

## ORIGINAL RESEARCH

# Influence of a rural background on a medical student's decision to specialize in family medicine

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## ABSTRACT

**Introduction:** Minority populations, including those from rural areas, continue to be underrepresented in medical schools despite increased efforts to recruit them. Although family physicians are more highly represented in rural areas, and medical students from rural areas are more likely to return to rural areas, relatively few medical students enter the specialty of family medicine in the USA. Because family physicians are a smaller proportion of all practicing physicians - both urban and rural - in the east when compared with the remainder of the USA, this study examines the influence of a rural background on career decisions of medical students in an eastern state, New York. New York's social and political structure is additionally influenced by the presence of New York City, the largest city in the USA and one of the world's major financial centers.

**Methods:** A retrospective, case-control study comparing medical school graduates entering family medicine residencies with those entering residencies in other disciplines was conducted for a period of 16 years at a north-east medical school. The size of the town or city of the student's high school graduation was used to determine which students came from a rural background.



**Results:** Students graduating from rural high schools were more than twice as likely to enter family medicine (OR 2.27,  $p < 0.01$ ) than those from non-rural high schools.

**Conclusions:** In order to alleviate health disparities and meet health manpower needs, admitting students to medical school who graduated from rural high schools will increase the rural workforce.

**Key words:** family medicine, health manpower, hometown, internship and residency, medical education, medical students, medically underserved area, school admission criteria.

## Introduction

The largest underserved population in the USA is rural: 20% of its citizens live in a rural area, although only 9% of its physicians practice there<sup>1,2</sup>. This underserved group exceeds in size even Latinos (14.8%), Blacks (13.1%), Asians (4.9%) and First Nations or Native Americans (1.4%)<sup>3</sup>. While various strategies have been used to address the physician shortage in rural areas, one of the simplest methods is to admit students to medical school who have a rural background. Physicians who practice in rural areas are more likely to have been raised in a rural area<sup>4,5</sup>, and medical students who are from a rural background are more likely to return to a rural area to practice<sup>6</sup>.

Family medicine (frequently known as general practice elsewhere in the world) is the only medical discipline in the USA that does not have a disproportionately increased concentration of physicians in urban areas but distributes evenly across all populations, including rural populations, where 25% of the family physicians in the nation practice<sup>7</sup>. A rural medical student who matches into a family medicine residency has a much higher probability of eventually practicing in a rural area<sup>6</sup> where a broad range of skills are needed<sup>8</sup>.

In New York State, which has only half the concentration of family physicians compared with the nation as a whole (6% vs 12%), there is a somewhat less equitable distribution<sup>9</sup>. In New York City where 4 of the 9 medical schools do not have a department of family medicine, only 4% of its physicians

are family physicians (2/3 the statewide rate) in contrast to the rural areas where 16% are family physicians (2½ times the statewide rate)<sup>9</sup>. In the four other large urban areas of Buffalo, Syracuse, Rochester and Albany, which each have medical schools with departments of family medicine, the concentration of family physicians equals the statewide average of 6%.

We were interested in determining the influence of rural roots, defined as the location of a student's high school in a rural area, on the entry of a New York medical student into a residency in family medicine, independent of other variables. The index medical school trains for a broad range of specialties. It does not have a stated primary care mission, a rural mission or a rural training program for medical students. Additionally, over 90% of the medical school's curriculum is identical for each medical student. We hypothesized that the social milieu in which students are raised prior to college can independently influence their selection of family medicine as their professional specialty.

## Methods

A retrospective case-control design was used, with two arms: a study group and a control group. The study group consisted of the graduates of the medical school at the University at Buffalo who entered a residency in family medicine over a 16 year period from 1989 to 2004. The control group was an equal number of graduates who entered any specialty other than family medicine over the same period. For each graduate who entered a family medicine residency, the



control student was the next graduate alphabetically who entered a different specialty. There were 181 graduates in each group.

Each student entered into the study also needed to be a graduate from a high school in New York State, which was so for 90% of all graduates entering either a family medicine residency or other residency. The data were obtained from two sources: the National Residency Match Program and the American Association of Medical Colleges' Graduate Student Questionnaire.

For the purpose of this analysis, the sizes of the cities in which the high schools are located were divided into four groups: rural, small city, urban, and the metropolitan area of New York City (NYC). A rural town had a population of up to 10 999. A small city was 11 000 to 60 000 population in size. An urban area referred to the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> largest cities in the state (Buffalo, Syracuse, Rochester and Albany) including their contiguous suburbs – all metropolitan areas that ranged in size from a population of 100 000 to 950 000. The NYC area included the 5 counties (or boroughs) of NYC as well as the 2 contiguous northern counties (Rockland and Westchester) and the 2 eastern counties on Long Island (Suffolk and Nassau), a 9 county metropolitan area collectively and colloquially known as 'downstate' - an area that represents 2/3 of the state's population.

If a town was  $\geq 15$  km from the outer edge of an urban area, it was considered to be a separate entity. While the five largest cities in the state have associated suburbs, the remainder of the cities are 60 000 or less in population without suburbs. Although a few areas in the Hudson River Valley north of the downstate area are long-distance commuter areas into NYC for employment, the local communities are used predominantly for education, health, commerce, religion and socialization.

There are 62 counties in the state of New York. The nine counties comprising the NYC metro area contains 63% of the population of the entire state (12.3 M out of 19.3 M); the four counties which contain the other four largest cities

collectively have 24% of the state's population (4.6 M); and the remaining 49 counties, which are predominantly rural, have 13% (2.5 M).

The independent variable is the size of the city of the student's high school graduation. The dependent variable is the selection of a family medicine residency. The data for the independent variable is categorical and represented by four possible categories: rural; small city; urban; and metropolitan NYC. The data for the dependent variable is likewise categorical and represented by two possible categories: entry into a family medicine residency; and entry into a residency other than family medicine. Because the variables are categorical - that is, separable into categories that are mutually exclusive - the statistical calculation was performed using an odds ratio, which is a measure of the strength of association between the independent and dependent variables. Microsoft compatible software from SPSS (SPSS Inc; Chicago, IL, USA) was used to calculate the odds ratio (OR).

## Results

Each year, a mean of 11.3 of all of the graduates from the index medical school entered a family medicine residency, ranging from five to 19 per year, 8% of all students. Although there was a trend towards females and whites among those who entered a family medicine residency, there was not a significant difference in characteristics of those in the study and control groups: age (23 vs 23); college performance (3.57 vs 3.60 GPA); gender (48 vs 41% female, OR 1.34, 95% confidence interval [CI] 1.0-1.7,  $p$  0.17); and race (24 vs 19% white, OR 1.33, 95% CI 0.6-2.1,  $p$  0.25).

As is shown (Table 1), students from rural areas were over twice as likely to enter family medicine (OR 2.27,  $p < 0.01$ ). Students from small cities and from urban areas were as equally likely to go into family medicine as to go into another specialty. Students from NYC were approximately one-third less likely to go into family medicine (OR 0.64,  $p = 0.08$ ).



**Table 1: Location of the high school (home town) of medical school graduates, and the odds of entry into family medicine residencies versus residencies in other disciplines**

Town Size	Study group (entered FMR) n (%)	Control group (did not enter FMR) n (%)	Odds ratio (95% CI)	P value
Rural	38 (21)	19 (10)	2.27 (1.25-4.11)	0.01
Small city	26 (14)	26 (14)	1.00 (0.56-1.80)	1.00
Urban	84 (46)	89 (49)	0.90 (0.59-1.35)	0.60
NYC	33 (18)	47 (26)	0.64 (0.39-1.05)	0.08
Total	181(100)	181(100)	–	–

FMR, Family medicine residency; NYC, New York City.

## Discussion

The cultural milieu to which a student is exposed prior to medical school influences the student's decision regarding career choice, independent of the medical school's curriculum. This becomes important because specialties are distributed disproportionately between urban and rural areas.

In the state of New York where family physicians have a fourfold higher representation in rural areas compared with NYC (16% vs 4%), our data show there is a close parallel between the percentage of family physicians practicing in a given geographic area and the choice of a family medicine residency by medical students from those areas.

There frequently is a mismatch between the physician shortage areas in a state and the professional goals of graduating medical students. A medical school admission process that reflects the health manpower needs of the state can help alleviate these shortages. There is no recruitment or financial cost for a medical school admission committee to give preference to students from a shortage area who are most likely to return to practice in a shortage area. Because the professional goals of students graduating from medical school should ideally parallel the health manpower needs of its public constituency, increased entry into medical school of underrepresented minority groups can help alleviate these health care disparities if increased priority is given to applicants from underserved areas, including those who graduated from a rural high school.

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