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Nurse Practitioners and Physician Assistants Employed by General and Subspecialty Pediatricians

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KEY WORDS

generalist, subspecialist, workforce

ABBREVIATIONS

NP—nurse practitioner

PA—physician assistant

PNP—pediatric nurse practitioner

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WHAT'S KNOWN ON THIS SUBJECT: Nurse practitioners (NPs) and physician assistants (PAs) play important roles in the care of children. Previous research has examined the roles and scope of work of this workforce from the perspective of NPs and PAs.



WHAT THIS STUDY ADDS: This study's results provide a better understanding of the current roles of and future market trends for NPs and PAs, in both general and subspecialty settings, from the physician perspective.

abstract

OBJECTIVE: There is little nationally representative information describing the current manner in which nurse practitioners (NPs) and physician assistants (PAs) work in pediatric practices and their professional activities. To understand better the current NP and PA workforce in pediatric primary and subspecialty care, we conducted a national survey of pediatricians.

METHODS: A survey study of a random national sample of 498 pediatric generalists and 1696 subspecialists in the United States was performed by using a structured questionnaire administered by mail. The survey focused on practice settings, employment, and scope of work of NPs and PAs.

RESULTS: Response rates were 72% for generalists and 77% for subspecialists. More than one-half (55%) of generalists reported that they do not currently work with NPs or PAs, compared with only one-third of subspecialists who do not. Many generalists and subspecialists intend to increase the number of NPs and PAs in their practices in the next 5 years. More generalist and subspecialty practices work with NPs than with PAs. There was great variability between generalists and subspecialists and among different subspecialties in the proportions that worked with NPs and PAs. The scope of work of NPs and PAs also varied between generalists and subspecialists.

CONCLUSIONS: Planned increases in the number of NPs hired and expansion of their scope of work might put subspecialists and general pediatricians in competition with regard to recruitment and hiring of a limited pool of new pediatric NPs. Similar issues might arise with PAs. *Pediatrics* 2011;128:665–672

There has been significant recent interest in the structure and organization of care delivery for children, involving pediatricians, nurse practitioners (NPs), and physician assistants (PAs). As part of the process of envisioning the future of pediatrics in the year 2020, the American Academy of Pediatrics has hypothesized that there will be increased reliance on teams of providers providing primary care to our nation's children.¹ However, there is little nationally representative information on the current manner in which NPs and PAs work in pediatric practices and on descriptions of their professional activities.

As members of the health care team, NPs and PAs play important roles in the care of children. Approximately 13 000 pediatric NPs (PNPs) and 2000 PAs are engaged in the care of children in the United States.^{2,3} Recent studies examined the perceptions of PNPs, neonatal NPs, family NPs, and PAs regarding their clinical roles, practice settings, scope of work, and career plans and goals.³⁻⁵ Most PNPs reported that they are engaged in primary rather than subspecialty care, few PAs are engaged in pediatric practice, and only a small proportion of family NPs' time is spent in the care of children.

A recent Institute of Medicine report on the future of nursing declared that nurses should practice to the full extent of their education and training and that they should be full partners with physicians and other health care workers in redesigning health care in the United States.⁶ The report also noted that "effective workforce planning and policymaking require better data collection and information infrastructure."⁶ Unfortunately, most efforts at defining advanced practice nursing and the NP workforce have focused on the care of adults or have included children only in the overall health care workforce needs of the

entire population.⁷⁻⁹ Because children constitute a decreasing proportion of the US population, such studies are not truly applicable to pediatric care.¹⁰ The pediatric health care delivery system in this country often functions with a different set of parameters, workforce constraints, and financing and delivery systems.¹¹ To understand better the current NP and PA workforce in pediatric primary and subspecialty care, we conducted a national study of general and subspecialty pediatricians, to assess employment and work patterns for NPs and PAs.

METHODS

Sample

The American Board of Pediatrics maintains a database of all pediatrics-certified physicians. To characterize the employment of NPs and PAs within general pediatric practices, we surveyed a random national sample of 498 pediatric generalists in the United States. We also surveyed a stratified random national sample of 1696 subspecialists from 5 varied subspecialties. The subspecialist sample included 350 pediatric cardiologists, 323 pediatric critical care physicians, 300 pediatric gastroenterologists, 350 pediatric hematologists-oncologists, and 373 neonatologists.

Survey Instrument

In collaboration with the American Board of Pediatrics Research Advisory Committee, we developed a 15-item, fixed-choice, structured questionnaire to be administered by mail. The survey was designed to be completed in ≤ 10 minutes. The survey focused on practice setting, employment, and scope of work of NPs and PAs.

Questionnaire Administration

The first mailing of questionnaires was sent via priority mail to the 498 general pediatricians and 1696 subspecialty

pediatricians in March 2010. The survey packet contained a personalized cover letter signed by Dr Freed, the survey instrument, a business reply mail envelope, and a \$5 bill as an incentive to complete the questionnaire. Two additional mailings were sent to nonrespondents in May and June 2010.

Data Analyses

First, frequency distributions were calculated for all survey items. Then, bivariate analyses of responses were conducted according to practice type and subspecialty, and χ^2 statistics were used to determine the level of association between the outcome variables and the predictor variables. The study was approved by the University of Michigan Medical School institutional review board.

RESULTS

Response Rates for Generalists

Of the 498 survey packets mailed, 310 surveys were returned and 65 were undeliverable. This yielded an overall response rate of 72%. Sixty-one of those who returned the survey were ineligible because they were retired or no longer working clinically in the field of general pediatrics, and 2 pediatricians refused to complete the survey. This left a total of 247 surveys for analysis, with a 66% response rate among eligible respondents. The number of ineligible pediatricians is likely higher than in previous studies we conducted with this roster source because this sample was not truncated according to age. There were no significant differences between respondents and nonrespondents.

Response Rates for Subspecialists

Of the 1696 survey packets mailed, 1193 surveys were returned and 138 were undeliverable. This yielded an overall response rate of 77%. One hundred twelve of those who returned the

TABLE 1 Reasons for Not Currently Working With NPs or PAs

	Proportion, % (n)						
	Generalists Overall (N = 247)	Subspecialists Overall (N = 1084)	Cardiologists (N = 219)	Critical Care (N = 231)	Gastroenterologists (N = 198)	Hematologists- Oncologists (N = 197)	Neonatologists (N = 239)
Not currently working with NPs or PAs	55 (135)	31 (335)	43 (95)	45 (104)	34 (65)	17 (33)	16 (38)
Previously worked with NPs or PAs							
Yes	35 (47)	39 (131)	21 (20)	35 (36)	46 (30)	61 (20)	66 (25)
No	65 (87)	61 (204)	79 (75)	65 (68)	54 (35)	39 (13)	34 (13)
Reason for not currently working with NPs or PAs							
Did not make decision for practice	49 (65)	53 (178)	52 (49)	62 (64)	42 (27)	55 (18)	56 (20)
Too expensive for practice	12 (16)	18 (61)	15 (14)	14 (15)	22 (14)	21 (7)	31 (11)
Patients want to see physician	27 (36)	16 (54)	22 (21)	5 (5)	31 (20)	15 (5)	8 (3)
Prefer to hire/to work with physicians	28 (37)	16 (53)	16 (15)	15 (16)	17 (11)	9 (3)	22 (8)
Other	11 (15)	14 (45)	14 (13)	15 (16)	12 (8)	15 (5)	8 (3)
None available to hire	3 (4)	10 (33)	6 (6)	8 (8)	12 (8)	15 (5)	17 (6)
Never considered it	10 (14)	8 (27)	18 (17)	4 (4)	8 (5)	3 (1)	0 (0)
Inconsistent reimbursement for services	3 (4)	7 (24)	4 (4)	8 (8)	5 (3)	9 (3)	17 (6)

survey were ineligible because they had retired or were no longer working in the field of pediatrics, and 13 subspecialists refused to complete the survey. This left a total of 1067 surveys for analysis, with a 74% response rate among eligible respondents. The response rates ranged from 84% for pediatric cardiologists to 64% for pediatric hematologists-oncologists.

Respondent Demographic Features

Among generalists, 76% of respondents ($n = 188$) were US medical school graduates and 54% ($n = 134$) were female. Eighty-seven percent of respondents ($n = 216$) were <60 years of age.

Among subspecialists, 73% of respondents ($n = 788$) were US medical school graduates and 39% ($n = 420$) were female. Eighty-seven percent of respondents ($n = 926$) were <60 years of age.

Working With NPs and PAs

Generalists

More than one-half of respondents (55% [$n = 135$]) reported that they do not currently work with NPs or PAs (Table 1). When those 135 respondents

were queried regarding the reasons why they do not currently work with NPs or PAs, one-half (49% [$n = 65$]) indicated that they did not make the decision for their practices. More than one-fourth of respondents reported that they prefer to hire or to work with physicians (28% [$n = 37$]) and that patients want to see a physician (27% [$n = 36$]).

Subspecialists

Approximately one-third of respondents ($n = 335$) reported that they do not currently work with NPs or PAs. Larger proportions of cardiologists (43% [$n = 95$]), critical care physicians (45% [$n = 104$]), and gastroenterologists (34% [$n = 65$]), compared with other subspecialists, reported that they do not currently work with NPs or PAs. Approximately one-half of respondents who do not currently work with NPs or PAs (53% [$n = 178$]) reported that they are not responsible for making the decisions regarding employment for their practices. Thirty-one percent of gastroenterologists ($n = 20$) and 22% of cardiologists ($n = 21$) indicated that they do not supervise NPs or PAs because they think

that patients want to see a physician (Table 1).

Respondents Who Currently Work With NPs or PAs

The rest of the reported results apply only to the 45% of generalist respondents ($n = 112$) and the 69% of subspecialist respondents ($n = 749$) who reported that they currently work with NPs or PAs. Among those general pediatricians, 89% ($n = 100$) reported that there were NPs in their practices and 37% ($n = 41$) reported that there were PAs in their practices. For subspecialists overall, 96% ($n = 719$) reported that there were NPs in their practices, whereas 32% ($n = 238$) reported that their practices included PAs. There was very little variation among the subspecialties.

Trends in Working With NPs and PAs

More than one-half (53% [$n = 59$]) of general pediatricians who work with NPs or PAs indicated that their practices have included NPs and/or PAs for ≥ 10 years, whereas only 10% ($n = 11$) have done so for <2 years. For subspecialists, approximately one-half of re-

TABLE 2 Length of Time Practice Has Included NPs or PAs

	Proportion, % (n)						
	Generalists Overall (N = 112)	Subspecialists Overall (N = 746)	Cardiologists (N = 124)	Critical Care (N = 127)	Gastroenterologists (N = 132)	Hematologists- Oncologists (N = 162)	Neonatologists (N = 201)
<2 y	10 (11)	7 (52)	6 (8)	15 (19)	9 (12)	6 (9)	2 (4)
≥2 y but <5 y	12 (14)	12 (87)	13 (16)	22 (28)	19 (25)	5 (8)	5 (10)
≥5 y but <10 y	18 (20)	25 (191)	40 (49)	39 (49)	23 (31)	19 (31)	15 (31)
≥10 y	53 (59)	51 (379)	34 (42)	23 (29)	39 (52)	64 (104)	76 (152)
Do not know/unsure	7 (8)	5 (37)	7 (9)	2 (2)	9 (12)	6 (10)	2 (4)

spondents who work with NPs or PAs (51% [$n = 379$]) indicated that their practices have included NPs or PAs for ≥ 10 years. Larger proportions of hematologists-oncologists (64% [$n = 104$]) and neonatologists (76% [$n = 152$]), compared with other subspecialists, reported that they have included NPs or PAs for ≥ 10 years (Table 2).

Hiring Trends and Scope of Work for NPs and PAs

Nurse Practitioners

Approximately one-third of generalist respondents reported that the number of NPs in their practices (34% [$n = 38$]) and the NP scope of work (33% [$n = 37$]) have not changed in the past 5 years. However, 38% of respondents ($n = 42$) reported that their practices increased the number of NPs and 16% of respondents ($n = 18$) reported that the scope of work of NPs expanded during that time period. In contrast,

nearly two-thirds of subspecialists who work with NPs or PAs (64% [$n = 477$]) reported that their practices increased the number of NPs in the past 5 years and 41% ($n = 305$) indicated that their practices expanded the scope of work of NPs (Table 3).

Thirty-nine percent of pediatricians whose practices currently include NPs or PAs ($n = 44$) reported that their practices plan to maintain the current number of NPs over the next 5 years, and 22% ($n = 25$) reported that no change is planned in relation to the current scope of work of NPs. Fifteen percent ($n = 17$) reported that they plan to increase the number of NPs at their practices (Table 4).

Forty-three percent of subspecialists who currently work with NPs or PAs ($n = 320$) reported that their practices plan to increase the number of NPs in the next 5 years, and one-fourth ($n = 184$) indicated that their practices will

expand the scope of work. Twenty-nine percent of respondents ($n = 215$) reported that the number of NPs in their practices likely will remain the same (Table 4).

Physician Assistants

Almost one-half of pediatricians (45% [$n = 50$]) whose practices include either NPs or PAs reported that there were no PAs in their practices over the previous 5 years (Table 5). Sixteen percent of respondents ($n = 18$) reported that the number of PAs in their practices have not changed in the past 5 years (Table 5).

Among subspecialists who indicated that they work with NPs or PAs, nearly one-half (46% [$n = 342$]) reported that there were no PAs in their practices over the previous 5 years. Seventeen percent ($n = 128$) reported that they increased the number of PAs in the previous 5 years (Table 5). Only 5% of generalists and 12% of subspecialists

TABLE 3 Practice's Use of NPs in Previous 5 Years

	Proportion, % (n)						
	Generalists Overall (N = 112)	Subspecialists Overall (N = 748)	Cardiologists (N = 124)	Critical Care (N = 127)	Gastroenterologists (N = 132)	Hematologists- Oncologists (N = 164)	Neonatologists (N = 201)
Not applicable; no NPs in practice in past 5 y	10 (11)	3 (23)	2 (3)	4 (5)	8 (10)	2 (3)	1 (2)
No. of NPs has not changed	34 (38)	20 (150)	19 (23)	16 (20)	27 (35)	18 (29)	21 (43)
NP scope of work has not changed	33 (37)	24 (177)	15 (18)	22 (28)	23 (31)	16 (26)	37 (74)
Increased No. of NPs	38 (42)	64 (477)	64 (79)	71 (90)	47 (62)	70 (114)	66 (132)
Decreased No. of NPs	5 (6)	5 (35)	4 (5)	5 (6)	5 (7)	4 (7)	5 (10)
Expanded scope of work of NPs	16 (18)	41 (305)	48 (59)	48 (61)	35 (46)	47 (77)	31 (62)
Decreased scope of work of NPs	1 (1)	2 (17)	2 (2)	2 (2)	5 (6)	2 (4)	1 (3)
Unsure of practice's use of NPs over past 5 y	1 (1)	2 (13)	1 (1)	3 (4)	3 (4)	1 (1)	1 (3)

TABLE 4 Practice's Planned Use of NPs Over Next 5 Years

	Proportion, % (n)						
	Generalists Overall (N = 112)	Subspecialists Overall (N = 749)	Cardiologists (N = 124)	Critical Care (N = 127)	Gastroenterologists (N = 132)	Hematologists- Oncologists (N = 164)	Neonatologists (N = 201)
Will maintain current no. of NPs	39 (44)	29 (215)	27 (33)	20 (26)	32 (43)	32 (53)	30 (60)
Will maintain scope of work of NPs	22 (25)	19 (141)	11 (14)	19 (24)	14 (19)	21 (35)	24 (49)
Will increase No. of NPs	15 (17)	43 (320)	43 (53)	61 (78)	31 (41)	29 (47)	50 (101)
Will expand scope of work of NPs	5 (6)	25 (184)	30 (37)	34 (43)	22 (29)	24 (39)	18 (36)
Will decrease No. of NPs	4 (4)	1 (9)	0 (0)	2 (3)	1 (1)	2 (3)	1 (2)
Will decrease scope of work of NPs	0 (0)	0 (2)	0 (0)	1 (1)	0 (0)	1 (1)	0 (0)
Unsure	26 (29)	17 (131)	22 (27)	13 (17)	20 (26)	23 (38)	11 (23)

TABLE 5 Practice's Use of PAs Over Previous 5 Years

	Proportion, % (n)						
	Generalists Overall (N = 112)	Subspecialists Overall (N = 748)	Cardiologists (N = 124)	Critical Care (N = 127)	Gastroenterologists (N = 132)	Hematologists- Oncologists (N = 164)	Neonatologists (N = 201)
Not applicable; no PAs in practice in past 5 y	45 (50)	34 (257)	25 (31)	39 (50)	38 (51)	38 (62)	31 (63)
No. of PAs has not changed	16 (18)	8 (59)	10 (13)	8 (10)	5 (7)	9 (15)	7 (14)
PA scope of work has not changed	12 (13)	7 (51)	11 (14)	8 (10)	3 (4)	4 (6)	8 (17)
Increased No. of PAs	11 (12)	17 (128)	15 (19)	14 (18)	15 (20)	26 (42)	14 (29)
Decreased No. of PAs	1 (1)	1 (9)	0 (0)	2 (2)	2 (2)	1 (1)	2 (4)
Expanded scope of work of PAs	6 (7)	9 (70)	8 (10)	10 (13)	8 (10)	13 (21)	8 (16)
Decreased scope of work of PAs	1 (1)	0 (2)	0 (0)	1 (1)	1 (1)	0 (0)	0 (0)
Unsure of practice's use of PAs over past 5 y	0 (0)	1 (7)	2 (3)	1 (1)	2 (2)	0 (0)	1 (1)

(n = 87) who currently work with NPs or PAs reported that their practices plan to increase the number of PAs in that time frame (Table 6).

Practice Roles of NPs and PAs

General pediatricians whose practices include NPs (n = 100) reported that the majority of NPs often perform assessment and diagnosis (95% [n = 94]), perform patient education (93% [n = 92]), develop and manage treatment plans (87% [n = 86]), perform

well-child examinations (83% [n = 81]), coordinate care (81% [n = 79]), and interpret laboratory or test results (79% [n = 78]). Thirty-four percent of respondents (n = 33) indicated that NPs rarely or never manage the care of children with complex chronic illnesses. Among general pediatricians whose practices include PAs (n = 41), most reported that PAs often perform assessment and diagnosis (94% [n = 33]), perform patient education (94%

[n = 33]), develop and manage treatment plans (89% [n = 31]), coordinate care (88% [n = 31]), and interpret laboratory or test results (86% [n = 30]).

Most general pediatricians whose practices include PAs reported that the PAs rarely or never perform inpatient rounding (85% [n = 28]), perform consultations (77% [n = 27]), complete discharges (76% [n = 26]), or write progress notes (70% [n = 23]). Approximately one-fourth of re-

TABLE 6 Practice's Planned Use of PAs Over Next 5 Years

	Proportion, % (n)						
	Generalists Overall (N = 112)	Subspecialists Overall (N = 749)	Cardiologists (N = 124)	Critical Care (N = 127)	Gastroenterologists (N = 132)	Hematologists- Oncologists (N = 164)	Neonatologists (N = 201)
Will maintain current No. of PAs	13 (14)	9 (68)	9 (11)	6 (7)	10 (13)	10 (17)	10 (20)
Will maintain scope of work of PAs	5 (6)	7 (49)	7 (9)	5 (6)	6 (8)	8 (13)	6 (13)
Will increase No. of PAs	5 (6)	12 (87)	15 (19)	12 (15)	9 (12)	13 (21)	10 (20)
Will expand scope of work of PAs	3 (3)	6 (42)	6 (8)	9 (11)	5 (7)	7 (12)	2 (4)
Will decrease No. of PAs	1 (1)	1 (6)	0 (0)	2 (2)	2 (2)	1 (1)	1 (1)
Will decrease scope of work of PAs	0 (0)	0 (1)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)
Unsure	14 (16)	11 (86)	17 (21)	15 (19)	10 (13)	13 (21)	6 (12)

spondents indicated that PAs rarely or never manage the care of children with complex chronic illnesses (26% [$n = 9$]) or perform well-child examinations (23% [$n = 8$]).

Subspecialists working in academic hospitals were more likely than their peers in private practice to report that their practices increased the number of NPs (68% vs 39%; $P < .0001$) and their scope of work (47% vs 25%; $P < .0001$) in the previous 5 years. Similar trends were not seen for the employment of PAs. Subspecialists working in academic hospitals and outpatient clinics also were more likely than their peers to report that their practices plan to expand the scope of work of NPs in the next 5 years.

Impact of NPs and PAs on Outcomes

Forty-nine percent of generalist pediatricians ($n = 53$) reported that their practices assess the impact of NPs or PAs on patient satisfaction, and 38% ($n = 41$) indicated that their practices assess their impact on the cost of care. Thirty percent ($n = 33$) reported that they assess treatment variations between physicians and NPs or PAs.

Nearly two-thirds (61% [$n = 431$]) of subspecialists who work with NPs and PAs reported that their practices do not assess the impact of NPs and PAs on outcomes. More than one-fourth of subspecialists who work with NPs or PAs indicated that their practices assess the impact of NPs and PAs on patient satisfaction (30% [$n = 211$]) and cost of care (27% [$n = 195$]).

DISCUSSION

Significant Findings

Among the most important findings of this study are the variations among and within general and subspecialty pediatric practices with regard to their inclusion of NPs and PAs. Cur-

rently, more than one-half of primary care pediatricians in the United States do not work with NPs or PAs. In contrast, NPs and PAs commonly work in the practices of the 5 subspecialties included in this study, averaging 69% overall. There was significant heterogeneity among these subspecialties, however, with a range from 84% in neonatology to 55% in critical care. NPs were much more common than PAs in the practices of all subspecialties examined. This is consistent with previous research that found a nationwide paucity of PAs working in nonsurgical pediatric care.³

Also of significant interest are the recent trends in NP and PA employment. Less than 25% of general pediatric practices that employ these providers have worked with them for <5 years. This suggests that the decision to begin working with NPs and PAs was not a recent decision for the majority of practices in which these providers are employed currently and there is long-term experience with this model of care.

The majority of the subspecialists had, over the past 5 years, both increased the number of NPs in their practices and expanded the scope of work the NPs performed. This increase in numbers is likely a response to greater patient care demands for specific subspecialties. The expansion in the scope of work is consistent with a recent Institute of Medicine report and others calling for a greater role for NPs in the care of patients.^{6,12} This broad-based expansion in the pediatric subspecialty setting might be seen as contrasting with the efforts of some in pediatric primary care to limit some aspects of NP care provision.¹³

The continued real and/or perceived shortage of subspecialty pediatric care providers^{14,15} also is manifest in our finding that >40% of our subspecialty respondents overall plan to in-

crease the number of NPs in their practices in the next 5 years and 25% plan to expand further the scope of their work. Of interest is the finding that the subspecialties that were most likely to report plans for increased hiring of NPs were those that are ICU-based, that is, critical care and neonatology. Some authors have postulated that additional restrictions in duty hours for residents will have a significant impact on the ability to provide patient care without expanding both the number and scope of care providers of a variety of types.¹⁶ These trends are expected to result in even greater demands on the pediatric NP and PA workforce.

Contrasting NPs and PAs

There were significant differences in the proportions of general pediatric practices that employ either PAs or NPs, with many more practices working with NPs. Furthermore, approximately one-third of practices that employ NPs increased the number of NPs in their practices over the past 5 years. This is in contrast to only 11% of practices that increased the number of PAs they employed during the same time period.

Similarly, a much smaller proportion of our subspecialty pediatric respondents indicated that they increased the number of PAs and/or expanded their scope of work in the past 5 years. Furthermore, only 12% indicated that they plan to increase the number of PAs in their practices in the upcoming 5 years. This is likely a result of the historic pattern of few PAs choosing a career in either primary care or subspecialty pediatrics,³ as well as a smaller overall supply of PAs within the workforce, relative to the supply of NPs. Unless there are specific efforts to recruit more PAs for the care of pediatric patients, these patterns are likely to continue.

Assessing the Impact of NPs on Practice

Although there seems to be great interest in the impact of NPs and PAs on a wide range of potential outcome measures, the majority of subspecialists working with these providers do not assess outcomes related to patient satisfaction, cost, or treatment variations. Among respondents who reported conducting assessments, assessments were performed most commonly to examine effects on patient satisfaction (30%) and the cost of care (27%). Only 13% overall reported assessing treatment variations between the care provided by NPs and/or PAs and that provided by the physician subspecialists. In contrast, a larger proportion of primary care pediatricians reported making such assessments. Previous research in this area mostly found a high level of patient satisfaction with NPs and PAs and little or no difference in the cost of care or clinical outcomes, compared with physician care.^{7,17–19}

Roles of NPs

Some authors have postulated a potentially increased role for NPs in the primary care of children with complex chronic illnesses, especially with respect to the expanding concept of the medical home.¹ However, our data indicate that this is not a common role for NPs now in practice. Only 26% of our respondents indicated that NPs in

general pediatrics often manage the care of children with complex chronic illnesses. This is in contrast to the 72% who stated that NPs often manage the care of children with acute care needs. However, 81% reported that NPs often engage in the coordination of care for the patients in their practices. Delineation of the meaning of these terms (coordination versus management) for practitioners currently engaged in primary care pediatrics will be necessary for better understanding of the current roles of NPs and potential changes in future roles in their practices.

Future NP Hiring Plans of Generalists and Subspecialists

Our findings indicate that ~1 in 7 pediatric primary care practices intend to increase their numbers of NPs within the next 5 years. Recently published studies demonstrated a limited flow of new PNPs into the health care workforce.² Therefore, it is likely that PNPs will become increasingly scarce resources for practices planning such hiring. Competition for the limited number of PNPs and pediatric PAs likely will increase, because more might be recruited to assist in academic centers to fill the voids left through increasing restrictions on resident duty hours.¹⁶ The impact of this scarcity on workforce planning for primary care provision for children will need to be addressed.

Furthermore, currently only ~40% of PNPs work in subspecialty settings, with most of the rest in primary care.⁴ The relatively robust plans of subspecialists to hire additional NPs over the next 5 years might signal greater competition between generalists and subspecialists and among subspecialties for this limited pool of providers. This will become manifest very quickly (if it is not already occurring) because the aforementioned supply of new PNPs entering the workforce has not increased in a manner similar to the growth seen for NPs trained in the care of adults.^{2,20}

CONCLUSIONS

Planned increases in the numbers of NPs hired and expansion in their scope of work might put subspecialists and general pediatricians in competition with respect to the recruitment and hiring of a limited pool of new PNPs. Similar issues might arise with PAs. To meet demands, examination of strategies to increase the pool of NP and PA trainees interested in developing a career in the care of children should be prioritized.

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A NIBBLE A DAY: *What do you eat before exercising? Some experts and trainers advocate high-quality protein, complex carbohydrates, or, sometimes, even simple sugars. Has anyone ever recommended eating chocolate before exercising? If not, that could change. According to an article in The New York Times (Health: August 3, 2011), chocolate may improve exercise performance. Researchers conducted a study in middle-aged sedentary mice. Twice a day the experimental mice were given small doses of purified epicatechin, a flavonol and the primary ingredient of cacao in chocolate. Control mice were only given water. Groups were further divided into those that did light exercise and those that did not. After 15 days, all animals were run to exhaustion on a treadmill and then underwent hind-leg biopsy. Animals that had only been given water were the first to tire. Surprisingly, control mice that had exercised tired more quickly than the nonexercising mice that had received epicatechin. Mice that exercised and consumed epicatechin were the fittest and could run 50% farther than the others. Leg-muscle biopsies revealed that the exercising mice given epicatechin demonstrated rich new capillary growth and evidence of increased mitochondria production. Those mice only given epicatechin still had evidence of new mitochondria production, which suggests that epicatechin had beneficial effects in sedentary rodents and that exercise greatly magnified the benefits. Exactly how epicatechin improves the mouse’s muscle response to exercise is not known. Whether this effect will be seen in humans is also not known. Although it may be tempting to gulp down a chocolate bar before a long run, a few caveats should be kept in mind. Processing tends to destroy the epicatechin in chocolate. Dark chocolate contains far more epicatechin than heavily processed milk chocolate. Unfortunately, for those of us who love dark chocolate, a little goes a long way and more is not better. On the basis of the mouse study, the average person only needs about 5 g of chocolate before exercising. As my wife would say, that is less than a bite and more in line with just a nibble. The hardest part may not be the ensuing run but refraining from eating the rest of the bar.*

Noted by WVR, MD

Nurse Practitioners and Physician Assistants Employed by General and Subspecialty Pediatricians

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