An Educational Needs Assessment of Rural Family Physicians

Tom E. Norris, MD, John B. Coombs, MD, and Jan Carline, PhD

Background: **A shortage of family physicians persists in rural and medically underserved areas of the United States. We explore the hypothesis that a definable set of educational needs should be addressed for rural family physicians, both during their formal education and as part of continuing education while in practice.**

Methods: **An educational needs assessment questionnaire was sent to 1096 family physicians who had finished residency and entered rural practice within the last 3 years. Six hundred twenty-seven (57.2 percent) of the questionnaires were returned. The demographic characteristics of the respondent physicians and their assessment of the appropriateness and adequacy of their educational process in preparing them for rural practice were analyzed by looking at individual items and groups of items or subject areas.**

Results: **We were able to define successfully a group of items that were important components of rural practice but were not adequately addressed in training programs. These groups included counseling, pediatrics, obstetrics and gynecology, geriatrics, surgery and trauma, medical specialties, surgical specialties, community medicine and management, and a mixed factor that included rehabilitation, behavioral sciences, learning disabilities (in children), chronic childhood problems, and human growth.**

Conclusions: **It is possible to define a group of educational areas not covered adequately by standard family practice curriculum that should be included in preparation for rural practice. If these areas were included in the education of rurally oriented family practice medical students and residents, these physicians would be more adequately prepared to meet the demands of rural practice. If preparation for rural practice is improved, rural communities might be more successful in recruiting and retaining well-trained family physicians. (J Am Board Fam Pract 1996;9:86–93.)**

There is a serious and persistent shortage of rural primary care physicians in the United States that has worsened despite a doubling of physicians in practice during the past two decades.[1] Because family physicians make up the predominant number of rural primary care physicians, many efforts have focused on encouraging interest in primary care and rural practice by members of this specialty in an attempt to solve the distribution problem. Among these efforts have been the following:

1. Medical school admissions strategies[2]
2. Curricular innovations in medical schools through which family medicine rotations are both required and scheduled early in the medical school curriculum sequence[3-5]
3. Extended rural rotations while in medical school[6,7]
4. Rural preceptorships for family medicine residents[8]
5. Rural training tracks in family medicine residencies[9]
6. Rural fellowships following family medicine residencies[10]
7. Rural recruitment tactics[11]
8. Efforts to improve rural health care delivery systems[12] to facilitate physician recruitment and retention

A review of the strategies that have been used to address the rural family physician shortages shows a clear preponderance of interventions during medical school and residency. Perhaps educational interventions have been used because during residency and medical school some systematic external control can be exerted without having to change the practice environment. Furthermore, after examining the efficacy of various approaches, we found these educational interven-

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From the Dean's Office, University of Washington School of Medicine, the Division of Regional Affairs and Rural Health, and the Department of Family Medicine (TEN, JBC) and the Department of Medical Education (JC), University of Washington School of Medicine, Seattle. Address reprint requests to Tom E. Norris, MD, Division of Regional Affairs and Rural Health, University of Washington, Box 356340, Seattle, WA 98195.

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tions to be among the most effective at addressing the task of producing physicians who choose a career in family practice and who subsequently enter rural practice.[13,14]

We hypothesized that if a unique set of educational needs for rural practice could be defined, then these areas could be included in the curricula (of medical schools, family practice residencies, fellowships, and continuing medical education courses) for training physicians planning rural practice. If successful, this strategy might decrease the culture shock experienced by many newly graduated rural physicians when they make the transition from residency to rural practice by decreasing the sense of professional isolation and perceived lack of preparation. Better attention to the educational needs of rural physicians during medical school and residency might also help offset the effects of professional isolation and reduce dissatisfaction reported by rural providers, as well as enhance both rural retention and rural recruitment. Additionally, if practicing rural physicians had a clear description of those areas in which they might need more education, they could use continuing medical education (CME) programs to address these deficits. This approach might further improve retention, because the feeling of practicing at the edge of one's competency has been found to be a powerful stimulus to leave rural practice.[15] The purpose of our study was to develop a nationally applicable set of educational needs of rural family physicians.

We theorized that by surveying a recently graduated national group of practicing rural family physicians about their areas of perceived competencies, we would be able to discern the strengths and weaknesses of the current medical school and residency curricula designed to prepare family physicians for rural practice. We assumed that by questioning rural physicians who had been in practice for only a short time (4 years or less), it would be possible to obtain a practice-reality versus educational-adequacy comparison, in that the study group would understand the needs of rural practice while recognizing their capabilities and deficiencies upon entry into practice.

Methods

In 1992 we obtained from the American Academy of Family Physicians (AAFP) the names and addresses of the 1096 family physicians in the United States who (1) were AAFP members, (2) described their practice setting as rural (unfortunately, no uniform definition was used—only self-description), and (3) had graduated from a family practice residency within the preceding 4 years.

We developed a survey instrument designed to elicit from each respondent basic demographic information and a detailed assessment of the adequacy of educational preparation for practice in 107 clinical, psychosocial, and procedural areas. The general design of the survey instrument was based on the series of questionnaires used by the University of Washington Affiliated Network of Family Practice Residencies to seek follow-up information on its graduates.[16] Our questionnaire differed in that the educational needs assessment component was much more inclusive and much more detailed. In the educational needs assessment component, respondents were asked to rate their educational preparation for a variety of clinical areas (for example, well-child care, normal prenatal care, geriatric pharmacology, etc) into one of the following four categories: (1) minimal or no preparation, (2) underprepared, (3) adequately prepared, and (4) exceptionally well prepared. Additionally, each respondent was asked to note whether the clinical area under consideration was "Not a part of my current practice."

To detect any ambiguous questions and additional problem areas, the questionnaire was developed in draft form and tested on a group of 20 rural and academic family physicians practicing in Washington and Idaho. Based on the results of this pilot test, many questions were modified to improve clarity, and the format was changed to facilitate response and data entry. The draft questionnaire took approximately 15 minutes to complete. In its final form the questionnaire was six pages and included 130 questions.

The resulting survey instrument was mailed to 1096 recently graduated US practicing rural family physicians. The questionnaires were coded to allow for second and third follow-up mailings to be sent to those physicians who had not responded during the ensuing 4 months. Included in each mailing was a stamped return envelope and a covering letter explaining the purpose of the study. Data from questionnaires that were less than 75 percent complete were not included in the analysis. The demographic data provided us with an overview of the respondent group. We

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Table 1: Summary of Demographic Data of Respondents (n = 590).

Characteristics	Responses
Average population of community where practicing	10,253 (range 450–65,000)
Average service area population where practicing	23,536 (range 1450–150,000)
Average distance to a community of > 25,000 (miles)	49.49 (range 1–250)
Completed family practice residency (%)	>99.9
Took special residency track for rural family physicians	7.3
Most common residency duration in rural town (mo)	1–6
Required rural rotation in residency (%)	31.5
Optional rural rotation in residency (%)	48.3
Type of degree (%)	
Doctor of medicine	90.0
Doctor of osteopathy	10.0
Took rural program in medical school (%)	31.8
Took family medicine clerkship in medical school (%)	87.5
Took rural family medicine clerkship in medical school (%)	59.5
Grew up in town < 25,000 (%)	58.0
Graduated from high school in town < 25,000 (%)	56/0
Spouse grew up in town < 25,000 (%)	44.0
Sex (%)	
Men	77.8
Women	22.2
Marital status (%)	
Divorced	1.9
Single	7.3
Married	89.2
Common spouse occupations (%)	
Homemaker	24.2
Nurse	15.6
Physician	8.8
Teacher	6.2
Common practice settings (%)	
Private practice	61.4
Salaried	10.2
IHC/CHC/MHC	7.8
Emergency department	4.0
Most common on-call exposure (50%, times per month)	4–8
Include obstetrics in practice (%)	54.8
Emergency department coverage provided by hospital (%)	70.7
American Board of Family Practice certified (%)	89.0
Doctor of medicine	88.9
Doctor of osteopathy	88.1

IHC – Indian Health Service, CHC – community health service, MHC – medical health center.

scored the needs assessment responses (minimal or no preparation = 1, underprepared = 2, adequately prepared = 3, and exceptionally well prepared = 4) and calculated means for each of 107 clinical areas. Additionally, we calculated the percentage of physicians including a particular item in their current practice.

We used factor analysis to group clusters of items that had similar patterns of ratings. The means and 95 percent confidence intervals for each of these groups were calculated and then placed in rank order. The means for individual items in the groups that were lower than the lower confidence interval for the group were interpreted as indicating significantly lower levels of preparation compared with other items in that group. Multivariate analysis of variance (MANOVA) with repeated measures was used to investigate the differences between the means for the groups.

Results

A total of 627 questionnaires were returned, for an overall response rate of 57.2 percent. Thirty-seven questionnaires were less than 75 percent complete and were deleted from further analysis. Demographic data and survey results were calculated on the remaining 590 questionnaires. The nonrespondents' addresses indicated that the geographic distribution and community population patterns were similar to those for the respondents.

The respondents, described in Table 1, were a demographically and geographically representative national sample of those surveyed. Most (78.7 percent) of these rural family physicians were men, and nearly 90 percent were married. Roughly 60 percent stated that they had grown up in communities of fewer than 25,000, and a large percentage had taken a rural rotation in medical school, residency, or both. Almost 100 percent of the respondents had been in practice for 4 or fewer years.

Forty-four of the 107 items, primarily procedures, were excluded from further analysis because a flaw in the questionnaire made it impossible to tell whether the responding physician actually performed the procedure or simply referred patients when the procedure was indicated. Further statistical analysis was completed for the 531 questionnaires that provided ratings for the remaining 63 items. Principal components factor analysis with varimax rotation revealed nine

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Table 2. Group and Individual Means of Educational Needs Assessment Items on a Scale of 1 to 4 (respondents n = 590).

Group and Item	Item Mean	Percent Including in Practice
Basic pediatrics (group mean 3.26)		
Well-child care	3.46	97.3
Well-newborn care	3.45	97.3
Acute childhood illness	3.37	96.9
Hospital care of children	3.26	94.7
Newborn resuscitation	3.06*	94.9
Sick-newborn care	3.01*	96.1
Obstetrics and gynecology (group mean 3.13)		
Normal prenatal care	3.48	85.8
Pre-eclampsia	3.29	85.8
Gynecologic problems—general	3.20	94.2
Gynecologic problems—medical	3.15	94.1
Diabetes in pregnancy	3.02*	85.1
Multiple gestations	2.63*	82.7
Medical specialties (group mean 2.91)		
Cardiology	3.28	98.1
Pulmonology	3.15	98.5
Gastroenterology	3.12	98.3
Infectious disease	3.08	98.5
Dermatology	2.92	98.5
Nephrology	2.73*	97.6
Rheumatology	2.71*	98.0
Hematology	2.68*	97.6
Allergy	2.50*	96.8
Geriatrics (group mean 2.91)		
General office geriatrics	3.09	96.6
Nursing home care	3.08	94.9
Geriatric pharmacology	2.95	97.3
Terminal care of geriatric patients	2.94	97.1
Geriatric home care	2.78*	94.4
Geriatric functional assessments	2.63*	95.3
Surgery and trauma (group mean 2.84)		
Surgical assisting	3.17	85.6
Postoperative care	3.04	90.8
Preoperative care	3.02	91.2
General trauma care	2.84	90.2
Emergency surgery	2.71*	75.1
Pediatric trauma care	2.43*	95.9
Counseling (group mean 2.79)		
Life style change	2.99	97.5
Grief and loss counseling	2.92	98.1
Alcohol and drug abuse counseling	2.92	87.6
Substance abuse counseling	2.89	98.1
Psychopharmacology	2.83	97.5
Psychiatric disorders	2.79	97.5
Brief psychotherapy	2.77	100.0
Hostile patients	2.77	99.8
General counseling	2.74*	87.5
Crisis intervention	2.73*	95.6
Family and parental counseling	2.66*	92.5
Marital counseling	2.52*	91.2
Developmental problems	2.51*	97.6
Surgical specialties (group mean 2.77)		
Otolaryngology	2.85	92.3
Urology	2.80	93.4
Ophthalmology	2.67*	92.3
Rehabilitation, behavioral science, chronic childhood diseases, human growth (group mean 2.46)		
Chronic childhood illnesses	2.72	97.3
Pediatric behavioral disorders	2.55	97.3
Pediatric growth disorders	2.48	95.9
Rehabilitation medicine	2.26*	95.8
Pediatric learning disorders	2.25*	96.4
Community medicine, management, etc (group mean 2.43)		
Critical review of medical literature	2.78	96.4
Assessment: community health	2.54	97.5
Nutrition	2.53	96.6
Practice management	2.45	95.6
Assessment: community needs	2.44	98.1
Library computer database use	2.37*	94.1
Hospital quality assurance	2.29*	95.1
Office quality assurance	2.27*	96.1
Computer use in practice	2.18*	92.7

Note: 1-minimal or no preparation, 2-underprepared, 3-adequately prepared, 4-exceptionally well prepared.
*Score below the lower 95% confidence interval of the overall mean for the group.

groups distinguished by content: counseling, pediatrics, obstetrics-gynecology, geriatrics, surgery and trauma, medical specialties, surgical specialties, community medicine and management, and a mixed group that included rehabilitation, behavioral sciences, learning disabilities, chronic childhood problems, and human growth. Overall means and 95 percent confidence intervals were calculated for each of these groups, including items that had factor loadings of 0.45 or greater.

The mean ratings of the original survey items, reported in Table 2, indicated some dissatisfaction with the adequacy of medical school and residency preparation of physicians for rural practice. Of the 63 survey items available for analysis,

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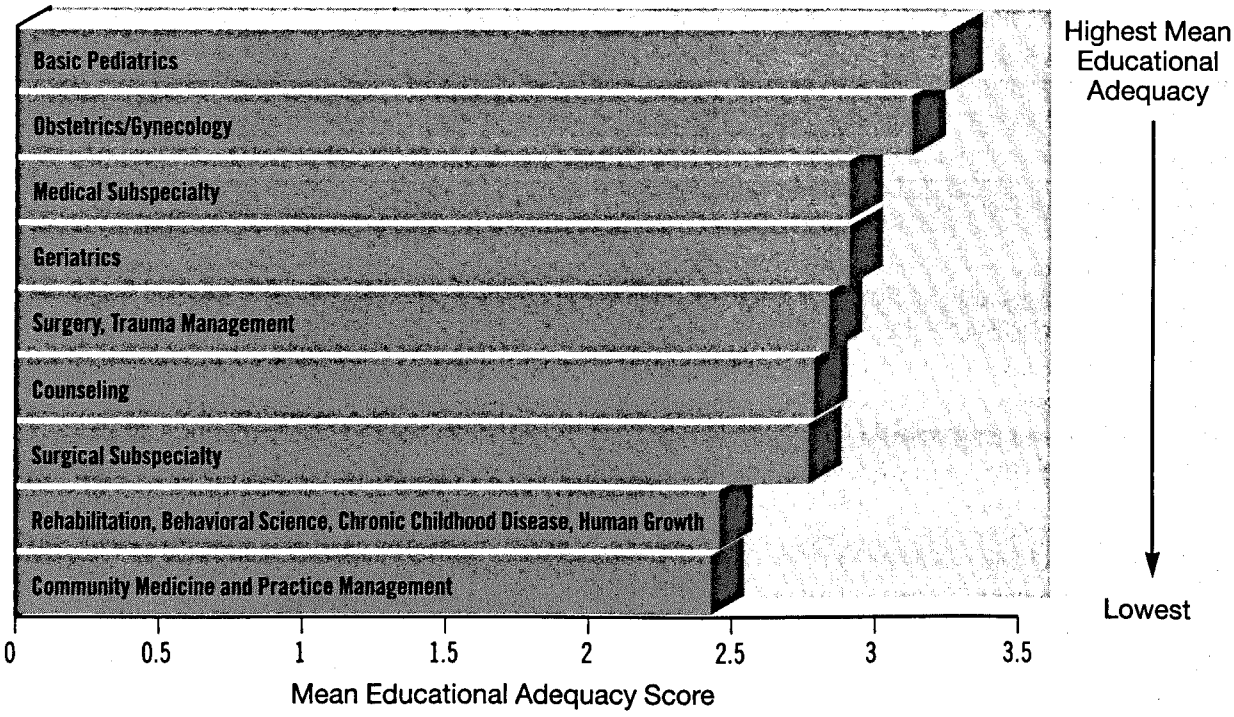

Figure 1. Comparison by groups of topics from highest mean educational adequacy score to lowest score.

20 received ratings indicating adequate or better preparation. An additional 16 items were rated between 2.75 and 2.99, indicating nearly adequate training. Thus, while the majority of the ratings indicated adequate or nearly adequate training, more than 40 percent of the ratings indicated a perception of inadequate preparation for rural practice.

There were differences in the ratings of individual items from the original questionnaire and the groupings derived from factor analysis. The ratings of individual items were compared with the overall mean for the grouping in which they were located. For example, marital counseling, family and parental counseling, and developmental problems received ratings significantly lower than the overall ratings for the counseling group. This finding might indicate a relatively lower level of preparation for these aspects of counseling. Items falling below the 95 percent level for their group might represent areas where additional education for rurally bound students, residents, and fellows would be indicated. In cases in which all items in a factor received a high rating, such as basic pediatrics, even lower rated items might have been adequately covered. Table 2 also includes the percentage of respondents who included each particular item in their practice. There was remarkable uniformity in practice content. With the exception of emergency surgery, all items were included in more than 85 percent of practices of the physicians responding to the survey.

The means for each group obtained from the factor analysis were compared by MANOVA. The rank ordering of these groups is displayed in Figure 1. The highest rated group is that of basic pediatrics. Each successive group was found to be statistically significantly lower than the next, with the exceptions of medical specialties and geriatrics and the mixed group and community medicine and management. The latter two groups were not significantly different from each other, although they were the lowest groups compared with all others.

Discussion

Based on one commonly accepted definition of rural as a community with a population of less than 25,000 located more than 25 miles from a larger community, demographic information for our study confirms that it did truly represent rural family physicians. Because the AAFP database used for this survey was based only on self-defined rural physicians, it is important to note that, with an average community population of 10,253 and an average distance of 49.49 miles to a community with a population of more than 25,000,

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this group actually was rural. Additionally, with essentially 100 percent of those surveyed having completed a family medicine residency and having entered practice within the preceding 4 years, the other criteria of the survey were also met. It must be noted that, while an overall response rate of 57.2 percent is considered acceptable for this type of survey, this rate allows for a potential selection bias among the respondents. If there had been a 100 percent response rate, both the demographic data and the other results might have been somewhat different.

Nearly 60 percent of the responding physicians participated in a rural rotation in medical school, and nearly 50 percent participated in a rural rotation in residency. Most likely these physicians took the rural rotations because they were interested in rural practice, or they became increasingly interested in rural practice as a result of participation in the rural rotations. It is also interesting to note that, whereas less than one fourth of the US population lives in rural areas, more than one half of these physicians grew up and graduated from high school in rural areas. Furthermore, we observe that, although less than 25 percent of US family physicians include obstetrics in their practice, obstetric care was included by more than one half of these rural physicians.

We can draw several conclusions regarding the raw mean scores of the individual items (Table 2) in the educational needs assessment. First, 20 (32 percent) of the scores were higher than 3.0 (adequately prepared), and an additional 16 (25 percent) were between 2.75 and 2.99, so that 57 percent of the items were considered to be adequately addressed. For this group of residency-trained physicians, the medical school curriculum mandated by the Liaison Committee on Medical Education and the family practice residency curriculum prescribed by the Accreditation Council for Graduate Medical Education's Residency Review Committee in Family Practice provided adequate preparation for rural practice in many important areas. Nevertheless, inadequate preparation is apparently provided in a substantial minority of areas pertinent to the rural provider. Although not the focus of this study, urban physicians no doubt have a similar experience, especially those serving in relatively isolated practices, such as in community health centers. In general, the areas of inadequate preparation include allergy, rehabilitation medicine, many forms of counseling, several practice management and informatics areas, advanced and operative obstetrics, pediatric trauma care, and nutrition. Although it is not practical to train all physicians to be masters of all disciplines, increased attention to the educational needs of rural physicians would improve not only the scores in future rural educational needs assessments surveys, but also actual preparation for rural practice. Furthermore, such an outcome could ease the difficulties encountered by rural communities in recruiting and retaining well-trained physicians.

Some of the clinical categories in this study are quite broad. If this study were to be done again, it might be more helpful for cardiology, for instance, to be subdivided into valvular heart disease, cardiomyopathies, atherosclerotic heart disease, and so on. Curriculum-planning committees could then use the information to fine-tune their educational programs. Still, the material we have presented would allow planning for additional block rotations, written material, or lectures in the subspecialty areas where marked deficits were noted.

In Table 2 the proportion of respondents including specific clinical items in their practices reflects a remarkable degree of uniformity in rural practice content. This uniformity is encouraging, for it lends credibility to the hypothesis that a curriculum could be designed that would allow better preparation for the demands of rural practice. Because this nationwide sample had a largely similar practice content, a curriculum focused on specific rural practice needs would probably be valid for most rural practices without having to be tailored to each rural practice site.

To view the data in another fashion, we calculated the 95 percent confidence intervals within which we expected the responses to fall. We then focused on those items for which the mean scores fell below the lower end of the calculated interval (items marked with asterisk in Table 2). This exercise not only highlighted the items that had low raw mean scores, but also allowed us to note the items for which the scores were lower than expected, even though the raw scores appeared adequate when compared with the mean scores of their groups. Topics added to our list of items deserving educational emphasis for rural family physicians included care of sick newborns, man-

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agement of diabetes in pregnancy, geriatric home care, geriatric functional assessments, hematology, nephrology, rheumatology, and ophthalmology. Ideally, a rural curriculum might include emphasis and special educational opportunities in these areas. Realistically, applying these curricular changes to all residency programs might be beneficial. A follow-up study using similar methods and focusing on family physicians who have recently entered urban practice would add to our comparative knowledge.

Finally, because both medical school and residency training is composed, to a large extent, of block rotations and grouped by topics, we compared the educational adequacy of the topics by grouping related items. By studying the lower portions of the cascade in Figure 1, we can prioritize the areas most urgently in need of curricular emphasis. Of special importance here are community medicine, practice management, rehabilitation medicine, the surgical specialties, and behavioral science. This ranking can help answer the question of where to begin when developing better training programs with particular emphasis on physicians preparing to enter rural practice.

Conclusions

If we accept that there is a critical shortage of rural physicians, especially well-prepared family physicians, then we can conclude that we must improve both recruitment and retention of these physicians. By enhancing the rural practice component of physician education during medical and osteopathic school, residency, and fellowship training and with continuing medical education courses, we can positively influence our ability to recruit and to retain family physicians interested in rural practice.

Although this study does help define the areas where additional training should be offered, it does not address when it would be best to offer this educational material.

The curricular information presented in this study should be useful for medical schools, family practice residency programs, and developers of CME courses interested in improving both appropriateness and applicability of education for current and future rural family physicians. These data should also be of special interest to practicing rural family physicians who want help designing personal study strategies and CME activities. Further study should be carried out to define the optimal time for presenting this material, and to research any unmet educational needs of other family physicians practicing in other underserved areas, such as those physicians serving inner-city, minority, or non-English-speaking populations.

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