations

In Brazil, 26.2% of medical students stated that they had already chosen a specialty when they entered the course, the most prevalent decision in

the Southeast and Northeast. During graduation, in the sample distributed in the five regions of the country, there were minimal options for specialty in the areas of gynecology and obstetrics, pediatrics and family medicine.

The main moment of this choice was the intermediate phase of the course, between the 5th and 8th period. In the internship, most had already opted for a specialty to exercise professionally. “Affinity” was the main factor in this decision, followed by “lifestyle”, “contact with specialty during graduation” and “influence of teachers”. In the five regions, most of the sample is satisfied with the current workload established for primary health care disciplines.

It is observed that 82.5% of students are against the obligation to work two years in family medicine before medical residency. The absolute majority consider it “important” or “very important” to regularly introduce the following topics in graduation: career administration and finance, public health management, medical representation entities, quality of care, medical practice in hospital management and entrepreneurship. In all regions surveyed, the option for specialty in family medicine was minimal among students throughout undergraduate.

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#### Participation of the authors

Andressa Carvalho Quinet de Andrade, Jonas Munck de Oliveira, Matheus Bresser, Matheus Magalhães Apolinário and Pedro Murari de Barros conceived the project, performed the bibliographic research, collected the data and wrote the article. José Antonio Chehuen Neto guided and revised the project, as well as formatted and revised the text. Renato Erothildes Ferreira collaborated with the study design, statistical analysis and data interpretation.

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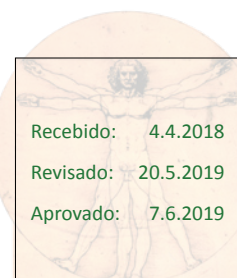
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## Annex

## Questionnaire applied to medical students

1. Do you agree to the Informed Consent Form (ICF)?  
( ) Yes ( ) No
2. Educational institution? \_\_\_\_\_
3. Current period? \_\_\_\_\_
4. Which region of the country does your college belong to?  
( ) North ( ) Northeast ( ) Midwest ( ) South ( ) Southeast
5. Upon entering medical school, had you already decided on a medical specialty?  
( ) Yes ( ) No
6. At this point in the course, have you defined a specialty in one of the major areas?  
( ) Yes ( ) No
7. In which of these major areas does your specialty best fit?  
( ) Medical clinic  
( ) Surgery  
( ) Pediatrics  
( ) Gynecology and Obstetrics  
( ) Family and community medicine
8. At this point in the course, have you ruled out any of the major areas?  
( ) Yes ( ) No
9. Which one?  
( ) Medical clinic  
( ) Surgery  
( ) Pediatrics  
( ) Gynecology and Obstetrics  
( ) Family and community medicine
10. Why?  
( ) Lifestyle, quality of life (working hours, shifts, salary)  
( ) Affinity with specialty, personal/professional satisfaction  
( ) Little contact with the specialty during graduation, exposure to the area during the course  
( ) Knowledge of teacher/advisor who has aroused interest in the specialty  
( ) Family influence  
( ) Social trend/commitment  
( ) Urgency to earn money fast, short residency time
11. Do you consider choosing a specialization in primary health care?  
( ) Yes ( ) No

## 12. Why?

- ☐ Lifestyle, quality of life (working hours, shifts, salary)
- ☐ Affinity with specialty, personal/professional satisfaction
- ☐ Little contact with the specialty during graduation, exposure to the area during the course
- ☐ Relationship with or knowledge of teacher/advisor who has aroused interest in the specialty
- ☐ Family influence
- ☐ Social trend/commitment
- ☐ Urgency to earn money fast, short residency time

## 13. Do you have doctors among your close relatives (father, uncle, grandfather)?

- ☐ Yes ☐ No

## 14. Was your choice influenced by the specialty of the doctor(s) in your family?

- ☐ Yes ☐ No

15. In each of the seven reasons below, give a score (very important; important; of little importance; unimportant) for your relevance in choosing the specialty.

- (15.1) Lifestyle, quality of life (working hours, shifts, salary) \_\_\_\_\_
- (15.2) Affinity with specialty, personal/professional satisfaction \_\_\_\_\_
- (15.3) Little contact with the specialty during graduation, exposure to the area during the course \_\_\_\_\_
- (15.4) Relationship with or knowledge of teacher/advisor who has aroused interest in the specialty \_\_\_\_\_
- (15.5) Family influence \_\_\_\_\_
- (15.6) Social trend/commitment \_\_\_\_\_
- (15.7) Urgency to earn money fast, short residency time \_\_\_\_\_

## 16. Are you supportive of the workload related to primary health care subjects in your college curriculum?

- ☐ Yes ☐ No, would like it to be bigger. ☐ No, would like it to be smaller

## 17. Are you in favour of establishing two years of service in family and community medicine as a requirement upon graduation?

- ☐ Yes ☐ No

## 18. Would you be a family medicine professional if there was a federal public career plan?

- ☐ Yes ☐ No

19. On the topics listed, give a grade (very important; important; of little importance; unimportant) according to its relevance to the medical curriculum:

- (19.1) Career-related administrative and financial aspects \_\_\_\_\_
- (19.2) Public health management \_\_\_\_\_
- (19.3) Medical Representative Entities (Regional Council of Medicine, Federal Council of Medicine, Brazilian Medical Association, etc.) \_\_\_\_\_
- (19.4) Quality in health care (National Accreditation Organization, international certifications, etc.) \_\_\_\_\_
- (19.5) Medical representation in hospital management (technical board, clinic, hospital infection committee, ethics committee, etc.) \_\_\_\_\_
- (19.6) Medical Entrepreneurship \_\_\_\_\_