Cite this article as:
R Riportella-Muller, D Libby and D Kindig
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*Health Affairs* 14, no.2 (1995):181-191
doi: 10.1377/hlthaff.14.2.181

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The Substitution Of Physician Assistants And Nurse Practitioners For Physician Residents In Teaching Hospitals

by Roberta Riportella-Muller, Donald Libby, and David Kindig

Abstract: This study documents features of clinical departments in teaching hospitals that are using physician assistants (PAS) and nurse practitioners (NPs) to perform some tasks previously done by medical or surgical residents. More than 60 percent of teaching hospital medical directors surveyed reported experience with substitution in their hospitals. The experience overall appears to be positive; one-third of the departments are planning to increase the number of PAS and NPs they use. The results imply that some of the services lost in housestaff reductions called for in many physician workforce reform proposals could be provided by alternative health professionals.

Interest in the practice of using nonphysician providers to carry out certain tasks previously performed by physician resident staff has been growing since the 1970s. Recent policy discussions have considered the use of nonphysician providers to decrease the number of residents training in highly specialized programs in a variety of contexts. A recent study analyzed in depth the types of tasks that substitute providers perform. Others have described task-specific substitution of nurse practitioners (NPs) and/or physician assistants (PAS) for physician residents in individual programs or have investigated the quality of care and satisfaction with substitution in different specialty programs. These studies have focused on individual providers or single programs and have little value in generalizing to the broader range of settings in which substitution may take place. The 1981 report by Henry Perry and colleagues about experience with substitution in surgery programs is the only such study that has nationwide scope; in addition to being outdated, however, it is limited by its focus on surgical specialties.

The call for national health care workforce reform has created a need for documentation on the substitution of nonphysician providers for physicians across the country. The Council on Graduate Medical Education...
(COGME) has recommended an overall reduction in the nation’s physician supply and the number of physicians-in-training; this would cause some training institutions to seek alternative professionals to provide the care that resident physicians now provide. Our review of the literature on resident substitution reveals the absence of a comprehensive national overview of recent experience with substitution in all specialties from the perspective of institutions. Therefore, this study has several aims: (1) to document the extent to which substitution is taking place in the clinical departments of teaching hospitals; (2) to describe the characteristics of the departments within which substitution is taking place; and (3) to register any reported constraints associated with the practice of substitution under which these departments now operate. We accomplish these goals with a national survey of all member institutions of the Council of Teaching Hospitals (COTH).

For the purposes of this study we define substitution as the actual completion of one or more tasks by a person other than the one originally intended to complete such tasks. We distinguish this from role enhancement, the use of one person to go beyond what others do, usually with the intent to improve the overall outcome of the service provided. The intent of this study is to document the general experience of using nonphysician providers to perform tasks previously performed by physician residents; we did not gather data about substitution for specific tasks. It would be an appropriate next phase to add to the work of James Knickman and colleagues with more detailed explanations of the specific types of tasks that nonphysician providers substitute for or enhance in teaching hospital settings. The data provide evidence that NPs and PAS are performing tasks that in the past have been performed by resident house staff. About half of the PAS and one-third of the NPs were reported to be primarily substitutes for residents; the rest were partial substitutes with substantially more role enhancement. We include nonphysician providers with major or minor role overlap in our description of substitution practices, and we exclude those with no resident role overlap at all.

The national survey. Initial postcard screeners were mailed to medical directors of 391 hospitals belonging to COTH, a voluntary association. The screeners were returned by 73 percent (286) of COTH medical directors. Using American Hospital Association (AHA) data, we compared responding and nonresponding hospitals. Our comparison indicated no major differences in bed size, ownership, or geographic location, so we consider this self-selected sample to be fairly representative of all COTH member hospitals in the United States.

Sixty-two percent (178) of responding medical directors reported that substitution was occurring at their hospitals, in 463 clinical departments. A
questionnaire was then mailed to the 463 identified contact persons. This questionnaire was designed to provide information on organizational staffing practices and was subjected to tests for content validity by a panel of experts in health services research, and clinicians and educators in nursing and the physician assistant fields, and by a pretest of twenty programs.

Questionnaires were returned by 325 of the departments (70 percent), which were located in 144 of the 178 hospitals surveyed (81 percent). However, only 255 of 325 responding clinical departments (78 percent) were eligible for the survey: Forty-two (13 percent) were ineligible because the respondent indicated that NPs and PAS were used only to enhance, rather than substitute for, the work of residents; one PA surgical resident training program was excluded from the analysis because in this case all of the “residents” were PAS rather than medical doctors; sixteen (5 percent) were ineligible because they did not employ NPs or PAS; and eleven surgical departments (3 percent) did not complete the questionnaire because they thought our use of the term medical resident to describe physicians-in-training did not refer to surgical residents.

Survey respondents generally were involved in the daily operations of their department, so we consider them to be reliable key informants on the substitution of nonphysician providers for physician residents. Most (81 percent) labeled themselves as the chair, chief, or director. Others included those in administrative positions (7 percent), attending physicians (4 percent), supervisors (5 percent), and secretaries (2 percent).

Experience With Physician Assistants And Nurse Practitioners

Physician assistants are used to perform some tasks previously done by physician residents in 116 programs, nurse practitioners in seventy-seven, and both are used in sixty-two (Exhibit 1). A total of 178 (70 percent) departments employ PAS, and 139 (54 percent) employ NPs to perform tasks previously done by medical or surgical residents. Of the 178 departments using PAS as substitutes, most (42 percent) are surgical, followed by primary care departments (25 percent) and medical subspecialties (21 percent). Of the 139 departments substituting NPs for residents, most are primary care departments (39 percent), followed by specialty medicine (24 percent) and surgery (23 percent). Of note, PAS are more likely than NPs to substitute in surgery and emergency departments, while NPs are more likely than PAS to substitute in pediatrics and neonatal care departments. The vast majority of these clinical departments use professionals who are credentialed in some way.

Departments vary widely in terms of staff size and other nonphysician provider employment characteristics (Exhibit 2). Of the reporting 170
Exhibit 1
Distribution Of Departments Where Nurse Practitioners And Physician Assistants Are Performing Some Tasks Previously Done By Resident Physicians, By Provider Type

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Physician assistant only</th>
<th>Nurse practitioner only</th>
<th>Both</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>General surgery</td>
<td>20</td>
<td>17.2%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Surgical specialties</td>
<td>36</td>
<td>31.0%</td>
<td>14</td>
<td>18.2%</td>
</tr>
<tr>
<td>Internal medicine</td>
<td>16</td>
<td>13.8%</td>
<td>11</td>
<td>14.3%</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>1</td>
<td>0.9%</td>
<td>15</td>
<td>19.5%</td>
</tr>
<tr>
<td>Other primary care</td>
<td>5</td>
<td>4.3%</td>
<td>8</td>
<td>10.4%</td>
</tr>
<tr>
<td>Emergency</td>
<td>14</td>
<td>12.1%</td>
<td>2</td>
<td>2.6%</td>
</tr>
<tr>
<td>Neonatal</td>
<td>0</td>
<td>0.0%</td>
<td>15</td>
<td>19.5%</td>
</tr>
<tr>
<td>Other specialty</td>
<td>10</td>
<td>8.6%</td>
<td>8</td>
<td>10.4%</td>
</tr>
<tr>
<td>Unspecified</td>
<td>14</td>
<td>12.1%</td>
<td>6</td>
<td>7.8%</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>100%</td>
<td>77</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: National survey of teaching hospitals.

Surgical specialties include cardiovascular and thoracic surgery (12); orthopedics (12); obstetrics/gynecology (12); neurosurgery (7); urology (6); ophthalmology (1); ear, nose, and throat (1); and other surgical subspecialties (8). Internal medicine includes departments of medicine (26) and internal medicine or general internal medicine (12). Other primary care includes family medicine (3), prevention (1), and ambulatory clinics (16). Other specialty includes hematology/oncology (6), cardiology (6), pediatric subspecialties (3), psychiatry (5), anesthesiology (2), gastroenterology (1), neurology (1), and geriatrics (1). Unspecified includes multidepartment services (11), administrative divisions (2), other departments not elsewhere classifiable (2), and department specialty not ascertained (15).

The total and subtotals of departments employing PAS are obtained by adding the first column with the third column. To obtain the total and subtotals for NPs, add the second column with the third column. Not all totals equal 100 percent because of rounding errors.

Clinical departments that use PAS as resident substitutes, the mean number in a program was 5.14 PAS, with a range from 1 to 31 and a median of 3. Of the reporting 128 clinical departments that use NP’s as resident substitutes, the mean number in a program was 5.94 NPs, with a range of 1 to 48 and a median of 4.

Nonphysician providers were being used to substitute for physician residents in the first five postgraduate years of residency (the only years given as choices on the questionnaire). Most of the clinical departments used both types of nonphysician providers beyond the first postgraduate year (mean postgraduate year for PAS was 2.85; for NPs, 3.03). Of the 165 reporting departments that use PAS to substitute, more than 53 percent are using them at the postgraduate year three level; almost 62 percent of the departments using NPs are also at that level, with 15 percent and 18 percent, respectively, using these substitutes for the postgraduate year five. We cannot tell from these data whether the substitutes are performing highly skilled or less skilled.
PAs or NPs have been employed in these clinical departments for an average of 7.4 years, which corresponds to their initial hiring in about 1985, and all but two hospitals continue to hire such providers. The 151 PA departments that reported on total numbers employed a total of 714 PAs as substitutes in 1991 and 771 in 1992, for an increase of about 8 percent. The 103 responding departments that use NPs as substitutes employed a total of 618 NPs in 1991 and 688 in 1992 for an 11 percent increase. Respondents estimate the expected increase in employment in 1993 to be between 20 percent and 24 percent. On average, both PA and NP clinical departments had about one current job opening for nonphysician providers that they expected to fill within the next year. Many respondents commented that the main problem they faced in hiring these providers was a lack of available candidates-two respondents estimated that there are six to nine (respectively) positions available for each qualified candidate. As several lamented, a hospital’s inability to offer competitive salaries to attract candidates for its open positions compounds the problem.

Almost all of the clinical departments we surveyed reported either maintaining their current employment configuration or expanding it by employing more staff, and/or increasing the level of substitution or enhancement. About two-thirds of the departments plan to maintain current levels of substitution, while only one-third plan to increase the extent of substitution for residents’ work by PAs or NPs. About half of the clinical departments plan to maintain the extent of PA or NP enhancement of residents’
work, and half plan to increase enhancement.

Exhibit 3 illustrates changes in staff size and composition between 1991 and 1992 for the clinical departments that provided these data. Although every kind of provider increased in absolute number between 1991 and 1992, the slower rate of increase in the number of residents caused a decline in the percentage of staff who are residents. The same pattern is more evident when comparing full-time-equivalent (FTE) distribution changes between 1991 and 1992.

We explored the staffing patterns of different types of patient care providers (Exhibit 4). Although the absolute number of nonphysician providers varies widely among departments (see Exhibit 2) the relative ratio of nonphysician providers to physicians varies in a narrower range—zero to five PAS per physician and zero to three NPs per physician (Exhibit 4). The number of residents per physician is more than twice the number of nonphysician providers per physician, on average. The negative correlations indicate that where there are fewer residents (relative to physicians) there tend to be more nonphysician providers, and conversely, departments with more residents per physician tend to have fewer nonphysician providers per physician. Although this is consistent with the notion of one provider substituting for the functions of another, these results are tentative. They are based on only sixty-eight departments that were missing no data for all types of providers, and none of the correlations reaches the .05 level of significance.

When asked, “Have you decreased the number of medical residents used

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### Exhibit 3

<table>
<thead>
<tr>
<th>Employees</th>
<th>1991</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Residents</td>
<td>4,744</td>
<td>47.2%</td>
</tr>
<tr>
<td>Physicians</td>
<td>3,972</td>
<td>39.5</td>
</tr>
<tr>
<td>PAS</td>
<td>714</td>
<td>7.1</td>
</tr>
<tr>
<td>NPs</td>
<td>618</td>
<td>6.1</td>
</tr>
<tr>
<td>Total</td>
<td>10,048</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Full-time equivalents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents</td>
</tr>
<tr>
<td>Physicians</td>
</tr>
<tr>
<td>PAS</td>
</tr>
<tr>
<td>NPs</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Source: National survey of teaching hospitals.

\(^a\) Sum of responses for all departments without missing data.
in your program because of the employment of Physician Assistants and/or Nurse Practitioners?,” the vast majority (87 percent) reported no change in the number of residents. However, 14 percent of those using PAs reported that such use has coincided with a decrease in the number of medical residents, and 13 percent of clinical departments using NPs as substitutes reported a decrease in the number of residents. It is hard to tell if the use of nonphysician providers is a cause or an effect of a slowdown in resident openings, but twenty-five of the forty-two programs that volunteered an explanation commented that PA or NP hiring followed as a result of cutbacks in residency positions or applicants.

Reasons for hiring nonphysician providers and their productivity relative to that of residents were explored in a follow-up phone survey with a subsample of twenty respondents. These interviews indicated that changes in the number of residency slots and the improved quality of care afforded by full-time, permanent workers were common reasons for expanding use of nonphysician providers. Our mail survey data confirm that hiring nonphysicians is a solution that some teaching hospitals have used to cope with declines in the size of residency programs (although that has certainly not been the primary reason for nonphysician provider employment historically). The economic feasibility of substitution in light of anticipated downsizing of graduate medical education is fully discussed elsewhere.

Forty-two clinical departments noted administrative or legal problems with using PAs to substitute for residents; thirty-one noted such problems with using NPs. Respondents mentioned hospital administrative limitations, including lengthy internal review processes complicated by lack of coordination between administrative and medical departments; budget limits for payroll financing; writing new job descriptions or changing hospital bylaws to accommodate a new class of employee; and requirements to implement a “pilot program” for formal administrative evaluation. Others described legislative hurdles imposed by county or state governments, often

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**Exhibit 4**

**Ratios Of Physician Assistants (PAs), Nurse Practitioners (NPs), And Residents Per Hospital Staff Attending Physician**

<table>
<thead>
<tr>
<th></th>
<th>PAs per physician</th>
<th>NPs per physician</th>
<th>Residents per physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.64</td>
<td>0.49</td>
<td>1.64</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.98</td>
<td>0.64</td>
<td>2.11</td>
</tr>
<tr>
<td>Minimum</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>5.33</td>
<td>3.00</td>
<td>12.33</td>
</tr>
<tr>
<td>Valid number</td>
<td>150</td>
<td>123</td>
<td>172</td>
</tr>
</tbody>
</table>

Source: National survey of teaching hospitals.

Note: Correlations are available on request from the authors.
backed by resistance from nurses’ and physicians’ professional societies.

At least three states apparently have interpreted Medicare requirements in such a way as to hamper efforts to hire nonphysician providers. Medicare regulations do not state specifically that NPs or PAs cannot be employed by hospitals or other facilities, but Medicare reimbursement is limited by the scope-of-practice laws affecting NPs and PAs in individual states. Medicare cannot reimburse these providers for services provided outside their scope of practice. Therefore, individual states’ scope-of-practice laws have been a major limiting factor to the full participation of these hospitals’ programs. Physician supervision, prescriptive authority, and scope of practice all were mentioned as legislative restraints.

Almost every respondent reported satisfaction with the experience of substitution and enhancement. Many expressed enthusiastic support from all quarters, including attending physicians, residents, nurses, and patients. Several respondents who reported overall satisfaction pointed out that there was some initial resistance to the incorporation of PAs or NPs into the medical staff, but that this subsided with familiarity and experience. Most often this was expressed as a reluctance by staff nurses to take orders from charts without physician signatures. The most intense problems seem to stem from professional rivalry or “turf battles” among PAs, NPs, nurses, and technicians, especially where there is uncertainty or confusion over the qualifications and roles of the new professionals. In a few cases, these controversies required intervention by hospital officials to establish clear guidelines with “tact and diplomacy,” as one respondent put it.

These data verify that some teaching hospitals are hiring PAs and NPs to do tasks done at other times by medical residents, in the judgment of 62 percent of responding medical directors. We cannot estimate the full extent of substitution because we have no details on the actual tasks being completed, nor do we have complete coverage of sites where substitution may occur. However, the American Academy of Physician Assistants (AAPA) estimates that of the more than 3,200 PAs in their census, at least 53 percent perform house-staff duties. Our survey has identified 771 such providers, or approximately 44 percent of the number reported by the AAPA. We believe that the remaining 56 percent are practicing in the non-COTH hospitals and clinical departments as well as the non-COTH hospitals not included in our survey. We are investigating the hiring practices of non-COTH teaching hospitals.

The Future Of Substitution

As emphasis on the need for more generalists and fewer specialists has focused attention on national health care workforce issues, new policies
that propose to decrease the number of physician residents will amplify the need for substitute providers. This study documents the extent to which clinical departments in teaching hospitals are already using PAs and NPs to perform some tasks previously done by medical or surgical residents. Knickman and colleagues have suggested the value of using PAs to substitute for residents: “It makes more sense from a public policy perspective to encourage the use of such persons, who will be available for an entire career, as opposed to residents, who work only three years before joining the already existing surplus of practicing physicians.”

Policymakers need to consider what types of financial resources, training sites, teachers, and the like would be needed to make this happen. James Cawley (for PAs) and Len Nichols (for NPs) have both provided evidence that these nonphysician providers can be cost effective in hospital settings. However, as nonphysician providers are demanding higher salaries and benefits—higher than relatively inexpensive recent medical graduates who work long hours but less than attending medical staff—the costs to hospitals of round-the-clock staffing by nonphysician providers are high. These increased salary demands gave several of our survey respondents pause as to the utility of continuing the practice of substitution. The use of nonphysician providers to substitute probably will necessitate employing a variety of different types of providers at a cost higher than teaching hospitals have borne in the past.

These additional costs will need to be justified in the long run by expected savings for the overall health care system operating with fewer physicians and fewer specialists. That is, while it may cost individual hospitals more, using PAs or NPs to substitute for medical residents may mitigate the cost to society of overproduction and overspecialization of physicians, including the medical personnel training costs associated with the production of various types of providers. National policies may need to consider this overall impact and find innovative ways to support hospitals in using nonphysician providers.

It is important to consider what effects diminishing hospital resources for market forces or cuts in Medicare and Medicaid will have on substitution of nonphysician providers for residents. To the degree that fewer resources are available and substitution is more expensive, the extent of substitution could be slowed. On the other hand, if residency positions supported by Medicare are reduced to slow aggregate physician workforce growth, some hospitals will have to invest in order to provide essential services. This may be particularly relevant in subspecialties in which revenue generation is still positive. Some policy discussions have suggested additional federal investment in NP/PA training for resident substitution in geographic areas that would be highly affected by resident reductions. In recent years it has been...
argued that nursing education institutions are ready for the challenge.\textsuperscript{20}

Finally, there remains the issue of recruitment competition. Some have expressed concern that increasing the use of nonphysician providers in teaching hospitals may limit the availability of the current pool of these providers to deliver primary care in underserved areas and in managed care settings. As long as cost-effectiveness can be demonstrated, the goals of access and efficacy should stimulate the additions to current supply that all settings demand.

This research was supported by a grant from The Robert Wood Johnson Foundation. The authors thank several anonymous reviewers for their constructive input into the presentation of this DataWatch.

NOTES


9. Seven states do not have any hospitals that belong to the council (Alaska, Idaho,
Montana, Nevada, North Dakota, South Dakota, and Wyoming). Six states (Hawaii, Iowa, Kansas, Mississippi, New Hampshire, and Oregon) and Puerto Rico had none of their twelve eligible COTH hospitals participate in the survey. Two states (Illinois and New Jersey) had fewer than 25 percent of their twenty-five COTH members responding, and the remaining states had more than 25 percent of COTH hospitals responding.


18. Stoddard et al., “Graduate Medical Education Reform.”

19. Ibid.