Residents of the United States lack universal access to health care, and millions of people have difficulty obtaining medical care.1,2 The year 2005 marked the 40th anniversary of one of the nation’s most enduring attempts to remedy this problem: the creation of community health centers (CHCs) as part of the “war on poverty.”3-8 The national importance of these centers has grown during the ensuing 4 decades, and the federal government provides funding through a variety of categorical mechanisms under the collective term federally qualified health centers. CHCs provide medical, dental, and mental health care for migrant workers, the uninsured, the homeless, and others in need, and the number of people they have served has expanded rapidly in the 21st century.9

The role and responsibility of CHCs have increased as more people in the United States have difficulty gaining access to medical care.10 CHCs now provide care to more than 14 million US residents in more than 3500 communities.9 Governed by nonprofit boards with majority representation from the patient population served, CHCs are different from the private practices and for-profit entities that deliver most ambulatory care in the United States.11

A national decision to invest further in CHCs has occurred during a period when access to health care in the United States is limited for more people...
than ever before in the country’s history.10,12,13 Ongoing plans include a
5-year initiative that will increase federal spending on CHCs by at least $2.2
billion through fiscal year 2006 and substantially increase the number of
treated patients.14-17

We examined the status of the health care workforce in CHCs in the United
States, with particular attention to the types of personnel who are most diffi-
cult to recruit and retain. Rural health care delivery systems are smaller and
less well staffed than their urban counterparts; 20% of the US population lives
in rural areas but only 9% of physicians practice there.18,19 We therefore
also examined whether workforce shortages are more acute in rural CHCs
and whether rural and urban CHCs differ in their staffing patterns, the source
of their clinicians, and their ability to retain clinicians.

METHODS

The study was undertaken by the Rural Health Research Centers of the Uni-
versity of Washington and the University of South Carolina and the National
Association of Community Health Centers (NACHC). A questionnaire was
created and pretested with the assistance of an advisory committee com-
posed of representatives from the Office of Rural Health Policy, Bureau of
Primary Health Care (BPHC), and Bureau of Health Professions, all compo-
nents of the Health Resources and Services Administration of the US Public
Health Service. For questions about perceived barriers to recruitment, respon-
dents answered on a 4-point scale (1=not important, 4=important), and
the answers were dichotomized into im-
potant or not important. The survey
instrument and research methods were
reviewed and approved by the Office of
Management and Budget and by the in-
stitutional review boards of the partici-
pating universities.

The study population included the
890 nonprofit organizations that re-
cieved funding from the federal govern-
ment’s Section 330 Consolidated Health
Center Program17 and reported data to
BPHC’s Uniform Data System (UDS) as
of 2004. We excluded grantees that did
not directly provide general clinical ser-
vices or were outside of the 50 states and
the District of Columbia, leaving a sam-
ping frame of 846 grantees.

The survey instrument was mailed
to the chief executive officer of each
grantee, with a cover letter from
NACHC, on May 7, 2004. A reminder
postcard was sent on May 21, and a sec-
ond mailing and questionnaire with a
new cover letter was sent to nonrespon-
dents on June 11. After 2 mailings, all
nonrespondents from rural CHCs were
surveyed by telephone between Sep-
tember 2 and 17 and asked a subset of
the original questions restricted to cli-
ician supply issues. The final re-
sponse rate was 79.3%, ranging from
85.3% for the largest grantee category
(CHCs without other federal funding
sources) to 50.9% for the CHCs that re-
cieved funding solely as homeless cen-
ters. Rural grantees’ response rate (in-
cluding the minimal data set obtained
by telephone) was 97.5%; urban cen-
ters’ response rate was 68.5%. Exclud-
ing the 2 categories of centers with re-
sponse rates below 60% did not change
the results.

Urban and rural designations are
based on the ZIP code version of the Ru-
ral-Urban Commuting Area (RUCA)
classification system.20,21 Because of dif-
ferential response rates between organi-
zations in urban and rural locations,
as well as regional differences, survey re-
sults were weighted to make them na-
tionally representative. Weights were
tested by being applied to survey re-
sponses and comparing the results with
UDS variables, including CHC type, size,
and patient population. Many CHCs
have multiple clinical sites, but each re-
ports data to the federal government only
in aggregate. Therefore, the results re-
ported apply to the grantee as a total en-
tity and not individual clinical sites.

The information from the returned
questionnaires was coded and data
were entered for analysis. The data
were checked for systematic errors
during routine data cleaning. When
response categories for data collected
in the UDS matched survey questions
exactly, missing data were imputed
from the 2003 UDS. The validity of
this imputation was supported by
comparison of 2004 survey data and
2003 UDS data for those items in
which the response categories were
identical, with survey results similar
for each category and around 10%
higher than UDS, consistent with the
1-year program growth. The source of
data on number of patient visits was
the 2003 UDS. Means were compared
using t tests, and proportions were
compared using χ2 tests. All tests were
2 sided, and significance was set at
P<.05. Data analysis was performed
with SPSS statistical software version
11.5 (SPSS Inc, Chicago, Ill).

RESULTS

Location, Structure, and Staffing
The majority of CHCs (62.8%) in the
United States are funded as CHCs only
(TABLE 1). An additional 114 grantees
that grew out of the initial CHC program;
neither as stand-alone entities or in con-
junction with CHCs. An additional 93
grantees (11.0%) are either migrant
health centers (MHCs) or a combina-
tion of CHCs and MHCs. The other 108
health centers represent institutions
with other funding combinations.

As a group, US CHCs are in the pro-
cess of expanding their capability of
providing services, with 66.3% of the
grantees planning to do neither.
One of the most important determi-
nants of the structure and function of
the CHCs is whether they are located in
urban or rural areas. Urban grantees are
much more likely to receive their fund-
ing from categorical grant programs that
grew out of the initial CHC program;
46.5% of urban grantees receive some or
all of their funding from the newer fund-
ishing streams compared with 21.6% of the
rural grantees (P<.001). Rural CHCs
have a mean of 30.9 clinical full-time
equivalents (FTEs) compared with the
urban CHCs, with a mean of 51.8 FTEs;
rural centers serve a mean of 9921 patients and have a mean annual budget of $4,615,639, compared with urban grantees who serve 16,536 patients and spend $4,615,639, compared with urban grantees.

The main objective of CHCs is the provision of primary care services, and their clinician mix reflects this mission (Table 2). Primary care physicians comprise 89.4% of CHC physicians. Family physicians are the single largest category of specialists in both rural and urban centers, accounting for 48.1% of the total physician staff. Urban grantees employ more internists and pediatricians, but even in these settings the total number of family physicians equals the combined number of internists and pediatricians.

Obstetrician/gynecologists and psychiatrists represent less than 10% of the CHC physician workforce and are more likely to be found among urban grantees. There are few other specialty physicians; “other specialist physicians” account for only 2.6% of the total number of physicians employed by the CHCs, from the 2003 UDS. Of the grantees, 62.5% of those from rural areas and 28.8% of those from urban areas employ only physicians from the 3 primary care fields.

The physician staff is complemented by a substantial number of primary care nonphysician clinicians, represented by nurse practitioners, physician assistants, and certified nurse midwives. In rural CHCs, 46% of the direct clinical providers of care are nonphysician clinicians compared with 38.9% in urban CHCs. Urban grantees are more likely to employ nurse practitioners. The distribution of nurse midwives is similar to that of obstetricians.

The CHCs have a large complement of registered nurses, with a mean of 3.8 FTEs for rural grantees and a mean of 5.7 FTEs for the urban grantees. Mental health clinicians and dentists are present in most of the CHCs; the number of dentist FTEs in urban areas is almost twice that of their rural counterparts. Pharmacists are commonly found in both settings.

### Table 2. Staffing Pattern in US Health Centers, by Rural-Urban Location for Selected Clinical Disciplines, 2004

<table>
<thead>
<tr>
<th>Grantee Type</th>
<th>No. of Clinical Sites per Grantee, Median (Range)</th>
<th>No. (%)</th>
<th>Mean No. in 2003†</th>
<th>Encounters per FTE Physician in 2003</th>
<th>Planning to Expand</th>
<th>Planning to Expand Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHC only</td>
<td>3 (1-21)</td>
<td>531 (62.8)</td>
<td>453 (85.3)</td>
<td>247 (46.5)</td>
<td>11,115</td>
<td>43,792</td>
</tr>
<tr>
<td>CHC/MHC</td>
<td>5 (1-26)</td>
<td>80 (9.5)</td>
<td>67 (83.8)</td>
<td>44 (50.0)</td>
<td>21,571</td>
<td>86,059</td>
</tr>
<tr>
<td>Homeless only</td>
<td>7 (1-88)</td>
<td>57 (6.7)</td>
<td>59 (50.9)</td>
<td>1 (1.8)</td>
<td>5512</td>
<td>26,437</td>
</tr>
<tr>
<td>CHC/homeless</td>
<td>6 (1-27)</td>
<td>57 (6.7)</td>
<td>44 (72.2)</td>
<td>4 (7.0)</td>
<td>18,387</td>
<td>69,553</td>
</tr>
<tr>
<td>CHC/school health</td>
<td>8 (1-30)</td>
<td>35 (4.1)</td>
<td>21 (60.0)</td>
<td>6 (17.1)</td>
<td>26,546</td>
<td>119,546</td>
</tr>
<tr>
<td>MHC only</td>
<td>6 (1-19)</td>
<td>13 (1.5)</td>
<td>10 (76.9)</td>
<td>6 (46.2)</td>
<td>5081</td>
<td>16,638</td>
</tr>
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<td>6 (46.2)</td>
<td>5081</td>
<td>16,638</td>
</tr>
<tr>
<td>All others, without CHC‡</td>
<td>2 (1-32)</td>
<td>17 (7.0)</td>
<td>9 (52.9)</td>
<td>1 (5.9)</td>
<td>3654</td>
<td>14,554</td>
</tr>
<tr>
<td>All others, with CHC§</td>
<td>11 (1-59)</td>
<td>56 (6.6)</td>
<td>38 (67.9)</td>
<td>6 (10.7)</td>
<td>30,320</td>
<td>119,591</td>
</tr>
<tr>
<td>Homeless only</td>
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<td>5081</td>
<td>16,638</td>
</tr>
</tbody>
</table>

Abbreviations: CHC, community health center; FTE, full-time equivalent; MHC, migrant health center.

*Data are from the 2004 survey except as noted.

†2003 Data are from the Bureau of Primary Health Care’s Uniform Data System.

‡There were fewer than 10 usable responses in this category.

§“All others” includes other grantees with combinations of funding from migrant, homeless, housing, and school-based programs.
gate shortages are for family physicians. The average CHC has 13.3% of its family physician FTEs unfilled and is currently recruiting for 0.6 family physicians. Rural CHCs report significantly higher proportions of unfilled positions and more difficulty recruiting family physicians than their urban counterparts, and more than one third of rural grantees have been recruiting for a family physician for 7 or more months. It would require more than 400 FTE family physicians to fill all of the vacancies for this discipline.

As a percentage of vacancies, some of the greatest recruitment difficulties are for obstetrician/gynecologists and psychiatrists, with more than 20% of funded positions unfilled and greater difficulty in recruiting found in rural CHCs. Because there are relatively few funded positions for obstetrician/gynecologists and psychiatrists in CHCs, the average grantee was recruiting for only 0.1 FTE of each of these types of physicians at the survey.

Dentists are also in high demand and short supply. The aggregate demand for dentists is greater than for other nonphysicians, and almost half of the rural grantees have had vacant dentist positions for 7 or more months. By contrast, there is less difficulty reported in recruiting nurse practitioners and physician assistants, without significant rural-urban differences.

Federal and State Recruitment Programs

There are a number of governmental programs used by CHCs to increase the flow of clinicians to underserved areas, which are widely used by rural and urban grantees alike (Table 4). These data reflect only clinicians who are currently participating in one of these programs. The number of CHC physicians and dentists who benefited from these programs would be higher if alumni of these programs were included.

There are 3 general categories of recruitment incentives: educational scholarships, in which medical and dental students incur subsequent service paybacks; loan repayment for service in designated shortage areas; and J-1 visa waivers for international medical graduates (IMGs). Of these, loan repayment is the most frequently used. Eight hundred thirty-three (14.5%) of the physicians currently working in CHCs and 348 (22.6%) of the dentists in CHCs were receiving either federal or state loan repayment. Rural programs had a greater proportion of their staff in each of these programs. Of the current rural physician staff, 44.5% are enrolled in one of these programs, almost twice as great a proportion as within urban CHCs.

CHCs in general and rural grantees in particular are dependent on IMG physicians. Of the rural CHCs, 37.6% have current physician staff who have been given J-1 visa waivers that allow them to practice in designated shortage areas. Because some IMGs change their immigration status after several years of working in the United States and no longer depend on J-1 visa waivers to remain in the country, the total number of IMGs working in CHCs is almost certainly higher than that listed in Table 4.

The pattern is similar for dentists, with 32.6% of current rural dentists either previous recipients of National Health Service Corps (NHSC) scholarships or currently receiving loan repayment from

### Table 3. Vacancies for Funded Clinician Positions in US Health Centers, by Discipline and Rural/Urban Location, 2004

<table>
<thead>
<tr>
<th></th>
<th>Vacancy Proportion</th>
<th>Grantees Reporting That Recruiting Is Very Difficult</th>
<th>Grantees Reporting That Longest Currently Open Position Is Unfilled for ≥7 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Vacancies, FTE</td>
<td>% Rural, % Urban, %</td>
<td>P Value</td>
</tr>
<tr>
<td>Physicians</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other clinical staff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dentist</td>
<td>313.0</td>
<td>18.5</td>
<td>26.7 [2.51]</td>
</tr>
</tbody>
</table>

Abbreviation: FTE, full-time equivalent.

*Comparing rural vacancy proportion vs urban vacancy proportion.

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Recruitment Barriers and Incentives

We asked respondents to indicate all of the issues that they perceived as preventing recruitment of physicians and nurses. The inability to offer a competitive compensation package was consistently seen as a barrier to recruitment of rural and urban physicians and nurses (Figure). The lack of spousal employment opportunities, lack of cultural activities and opportunities, lack of adequate housing, and poor-quality schools were perceived as disproportionately greater barriers for rural centers.

Three potential interventions were selected by the majority of both urban and rural CHCs as tools that would improve recruitment: better capacity to provide annual salary increases, more NHSC loan repayment slots, and greater visibility of CHCs as desirable practice opportunities during training. Urban centers were significantly more likely than their rural counterparts to identify an increase in the number of minority graduates from health professional training programs as a useful strategy (44.6% vs 28.3%, P < .001). Other interventions were mentioned by less than one third of respondents.

Comment

Our results show that in 2004, CHCs were understaffed and were having difficulty recruiting essential health care personnel. This inability to fill budgeted vacancies could become a rate-limiting factor as they seek to expand their clinical activities to care for needy populations, particularly in rural areas.

The clinical role of CHCs is dependent on primary care clinicians, both physicians and nonphysician clinicians. This is occurring in a national environment in which primary care in general has lost popularity as a practice discipline. For example, the US production of family physicians has decreased rapidly in the last 7 years, with the number of US medical graduates matching in family medicine declining 51.6% from 1997 to 2005. Filling the existing CHC vacancies would absorb 20% of the 2005 output from the family medicine residencies. Physician turnover in CHCs is rapid, with a large proportion of physicians leaving after discharging their scholarship obligations or paying off their loans. Because family physicians have traditionally been much more likely than other disciplines to provide care to underserved populations, the declining production of family physicians may lead to serious workforce shortages, particularly in rural CHCs.

The high proportion of unfilled positions for obstetrician/gynecologists and psychiatrists also constitutes a problem, even though CHCs employ relatively few of these or other specialists to provide care. Inability to recruit these specialists may impair the ability of CHCs to provide a full spectrum of obstetric and psychiatric services to their clientele. Shortages of dentists are also particularly acute, reflecting the national shortage of dental services for the poor and uninsured.

Rural-Urban Differences in Staffing and Workforce Demand

CHCs are a disproportionately important part of the rural health care system. Many rural areas have large vulnerable populations. Poverty, combined with isolation and low population densities, makes it increasingly difficult to provide an appropriate spectrum of health services to these populations. Although only 20% of the population lives in rural counties, 37.2% of CHCs are located in these areas.

Our study indicates that rural CHCs have more difficulty than their urban counterparts in recruiting and retain-

Table 4. Participation in Selected State and Federal Programs Among Physicians and Dentists in US Health Centers, 2004

<table>
<thead>
<tr>
<th>No.</th>
<th>Rural, %</th>
<th>Urban, %</th>
<th>P Value</th>
<th>Total, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>No. (%) [SE]</td>
<td>No. (%) [SE]</td>
<td></td>
<td>No. (%) [SE]</td>
</tr>
<tr>
<td>NHSC scholarship</td>
<td>114 (7.4) [0.86]</td>
<td>224 (5.3) [0.72]</td>
<td>.06</td>
<td>338 (5.9)</td>
</tr>
<tr>
<td>NHSC loan repayment</td>
<td>210 (13.7) [1.31]</td>
<td>315 (7.5) [0.75]</td>
<td>&lt;.001</td>
<td>525 (9.1)</td>
</tr>
<tr>
<td>State loan repayment</td>
<td>101 (6.6) [0.89]</td>
<td>206 (4.9) [0.62]</td>
<td>.12</td>
<td>306 (5.3)</td>
</tr>
<tr>
<td>J-1 visa waiver</td>
<td>258 (16.8) [2.15]</td>
<td>277 (6.6) [0.83]</td>
<td>&lt;.001</td>
<td>535 (9.3)</td>
</tr>
<tr>
<td>Total</td>
<td>44.5</td>
<td>24.3</td>
<td>29.6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Rural, %</th>
<th>Urban, %</th>
<th>P Value</th>
<th>Total, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentists</td>
<td>No. (%) [SE]</td>
<td>No. (%) [SE]</td>
<td></td>
<td>No. (%) [SE]</td>
</tr>
<tr>
<td>NHSC scholarship</td>
<td>21 (5.2) [1.60]</td>
<td>32 (2.8) [0.84]</td>
<td>.18</td>
<td>53 (3.4)</td>
</tr>
<tr>
<td>NHSC loan repayment</td>
<td>79 (20.0) [2.59]</td>
<td>161 (14.1) [1.57]</td>
<td>.05</td>
<td>240 (15.6)</td>
</tr>
<tr>
<td>State loan repayment</td>
<td>29 (7.4) [1.92]</td>
<td>79 (6.8) [1.06]</td>
<td>.83</td>
<td>108 (7.0)</td>
</tr>
<tr>
<td>Total</td>
<td>32.6</td>
<td>23.8</td>
<td>26.0</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: FTE, full-time equivalent; NHSC, National Health Service Corps.

* Rural and urban numbers do not equal total due to rounding. FTEs are rounded to the nearest whole number.
ing an adequate workforce, with rural physician vacancy rates higher for every discipline studied except internists. Rural CHCs face some unique recruitment challenges and often lack the services and amenities that are sought by health professionals, factors that have been shown to be relevant to rural workforce recruitment and retention.37,38 One of the most effective ways to attract rural health professionals is to train people from rural backgrounds in programs with a rural emphasis.39,40 Unfortunately, declining emphasis on these programs and the decrease in the number of rural students applying from and being accepted to medical schools41 portend greater difficulties for CHCs and other clinical entities in attracting adequate personnel.42

Limitations

We were unable to receive responses from about 20% of the health centers. However, a response rate of 79.3% for this type of study is high. Moreover, the availability of the 2003 UDS allowed us to impute selected workforce data for centers that did not respond. Information about vacancies is, however, not available in the UDS. The designation of a grantee as rural or urban was based on the location of the grantee’s administrative office, as provided by NACHC. Because most grantees have more than 1 clinical site, some grantees have clinical programs in rural and urban areas. However, 81.9% of the grantees are entirely rural or entirely urban.

The data presented are weighted national estimates, which are designed to compensate for differences in urban and rural response rates, for differences in response across program type, and for geographic variations in reporting. To the extent that differences between respondents and nonrespondents affect their clinical staffing experience, weighted national estimates may not be entirely accurate.

Although the respondents reported that the difficulty in recruiting physicians and nurses has increased some-what during the last 2 years, this study is cross-sectional, so that we were not able to measure whether vacancies have increased as well. The ongoing expansion of CHCs, coupled with decreasing production of primary care physicians, suggests that workforce shortages may become more important in the years ahead, but future studies should track these changes.

Interpretation of our results is limited by the absence of published benchmarks. Although there appears to be a high proportion of vacancies for selected specialties in this study, there are no data available on what constitutes an expected or acceptable pattern of vacancies for clinicians in ambulatory care settings.

Policy Implications

This study suggests that workforce shortages may impede the expansion of the US CHC safety net, particularly in rural areas. During a time when serious shortages of physicians, nurses, and dentists are widespread, CHCs may face increasing competition for these essential personnel.31,43,44 The precipitous decline in the proportion of physicians choosing generalist careers may be the rate-limiting step in the nation’s ability to staff CHCs and may lead to renewed shortages of safety-net and rural physicians generally.45

Recruitment and retention of health care professionals has been a major problem for CHCs since their inception.3,46-48 Federal programs such as the NHSC, augmented by state loan repayment and J-1 visa waivers, remain important sources of CHC clinical personnel49-53 and our study suggests that they remain important recruitment tools. The chief executive officers of the CHCs identified a number of other interventions that they believe would improve workforce supply, including better salaries, more loan-repayment slots, and greater visibility of CHCs during training. Rural and urban centers had similar responses, even though rural centers are more dependent on federal recruitment programs as a source of physicians and dentists.

These findings suggest several policy options for federal and state government and for the CHCs themselves:

1. Bolster Title VII of the Health Professions Educational Assistance Act. This is the only federal program that exists to encourage the production of primary care clinicians likely to practice in underserved areas and has been successful in improving the supply of primary care practitioners in underserved settings,54-57 but its proposed funding has decreased substantially.58

Figure. Perceived Barriers to the Recruitment of Physicians and Registered Nurses, by Location

P <.001 for all pairwise comparisons except excessive workload for physicians (P = .03), compensation for physicians (P = .28), and compensation for nurses (P = .02).
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2. Augment the use of nurse practitioners and physician assistants as physician substitutes, particularly in urban clinics where the proportional use of physicians is higher.25,29

3. Create new alliances between primary care training programs and CHCs.

4. Expand the NHSC and related state programs that provide financial incentives for health care clinicians who serve in underserved locations.30

These programs have more than 30 years of experience in this effort, and the statutory and organizational machinery exists to expand them.33 This expansion would also make health professional education more available to less affluent segments of the US population.

5. Experiment with new approaches to loan repayment to improve retention of physicians who satisfactorily complete their initial contractual obligations, such as a loan repayment program that continued to pay year-to-year retention bonuses.

6. Given the socioeconomic problems that afflict many rural communities, additional incentives may be needed to entice clinicians to rural areas, particularly to communities without the amenities that attract physicians and their families. One approach would be to expand programs, such as the Medicare incentive payment program, which use financial incentives as a magnet.34

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Study concept and design: Rosenblatt, Curtin, Hart.

Acquisition of data: Rosenblatt, Curtin, Hart.

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REFERENCES


Every man who knows how to read has it in his power to magnify himself, to multiply the ways in which he exists, to make his life full, significant and interesting.

—Aldous Huxley (1894-1963)