



## Practice characteristics of primary care nurse practitioners and physicians

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### ABSTRACT

**Background:** Projections of physician shortages, an aging population, and insurance expansions have increased interest in expanding the number of primary care nurse practitioners (PCNPs) in the United States. Although information about the number and distribution of nurse practitioners is known, there is little information about the practice characteristics of PCNPs. The purpose of this study was to identify demographic and practice characteristics of PCNPs and compare these characteristics with primary care physicians (PCMDs).

**Methods:** From November 23, 2011, to April 9, 2012, we conducted a national postal mail survey of 972 clinicians (467 PCNPs and 505 PCMDs). Questionnaire domains included compensation and billing practices; characteristics of patients treated; PCNPs' use of their own National Provider Identification number to bill services; how PCNPs spend their time; clinical and nonclinical activities performed; and whether PCNPs have privileges to admit, round on (i.e., oversee the care provided to) patients, and write orders independently of physicians. The response rate was 61.2%.

**Discussion:** PCNPs are more likely than PCMDs to practice in urban and rural areas, provide care in a wider range of community settings, and treat Medicaid recipients and other vulnerable populations. Not only do most PCNPs work with PCMDs, but also the majority of both clinicians believe that increasing the supply of PCNPs will result in greater collaboration and team practice. Although PCNPs and PCMDs deliver similar services and spend their time in nearly identical ways, PCNPs work less hours and see fewer patients, and only a handful of PCNPs have their salary adjusted for productivity and quality performance. PCNPs cite government and local regulations as impeding their capacity to admit and round on patients in hospitals and long-term care facilities and write treatment orders without a physician cosignature.

**Conclusions:** Significant differences in demographic and practice characteristics exist between PCNPs and PCMDs. Whether working independently or with

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PCMDs, increasing the number of PCNPs can be expected to expand access to primary care, particularly for vulnerable populations, and for those gaining access to health insurance through the Affordable Care Act.

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## Introduction

Health care stakeholders, including primary care clinicians, policy makers, and researchers, have suggested that increasing the supply of nurse practitioners (NPs) and physician assistants (PAs) could help mitigate the negative consequences of expected primary care physician (PCMD) shortages (Iglehart, 2013; Institute of Medicine, 2010; Ku, Jones, Shin, Bruen, & Hayes, 2011; National Governors Association, 2012). Shortages of PCMDs are expected to reach 45,000 by 2020 and grow to 66,000 by 2025 (Association of American Medical Colleges, 2011). The prospect of PCMD shortages has become an increasing concern in light of the expected increased demand for primary care services that is driven by population growth, an aging and sicker population, and insurance expansions under the Affordable Care Act (Health Resources and Services Administration, 2013). The interest in increasing the NP workforce as one means of expanding the capacity of the primary care workforce is fueled, in part, by the fact that NPs can be educated more quickly than PCMDs and because, according to many studies, NPs provide comparable quality on many dimensions of primary care (Cooper, 2001; Horrocks, Anderson, & Salisbury, 2002; Laurant et al., 2005; Munding et al., 2000; Newhouse et al., 2011; Sackett, Spitzer, Gent, & Roberts, 1974; Venning, Durie, Roland, Roberts, & Leese, 2000). Prior research by our team documented that Medicare beneficiaries who received their primary care from a primary care NP (PCNP) were more likely to be female, to be dually eligible for Medicare and Medicaid, to have qualified for Medicare because of a disability (DesRoches et al., 2013), and to cost less than care provided by PCMDs for comparable patients (Perloff, DesRoches, & Buerhaus, 2014).

In 2010, there was an estimated 56,000 PCNPs, which is about half of the total NP workforce and approximately 19% of the overall primary care workforce in the United States (Agency for Healthcare Research and Quality, 2013; Dower & O'Neil, 2011). A survey of the NP workforce conducted 2 years later by the Health Resources and Services Administration estimated 60,407 PCNPs were working in primary care practices or facilities in 2012 (Health Resources and Services Administration, 2014). The per capita supply of NPs is larger in the 16 states with the least restrictive scope of practice regulations compared with the states that restrict NP practice (Reagan & Salsberry, 2013). Although both PCNPs and PCMDs agree that there is a

national shortage of PCMDs, they disagree about the role that PCNPs should play in the leadership of clinical practice. PCMDs also express reservations about whether the quality of care will be positively affected with further expansions of the PCNP workforce (Donelan, DesRoches, Dittus, & Buerhaus, 2013). These disagreements, together with incomplete data on the current practice characteristics of PCNPs, leave policy makers uncertain about the contributions of PCNPs, their impact on access to care, and how PCNPs can optimally fit within a rapidly evolving primary care delivery system.

The 2012 National Survey of Primary Care Nurse Practitioners and Physicians was conducted, in part, to help address these uncertainties. This article provides descriptive data from the survey that address the following questions: (a) What are the demographic, education, and employment characteristics of PCNPs and PCMDs? (b) Are there systematic differences in the characteristics of the patients treated by these two groups of clinicians? (c) What are the billing practices of PCNPs and PCMDs, and how do these practices vary by practice organization characteristics? (d) Are there differences in how PCNPs and PCMDs spend their time and in the care delivery activities they provide?

## Methods

The 2012 National Survey of Primary Care Nurse Practitioners and Physicians was conducted by postal mail survey from November 23, 2011, to April 9, 2012. Eligibility for the survey was restricted to clinicians who were licensed NPs or physicians, trained in a primary care specialty, actively working in primary care practice, and providing direct patient care services. Detailed methods have been published previously (Donelan et al., 2013).

## Samples

Samples of PCNPs and PCMDs were obtained from the Nurse Practitioner Masterfile (PCNPs) and the American Medical Association Masterfile (PCMDs) from Medical Marketing Service, Inc. Physicians were randomly selected from the American Medical Association Masterfile, a comprehensive listing of all licensed physicians in the United States. We selected direct patient care physicians in an eligible specialty (general practice, family practice, internal medicine, general internal medicine, adolescent medicine,

internal medicine/pediatrics, pediatrics, and geriatric medicine). NPs were randomly selected from the Nurse Practitioner Masterfile provided by Medical Marketing Service, Inc. NPs in an eligible specialty were selected according to the same physician specialties where possible (adolescent medicine, adult Medicine, family medicine, general practice, geriatric medicine, internal medicine, pediatrics, and women's health). The initial sample included 1,914 clinicians (957 each of NPs and physicians practicing in primary care specialties). The response rate was 61.2% (calculated according to American Association for Public Opinion Research guidelines) and yielded a final analytic sample of 505 PCMDs and 467 PCNPs.

### Instrument Development

The survey instrument was developed by the research team using expert review and subject pretesting of measures and drawing from multiple prior health workforce surveys published by our team. Domains included personal and practice characteristics, perceptions of primary care shortages, scope of practice, implications of expanding the supply of PCNPs, career and job satisfaction, and career recommendations. Question and response wording are included in the tables, figures, and text.

### Data Collection

Harris Interactive, Inc. fielded the survey, which consisted of four waves of mail contact. Wave 1 was sent by U.S. priority mail and included a cover letter, questionnaire, \$35 incentive check, and a postage-paid return envelope. Waves 2 and 3 were complete packets (absent the incentive) sent by first class mail; the fourth mailing included a \$60 prepaid incentive check to encourage completion of the survey.

### Analysis

Data for analysis were weighted to account in part for differences between respondents and nonrespondents by years in practice, gender, and region. The entire sample (505 PCMDs and 467 PCNPs) was used for analyses of all personal and practice characteristics. The primary focus of our analyses was on comparing attitudes and experience of PCMDs and PCNPs in primary care settings. We first compared the overall sample of PCNPs with PCMDs using chi-square analysis. Next, we examined PCNP and PCMD characteristics comparing four practice groupings: PCNP respondents who work with a PCMD(s), PCNP respondents who do not work with a PCMD, PCMD respondents who work with a PCNP(s), and PCMD respondents who do not work with a PCNP. We used chi-square tests of significance for categorical variables. The sampling error for the entire sample is  $\pm 3.1\%$ .

## Results

### Characteristics of PCNPs and PCMDs

In the overall sample, PCNPs are significantly more likely than PCMDs to be female and slightly older but less likely to identify as a member of a racial or ethnic group (Table 1). The vast majority of PCNPs have a master's degree as their highest nursing education and, on average, possess 5 fewer years of experience in primary care than PCMDs. Half of PCNPs and two thirds of PCMDs practice in ambulatory settings, and twice as many PCNPs compared with PCMDs (32% vs. 16%) practice in other settings, including long-term care, home- and community-based settings, walk-in or retail-based clinics, and school health or student health services in higher education settings. PCNPs are significantly more likely than PCMDs to practice in urban and rural areas, whereas PCMDs are more likely to practice in suburban locations. Twice as many PCNPs (56%) as PCMDs (24%) reported being compensated by a fixed salary, and only 14% of PCNPs vs. 50% of PCMDs receive salary adjustments tied to productivity, financial performance, and quality attainment. Nearly one quarter (24%) of PCNPs compared with 8% of PCMDs are paid on a shift or hourly basis, and, as expected, the annual income of PCMDs is significantly higher than PCNPs.

### Primary Care Practice Arrangements

The vast majority of PCNPs (405 or 81%) surveyed work in a practice with a PCMD compared with only 61 PCNPs (13%) who do not work with a PCMD (Table 2). Slightly less than one half of physicians reported working with a PCNP. The majority of all clinicians across practice types reported accepting new Medicare patients although PCMDs who do not work with PCNPs were significantly less likely than clinicians in other practice arrangements to report accepting these new patients. Overall, fewer clinicians, although still a majority of PCNPs and PCMDs who work with PCNPs, reported accepting new Medicaid patients; less than half of PCMDs who do not work with PCNPs reported accepting these patients. Clinicians across all practice types reported a similar average proportion of practice revenue from Medicare and Medicaid. However, PCMDs, regardless of whether they worked with a PCNP, reported a significantly higher percentage of practice revenue from patients with private insurance. There were no significant differences in the sources of practice revenue among PCNPs working with and without PCMDs.

Eight of every 10 PCNPs we surveyed have a National Provider Identifier (NPI) number. A similar proportion of PCMDs who work with PCNPs say PCNPs have their own NPI. Billing practices vary substantially even among PCNPs with NPIs; 31% of PCNPs who report they work in a collaborative practice with PCMDs say that all of their services are billed to

**Table 1 – Demographic and Practice Characteristics of Primary Care Nurse Practitioners (PCNPs) and Primary Care Physicians (PCMDs)**

n (%)	PCNPs	PCMDs	p Value
	467* (48.1%)	505* (52.0%)	
Gender, n (%)			
Male	35 (7)	231 (46)	<.0001
Female	432 (93)	274 (54)	<.0001
Ethnicity, n (%)			
Hispanic or Latino	19 (4)	41 (8)	.0005
Non Hispanic or Latino	445 (95)	448 (89)	.0005
Race, n (%)			
White	411 (89)	345 (68)	<.0001
Black/African American	21 (5)	24 (5)	.8820
Asian	17 (4)	90 (18)	<.0001
Other	-	8 (2)	.0072
Age, n (%)			
<45	136 (29)	165 (33)	.0159
45+	322 (69)	316 (63)	.0159
Mean number of years in practice	13.4	18.9	<.0001
Highest nursing degree, n (%)			
Associate degree in nursing	16 (3)	NA	
Baccalaureate of science in nursing	27 (6)	NA	
Master's degree in nursing	391 (84)		
Doctorate in nursing	28 (6)	NA	
Practice characteristics			
Practice setting, n (%)			
Hospital, medical center	66 (14)	51 (10)	<.0001
Ambulatory	235 (50)	343 (68)	<.0001
Other	147 (32)	81 (16)	<.0001
Location, n (%)			
Urban	190 (41)	165 (33)	.0015
Suburban	169 (36)	239 (47)	.0015
Rural	99 (21)	85 (17)	.0015
Compensation, n (%)			
Fixed salary	261 (56)	121 (24)	<.0001
Salary adjusted for productivity or quality performance	65 (14)	254 (50)	
Shift, hourly, or other time-based payments	112 (24)	42 (8)	
Other	49 (10)	46 (9)	
Blank/decline to answer	26 (5)	42 (8)	
Income, n (%)			
\$0-\$99,000	127 (27)	28 (6)	<.0001
\$100,000-\$149,000	148 (32)	190 (38)	.0474
\$150,000-\$200,000+	137 (29)	388 (77)	<.0001

NA = not applicable.  
\* Will not sum to 100% because of rounding

Medicare under their own provider number, 29% report that all services they render are billed under their physician colleague's number, and 24% indicate that some are billed to the PCMDs and some to the PCNP number. Among PCNPs who do not work with a PCMD, 56% bill all services under the PCNP number, 11% bill all services under a physician's number, and 10% bill in some combination. PCMDs who work with

PCNPs report somewhat different billing practices; 27% of PCMDs say that the PCNPs who work with them bill all services under their own NPIs, and 17% say the PCNP bills all services under the primary care physician's NPI. Although not included in the table, survey results show that 20% of PCMDs and 15% of PCNPs work in practices that are recognized by the National Committee on Quality Assurance as a Patient-Centered Medical Home.

### Characteristics of Patients

We also examined the characteristics of patients cared for by PCNPs working with and without a PCMD (Table 2). Overall, PCNPs were more likely than PCMDs to report caring for patients who were from racial or ethnic minorities or were uninsured, and PCNPs who do not work with PCMDs were more likely than clinicians in other practice types to report caring for a high proportion of such patients; 41% of PCNPs who do not work with PCMDs reported that more than 25% of their patient population were African American or uninsured, and 35% reported having a similar proportion of Hispanic or Latino patients.

### How PCNPs and PCMDs Spend Their Time

Both the average number of hours worked each week and the number of patients seen by PCMDs working with and without PCNPs are nearly identical and are higher than reported by PCNPs; notably, when compared with PCNPs who do not work with PCMDs, physicians work, on average, 8 to 10 hours more per week and see between 19 and 22 more patients per week than PCNPs (Table 2). The survey also asked both clinicians how they spend their time during a typical work week. Of the 10 activities listed in Table 3, PCNPs and PCMDs, regardless of practice arrangement, spend most of their time providing direct patient care, writing patient notes and documenting care, and providing patient and family teaching. Although physicians in both types of physician practice arrangements are more likely than PCNPs to report a higher percentage of their time providing direct patient care, PCNPs spend somewhat larger percentages of their time each week providing patient and family teaching. There is little variation by clinician or practice arrangement in the percentage of time spent performing the remaining 7 activities shown in Table 3, and both PCNPs and PCMDs spend the least amount of time each week in continuing education required for licensure, conducting research, and performing "other" activities.

Another dimension of primary care practice assessed in our survey asked PCNPs about their ability to admit and round on patients in hospitals and skilled nursing facilities (SNFs) and to write orders with and without a physician cosignature. Data in Table 4 show that in both settings few PCNPs reported having these privileges for their own or their physician colleague's patients, particularly in SNFs. When

**Table 2 – Patients Treated, Billing, and Revenue by Type of Practice**

	PCNPs Who Work with PCMDs n = 405 %	PCNPs Who Do Not Work with PCMDs n = 65 %	PCMDs Who Work with PCNPs n = 233 %	PCMDs Who Do Not Work with PCNPs n = 272 %	p Value*
25% or more of patients in vulnerable populations					
Are African American or Black	36	41	20	20	<.0001
Are Hispanic or Latino	31	35	25	22	.062
Have a primary language other than English	24	27	19	22	.44
Are uninsured/have no health insurance coverage	30	43	13	7	<.0001
Is the practice in which you work accepting new patients?					
Accepting new Medicare patients (yes)	74	75	73	63	.0447
Accepting new Medicaid patients (yes)	66	65	70	45	<.0001
Average percentage of revenue from					
Medicare	23	23	24	26	
Medicaid	25	24	22	18	
Private insurance	29	23	39 <sup>†</sup>	41 <sup>†</sup>	
Patient payments	10	15	9 <sup>†</sup>	11	
Other (charity, research, CHAMPUS, VA, etc.)	16	15	10	7 <sup>†</sup>	
NP has a billing number					.0108
Yes	82	81	79	NA	
No	14	9	9	NA	
I have applied for one but do not have it				NA	
Don't know	3	3	7	NA	
How NP services provided to Medicare beneficiaries are billed					<.0001
All of the services provided by nurse practitioners are billed to Medicare under NP's own provider numbers	31	56	27	NA	
All of the services provided by nurse practitioners are billed to Medicare under physician's provider number	29	11	17	NA	
Some of the services NPs provide are billed under NP number, and some are billed under a physician's number	24	10	8	NA	
Not applicable to my practice			36	NA	
Don't know/missing	6	23	12	NA	
Weekly employment and patient activity					
Mean number of hours worked per week	37	38	46 <sup>†</sup>	45 <sup>†</sup>	
Mean number of patient visits per week	66	70	88 <sup>†</sup>	89 <sup>†</sup>	

CHAMPUS, civilian health and medical program of the uniformed services; VA, veteran affairs; NA, not applicable.

\* Differences for categorical variables were tested using the Pearson chi-square test. For continuous variables, significance levels for differences in means were tested using linear regression with the continuous variable as the outcome and a series of dummy coded variables for practice type as the predictors. PCNPs who do not practice with PCMDs was the referent category.

† Significantly different from NP only practice at  $p \leq .05$ .

comparing the two settings, a higher percentage of PCNPs, regardless of whether they worked with or without PCMDs, reported having such privileges for hospitalized patients vs. SNFs. With respect to hospitals, PCNPs working with PCMDs are significantly more likely than PCNPs who do not work with PCMDs to have admitting privileges and to round on patients; however, they are less likely to write orders that require a physician signature. In the case of SNFs, the low rate of privileges reported by PCNPs does not vary by whether the PCNP works with or without a PCMD.

### Hiring Preferences and Ideal Practices

We asked both groups of clinicians about their preferences for the type of primary care professional they would prefer hiring and their first choice of an ideal type of primary care practice. PCNPs, particularly those who do not work with PCMDs, were more likely to report their practice would likely hire a PCNP over either a PCMD or a physician assistant (PA) (Table 5). Similarly, if PCMDs were to hire a new primary care health professional, more than half would hire a member of their own profession over a PCNP or a PA.

**Table 3 – Mean Percent of Time Spent in Each Practice Activity**

	PCNPs Who Work with PCMDs	PCNPs Who Do Not Work with PCMDs	PCMDs Who Work with PCNPs	PCMDs Who Do Not Work with PCNPs
	n = 405	n = 65	n = 233	n = 272
	%	%	%	%
Direct patient care	46	43	51*	55*
Patient/family teaching	13	14	10*	9*
Patient care notes/documentation	18	16	17	15
Patient related telephone calls	9	9	8	8
Teaching	5	6	3	3
Continuing education required for licensure	4	4	3	3
Research	2	1	1	1
Administration	5	5	6	5
Continuing education such as reading journals	4	5	4	4
Other	1	1		

For continuous variables, significance levels for differences in means were tested using linear regression with the continuous variable as the outcome and a series of dummy coded variables for practice type as the predictors. Nurse-only practice was the referent category.

\* Significantly different from PCNP-only practice at  $p \leq .05$ .

If they could choose an ideal primary care practice type, strong majorities of both clinicians (ranging from 62% to 88%) selected a team practice with physicians and NPs; only 33% of PCMDs who do not work with a PCNP chose this same option. Few PCNPs chose a solo practice or a practice with only other NPs as an ideal practice type. Although not reported in the table, when both groups were asked about the implications of increasing the supply of PCNPs, 80% of PCNPs and 60% of PCMDs felt collaboration with each other would increase.

## Discussion and Policy Implications

The U.S. health care system faces current and projected future shortages of PCMDs, the implementation of health care delivery and payment reforms, an aging and more chronically ill population, and significant increases in the number of people with health insurance coverage. Concerned over the size and configuration of the primary care workforce, policy makers have become increasingly interested in understanding

**Table 4 – Primary Care Nurse Practitioner (PCNP) Admitting, Rounding, and Order Writing**

	PCNPs Who Work with a PCMDs	PCNPs Who Do Not Work with PCMDs	p Value*
	n = 405	n = 65	
	%	%	
PCNP conducts the following (% yes)			
Hospital admitting privileges for your own patients	11	3	.073
Hospital admitting privileges for physician colleague's patients	16	6	.0319
Rounding on hospitalized patients	27	14	.0347
Writing orders without physician cosignature for hospitalized patients	38	35	.6089
Writing orders with physician cosignature	11	24	.0248
Skilled nursing facility admitting privileges for your own patients	4	4	.257
Skilled nursing facility admitting privileges for physician colleague's patients	6	6	.354
Rounding on skilled nursing facility patients	11	14	.465
Writing orders without physician cosignature for skilled nursing facility patients	14	16	.671
Writing orders with physician cosignature for skilled nursing facility patients	7	7	.573

\* Pearson chi-square p value test differences across practice type.

**Table 5 – Hiring Preferences and Ideal Practice**

	PCNPs Who Work with PCMDs	PCNPs Who Do Not Work with PCMDs	PCMDs Who Work with PCNPs	PCMDs Who Do Not Work with PCNPs	<i>p</i> Value*
	n = 405	n = 65	n = 233	n = 272	
	%	%	%	%	
If the practice in which you work were to hire a new primary care health professional to see patients, what is the type of professional your practice would be most likely to hire?					
Primary care nurse practitioner	37	69	16	11	<.0001
Primary care physician assistant	4	2	3	10	
Primary care physician	26	8	58	54	
All of the above	18	5	12	10	
Don't know/missing	16	17	11	16	
In an ideal primary care setting, your first choice would be a ...					
Solo practice in primary care	2	13	5	21	<.0001
Team practice with nurse practitioners only	6	15	2	2	
Team practice with physicians only	1	2	14	35	
Team practice with physicians and nurse practitioners	88	62	74	33	
Other		8	5	10	

\* Pearson chi-square *p* value test differences across the distribution of practice type.

the contributions of NPs. Although there appears to be growing support for increasing the number of NPs and removing regulations that restrict their ability to practice to the top of their license (Auerbach et al., 2013; Bodenheimer, & Smith, 2013; Fairman, Rowe, Hassmiller, & Shalala, 2011; Green, Sergei, & Yina, 2013; Naylor & Kurtzman, 2010; Pohl, Hanson, Newland, & Cronenwett, 2010), the absence of data about the practice characteristics of PCNPs hinders policy makers from adequately understanding how PCNPs function organizationally within the current system, the extent to which they contribute to increasing access to care, and how PCNPs can help shape the primary care delivery system of the future.

Based on where PCNPs report they practice and the types of patients they treat, results from the 2012 National Survey of Primary Care Nurse Practitioners and Physicians suggest that expanding the number of PCNPs will increase access to primary care. PCNPs were more likely than PCMDs to provide primary care in a wider range of community settings and were more likely to report the location of their practice in urban and in rural areas. Compared with PCMDs who worked with or without PCNPs, PCNPs also provided proportionally more care to Medicaid enrollees and vulnerable populations. These results confirm and extend the findings of a recent study that found PCNPs were significantly more likely than PCMDs to provide primary care to disadvantaged Medicare beneficiaries (DesRoches et al., 2013). Furthermore, other findings from our survey indicate that PCNPs who worked with or without PCMDs were significantly more likely to accept new Medicaid patients.

The policy implications of these practice characteristics of PCNPs suggest that for states that are expecting significant Affordable Care Act–related insurance expansions (especially via increased Medicaid enrollment) and whose primary care workforce is already challenged by shortages of PCMDs (Graves, Mishra, Dittus, Parikh, Perloff, & Buerhaus, 2014; Ku et al., 2011), the capacity of their primary care workforce could be increased by adopting policies that provide a more receptive and productive environment for PCNPs. For example, policy makers could work with state medical associations to encourage medical practices to ascertain how best to support a fuller integration of PCNPs into existing systems of primary care. Nursing education programs could be urged to increase the number of PCNP graduates as well as increase the racial and ethnic diversity of PCNPs so that they are more reflective of the populations they serve (survey results showed that PCNPs are predominately white and female). And, of course, policy makers could increase the productive capacity of the current NP workforce by removing restrictive state scope of practice regulations; survey results indicate that few PCNPs said they have hospital and SNF admitting privileges, round on patients, or write orders for their own or their physician colleague's patients.

As the country's delivery system evolves toward value-based payment, primary care practices will need to determine the allocation of patient care activities between PCNPs and PCMDs that increases quality and lowers cost. Although survey results show that PCNPs and PCMDs deliver similar services and spend their time in nearly identical ways, these clinicians care for

different patients and have a different payer mix. Furthermore, PCNPs and PCMDs are employed differently; PCNPs work less hours and see fewer patients, and only a handful have their salary adjusted for productivity and quality performance. Going forward, we believe this comparative information can be used to stimulate discussions about how PCNP and PCMD employment arrangements can be modified to maximize the contributions of both clinicians in the emerging value conscious environment.

In recent years, NPs have been urged to obtain an NPI for billing purposes, and survey results indicate that today approximately eight in 10 PCNPs have their own NPI. Although having an NPI helps researchers identify NPs in data sets, the practice of incident to billing makes it impossible to tease apart the services provided by a PCNP from those billed by a PCMD. Under incident to billing, physicians bill Medicare using their own NPI for the services that were actually provided by the PCNP. In addition, the services provided by the PCNP are billed at the higher physician payment rate; NPs typically bill at 85% of the physician rate, which makes cost comparisons between PCNPs and PCMDs difficult (Perloff et al., 2014). As a result, unknown types, quantities, and costs of services provided by PCNPs cannot be fully accounted for because they were billed by a PCMD, which undermines efforts to document the contributions of PCNPs (DesRoches et al., 2013). Survey results provide an estimate of the prevalence of incident to billing; less than one third (31%) of PCNPs who work with PCMDs bill all of the services provided to Medicare beneficiaries using their own NPI, and 29% of PCNPs reported that the physician bills for all of the services provided by PCNPs. These results underscore the need for insurers and, particularly, the Centers for Medicare and Medicaid Services to include a code that indicates incident to billing in claims data to allow researchers to more accurately identify and analyze the services provided by PCNPs. As a value-based payment system replaces the traditional fee-for-service system, efforts to assign the value of care provided by PCNPs will be undermined as long as incident to billing masks the ability to fully account for the quality and costs of PCNPs.

There is widespread belief that improving the delivery of population-based health care and achieving a more efficient and productive health care workforce will not be possible without increased collaboration and teamwork among clinicians. Not only did we find that the vast majority of PCNPs were practicing with PCMDs, but also the majority of both clinicians reported that increasing the supply of PCNPs would result in greater collaboration. Furthermore, solid majorities of PCNPs, and PCMDs who work with PCNPs, said that an ideal practice would involve team practice of NPs and physicians. These findings suggest that expanding the PCNP workforce would not only help to expand the capacity of the primary care workforce but also contribute to building a more collaborative and team-based practice environment, as opposed to

PCNPs practicing as economic substitutes and competing directly with PCMDs. At the same time, however, these results are muddled by other findings that indicate that if given the choice of the type of clinician they would hire, the majority of PCMDs would hire a primary care physician as their first choice and, similarly, the majority of PCNPs would hire a NP as their first employment preference. These contrary perspectives, expressing a desire for collaboration yet preferring to hire members of their own profession, probably reflect the remnants of long-standing education isolation and professional socialization and perhaps the need to protect one's own profession. Efforts to expand interprofessional education are increasing, and faculty and students in these programs need to be prepared with strategies to face and overcome such conflicting beliefs.

In addition to sampling and nonsampling error and respondent bias that affect all surveys, our study was limited because we did not survey all primary care professionals. We surveyed PCNPs and PCMDs only and did not include PAs who provide primary care. Also, the sample source for NPs, as compared with that for physicians, had a higher rate of inaccurate contact information and did not contain data on activities associated with direct patient care. Additionally, we did not assess ownership of PCNP and primary care physician practices, and, consequently, we do not know if, in fact, NP-only practices are owned by PCNPs and whether ownership might have influenced results. Nevertheless, our results are consistent with the findings of the 2009 National Ambulatory Medical Care Survey, which documented the proportion of office-based physicians who employed NPs (Park, Cherry, & Decker, 2011). Small sample sizes and lower than expected variation in PCNP responses limited multivariate modeling.

Finally, since the late 1990s, our research team has engaged in numerous studies of the work experiences of health professionals. This survey project was part of a larger study that assessed both survey and claims data about the contributions of PCNPs and PCMDs. Beyond this work, we have also surveyed national populations of hospital executives, physicians, registered nurses (RNs), health policy thought leaders, the public, and military personnel. Across all the surveys we have conducted, we find that RNs in general and advance practice nurses in particular have diverse educational backgrounds and career paths. The design and conduct of high-quality surveys of this varied population require improved standardized data about RNs and APRNs in the United States. A national database of all professional nurses that is updated routinely would substantially improve the feasibility and quality of research about the nursing workforce in the United States. The physician workforce is studied extensively and effectively because centralized and standard data are available for all U.S. physicians. The development and maintenance of a comparable data resource about the nursing workforce would expand the possibilities for health workforce and

policy researchers to understand the employment, clinical practice, and experience of nurses.

## Conclusion

In the years ahead, it is reasonable to expect that the primary care workforce will evolve to increase the number and enlarge the scope of practice of PCNPs and PAs, alter the role of PCMDs to focus more on medically complex patients, promote collaborative relationships, include other professionals and nonprofessionals as part of the primary care team, and use technology more effectively to increase the capacity and reach of clinicians. We believe that this evolution can best be supported by having all those who contribute to producing primary care work together to assess population health, ascertain the services that can most efficiently meet individual and population needs, and jointly determine which primary care clinician or team member can provide these services by obtaining the highest value. Policy makers will need to be involved in this process in order to ensure the achievement of changes in payment, scope of practice, or education needed to attain a more effective and consumer-centered primary care workforce. Without such inclusive efforts, it is difficult to envision a primary care workforce that allows for the evolution of roles and practices that make sense to clinicians, respect each other's strengths, and is optimally configured to meet the health needs of the nation.

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