

Affecting the Supply of Rural Physicians

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Abstract: A model describing physician supply and distribution is described. Two surveys obtained information to examine elements of the model. The first survey identified a group of primary care physicians that had considered rural locations but ultimately selected an urban location. This sub-group, 29 per cent of the primary care supply pool, received a follow-up survey to provide more information about how they made their choice. About one-half of them finally chose on the basis of factors other than metropolitan/non-metropolitan considerations. For this half, some of the factors that entered into the decision were the availability of

physician specialists, nearby hospital facilities, and access to medical school programs. Such factors could be affected by future policy decisions, but the cost is unknown. Even if such policy decisions were made, and appropriate programs instituted, the results would probably not solve the problem of disproportionate physician distribution. The most likely-to-succeed approach to increasing the number of rural physicians remains that of increasing the number of entrants to medical school with a rural background. (Am. J. Public Health 67:756-759, 1977)

Many federal and other programs are designed to increase the number of physicians that practice in rural areas. Such programs usually have as a goal increasing the number of new rural physicians. This can only be achieved by decreasing the relative proportion of new urban physicians. Implicit in such a goal is that there is a group of physicians who, at the time of making the decision of where to practice, consider locating in a rural area but choose an urban location instead. Presumably such physicians might be induced by appropriate incentives to choose a rural location.

To examine this implicit framework, the concept was structured as an explicit model. Such a dynamic model is useful in describing physician location phenomena, and lends itself to studies that quantify important dimensions.

The Model

The model describes physicians as entering medical training from either an urban or rural background (Figure 1). It assumes that by the time of decision, all physicians are not equally open to the total range of location choices. In fact, many physicians have narrowed their range of choices to one particular kind of community. If the model is correct, then at the conclusion of training and at the time of location choice,

there will be at least three groups or kinds of physicians: those who will consider only urban locations; those who will consider only rural locations; and those who will consider both urban and rural locations. From these three pools, there will ultimately be four supply streams: a) those considering urban locations only and entering urban locations; b) those considering both kinds of locations and entering urban locations; c) those considering both kinds of locations and entering rural locations; d) those considering only rural locations and thus entering rural locations. Most programs aimed at increasing the number of rural physicians are now designed to increase stream (c), at the expense of stream (b).

This model facilitates policy and planning efforts by defining useful categories. The model suggests the rationality of identifying the unique characteristics of the group of candidates for either an urban or rural location, as they are the only real new source of rural physicians; it further rationalizes concentrating on efforts to attempt to influence that group to select a rural location.

If this model is representative of the location decision-making process of physicians, then it can be hypothesized that a group of physicians can be identified as stream (b), urban locating physicians who considered a rural location (UCR). Such a group is the apparent target of major federal programs.

Methodology

To investigate this model, initial and follow-up surveys were performed. Details of the survey procedure are described elsewhere.¹ Briefly, all 1965 U.S. medical school

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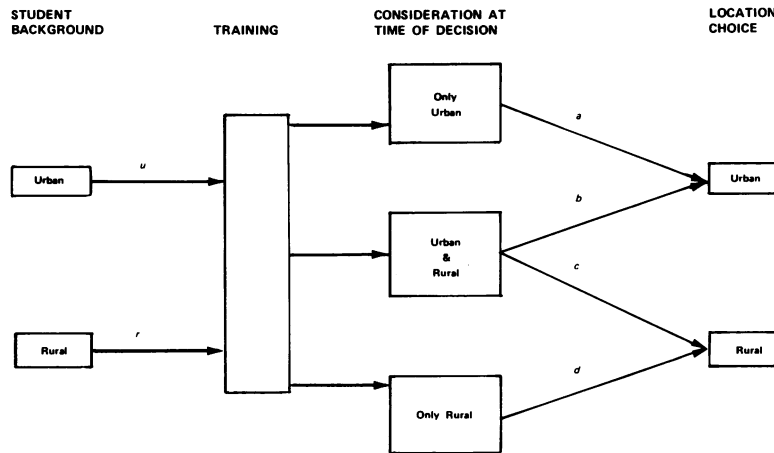


FIGURE 1—In this Study of Primary Care Physicians, a = 45.4%, b = 28.7%, c = 11.2%, d =14.6%; u = 71%, and r = 29%.

graduates were questioned by a mail survey in 1972. This survey identified primary care physicians* and described factors that influenced their location decision.² It also identified a sub-population of primary care physicians that seriously considered entering a rural practice but eventually chose an urban location; this group (UCR) could be considered the likely candidates to respond to programs aimed at increasing the supply of rural physicians. The UCR group was mailed a follow-up survey in 1973. For comparison purposes, all the primary care physicians in the original sample that had selected a rural location were also surveyed a second time.

The follow-up surveys were designed in two parts. Both follow-up questionnaires determine the context of the practice location decision, whether it was based primarily on a preference for metropolitan or non-metropolitan areas or was relatively independent of such a preference, whether it was a positive or negative choice, and the influences operating in whatever context the decision was made. The physicians were asked to read through a list of factors that the literature identified as potentially important in location decisions and to select those most relevant to their choice.

In summary, the first survey was sent to a universe consisting of a graduating class. The second survey was mailed to a universe identified by the first survey as entering a rural practice, or entering an urban practice after considering a rural one. Besides identifying factors influencing the location choice, the surveys also indicated the relative proportion of recent graduates going into the different supply streams.

Results

For the first survey, forms were sent to 6,978 physicians; the response rate was 76 per cent. For the second survey, forms were sent to 327 UCR primary care physicians and 287

*Primary care physicians, for these purposes, were defined as internists, pediatricians, and obstetric gynecologists that did not limit their practice to a subspecialty, and general and family practitioners.

rural primary care physicians, with response rates of 59 per cent and 67 per cent, respectively.

Distribution of graduate pool: 28.7% of primary care physicians were identified as selecting an urban location after considering one or more rural locations (UCR). The distribution among other supply streams are indicated on Figure 1.

Characteristic of the UCR stream: Comparing data on UCRs with other urban and rural physicians from the original survey, one finds that the UCR group has characteristics somewhat between those of the urban and rural physicians (Tables 1–2). More UCRs than other urban physicians were raised in rural areas; and more went into general or family practice. As a group, they may be more open than other urban-locating physicians to various appeals to take up a rural practice. The question would then become one of determining which appeals would be successful.

Basis of location choice: Nearly one-half (48 per cent) of the UCR physicians based their choice primarily on the desire to practice in a metropolitan rather than non-metropolitan area; 52 per cent picked their practice location for other, presumably personal and professional, factors independent of metropolitan/non-metropolitan considerations (Table 3).

Thus, the pool that can be affected by programs offering specific incentives (i.e., programs that do not affect the relative desirability of an urban location) is only one-half the UCR

TABLE 1—Distribution of Primary Care Physicians by Place of Rearing, Place of Practice, and Consideration of Rural Practice

Place of Rearing	Place of Practice*					
	Rural ("c" & "d")		UCR** ("b")		Other Urban ("a")	
	No.	%	No.	%	No.	%
Rural	151	54.3	78	25.2	79	16.2
Urban	127	45.7	231	74.8	409	83.8
Total	278	100.0	309	100.0	488	100.0

*Small letters refer to pathways labeled on Figure 1.
 **Urban-locating physicians who considered rural practice.

TABLE 2—Distribution of Primary Care Physicians by Specialty, Place of Practice, and Consideration of Rural Practice

Primary Care Specialty	Place of Practice					
	Rural		UCR		Other Urban	
	No.	%	No.	%	No.	%
General or family practice	171	59.4	124	37.9	136	26.6
Internal medicine	59	20.5	100	30.6	174	34.0
Obstetrics-Gynecology	31	10.8	54	16.5	90	17.6
Pediatrics	27	9.4	49	15.0	112	21.9
Total	288	100.0 ^a	327	100.0	512	100.0

^aTotals may not add to 100.0 because of rounding.

total. In other words, unless a rural location can change its basic quality and become “metropolitan”, it would not be considered as a choice in the final decision-making of 48 per cent of the UCR group. Only part of the UCR group are thus potential candidates for susceptibility to specific programs such as community recruitment or contact with a medical center.

For the UCR physicians who made their decision independent of metropolitan/non-metroplitan considerations, the factor most often cited as being important in making the location choice was availability of other physician specialists. Other important factors were access to medical school programs, and access to continuing medical education (Table 4).

Discussion

These surveys indicate that about one-third of the new primary care physician supply fits into the category of interest—urban locating physicians who had considered a rural location. Of this group, about one-half preferred an urban life and chose that environment over a rural one. Those who chose on that basis are felt to be unlikely to respond to specific programs aimed at influencing their decision, since little can be done to convert a rural ambience to an urban one, even if this were desirable.

The remaining 15 per cent of the total primary care pro-

viders class (52 per cent of 28.7 per cent) chose an urban location independent of metropolitan and non-metropolitan considerations. The factors they considered have the potential of being altered in the future, and presumably would influence their successors with similar attitudes. Thus, if access to medical school programs is important, such access could be provided in rural areas. It is possible that the provision of such access would influence this supply stream in the future, and encourage more primary care physicians to locate in a rural area. However, the cost of such programs is unknown.

If the possible incentives for attracting the available UCRs were offered under ideal conditions, and the physician response were perfect (i.e., rural areas successfully attracted UCRs), the model would predict that the rural pool would increase by 58 per cent (52 per cent b/c + d). This would bring the total new rural physicians supply to 41 per cent of the graduating class.

A more reasonable estimate would be that such programs could affect about one-half the susceptible group. If this occurred, the model predicts an increase in the total rural stream to 33 per cent of the graduating class.

An alternative solution to physician maldistribution is to focus on an earlier element of the model, intervention related to physician background. If the number of primary care physicians with a rural background were increased from 28 per cent to 42 per cent, and no incentives were offered, this alone would produce an expected increase in the supply stream to rural areas of 50 per cent, to a total of 42 per cent of the graduating class. This increase in rural background medical students would be achieved at virtually no cost. Once again, the importance of rural background on physician supply patterns is demonstrated.

While the response rate for these surveys was relatively high for mail surveys (76 per cent and 59 per cent), the ultimate sample size is small. This is the result of our interest in a relatively small proportion of the graduating class, primary care physicians who considered a rural practice but decided on an urban one.

The definition of “primary care” used here is not universally accepted, as it includes the obstetrician/gynecologist. However, it is felt that the specialists surveyed, i.e., internists, pediatricians, general and family practitioners, and obstetrician/gynecologists represent the major source of primary care in rural areas.

Female physicians were not included in the second survey. They should be studied separately. In order to have an adequate sample size, graduates of several years would have

TABLE 3—Basis of Location Choice

Basis	UCR (“b”)		Rural (“c” & “d”)		Total	
	No.	%	No.	%	No.	%
Between metropolitan and non-metropolitan	90	47.6	140	73.7	230	60.7
Independent of metropolitan non-metropolitan	99	52.4	50	26.3	149	39.3
Total	189	100.0	190	100.0	379	100.0

TABLE 4—Factors Important in Making Location Choice Independent of Metropolitan/Non-metropolitan Considerations

Factor	UCR (N = 99)		Rural (N = 50)		Total (N = 149)	
	No.	%	No.	%	No.	%
Professional						
Availability of physician specialists ^a	58	58.6	14	28.0	72	48.3
Access to medical school programs ^a	48	48.5	5	10.0	53	35.6
Access to continuing medical education ^a	34	34.3	3	6.0	37	24.8
Hospital facilities nearby	55	55.6	25	50.0	80	53.7
Availability of emergency medical services	21	21.2	6	12.0	27	18.1
Opportunity to join desirable partnership	17	17.2	11	22.0	28	18.8
Opportunity to enter established solo practice	16	16.2	7	14.0	23	15.4
Physical Environment						
Preferable geographic features	44	48.5	24	48.0	68	45.6
Preferable climate	42	42.4	17	34.0	59	39.6
Nearness to family and friends	48	48.5	23	46.0	71	47.7
Personal						
Quality of education system for children	43	43.4	19	38.0	62	41.6
Preference of spouse	36	36.4	15	30.0	51	34.2
Income potential	35	35.4	17	34.0	52	34.9
Similar to community where grew up	15	15.2	14	28.0	29	19.5
Other						
Other ^a	11	11.1	11	22.0	22	14.8
Recruitment efforts of community	9	9.1	9	18.0	18	12.1

^aChi square for difference between rural and UCR physicians is significant at .05 level.

to be included, which was beyond the scope of this project.

Six per cent of the physicians indicated they would be leaving their locations within two years while 94 per cent indicated their intention to stay longer. It was impossible, because of the small sample, to obtain meaningful information about why the 6 per cent of physicians had decided to change location. They, as with female physicians, should be studied separately, with a larger sample size.

The significance of this survey is that UCR physicians, as often as not, choose a location independent of a metropolitan/non-metropolitan preference. When that decision is made independent of urban/rural preference, professional factors are considered important significantly more often by UCR physicians than by rural physicians. These data could be subject to multivariate analysis. However, knowledge about the relative contribution of each variable to the total variance, which multivariate analysis would estimate, is not essential, since professional factors are usually linked together as a set, i.e., medical school contact, physician specialists, and continuing

medical education are part of what many physicians consider to be a professionally desirable environment, and usually occur together.

Perhaps the greatest value of this model is that it explicitly indicates different "kinds" of physicians, and departs from the view of physician supply as a homogenous pool. Observing trends in the relative number of each kind of physician, and in the factors that influence each kind of physician, should be useful in future physician manpower planning.

REFERENCES

1. Heald, K. A., Cooper, J. K., and Coleman, S. Choice of Location of Practice of Medical School Graduates: Analysis of Two Surveys. Rand Corporation R-1477-HEW, November, 1974.
2. Cooper, J. K., Heald, K., Samuels, M., and Coleman, S.: Rural or urban practice: factors influencing the location decision of primary care physicians, *Inquiry* 12:18-24, 1975.

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