



# Osteopathic Physicians and International Medical Graduates in the Rural Primary Care Physician Workforce

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**BACKGROUND AND OBJECTIVES:** Primary care physician (PCP) shortages are a longstanding problem in the rural United States. This study describes the 2005 supply of two important components of the rural PCP workforce: rural osteopathic (DO) and international medical graduate (IMG) PCPs.

**METHODS:** American Medical Association (AMA) and American Osteopathic Association (AOA) 2005 Masterfiles were combined to identify clinically active, non-resident, non-federal physicians aged 70 or younger. Rural-Urban Commuting Area codes were used to categorize practice locations as urban, large rural, small rural, or isolated small rural. National- and state-level analyses were performed. PCPs included family physicians, general internists, and general pediatricians.

**RESULTS:** DOs comprised 4.9% and IMGs 22.2% of the total clinically active workforce. However, they contributed 10.4% and 19.3%, respectively, to the rural PCP workforce, although their relative representation varied geographically. DO PCPs were more likely than allopathic PCPs to practice in rural places (20.5% versus 14.9%, respectively). IMG PCPs were more likely than other PCPs to practice in rural persistent poverty locations (12.4% versus 9.1%). The proportion of rural PCP workforce represented by DOs increased with increasing rurality and that of IMGs decreased.

**CONCLUSIONS:** DO and IMG PCPs constitute a vital portion of the rural health care workforce. Their ongoing participation is necessary in addressing existing rural PCP shortages and handling the influx of newly insured residents as the Patient Protection and Affordable Care Act (ACA) comes into effect. The impact on rural DO and IMG PCP supply of ACA measures intended to increase their numbers remains to be seen.

(Fam Med 2012;44(6):396-403.)

The persistent shortage of primary care physicians (PCPs) in the rural United States<sup>1-5</sup> may be exacerbated as millions of rural Americans gain insurance

coverage through the provisions of the Patient Protection and Affordable Care Act, P.L. 111-148 (ACA). This anticipated additional demand should coincide with the

implementation of ACA provisions intended to increase PCP supply, the combined effect of which on rural PCP supply is not yet possible to determine. This study describes the 2005 contribution of clinically active rural osteopathic (DO) and international medical graduate (IMG) PCPs and discusses this within the context of the changing rural primary care practice environment.

Access to health care depends on many factors, but most basic of these is the presence of providers. In particular, a high proportion of PCPs to population served has been associated with better health status.<sup>6-9</sup> The need for primary care in rural areas is great because the rural population is generally older, sicker,<sup>10,11</sup> and less well insured than its urban counterpart and yet rural areas are severely underserved. Because changes in PCP supply, the foundation of rural health care, can affect access for already at-risk populations, it is important to understand the contribution of various types of PCPs in rural settings. DOs and IMGs are

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two essential, and mutually exclusive, components of the rural PCP workforce.

Historically, DOs have made valuable contributions to health care in rural and underserved locations, and IMGs have likewise contributed in these areas. Many colleges of osteopathic medicine (COMs) are committed to training PCPs, emphasizing service in rural and underserved communities. As is true of DOs, IMGs' relative presence in rural areas varies geographically. However, IMGs' overall importance in rural health care is undeniable, as they provide substantial levels of staffing for community health centers and critical access hospitals (CAHs).<sup>12</sup> As US-educated allopathic physicians' (USMDs) interest in primary care has declined, DOs and IMGs have been filling residency slots left empty by them,<sup>13</sup> further increasing the importance of these two groups to rural primary care.

## Methods

We used the 2005 American Medical Association (AMA) and American Osteopathic Association (AOA) Masterfiles to determine physician supply. Physicians included in this study were non-federally employed, clinically active, and aged 70 years or younger. Clinically active physicians were identified in the data file as having a major professional activity of office based, hospital staff, or locum tenens. We excluded physicians whose primary professional activity included research, teaching, and/or administration as well as resident physicians, as they have not yet selected a practice location. We excluded federally-employed physicians because access to them is often limited to special populations, and their ability to choose their practice location is also limited. Of the remaining physicians, those with missing specialty or Rural-Urban Commuting Area (RUCA) information (n=93) were excluded. Of the 559,709 clinically active physicians in the combined AMA and AOA Masterfiles who met study

criteria, 532,479 (95.1%) were MDs and 27,230 (4.9%) were DOs.

We included IMGs who met study criteria but could not adequately differentiate US citizens educated outside the United States, Puerto Rico, or Canada versus foreign nationals. Of the 5,952 rural PCP IMGs, 13.6% were identifiable as US born; however, 46.3% of these IMGs were missing birth country information, and it was impossible to determine what percentage of these might be US citizens.

We categorized physicians according to their self-designated primary specialty. Primary care specialties, as defined by the US Government Accountability Office,<sup>13</sup> included family medicine (family physicians and general practitioners), general internal medicine, and general pediatrics.

We used zip codes to identify physician primary practice location as closely as possible and linked the zip code approximation of the RUCA taxonomy, version 2.0, by zip code to physician practice location. RUCA codes offer a more flexible way of differentiating among rural and urban areas and can define locations with more precision than county-based taxonomies. RUCA codes classify zip codes into 33 categories according to core population and work commuter flow patterns.<sup>14</sup> We categorized RUCAs into urban, large rural, small rural, and isolated small rural areas. Both size and functional connection to larger areas were considered in assigning RUCA categories.

We identified Persistent Poverty counties using the 2004 Economic Research Service (ERS) Policy Type County Typology codes. The ERS defines a Persistent Poverty county as any county in which 20% or more of the residents were classified as poor in each of the previous four censuses, 1970 through 2000.<sup>15</sup>

Estimated 2004 population data came from the 2004 Claritas zip-level demographic database and served as the denominator for calculating physician per 100,000 population ratios.<sup>16</sup> All analyses were completed using SPSS, Version

11.0.4. Tests of statistical significance were not used because the study included the population of virtually all clinically active physicians and associated residential populations. Tests of significance under these conditions would yield significant results even for very small differences, so any meaningful differences would return significant results upon testing.

The University of Washington Human Subjects Division issued a Certification of Exemption for this study.

## Results

### *Rural, Primary Care DOs*

In rural areas overall, there were 3,213 DO PCPs compared to 21,682 USMD PCPs and 5,952 IMG PCPs. DOs were more likely than MDs to specialize in primary care and to locate in rural practices. DOs comprised 4.9% of all study physicians, 7.8% of all PCPs (data not tabled), and 10.4% of all rural PCPs (Table 1). Among all DOs, 57.5% were PCPs, but among USMDs this figure was 32.8%, and among IMGs it was 41.2% (data not tabled). In rural areas overall, there were 5.7 DO PCPs per 100,000 population, a result higher than the 5.3 DO PCPs per capita figure in urban locations (Table 2).

Rural DO PCPs were more likely than rural USMD or IMG PCPs to practice in small and isolated small rural areas (Table 3). As a proportion of the PCP workforce, in large rural areas DOs made up 9.1% of all PCPs, in small rural areas 11.0%, and in isolated small rural areas reached 14.5% of all PCPs (Table 1). In contrast, rural DO PCPs were less likely (7.8% of all rural DO PCPs) to practice in rural persistent poverty areas than either USMD or IMG PCPs (9.3% and 12.4%, respectively) (Table 3).

While nationally DOs contributed 10.4% of the total rural PCP workforce, their contribution among states was extremely variable. DOs represented more than 20% of rural PCPs in Missouri (32.2%), Oklahoma (26.4%), West Virginia (22.9%),

**Table 1: USMDs, DOs, and IMGs as a Percent of All PCPs Within RUCA Category**

RUCA Categories	Urban	Rural Overall	Large Rural	Small Rural	Isolated Small Rural
<b>PCP Workforce</b>	n=169,966	n=30,847	n=17,358	n=9,153	n=4,336
	%	%	%	%	%
<b>USMD PCPs (n=134,067)</b>					
<b>PCPs overall</b>	<b>66.1</b>	<b>70.3</b>	<b>71.2</b>	<b>69.6</b>	<b>68.3</b>
Family medicine	24.4	45.7	40.3	51.8	54.1
General internal medicine	25.8	16.4	20.1	12.4	10.3
General pediatrics	15.9	8.2	10.7	5.4	3.9
<b>DO PCPs (n=15,644)</b>					
<b>PCPs overall</b>	<b>7.3</b>	<b>10.4</b>	<b>9.1</b>	<b>11.0</b>	<b>14.5</b>
Family medicine	5.8	8.9	7.5	9.6	13.4
General internal medicine	1.1	1.2	1.2	1.2	0.9
General pediatrics	0.4	.03	0.4	0.2	0.2
<b>IMG PCPs (n=51,502)</b>					
<b>PCPs overall</b>	<b>26.6</b>	<b>19.3</b>	<b>19.7</b>	<b>19.4</b>	<b>17.3</b>
Family medicine	6.5	6.1	5.2	7.3	7.1
General internal medicine	13.8	9.7	10.2	9.3	8.5
General pediatrics	6.3	3.5	4.2	2.9	1.6
<b>% within RUCA category</b>					
	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>% of total PCPs</b>					
	<b>84.6</b>	<b>15.4</b>	<b>8.6</b>	<b>4.6</b>	<b>2.2</b>

USMDs— US-educated allopathic physicians  
 IMGs—international medical graduates  
 PCPs—primary care physicians  
 RUCA— Rural-Urban Commuting Area

Michigan (22.8%), and Iowa (22.7%) but less than 3% in Massachusetts (0.7%), Louisiana (1.1%), Nebraska (2.2%), Wyoming (2.3%), North Dakota (2.4%), and North Carolina (2.9%) (Figure 1).

#### *Rural, Primary Care IMGs*

IMGs were more likely than USMDs to specialize in primary care but less likely to do so than DOs. They were also less likely than US medical graduates (both allopathic and osteopathic physicians) (USMGs) to practice in rural locations. IMGs comprised 22.2% of all study physicians, 25.4% of all PCPs (data not

tabled) and 19.3% of rural PCPs (Table 1). Among all IMGs, 41.2% were PCPs compared to 32.8% for USMDs and 57.5% for DOs (data not tabled). In rural areas there were 10.6 IMG PCPs per 100,000 population, a result lower than the 19.1 IMG PCPs per capita in urban areas (Table 2).

Rural IMG PCPs were more likely to practice in rural persistent poverty counties (12.4% of all rural IMG PCPs) than either USMDs (9.3%) or DOs (7.8%), and they were also more likely than USMGs to practice in large rural areas (Table 3). However, as a proportion of the rural PCP workforce, their relative

representation declined as degree of rurality increased. In large rural areas, 19.7% of the total PCP workforce was made up of IMGs, while in small rural areas that figure decreased to 19.4% and in small isolated rural areas it reached a low of 17.3% (Table 1).

Although nationally IMGs accounted for 19.3% of rural PCPs, state-level analyses highlighted the variability of their contribution. In seven states IMGs represented more than 30% of the rural PCP workforce: Florida (51.6%), New Jersey (41.8%), Delaware (38.7%), New York (35.5%), West Virginia

**Table 2: USMD, DO, and IMG PCPs/100,000 Population**

	Urban	Rural Overall	Large Rural	Small Rural	Isolated Small Rural
<b>USMD PCPs</b>					
<b>PCPs overall</b>	<b>47.5</b>	<b>38.6</b>	<b>43.5</b>	<b>40.7</b>	<b>24.3</b>
Family medicine	17.5	25.0	24.6	30.3	19.3
General internal medicine	18.5	9.0	12.3	7.2	3.7
General pediatrics	11.4	4.5	6.5	3.2	1.4
<b>DO PCPs</b>					
<b>PCPs overall</b>	<b>5.3</b>	<b>5.7</b>	<b>5.6</b>	<b>6.4</b>	<b>5.2</b>
Family medicine	4.2	4.9	4.6	5.6	4.8
General internal medicine	0.8	0.6	0.7	0.7	0.3
General pediatrics	0.3	0.2	0.2	0.1	0.1
<b>IMG PCPs</b>					
<b>PCPs overall</b>	<b>19.1</b>	<b>10.6</b>	<b>12.0</b>	<b>11.4</b>	<b>6.1</b>
Family medicine	4.7	3.3	3.2	4.2	2.5
General internal medicine	9.9	5.3	6.3	5.4	3.0
General pediatrics	4.5	1.9	2.6	1.7	0.6

USMDs—US-educated allopathic physicians

IMGs—international medical graduates

PCPs—primary care physicians

**Table 3: Percent of Rural USMD, DO, and IMG PCPs Practicing Within Each RUCA Category and Within Persistent Poverty Locations**

	USMD PCPs	DO PCPs	IMG PCPs
<b>Number of Rural PCPs</b>	n=21,682	n=3,213	n=5,952
	%	%	%
Large rural	57.0	49.2	57.5
Small rural	29.4	31.3	29.9
Isolated small rural	13.7	19.5	12.6
Total %	100.1*	100.0	100.0
Rural Persistent Poverty	9.3	7.8	12.4

USMDs—US-educated allopathic physicians

IMGs—international medical graduates

PCPs—primary care physicians

\* Rounding error

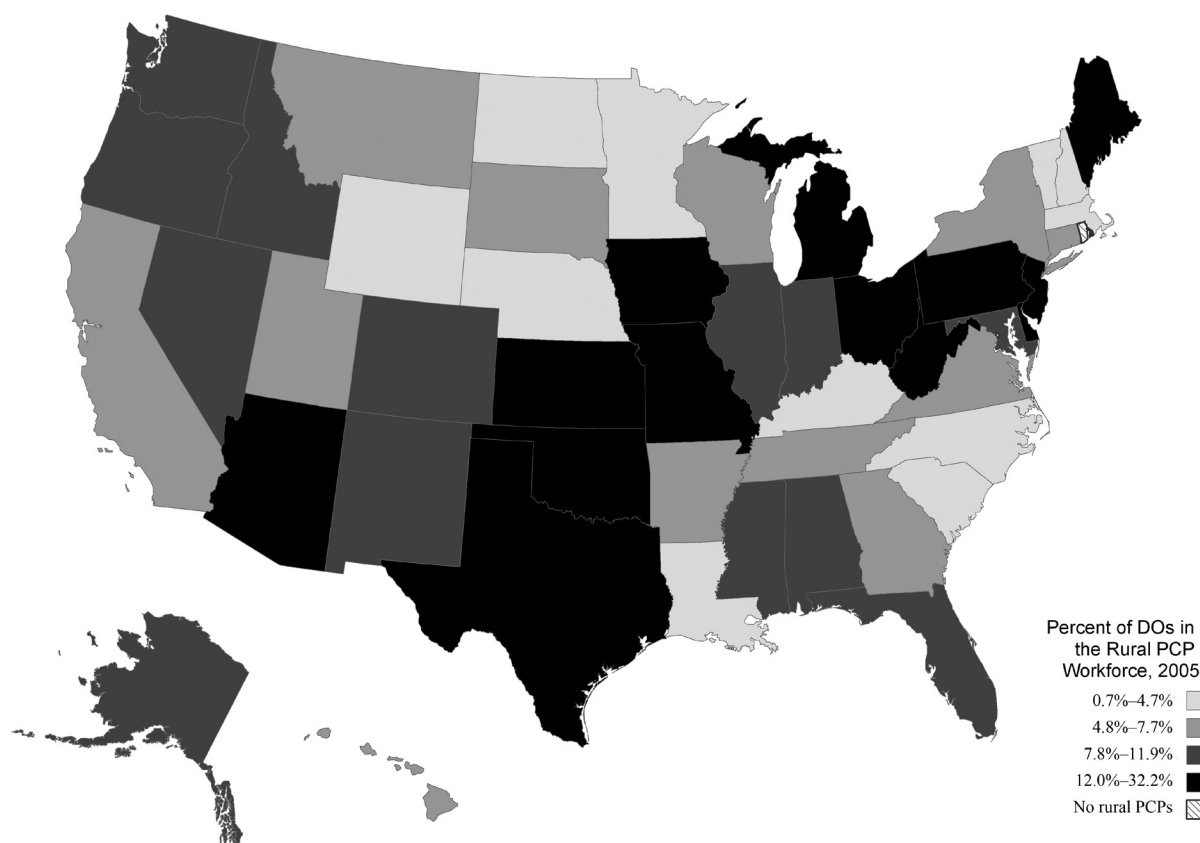
The percent of PCPs within each physician type practicing in urban areas was:

83.8% of all USMD PCPs

79.5% of all DO PCPs

88.4% of all IMG PCPs

Figure 1: DOs as a Percentage of the Rural PCP Workforce



Map date: August 2010. Sources: AMA and AOA master files

(34.5%), Maryland (33.3%), and Illinois (32.9%). Five states had less than 6%: Idaho (1.5%), Vermont (4.0%), Colorado (5.3%), Alaska (5.5%), and Montana (5.7%) (Figure 2). However, behind these percentages can lie substantial differences in the size of each state's rural PCP workforce and, therefore, the actual number of IMGs. For example, in New Jersey IMGs made up 41.8% of the rural PCP workforce while in Missouri it was only 16.2%. However, in Missouri there were 155 rural PCP IMGs while in New Jersey there were 28.

### Discussion

Higher PCP-to-population ratios have been shown to be related to better health status,<sup>6-9</sup> and health care systems based on primary care are also generally acknowledged to be the most effective in lowering

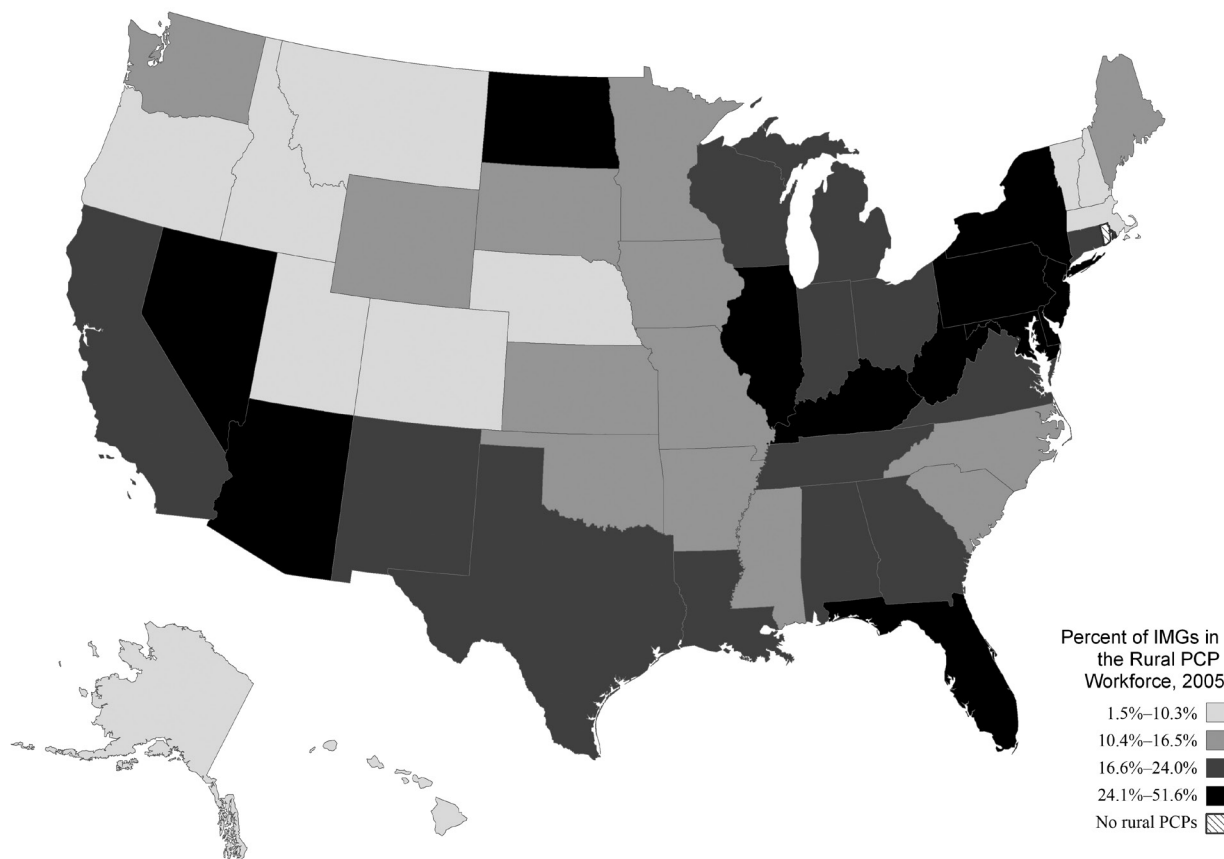
overall mortality and reducing cost.<sup>9,17-20</sup> However, as millions more Americans become insured through ACA, demand for primary care providers, already in short supply, will be greatly increased,<sup>21</sup> and although enrollment in both allopathic and osteopathic medical schools has increased, interest in primary care specialties has declined. Without adequate supply of PCPs to meet the upsurge, access to care will become increasingly compromised, especially in rural areas where existing shortages of PCPs currently jeopardize access to health care.

This study examined the 2005 contribution of DO and IMG PCPs to rural health care, thus offering insight into the role these physicians may play as ACA legislation is enacted. DOs represented 10.4% of all rural PCPs and in five states contributed over 20% of the rural PCP workforce.

They were more likely than MDs to practice in small and isolated small rural areas. IMGs also made a substantial contribution, 19.3%, to the rural PCP workforce, and IMG PCPs were more likely than USMGs to practice in rural persistent poverty locations. The percentage of the total rural PCP workforce represented by DO PCPs was shown to increase as rurality increased, underscoring the importance of these physicians in places where physician supply is most fragile.

DOs have a long history of selecting rural practice,<sup>3,22</sup> and their impact has been considerable. Frenzen<sup>3</sup> found DOs contributed up to 36% of physicians in nonmetropolitan counties in some states, and our study has shown they continue to contribute substantially to rural primary care, with the level of their participation varying geographically. In



**Figure 2: International Medical Graduates (IMGs) as a Percentage of the Rural PCP Workforce**

Map date: August 2010. Sources: AMA and AOA master files

Missouri they made up more than 32% of the rural PCP workforce, and of the 143 nonmetropolitan counties that had only one PCP almost 19% of these were DOs.

There are currently 26 accredited Colleges of Osteopathic Medicine (COMs) at 34 separate locations in 25 states.<sup>23</sup> Ten new campuses opened between 2000 and 2009, increasing first year DO enrollment by 30% between 2000 and 2008.<sup>24</sup> Many of these COMs are responding to rural PCP shortages by emphasizing delivery of primary care to rural and other underserved areas in their region. Pacific Northwest University of Health Science in Washington State, for example, preferentially enrolls students from the region and from rural areas who have an interest in primary care. These are the types of

future physicians who are most likely to enter practice in the area and have a commitment to rural primary care service.<sup>25</sup>

However, DOs are increasingly selecting non-primary care specialties,<sup>24,26,27</sup> and there are no guarantees that increased numbers of medical students will translate into increased numbers of PCPs, much less rural PCPs. More and more, DOs are entering Accreditation Council for Graduate Medical Education (ACGME)-approved residencies, particularly primary care specialties.<sup>24,28</sup> It is anticipated that traditional osteopathic postdoctoral programs will not be able to accommodate the influx of new DO graduates and that DOs will be turning to ACGME residencies in even greater numbers.<sup>29</sup> There is concern that in the future,

as the number of both allopathic and osteopathic physicians grows, there will be increasing competition for entry into ACGME residencies, with DOs being at a disadvantage.<sup>29</sup> It is unknown how this would impact primary care residencies where direct competition between MDs and DOs has not yet been an issue.

Increasing enrollment in COMs offers both opportunities and challenges. If COMs are successful in their commitment to produce rural PCPs, osteopathic physicians have the opportunity to build upon and expand their historical presence in rural health care. The challenge for osteopathic medicine will be to turn around the relative decline in interest in primary care and ensure sufficient numbers of primary care residencies are available to

DOs. Ongoing research is needed to track the role of DO PCPs in rural health care as the influence of current trends and ACA provisions continues to unfold.

IMGs also play a crucial role in rural primary care, providing 19% of rural PCPs and filling slots in ACGME primary care residencies left vacant by USMDs. Between 1981 and 2001 the percent of all rural PCPs who were IMGs increased.<sup>30</sup> They are also more likely than USMGs to practice in Rural Persistent Poverty locations, providing an invaluable service in these high need areas. In 1996 it was estimated that if all primary care IMGs were removed, one in every five adequately served non-metropolitan counties would become underserved and that the percent of non-metropolitan counties with a physician shortage would increase from 30% to 44.4%.<sup>31,32</sup> CAHs, located in isolated rural areas, comprise an important and growing segment of small rural hospitals. Approximately one quarter of all CAH admitting physicians are IMGs,<sup>33</sup> and in 16% of CAHs, IMGs account for more than half of the medical staff.<sup>12</sup> Changes in the flow of IMGs to rural areas could affect these hospitals, of which there are currently about 1,309.

Factors influencing flow of foreign national IMGs into the United States include post-9/11 changes in visa and immigration requirements making entering and practicing in the United States more difficult for foreign physicians<sup>30</sup> and a possible proportional increase in H-1b and decrease in J-1 visas.<sup>34</sup> IMG holders of J-1 visas wishing to remain in the United States after completing their studies must obtain a J-1 visa waiver, allowing them to stay but requiring service in designated physician shortage areas. H-1b visas do not have such a service requirement. Thus, reduction in J-1 visa holders in favor of H-1b can influence the influx of IMGs to underserved rural areas. At the state level, state licensing boards can limit the international medical schools

whose graduates are permitted licensure. If the IMG workforce expansion continues, IMGs may represent a larger share of rural PCPs while overall rural PCP ratios decline as USMDs select other specialties. Continued monitoring of IMG flow to the United States and especially to rural areas is necessary for understanding the changing dynamics of rural health care and the role of IMGs in it.

Other workforce issues are in play that provide a more complete context for the information presented here. For example, the PCP workforce is aging. We determined that, as of 2005, 27.5% of non-metropolitan physicians were 56 or more years old. There is also the possibility that changes in the roles of nurse practitioners and physician assistants may influence provision of rural health care. The overall effect of all these developing trends, while not examined here, raises serious policy questions about the future of rural primary physician supply and the roles that will be played by primary care physicians, nurse practitioners, and physician assistants.

The recently enacted Patient Protection and Affordable Care Act, P.L. 111-148 has a number of provisions aimed at bolstering the primary care workforce that may induce DOs and IMGs to continue choosing rural primary care careers. For example, the ACA's Title VII rural physician training grants aim to assist medical schools in recruiting students who are most likely to practice in underserved areas, provide rural-focused training and experience, and increase the number of physicians who practice in underserved areas. This provision should help support COMs in their mission to train rural DOs. At the residency level the ACA allows preexisting, unused Medicare-funded residencies to be reallocated to teaching hospitals in underserved areas, with 75% of slots reassigned to either primary care or general surgery. Moreover, the law creates "teaching health centers" under Title VII to train primary care

medical and dental residents in Federally Qualified Health Centers and a few other settings. This is a very important departure from how physicians have been paid previously for their graduate training through the Medicare Graduation Medical Education (GME) system, as teaching health centers will help balance the current hospital-focused GME training with the realities of ambulatory primary care practice. Eleven of these centers have already been established.<sup>35</sup> The ACA also proposes expanding National Health Service Corps (NHSC) funding for scholarships and loan payment awards for PCPs practicing in underserved areas, which will help all types of physicians choose rural practice. Primary care extension centers to provide technical assistance to primary care providers are also planned. Finally, the law seeks to narrow the income gap between PCPs and other specialists. Therefore, PCPs will receive Medicare incentive 10% bonus payments, a plan that is currently being implemented.<sup>35</sup> If not changed, these provisions should strengthen rural primary care, although several years will be needed to determine the law's impact.

This study has several limitations. Physician supply estimates could be affected by lag time in updating AMA information.<sup>36</sup> Physician self-reporting of specialty and practice zip code information is known to contain inaccuracies, although at a level considered acceptable.<sup>37</sup> The number of patient care DOs in this study before exclusions is about 11% smaller than that cited in a 2004 work from the Robert Graham Center,<sup>38</sup> possibly introducing an undercount of patient care DOs. However, if this is the case, then the DO contribution in rural areas is likely to be even greater than indicated in this study.

## Conclusions

PCP DOs and IMGs make vital contributions to rural health care, and in several locations their impact is far greater than their national-level proportions would suggest. However,

recent declines in PCP production when coupled with rural population growth, aging, and the influx of millions of persons who will be newly insured through ACA will place major stresses on rural PCP supply. The possibility of competition between USMDs and DOs for primary care residency slots and the effect of fewer J-1 visa holders on PCP supply in rural persistent poverty locations are also of concern. Whether COM expansion, the favorable ACA rural primary workforce provisions, and other factors will yield enough new rural PCPs to meet this surge in demand remains to be seen. Ultimately, an adequate supply of rural PCPs will only be achieved when the professional, economic, and social needs of rural providers are met. Much needs to be done to address this issue.

**ACKNOWLEDGMENTS:** This study was funded by the Health Resources and Services Administration, Office of Rural Health Policy, through HRSA Grant #6 UIC RH 00011-0.

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