Review Article

# Addressing Issues of Maldistribution of Health Care Workers

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## Abstract

**Introduction: The maldistribution of health care workers is a near-universal problem, particularly in developing countries. Shortages have become most critical over the past 2 decades with both out-migration of health care workers from developing to developed countries, and intra-country disparities between urban centres and rural regions. A variety of solutions have been proposed and tried, but in recent years the problem has become increasingly serious. Programme Description: Over the past 15 years, we have conceptualised and implemented a programme directed at the re-supply of rural physicians to our own state, Illinois, which was recently ranked as low as sixth worse in the US with regard to physician manpower shortages in rural areas. More recently, this programme has been expanded to include other health care workers where there are equivalent shortages in health services accessibility, and the entire programme is now designated as the National Center for Rural Health Professions. Programme Evaluation: Currently, the physician programme enjoys a 65% to 70% success rate in terms of the return of physicians to rural communities; a success largely due to the unique selection process, training, and the close relationship between students and faculty. Here, we describe this programme in detail, in the hope that elements of this somewhat unique programme may be "exportable".**

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## Out-migration Issues

The movement of people from one place to another has shaped today's political, social and economic world and continues to be a major influence on society. In 2000, almost 175 million people, or 2.9% of the world's population, were living outside their country of birth for 1 year or longer. These numbers have doubled since 1965, and the migration of health care workers has closely followed these general trends.[1] Today, however, certain features of the health care labour market have given rise to new concerns. First, new communication technologies are shaping the global labour market through electronic access, which means that jobs, and often education for jobs by distant learning, are available internationally, as are visa applications and access to processes. Mahroum[2] and Findlay[3] have commented that certain sets of skills and competencies are so specialised or in such short supply that they are being sourced globally.

The impact of this migration is most keenly felt in sub-Saharan Africa, where comparative figures from the 1970s and 1980s to the 1990s demonstrate that 7 out of 8 sub-Saharan countries experienced a decline in physicians per 100,000 in the 1990s. Thus the physician to population ratio has stagnated or declined in nearly every sub-Saharan country since 1960, such that, for example, out of 48 African countries, 13 had fewer than 5 physicians per 100,000.[4]

These issues are not unique to Africa. The Philippines, Haiti, Thailand, Jamaica, Sri Lanka, Pakistan, Bangladesh, and others have experienced similar declines. This out-migration of physicians results in the waste of substantial training dollars and the years for the home countries to train replacements.[5]

A number of schemes have been or are currently being explored to stem or counter this problem. For example, the

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International Organization for Migrations recently launched a programme on Migration and Development for Africa, which tries to encourage the temporary or long-term return of skilled workers in general as well as "virtual returns" through video link-ups to skilled members of the diaspora to teach at home.[6] Most recently, a consortium of authors called for national strategies backed by international reinforcement, given that this crisis in human resources is a shared problem requiring shared responsibility for cooperative action. They recommended alliances for action that would strengthen the performance of all existing actors while expanding space and energy for fresh actors.[7]

**The Urban-Rural Disparity Issue**

The issue of out-migration of health care workers from developed to developing countries further compounds long-standing intra-country disparities between urban centres and rural environs. In general, rural areas have lower availability and quality of local health facilities with adequate staffing. Further, it is often more difficult to gain access to health services due to distance, transportation, road infrastructure, and geographical factors.[8,9] Thus populations in rural locations tend to have fewer resources and less access to preventative health services such as immunisations, screenings, sanitation, and clean water. Consequently, rural populations experience an increased prevalence in preventable conditions such as parasitic infections and complications of childbirth, and have higher infant and adult mortality rates. Because the number of health care workers is limited in these areas, every loss significantly decreases access to care.[4] Yet levels of out-migration, which rose in the last decade, are projected to further increase as health care workers such as nurses are "poached" by developing countries which recruit from areas such as the Philippines and sub-Saharan Africa to fill their own shortages.[10]

Virtually all countries, developing and developed, experience this disparity. For example, rural populations in Africa, Asia, Latin America and the Caribbean make up 80% of the population lacking adequate sanitation. The Global Water Supply and Sanitation Assessment 2000[11] found the greatest disparity in water supply in sub-Saharan Africa and studies have shown similar differences in Latin America and the Caribbean.[12,13] Poor sanitation/hygiene and contaminated drinking water allow faecal-oral transmission of bacteria and viruses and is also important in the transmission of intestinal parasites. In 1998, the rate of infection by 1 or more parasites in Ortigueira, Brazil was 93% in rural schoolchildren compared to 22% in urban schoolchildren.[14] Rural populations of South Korea have also experienced a disproportionate prevalence of infection by parasitic organisms such as hookworm, *Enterobius vermicularis*, and *Ascaris lumbricoides*.[15]

Compounding this problem is the tendency for rural populations to seek medical treatment less often than their urban counterparts.[16] Untreated, intestinal parasites can cause significant cognitive and developmental delays due to anaemia, iron and vitamin A deficiencies, and by causing or exacerbating malnutrition.[17] Coincidentally, a significant disparity exists between the rural and urban prevalence of stunting. In Guatemala and Peru, more than half of all children with delayed growth are located in rural areas. In Brazil and the Dominican Republic, the prevalence of stunting in rural areas is more than 2.5 times greater than that in urban areas.[18] Access to care for these children is important because cognitive and developmental delays are largely preventable. In the case of hookworm, roundworm and whipworm infections, appetite and weight improvements have been noted in undernourished children after a single-dose treatment.[17]

Access to health care is an important factor in higher rural maternal and infant mortality rates as well. A large disparity exists between rural and urban populations with regard to access to obstetric care and maternal mortality. In West Africa, 80% of rural women give birth at home without any skilled care and only 11% give birth in a hospital. In contrast, 69% of women living in urban locations give birth with a skilled provider and 89% give birth in a health facility. A study by Ronsmans et al[19] found that maternal mortality was 601 per 100,000 in rural areas compared to 241 per 100,000 in urban areas.[19] Infant mortality rate (IMR) is another important area of disparity. Although IMR has decreased significantly over the past 30 years, the difference between municipal and non-municipal IMR in Thailand has been increasing steadily since 1964.[20] Similarly, infant mortality in Brazil fell 40% in the late 1990s while IMR differences between rural and urban areas increased.[18]

The gap between the urban and rural, and the "haves and have-nots", is increasing in India as well. Due to policies that have heavily favoured urban development over the past 50 years, almost 75% of India's health infrastructure, medical manpower and other health resources are located in urban areas, where only 27% of the population resides. Largely preventable contagious and water-borne diseases cause over twice the number of deaths per year in rural areas than in urban areas,[21] and immunisation rates are consistently and significantly lower for children living in rural locations.[22] These disparities illustrate the need for specific policy directed towards improving the health structure, workforce and other resources and programmes of rural populations globally.

**Addressing the Urban-Rural Disparity through A Workforce Approach**

In 1990, the Illinois State Legislature passed the Rural

Downstate Health Act, which shortly thereafter became law. The act was designed to improve access to health care services in rural downstate areas and designated shortage areas of the state. At the time, Illinois ranked sixth worse in the US in terms of the number of counties short of physicians. Funding for this act was not however appropriated until FY 1994. At that time, the Rural Medical Education (RMED) programme, which had been conceptualised and called for several years before, was initiated with the charter class entering the University of Illinois, College of Medicine-Rockford in August 1993. Additional state funding was provided in 1997.

*Early Programme Development*

RMED was a natural extension of the Rockford curriculum, which provides for the long ambulatory training for medical students in the US. From the middle of the second year of medical school (in a 4-year curriculum) through graduation in the fourth year, medical students had been assigned to one of the University's primary care clinics for 1 day/week. This experience with an assigned cohort of patients allowed medical students to more fully understand and appreciate the longitudinal nature of disease. This was particularly important given the increasingly shorter hospital stays and the presence of increasingly acute patients. By graduation, medical students in Rockford had developed their own patient panels.

The early development of RMED included the designation of RMED as a statewide programme, identifying rural teaching hospitals and rural preceptors, and partnering with other rural health entities such as the Illinois Rural Health Association. It was also critical that the RMED curriculum was fully integrated into the existing curriculum by the faculty curriculum committee.

*Student Recruitment and Development*

RMED was initially designed to identify, recruit and train Illinois students whose homes were in rural locales. A number of these students were disadvantaged in their application to medical school by virtue of not having the benefit of more advanced biology/chemistry classes in rural high schools, and so, initially, were not as competitive for major state universities. Some had sought other professions, but all expressed a keen desire to enter medicine. Their entry into medical school was facilitated by the creation of a rural recruitment and retention committee, made up not largely of faculty, but rather of rural practitioners, nurses, school officials, hospital administrators, and even a farmer or two. The recruitment and retention committee was developed to identify applicant characteristics that would predict a high probability of commitment and follow through. RMED planning strategists perceived that the traditional admission decision makers – medical school faculty members – might not have sufficient insight into RMED's target applicant pool to judge the likelihood of their success.

After an initial screening, this committee interviewed all applicants to determine those best committed to a rural practice of medicine. This advisory committee judges the merits of each candidate through a unique interview process conducted in Rockford, which is separate from the regular admissions process. In addition to meeting application and admission requirements to the University of Illinois, College of Medicine, RMED candidates must complete an application to the RMED programme. The RMED application form requests information about the applicant's ties to their home community, interest in primary care, community involvement, extracurricular activities, leadership experience, connections with their local health care professionals, and their perceptions of the role of health care professionals in their home community. The applicants must also list three people from their home community who can describe their suitability for RMED.

Once a student's RMED application is complete, he or she is screened by a faculty committee. Screening criteria include consideration of the student's dedication to primary care practice in rural Illinois, the strength of the student's roots in a rural community, academic background in relation to the RMED curriculum, and evidence of leadership and community involvement. The faculty screening committee selects about 25 candidates for interviews by the retention and recruitment committee. Interviews are held during the third week of January at the Rockford, Illinois campus. Those who are chosen for the RMED programme are notified following formal acceptance by the University of Illinois, College of Medicine. Under the arrangements, those students accepted into medical school sign a pledge that following residency in primary care, they will locate their practice in a rural community. It is also important to understand that once students have been accepted into RMED, an ongoing effort is made to achieve strong bonding between the students and faculty, as well as with rural preceptors. A similar relationship between such bonding and the unique success of the medical education programme at the Christian Medical School in Vellore, India was described by G Chandy at the December 2004 Asia Pacific Medical Education Conference in Singapore.

*Present Curriculum*

The RMED curriculum begins by exposing students in the M1 year to a breadth of rural health issues. During the first year of medical school, RMED students enrol in "Foundations in Rural, Family and Community Medicine I". The RMED M1 year orients students to the larger, macro-structural forces impacting the health and welfare of rural communities – emphasising their interconnectedness

to the practice of population-based family medicine. In preparation for careers as rural physicians, the first-year RMED curriculum provides students with a broad overview of current health-related topics – integrating community/public health and family medicine in the context of rural settings.

In stark contrast to memorising the detailed and voluminous minutiae conveyed in other M1 courses, the goal here is to provide students with a "big picture" understanding of rural health care and health care delivery. While some sessions will have more obvious clinical ramifications than others, all are "patient-centered" in that they are geared towards maximising or enhancing the health of individuals within a community setting. Emphasis in the M1 year is less on treatment modalities and disease pathology, though some topics (e.g., mental health) may touch upon these. However, all material is presented in a manner beneficial for the future practice of rural family medicine. An orientation to rural health issues, health resource development in rural communities, farm/agricultural safety, and a comprehensive presentation of an actual rural family case history comprise several of the M1 RMED sessions.

Thus, the M1 curriculum focuses on 5 objectives:

1. RMED students will begin to develop an understanding of the ways in which physicians can interact with their communities to enhance health.
2. RMED students will begin to develop an understanding of core concepts underlying the specialty of family medicine.
3. RMED students will also:
   - be exposed to a curricular experience that highlights the importance of integrating public/community health and medical models;
   - gain an appreciation for how larger, structural forces may impact the health of individuals within given geographic and ethnic populations;
   - begin to develop an understanding of pertinent health issues in rural America and specifically in rural Illinois;
   - be introduced to the concepts of COPC (Community-oriented Primary Care) and begin formulating project topics; and
   - be encouraged to take time for reflection and self-assessment to view the "big picture" of health and illness within a community context and begin to consider goals for senior rural preceptorship, residency, and future practice, and be encouraged to develop adult learning skills, such as negotiating, active learning, problem solving, and consensus building.
4. Along with faculty, community physicians, and other health care providers, RMED will offer opportunities for students to support one another in reinforcing and pursuing their career aspirations as rural family practitioners.
5. Lastly, RMED will broaden for students the acceptable roles and responsibilities of rural family physicians in maintaining/enhancing the health/well-being of individuals – both within and outside the context of the examination room. This includes assuming leadership positions to impact rural health policy at the local, state and national levels.

The M2 year is a preclinical curriculum that addresses pertinent issues commonly encountered by practicing rural physicians, including the psychosocial and behavioural dimensions of various illnesses. During this year the RMED student enrols in "Foundations in Rural Family and Community Medicine II", within which the nexus between community health and the individual patient is more clearly defined. Emphasis is more on social aetiology rather than treatment modalities, though sessions are typically balanced with a complement of clinical perspectives. An orientation to residency training, ethical issues in rural practice, and the upcoming fourth-year COPC research project conclude the M2 curriculum and serve as a segue into the clinical years.

Thus, there are 6 key objectives in the M2 year:

1. RMED students participate in preclinical didactic training, and an introduction to clinical medicine via the ambulatory clinics, all supplemented by the RMED curriculum.
2. RMED students continue to develop an understanding of the core concepts underlying family medicine and primary care:
   - comprehensive patient care;
   - continuity of care;
   - patient education;
   - doctor-patient relationships/communication; and
   - family context.
3. RMED students will consider the cultural, psychosocial, and behavioural dimensions of various clinical conditions commonly encountered in rural Illinois.
4. In preparation for graduate training, RMED students increasingly learn more about the structure and composition of these programmes as well as the relevant factors to consider when choosing a programme, and how to identify "best fit".
5. RMED students become cognizant of various ethical issues associated with practice in a rural community.
6. RMED students begin to translate basic knowledge of

a COPC into a working understanding of how a COPC can effect desired change in the health status of a local population, and how such efforts may be practically implemented during the required fourth-year 16-week rural preceptorship.

The M3 RMED year is used to prepare students for a 16-week rural preceptorship during the M4 year. Evening sessions are held monthly and use both didactic and small-group formats.

The M3 RMED curriculum focuses on 3 objectives:

1. Increasing awareness and understanding of community structure and assessment, by introducing concepts like "windshield analysis" and presenting material from resource texts.
2. Reviewing the process of COPC and having students begin to prepare for specific projects to be implemented as part of the M4 rural preceptorship and later presented as part of the medical school's Research Day.
3. Providing opportunities to discuss issues of primary care in rural areas, professionalisation of the physician, and future practice opportunities in Illinois.

The M4 RMED students are involved in a 16-week rural preceptorship training. This focuses on clinical skill development in a rural setting, implementation of a COPC project, and study of the rural community's social, economic, cultural and political structure. There are currently 23 sites for the experience in Illinois. All the rural hospitals have an affiliation with the medical school, and the preceptors enjoy faculty status. While clinical practice remains the focal point in the M4 year, service learning through community leadership and involvement continues to be a high priority.

*Outcomes*

To date, there have been some 118 RMED graduates. Of these graduates, 65 (55%) are currently in practice, 50 (42%) are in residency, and 2 (2%) are in fellowship. Of the graduates in practice, 55 (85%) practice in primary care, 48 (74%) practice in Illinois, of which 44 (68%) practice in rural Illinois. Thus, the programme has begun to achieve its targeted endpoints.

*Toward Building a Rural Health Workforce*

Given the success of RMED, discussions led to consideration of how this programme could be expanded to other health professions, given the shortages of nurses, pharmacists, dentists and others in rural Illinois. The concept of developing an interdisciplinary centre that included other health professions received enthusiastic support. In May 2000, the Illinois Board of Education, with the full support of the University, created the Center for Rural Health Professions Education, Evaluation and Research (RPEER). The RPEER mission is defined as an interdisciplinary, collaborative initiative to improve health and health care delivery, and related economic outcomes, of rural communities through education, evaluation and research. The goals of the Center are to:

1. Meet the health care needs of rural Illinois residents through collaborative projects involving multiple health professionals.
2. Emphasise recruitment, retention, and health care delivery initiatives that will positively impact the health and well-being of both rural residents and communities.

RPEER interdisciplinary partners include family medicine, nursing, pharmacy, public health, social work, and dentistry. Like RMED, the RPEER programme was designed by taking an "evidence-based" approach – looking at and talking with directors of other centres in the US to determine the optimal configuration of a rural-focused, interdisciplinary programme. The major components of the Center consist of health professions education, faculty development, community outreach, and health education, research and evaluation. Unique to the RPEER Center is its joint emphasis on community-based education and interdisciplinary clinical training.

*Building a National Centre*

For several years, RMED and RPEER existed in parallel, but in November 2003, the Board of Trustees of the University unanimously voted to combine both of these programmes into a National Center for Rural Health Professions. The Center has since continued to house the abovementioned programmes, but, in addition has, through multiple partners, begun to provide pre-professional education that creates awareness of various health careers, with particular emphasis on rural communities. For undergraduate and graduate students, the National Center has conducted rural interdisciplinary health professions training, focused attention on the retention of rural practitioners through continuing education, and begun to provide "community profiles" through the community outreach component. More recently, the National Center for Rural Health Professions received an award of more than US$6 million to promote and develop all these activities.

Although, the final outcomes from these multiple programmes are not totally known at this point, the early data, particularly from RMED, are most encouraging. We further believe that it is not necessarily so that success is assured in developing countries, nor is failure in lesser developed countries. Rather, commitment, dedication to these ideals, a willingness to undertake unique approaches, and adaptation to specific societal and cultural needs may be the overriding indicators in positively impacting on these disparities. As Nsiah-Asare stated in his October

2004 keynote speech at the Congress of the Netherland Society of Tropical Medicine, "*Capacity-building is a strong instrument in turning brain drain into brain gain*". Policy makers should initiate strategies to attract and retain health professionals. This particularly includes, but is not limited to, the creation of opportunities for local training and career development.

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