CHAPTER 5

Issues in Medicare beneficiaries' access to primary care

RECOMMENDATIONS

5-1 The Congress should require advanced practice registered nurses and physician assistants to bill the Medicare program directly, eliminating "incident to" billing for services they provide.

COMMISSIONER VOTES: YES 17 • NO 0 • NOT VOTING 0 • ABSENT 0

5-2 The Secretary should refine Medicare's specialty designations for advanced practice registered nurses and physician assistants.

COMMISSIONER VOTES: YES 17 • NO 0 • NOT VOTING 0 • ABSENT 0

CHAPTER 5

Issues in Medicare beneficiaries' access to primary care

Chapter summary

High-quality primary care is essential for creating a coordinated health care delivery system. Primary care services—such as ambulatory evaluation and management visits—are provided by physicians and other health professionals, such as nurse practitioners (NPs) and physician assistants (PAs). Physicians who focus on primary care are generally trained in family medicine, internal medicine, geriatric medicine, and pediatrics.

The Commission has a long-standing interest in ensuring that Medicare payments for primary care services are accurate. These services are underpriced in the fee schedule for physicians and other health professionals relative to other services, and the nature of fee-for-service (FFS) payment allows certain specialties to increase the volume of services they provide—and the payments they receive—more easily than primary care clinicians. In addition, the fee schedule—with its orientation toward discrete services that have a defined beginning and end—is not well designed to support primary care, which requires ongoing care coordination for a panel of patients. In response to these concerns, the Commission has made several recommendations over the years to improve payment accuracy for primary care services and better support primary care.

According to our surveys of beneficiaries, beneficiaries have access to clinician services that is largely comparable with (or in some cases, better

In this chapter

- Background
- Commission's prior work to ensure the accuracy of fee schedule payments for primary care services
- The supply of primary care physicians in Medicare
- The supply of APRNs and PAs in Medicare
- Prevalence of "incident to" billing for NPs and PAs
- Eliminating "incident to" billing for APRNs and PAs
- Medicare's specialty designations for APRNs and PAs
- Conclusion

than) access for privately insured individuals, although a small number of beneficiaries report problems finding a new primary care doctor. The number of primary care physicians treating Medicare beneficiaries increased by 13 percent between 2010 and 2017, although the number per 1,000 beneficiaries declined modestly. The number of family medicine and internal medicine residents has grown in recent years, but the majority of internal medicine residents plan careers in a subspecialty instead of general internal medicine, which raises concerns about the pipeline of future primary care physicians. In addition, significant disparities in compensation between primary care physicians and other specialties could deter medical school graduates and residents from pursuing primary care careers, which could reduce beneficiaries' access to primary care physicians in the future.

A variety of factors influence specialty choices by medical school graduates and residents: lifestyle preferences, personality fit, student characteristics, factors related to the medical school and curriculum, and income expectations. The findings on the influence of medical school debt on specialty choice are mixed. Some studies show no relationship between debt and physicians' career choices, but other studies find that debt is modestly related to their career decisions.

According to a survey administered by the Association of American Medical Colleges, almost half (46 percent) of medical school graduates responding to the questionnaire in 2018 planned to participate in programs to reduce their educational debt. There are several government-run scholarship, loan forgiveness, low-interest loan, and loan repayment programs for clinicians, such as the Public Service Loan Forgiveness program, military programs, state programs, the National Health Service Corps (NHSC), and the Primary Care Loan program. For example, the NHSC includes scholarship and loan repayment programs for primary care providers who agree to practice at designated ambulatory care sites in underserved areas for a minimum amount of time (between two and four years). In 2018, about 10,900 NHSC providers (such as primary care physicians, nurse practitioners, physician assistants, and mental health providers) furnished care to 11.5 million people at more than 5,000 of these sites.

Policymakers may wish to consider establishing a scholarship or loan repayment program for physicians who provide primary care to Medicare beneficiaries. Although physicians in several specialties (e.g., family medicine, general internal medicine, and geriatrics) furnish primary care to beneficiaries, a Medicare-specific scholarship or loan repayment program should target those physicians most likely to treat beneficiaries to ensure the best use of scarce resources. In addition, because Medicare serves disabled and elderly beneficiaries, the goals of a Medicare-specific program will differ from the goals of other programs that focus on different

populations. Therefore, a Medicare-specific program could target geriatricians because they specialize in managing the unique health and treatment needs of elderly individuals. In 2017, only 1,830 geriatric medicine physicians treated beneficiaries in traditional FFS Medicare (less than 1 percent of all physicians who treated FFS beneficiaries in that year). Between the 2013–2014 academic year and the 2017–2018 academic year, the number of residents in geriatric medicine declined by 2 percent, which raises concerns about the future pipeline of geriatricians.

By reducing or eliminating educational debt, a Medicare-specific scholarship or loan repayment program could provide medical students and residents with a financial incentive to choose geriatrics. However, it is difficult to anticipate how medical students and residents would respond to such an incentive. It could convince some medical students and residents to choose geriatrics over another specialty, while others could decide to pursue another specialty regardless of the subsidy. Nevertheless, policymakers could consider such a program as an option to address concerns about the future pipeline of geriatricians. We begin exploring design choices for this program in this chapter and plan to continue examining them in future work.

Although the Commission has concerns about the supply of primary care physicians, the number of advanced practice registered nurses (APRNs) and PAs has increased rapidly and is projected to continue to do so in the future. Medicare beneficiaries rely on APRNs and PAs to provide an increasingly substantial share of their medical services. APRNs and PAs are graduate-level trained clinicians who predominantly work in collaboration with or under the supervision of physicians to deliver care to patients. The growth in the number of NPs (one type of APRN) and PAs who bill Medicare has been particularly rapid. From 2010 to 2017, the combined number of NPs and PAs who billed Medicare more than doubled, reaching 212,000 in 2017.

In addition, state governments have steadily increased NPs' and PAs' scopes of practice, meaning that these clinicians have an increasing amount of authority and autonomy. While the existing literature has some methodological limitations, the preponderance of research suggests that NPs and PAs provide care that is substantially similar to physicians in terms of clinical quality outcomes and patient experience, within the confines of their respective scopes of practice. The evidence base regarding how NPs and PAs affect costs for payers such as Medicare is less robust and somewhat mixed since at least a few studies suggest that NPs and PAs order more services.

Medicare allows NPs and PAs to bill under the national provider identifier (NPI) of a supervising physician if certain conditions are met, a practice known as "incident to" billing. Medicare pays for services at 100 percent of the fee schedule rate when a service provided by an NP or PA is billed "incident to" and 85 percent of the fee schedule rate when the same service is billed under the NPI of the NP or PA who provided the service. While the existing literature on the prevalence of "incident to" billing is limited, we conducted two original analyses that suggest a substantial share of services furnished by NPs and PAs to Medicare FFS beneficiaries was likely billed "incident to" in 2016.

Medicare also collects little up-to-date information regarding the specialty in which NPs and PAs practice. While NPs and PAs have historically been concentrated in primary care, a large share of NPs and PAs do not work in primary care, and more recent patterns suggest that NPs and PAs are increasingly practicing in specialty fields.

Given the growing roles of NPs and PAs and their shift away from primary care, Medicare's "incident to" rules and lack of specialty data create several problems, including obscuring important information on the clinicians who treat beneficiaries and inhibiting Medicare's ability to identify and support clinicians furnishing primary care. Therefore, the Commission recommends that (1) the Congress require APRNs and PAs to bill the Medicare program directly, eliminating "incident to" billing for services they provide, and (2) the Secretary refine Medicare's specialty designations for APRNs and PAs. These recommendations are designed to give the Medicare program a fuller accounting of the breadth and depth of services provided by APRNs and PAs and improve policymakers' ability to target resources toward primary care. ■

Background

High-quality primary care is essential for creating a coordinated health care delivery system. Primary care has five core elements:

- first-contact accessibility, including the affordability of services, the ease of getting an appointment and after-hours care, and geographic access;
- continuity, including the availability of a patient's health information at the point of care and continuity with the same practitioner or practice over time;
- comprehensiveness, which involves meeting the majority of each patient's physical and mental health care needs, including preventive, acute, and chronic care;
- coordination of care for a patient among multiple providers and settings; and
- accountability for the whole person, which means that the clinician is knowledgeable about the patient's overall medical history, preferences, and family and cultural orientation (O'Malley et al. 2015).

Primary care services are provided by physicians and other health professionals. Physicians who focus on primary care generally are trained in family medicine, internal medicine, geriatric medicine, and pediatrics. About 186,000 primary care physicians billed Medicare in 2017, accounting for 19 percent of all health professionals who billed Medicare. A substantial share of physician assistants (PAs) and advanced practice registered nurses (APRNs)—such as nurse practitioners (NPs)—also provide primary care.

The Commission has a long-standing interest in ensuring that Medicare payments for primary care services—such as ambulatory evaluation and management (E&M) services—are accurate. Ambulatory E&M services include office visits, hospital outpatient department visits, nursing facility visits, and home visits. Primary care services are underpriced in the fee schedule for physicians and other health professionals relative to other services, and the nature of fee-for-service (FFS) payment allows certain specialties to increase the volume of services they provide—and the payments they receive—more easily than primary care clinicians. In addition, the fee schedule—with its orientation toward discrete services that have a defined beginning and end—is not well designed to support primary care, which requires ongoing care coordination for a panel of patients. These issues have contributed to substantial compensation disparities between primary care physicians and other specialties (see pp. 132–133).

Payment rates in the fee schedule are based on relative weights, called relative value units (RVUs), which account for the amount of clinician work required to provide a service, expenses related to maintaining a practice, and professional liability insurance costs. Work RVUs are based on an assessment of how much time and intensity (e.g., mental effort and technical skill) services require relative to one another. Because estimates of time and intensity are not kept up to date, especially for services that experience efficiency improvements, the accuracy of the work RVUs has declined over time. Due to advances in technology, technique, and clinical practice, efficiency improvements are achieved more easily for procedures, imaging, and tests than for ambulatory E&M services, which are composed largely of activities that require the clinician's time and so do not lend themselves to efficiency gains. When efficiency gains reduce the amount of work needed for a service, the work RVUs for the affected service should decline accordingly. Because the fee schedule is budget neutral, a reduction in the RVUs of some services raises the RVUs for all other services. However, because of problems with the process of reviewing mispriced services, this two-step sequence tends not to occur. As a result, ambulatory E&M services become passively devalued over time, while many other services become overvalued.

CMS, with input from the American Medical Association/Specialty Society Relative Value Scale Update Committee (RUC), has reviewed the work RVUs of many potentially mispriced services since 2009. However, CMS's review has taken several years and has not yet addressed services that account for a substantial share of fee schedule spending. CMS's review is hampered by the lack of current, accurate, and objective data on clinician work time and practice expenses. For example, CMS relies on data from surveys conducted by specialty societies to estimate clinician work time for specific services. These surveys have low response rates and low total number of responses, which raises questions about the representativeness of the results.

TABLE 5–1

Number of physicians billing Medicare, 2010–2017

	2010		2017	
Physician type	**Number**	**Number per 1,000 beneficiaries**	**Number**	**Number per 1,000 beneficiaries**
Primary care	165,499	3.8	186,193	3.5
Other specialties	369,580	8.4	409,995	7.7
Total	**535,079**	**12.2**	**596,188**	**11.2**

Note: Specialty is self-reported by physicians and other health professionals when they enroll in the Medicare program. "Primary care" specialties are specialties that were eligible for the Primary Care Incentive Payment program: family medicine, internal medicine, pediatric medicine, and geriatric medicine. These figures may overstate the number of primary care physicians because we count all internal medicine physicians as primary care even though many of them practice in a subspecialty. The number billing Medicare includes those with a caseload of more than 15 different beneficiaries during the year. Beneficiary counts used to calculate numbers per 1,000 include those in fee-for-service and Medicare Advantage on the assumption that physicians are furnishing services to beneficiaries in both programs. Figures for 2010 may vary from figures that appeared in prior Commission reports due to minor technical changes.

Source: MedPAC analysis of Medicare claims data for 100 percent of beneficiaries and the 2011 and 2018 annual reports of the Boards of Trustees of the Medicare trust funds.

Commission's prior work to ensure the accuracy of fee schedule payments for primary care services

To improve payment accuracy for primary care services and better support primary care, the Commission has made several recommendations over the last several years. In 2008, the Commission recommended that the Congress establish a bonus for primary care services billed by practitioners who have practices focused on primary care (Medicare Payment Advisory Commission 2008). This recommendation was adopted by the Congress as the Primary Care Incentive Payment (PCIP) program. The PCIP program, which existed from 2011 to 2015, provided a 10 percent bonus payment on fee schedule payments for certain primary care services provided by eligible primary care practitioners. The services defined as primary care were a subset of E&M services: office and home visits and visits to patients in certain nonacute facility settings (e.g., skilled nursing and intermediate care). Primary care practitioners included clinicians (1) who had a primary Medicare specialty designation of family practice, internal medicine, pediatrics, geriatrics, nurse practitioner, clinical nurse specialist, or physician assistant and (2) for whom primary care visits accounted for at least 60 percent of allowed charges under the fee schedule.

In 2011, the Commission recommended replacing the sustainable growth rate system with payment updates that would have been higher for primary care than for specialty care (Medicare Payment Advisory Commission 2011). Specifically, payment rates for primary care would have been frozen at their current levels for 10 years, while rates for all other services would have been reduced in each of the first 3 years and then frozen for the subsequent 7 years. Also in 2011, the Commission recommended that CMS use a streamlined method to regularly collect data—including service volume and work time—from a cohort of efficient practices to establish more accurate work and practice expense RVUs (Medicare Payment Advisory Commission 2011). These data should be used in a "top-down" approach to calculate the amount of time that a physician worked over the course of a week or month and compare it with the time estimates in the fee schedule for all of the services that the physician billed for over the same period. If the fee schedule's time estimates exceed the actual time worked, this finding could indicate that the time estimates are too high. Neither of these recommendations was adopted.

In 2015, the Commission recommended that the Congress establish a per beneficiary payment for primary care clinicians to replace the PCIP program

after it expired at the end of 2015 (Medicare Payment Advisory Commission 2015). This payment would encourage care coordination, including the non-face-to-face activities that are a critical component of care coordination, and would be exempt from beneficiary cost sharing. To fund this payment, the Commission recommended reducing fees for all fee schedule services other than primary care visits furnished by any provider, including specialists. This funding method would be budget neutral and would help rebalance the fee schedule between specialty care and primary care. At least as a starting point, the Commission supported funding the per beneficiary payment at the same aggregate level as the PCIP program, which means that each practitioner would receive an annual per beneficiary payment of about $28. This funding level would require reducing fees for non–primary care services in the fee schedule by 1.3 percent. The Congress has not adopted this recommendation.

In our June 2018 report to the Congress, the Commission described a budget-neutral approach to rebalance the fee schedule that would increase payment rates for ambulatory E&M services while reducing payment rates for other services (e.g., procedures, imaging, and tests) (Medicare Payment Advisory Commission 2018a). Under this approach, the increased payment rates would apply to ambulatory E&M services provided by all clinicians, regardless of specialty. We modeled the impact of a 10 percent payment rate increase for ambulatory E&M services, although a higher or lower increase could be considered. A 10 percent increase would raise annual spending for ambulatory E&M services by $2.4 billion. To maintain budget neutrality, payment rates for all other fee schedule services would be reduced by 3.8 percent. This change would be a one-time adjustment to the fee schedule to address several years of passive devaluation of ambulatory E&M services. Even if this approach were adopted, we urged CMS to accelerate its efforts to improve the accuracy of the fee schedule by developing a better mechanism to identify overpriced services and adjust their payment rates.

The supply of primary care physicians in Medicare

Between 2010 and 2017, the number of primary care physicians providing services to Medicare beneficiaries increased by 13 percent, although the number per 1,000 beneficiaries declined modestly. During that period, the ratio of primary care physicians to beneficiaries fell from 3.8 per 1,000 to 3.5 per 1,000 (Table 5-1). These figures may overstate the number of primary care physicians because we count all internal medicine physicians as primary care even though many of them practice in a subspecialty. Between 2010 and 2017, the number of physicians in other specialties increased by 11 percent, although the number per 1,000 beneficiaries declined from 8.4 per 1,000 to 7.7 per 1,000.

In recent years, the number of Medicare beneficiaries has grown rapidly as the baby boomers age into the program. This enrollment increase shrinks the ratio of physicians to beneficiaries over time, even though the overall number of physicians has been growing. By contrast, the ratio of practicing physicians to the entire U.S. population has increased slightly since 2011, from 2.5 physicians per 1,000 U.S. residents in 2011 to 2.6 per 1,000 in 2016 (Organisation for Economic Co-operation and Development 2018). As the overall population ages and more people shift from commercial insurance to Medicare, beneficiaries will probably become a larger share of physicians' caseloads over time. The share of physicians billing Medicare who are in primary care specialties grew slightly between 2010 and 2017, from 30.9 percent to 31.2 percent (data not shown). By comparison, the share of all physicians in the U.S. who practice primary care was 31.9 percent in 2017 (Petterson et al. 2018).

In our March 2019 report, which included a chapter on the adequacy of payments for physician and other health professional services, we found that beneficiaries have access to clinician services that is largely comparable with (or in some cases, better than) access for privately insured individuals, although a small number of beneficiaries report problems finding a new primary care doctor (Medicare Payment Advisory Commission 2019). Our primary data sources were a telephone survey of Medicare beneficiaries ages 65 and over and privately insured individuals ages 50 to 64, focus groups of beneficiaries and primary care physicians in three markets, and site visits to health care facilities. The survey, focus groups, and site visits were conducted in 2018. In general, beneficiaries reported adequate access to clinician services. For example, most beneficiaries reported that they never had to wait longer than they wanted to for routine, illness, or injury care.

However, beneficiaries looking for a new doctor generally reported more problems finding one when seeking a new primary care doctor than when seeking a new specialist. For primary care, 10 percent were looking for a new doctor, and of those looking, 14 percent reported a big problem, meaning that, on net, 1.4 percent of the Medicare population reported a big problem. For specialty care, 19 percent were looking for a new doctor; of those looking, 8 percent reported a big problem, meaning that, on net, 1.5 percent of the total Medicare population reported a big problem. These results are consistent with prior years, other surveys, and our beneficiary focus groups.

Although the number of family medicine and internal medicine residents has grown in recent years, the majority of internal medicine residents plan careers in a subspecialty instead of general internal medicine, which raises concerns about the pipeline of future primary care physicians. Between the 2013–2014 academic year and the 2017–2018 academic year, the number of active residents in family medicine and internal medicine increased at a faster rate than the total number of active residents (Accreditation Council for Graduate Medical Education 2018). The number of family medicine residents grew by 17.9 percent and the number of internal medicine residents increased by 15.7 percent, compared with 12.7 percent growth in the total number of active residents across all specialties. By contrast, the number of geriatric medicine residents declined by 2 percent (from 323 to 315).[1] Family medicine residents' share of total residents grew from 8.6 percent in the 2013–2014 academic year to 9.0 percent in the 2017–2018 academic year (Accreditation Council for Graduate Medical Education 2018). Internal medicine residents' share of total residents increased from 19.9 percent in the 2013–2014 academic year to 20.4 percent in the 2017–2018 academic year.

Although nearly all family medicine residents practice as generalists after their residencies, most internal medicine residents enter subspecialties such as cardiology, gastroenterology, hematology, oncology, and pulmonary medicine (Dalen and Ryan 2016). According to a large survey of internal medicine residents, only 21.5 percent of third-year internal medicine residents in 2009 through 2011 planned careers in general internal medicine; the remainder planned careers in subspecialties (64.2 percent) or hospital medicine (9.3 percent) or were undecided (4.1 percent) (West and Dupras 2012).[2]

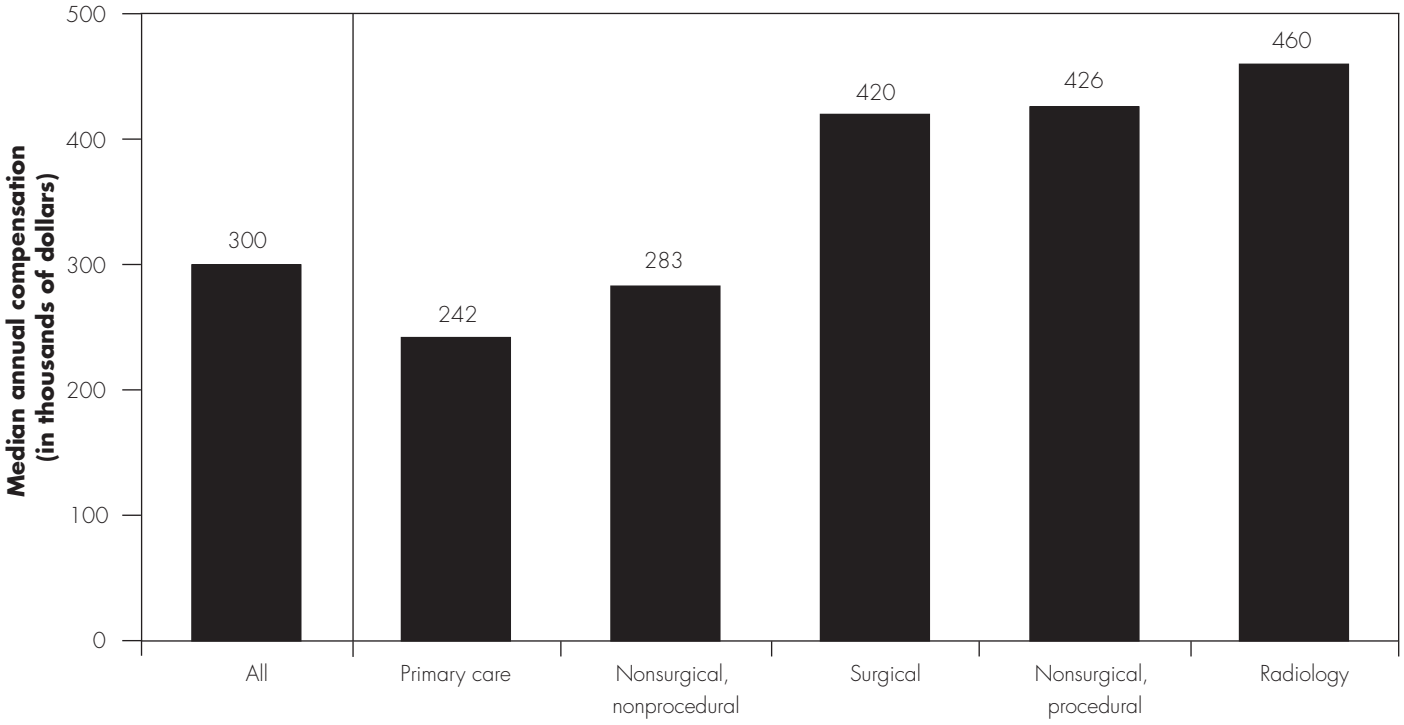
According to an estimate by Jolly and colleagues, 43 percent of internal medicine residents who began their residencies in 2010 were predicted to practice general internal medicine, compared with 49 percent of internal medicine residents who began their residencies in 2001 (Jolly et al. 2013). This estimate was based on a comparison of the number of new internal medicine residents in a given year with the number of internal medicine subspecialty fellowships that began in the same year.

There are concerns that significant disparities in compensation between primary care physicians and other specialties are deterring medical school graduates and residents from choosing to practice primary care, which could reduce beneficiaries' access to primary care in the future. For an analysis of the compensation received from all payers by physicians, the Commission contracted with the Urban Institute, working in collaboration with SullivanCotter. The contractor calculated median compensation based on 2017 data from SullivanCotter's Physician Compensation and Productivity Survey. Median compensation across all specialties was $300,000 in 2017. Compensation was much higher for some specialties than for others. The specialty groups with the highest median compensation were radiology ($460,000); the nonsurgical, procedural group ($426,000); and surgical specialties ($420,000) (Figure 5-1).[3] Median compensation for radiology ($460,000) was almost double the median compensation for primary care ($242,000), and median compensation for nonsurgical, procedural specialties was 76 percent higher than that of primary care.

Multiple studies show that a diverse health care workforce is associated with better access to care for underserved populations and with greater patient choice and satisfaction (Health Resources and Services Administration 2006, Institute of Medicine 2004). Students from rural areas, students who are from ethnic or racial minorities, and students who have lower socioeconomic status are more likely to choose a primary care career and practice in underserved areas (Brooks et al. 2002, Phillips et al. 2009, Senf et al. 2003). However, our June 2009 report found that minority, low-income, and rural students are underrepresented in medical schools (Medicare Payment Advisory Commission 2009). For example, medical students tend to come from more affluent families. In 2005, 55 percent of students came from families in the

FIGURE 5–1

Disparities in physician compensation are widest when primary care physicians are compared with surgeons, nonsurgical proceduralists, and radiologists, 2017



Note: Figure includes all physicians who reported their annual compensation in the survey (76,336).

Source: Urban Institute analysis of data from SullivanCotter's Physician Compensation and Productivity Survey, 2018.

top quintile of family income; only about 5 percent came from families in the lowest quintile (Association of American Medical Colleges 2008).

Medicare's role in financing graduate medical education

Medicare is the largest financial supporter of graduate medical education (GME)—spending about $14 billion in 2017 at more than 1,100 acute care hospitals—but requires minimal accountability from its recipients for achieving education and training goals (Medicare Payment Advisory Commission 2010a). In addition to Medicare, state Medicaid programs, the Department of Veterans Affairs, the Department of Defense, the Health Resources and Services Administration (HRSA), and teaching hospitals support GME training (Government Accountability Office 2018b, Medicare Payment Advisory Commission 2009).

Medicare GME funding includes direct GME and indirect medical education (IME) payments (Medicare Payment Advisory Commission 2009). Direct GME payments—about $4 billion in 2017—fund the teaching aspects of residency programs: residents' salaries and benefits, supervisory physician salaries, and administrative overhead expenses. Direct GME payments, which go to teaching hospitals, are based on a hospital-specific per resident payment amount for which Medicare pays its share.

IME payments—about $10 billion in 2017—account for the higher costs of patient care associated with care in teaching hospitals, such as unmeasured severity, "learning by doing," and greater use of emerging technologies. Medicare pays for IME through a percentage increase (or add-on) to the inpatient prospective payment system

rate that varies with the intensity of hospitals' residency programs. A Commission analysis found that total IME payments are higher than the empirically calculated indirect patient care costs associated with a teaching environment (Medicare Payment Advisory Commission 2010b). The Commission identified gaps in the mix of physicians produced by the GME system and in the content of their education and training (Medicare Payment Advisory Commission 2010a). For example, the share of physicians who practice primary care may not be adequate for a high-quality, high-value delivery system.

To increase accountability for Medicare's GME payments, the Commission recommended in 2010 that the Secretary create a new, performance-based GME program to support the workforce skills needed in a delivery system that reduces cost growth while improving quality (Medicare Payment Advisory Commission 2010a). We recommended that the Secretary establish standards for distributing the performance-based funds based on goals for practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice. The performance-based funds should be allocated to institutions—teaching hospitals, medical schools, and other entities that support residency programs—that meet the new standards. The recommendation stated that funding for this initiative should come from reducing IME payments to eliminate the amount currently paid above empirically justified IME costs.

Factors that influence physicians' specialty choice

A variety of factors influence specialty choices by medical school graduates and residents: personality fit, lifestyle preferences, student characteristics, factors related to medical schools and curricula, and income expectations. Educational debt may also play a role, but the evidence is mixed. Some studies show no relationship between debt and physicians' career choices, but other studies find that debt is modestly related to their career decisions.

Personality fit, content of the specialty, and role model influence

The Medical School Graduation Questionnaire, administered annually by the Association of American Medical Colleges (AAMC) to graduates of U.S. medical schools, asks respondents to rate the influence of various factors on their specialty choice (Association of American Medical Colleges 2018b). In 2018, a majority of graduating students reported that the following three factors had a "strong influence" on their specialty choice: fit with their personality, interests, and skills (87.6 percent of respondents); content of the specialty (83.8 percent); and role model influence (50.8 percent). The share of respondents rating these factors as having a strong influence on their specialty choice was stable between 2014 and 2018. A smaller share of graduates reported that income expectations and educational debt had a "strong influence" on their specialty choice in 2018 (13.5 percent and 6.3 percent, respectively). Over half of graduates (55.3 percent) responded that debt had "no influence" on their specialty choice, while almost half (44.7 percent) reported that debt had a minor, moderate, or strong influence on their specialty choice.

However, the AAMC survey is administered to graduating students before they begin their residency, and their reasons for choosing a specialty may change during their residency. In addition, they may change their specialty choice during or after their residency. For example, according to survey data from 2009 through 2011, almost half (45 percent) of first-year internal medicine residents who reported that they planned to practice general internal medicine changed their career plans by the third year of their residency (West and Dupras 2012).[4] Similarly, only 38 percent of third-year internal medicine residents who planned to practice general internal medicine had reported this career plan as first-year residents.

Lifestyle preference

Several studies found that lifestyle preference (e.g., work hours and time with family) is an important predictor of specialty choice. A survey of third-year internal medicine residents found that time with family was the most important factor in their career choices (West et al. 2009). A survey of fourth-year medical students at two medical schools found that lifestyle was a more important factor than income in students' choices of certain specialties (e.g., radiology, physical medicine, emergency medicine) (Newton et al. 2005).[5] But students who chose certain other specialties (e.g., general surgery and obstetrics/gynecology) valued income more highly than lifestyle. A study of the specialty preferences

of graduating medical students from 1996 to 2002 found that perceptions of controllable lifestyle accounted for most of the variation in specialty choice when controlling for income, work hours, and years of training (Dorsey et al. 2003). The authors defined controllable lifestyle as control of the number of hours devoted to clinical practice. Using data from a survey of fourth-year medical students at 11 medical schools, Hauer and colleagues examined the factors that affected whether students chose careers in internal medicine or another specialty (Hauer et al. 2008). They found that students were more likely to pursue a career in internal medicine if they had a favorable impression of their educational experiences in internal medicine, favorable feelings about caring for internal medicine patients, and favorable impressions of internists' lifestyle. Debt was not related to specialty choice.

Student characteristics

There is evidence of a relationship between the characteristics of students and their specialty decisions. A review of the literature found that rural background, lower socioeconomic status, and lower parental income were correlated with the choice of family medicine (Senf et al. 2003). A study based on data from the AAMC's 2002 Medical School Graduation Questionnaire found that students' demographic characteristics were the factors that best predicted choice of practice location and specialty (Rosenblatt and Andrilla 2005). For example, African American students were much more likely than other students to plan to practice in underserved inner-city areas, and female students were much more interested than male students in practicing primary care.

Factors related to medical schools and curricula

The characteristics of medical schools and curricula also influence specialty choice. Medical schools that graduate a higher proportion of primary care physicians are more likely to use community hospitals as teaching sites instead of academic medical centers, have strong primary care missions, and have family medicine departments (Phillips et al. 2009). In addition, curricula that require students to be exposed to primary care increase the likelihood that students will choose primary care careers (Phillips et al. 2009, Senf et al. 2003). Examples include requiring students to complete a clinical clerkship in family medicine and requiring an outpatient rotation in internal medicine (Phillips et al. 2009).

Income expectations

Evidence suggests that income expectations play an important role in the choice of certain specialties but not others. Senf and colleagues found that students with lower income expectations were more likely to choose family medicine and that students who chose a different specialty were concerned about the lower income potential of family medicine relative to other specialties (Senf et al. 2003). A survey of fourth-year medical students at two medical schools found that students who planned to enter certain specialties (e.g., orthopedics, general surgery, and internal medicine subspecialties) were more influenced by income issues than by lifestyle (Newton et al. 2005). A survey of third-year internal medicine residents found that financial considerations were an important factor in the career choices of residents with the most debt (greater than $150,000) (West et al. 2009).

Educational debt

Evidence that educational debt affects specialty choice is mixed. A survey of fourth-year medical students at 11 medical schools found that debt was not related to specialty choice despite differences in average compensation among specialties (Hauer et al. 2008). Similarly, another survey of medical students at three medical schools found no relationship between anticipated debt and intended specialty choice (Phillips et al. 2010). However, students from middle-income families (defined as an annual income between $50,000 and $99,999) were less likely to choose primary care as their debt levels increased. These students may be less likely than wealthier students to have financial support from their families, which may make them more inclined to choose specialties with higher compensation if they expect to accumulate higher debt. A study using data from the AAMC's 2002 Medical School Graduation Questionnaire found that total debt was modestly related to students' career choices when controlling for the students' demographic characteristics (Rosenblatt and Andrilla 2005). Higher debt had a modest negative impact on the likelihood that students would choose primary care, and the impact was greatest among those with the highest debt loads (greater than $150,000).

A large retrospective study of physicians who graduated from medical school between 1988 and 2000 examined the influence of various factors on the likelihood of practicing primary care and family medicine in 2010

(9 to 22 years after graduation) (Phillips et al. 2014).[6] Controlling for demographic and socioeconomic characteristics and the type of medical school (public or private), the authors found a nonlinear relationship between debt and specialty choice. Graduates with little or no debt were less likely to practice primary care, perhaps because they came from wealthier families and had higher income expectations. Among graduates of public medical schools, those with debt levels between $50,000 and $100,000 were most likely to choose primary care. At higher debt levels, the probability that graduates of public medical schools would practice primary care declined, perhaps because these graduates perceived a need to choose higher paying specialties to finance their higher debt. Among graduates of private medical schools, however, the likelihood of practicing primary care did not decline when debt exceeded $100,000.

The finding that graduates of public medical schools were less likely to choose primary care when their debt levels exceeded $100,000 is particularly concerning because median debt levels among all medical school graduates have grown. Data from the AAMC indicate that median medical education debt among medical school graduates increased between 2010 and 2016, from $164,850 to $180,000 (adjusted for inflation) (Grischkan et al. 2017).[7] This increase is likely related to rising tuition and a greater reliance on loans. Surprisingly, over the same period, the share of students graduating with no medical education debt also increased, from 16 percent to 27 percent.[8] This finding indicates a growing concentration of debt among a smaller share of students. Although there is no clear explanation for the growth in the share of graduates with no debt, three factors appear to play a role: the elimination of federally subsidized loans that were the only source of debt for a subset of borrowers, an increase in the share of graduates who received a scholarship, and growth in the share of graduates from families with parental income of at least $200,000 (Association of American Medical Colleges 2018a).

Federal and state scholarship, loan forgiveness, and loan repayment programs for clinicians

A growing share of medical school graduates plan to participate in loan forgiveness programs. According to the AAMC's Medical School Graduation Questionnaire, 45.7 percent of 2018 graduates planned to enter a loan forgiveness program, compared with 39.7 percent in 2014 (Association of American Medical Colleges 2018b).[9] There are several federal and state scholarship programs, loan forgiveness programs, and loan repayment programs for clinicians, including:

- the Public Service Loan Forgiveness (PSLF) program,
- programs sponsored by the Department of Defense (DoD),
- programs for civilian federal employees,
- state loan repayment programs,
- the National Health Service Corps (NHSC), and
- the Primary Care Loan (PCL) program.

Although some of these programs are available to a variety of clinician types (e.g., physicians, dentists, NPs, and PAs) and specialties regardless of where they practice, others are more limited. For example, the NHSC is restricted to primary care clinicians who commit to practicing in underserved areas.

According to the Medical School Graduation Questionnaire, of the approximately 5,280 surveyed medical school graduates in 2018 who planned to enter a loan forgiveness program, the majority (76.3 percent) planned to participate in the PSLF program, followed by hospital programs (8.4 percent), state loan forgiveness programs (6.8 percent), the NHSC (4.4 percent), other programs (2.4 percent), and military programs (0.8 percent) (Association of American Medical Colleges 2018b). By comparison, of those who graduated in 2014 who planned to enter a loan forgiveness program, a smaller share (62.6 percent) indicated they planned to participate in the PSLF program than in 2018, and larger shares planned to participate in state loan forgiveness programs (10.1 percent) and the NHSC (7.6 percent) than in 2018 (Association of American Medical Colleges 2018b).

Public Service Loan Forgiveness program

The PSLF program, which is administered by the Department of Education, was established in 2007 and provides student loan forgiveness to borrowers who have worked full time for a public service employer for 10 years and made at least 10 years of loan payments while working in a public service position (FinAid 2019). This program is not limited to health professionals. Public service employers include federal, state, local, and tribal

government agencies; the military; and tax-exempt organizations (e.g., medical schools, residency programs, and nonprofit hospitals). Only loans provided through the William D. Ford Federal Direct Loan program qualify for forgiveness.

The AAMC estimates the financial benefit of the PSLF program for a medical student who borrows $200,000 in federal direct loans (Association of American Medical Colleges 2018c). If the student makes loan repayments during three years of residency (which count as time working in public service) and while working in a public service job for seven years after residency, the student would repay a total of $130,000 and receive $226,000 of loan forgiveness.[10] These figures assume that the borrower is a 2018 medical school graduate, earns a starting salary of $160,000 after residency, and participates in an income-driven repayment plan (Association of American Medical Colleges 2018c).

Medical students may be more likely to plan to participate in the PSLF program than the NHSC or state loan repayment programs because the PSLF program does not require them to practice primary care or work in underserved areas. Although there are data on the share of medical students who plan to participate in the PSLF program, there is no information on the share of physicians across all specialties who actually participate. However, a 2016 survey of recent graduates of family medicine residency programs found that, of the 30 percent of respondents who reported participating in a loan repayment program, 23 percent participated in the PSLF program (6.9 percent of all respondents) (Nagaraj et al. 2018).[11]

The Consumer Financial Protection Bureau (CFPB) and the Government Accountability Office (GAO) have identified significant problems with how the Department of Education and its contractors manage the PSLF program (Consumer Financial Protection Bureau 2017, Government Accountability Office 2018c). The Department of Education contracts with several private companies (student loan servicers) to administer federal student loan programs, and it contracts with one company (the PSLF servicer) to certify borrowers as eligible for the PSLF program and to process loan forgiveness applications. Hundreds of borrowers have complained to the CFPB that student loan servicers have made it difficult for them to navigate the PSLF program (Consumer Financial Protection Bureau 2017). In some cases, the loan servicers have withheld essential information from borrowers about eligibility for the program, such as the types of loans that are eligible for the program. Borrowers also report that loan servicers have provided them with inaccurate counts of the number of qualified loan payments they have made. This information is important because borrowers must make at least 120 payments (the equivalent of 10 years of payments) to qualify for loan forgiveness.

According to the GAO report, as of April 2018, the Department of Education had processed applications for loan forgiveness from almost 17,000 borrowers but had approved only 55 applications. Forty percent of the applications were denied because the borrower had not yet made 120 loan payments while working in a public service position. Applications were also denied because the application was missing information or because the borrower did not have a qualifying federal loan. The high number of denials suggests that many borrowers are confused about the program's requirements. GAO found that the Department of Education provides insufficient guidance and instructions to the PSLF servicer to operate the program. For example, the Department of Education has not provided the PSLF servicer or borrowers with sufficient information to determine whether an employer qualifies a borrower for loan forgiveness, even though working for a qualifying employer is a key requirement of the program.

State loan repayment programs

Most states have loan repayment programs for health care professionals to meet their workforce needs and expand access to care. These programs are either solely funded by a state or jointly funded by a state and the NHSC (see p. 141 for a description of joint state and NHSC programs). In 2010, there were 93 state programs in 43 states and the District of Columbia (Pathman et al. 2013). Fifty-five programs were solely state-funded loan repayment programs; 27 were joint state and NHSC loan repayment programs; and 11 were direct financial incentive programs, which are similar to loan repayment programs but allow clinicians more flexibility in using program funds (Pathman et al. 2013). A total of 3,325 clinicians (1,288 physicians) participated in these programs. Solely state-funded programs had the largest number of clinicians—2,284 (863 physicians). State programs vary in their eligibility rules and the amount that participants can receive. For example, the Colorado Health Services Corps

Loan Repayment Program is a joint state–NHSC program that provides up to $90,000 for full-time physicians and dentists; $50,000 for PAs, APRNs, pharmacists, and mental health professionals; and $20,000 for dental hygienists who work for three years at an approved site in a health professional shortage area (HPSA) (Association of American Medical Colleges 2019a). California's Steven M. Thompson Physician Corps Loan Repayment Program is a solely state-funded program that repays up to $105,000 in educational loans for physicians who serve for three years in a medically underserved area (Association of American Medical Colleges 2019b).

California recently launched a new state-funded loan repayment program called the CalHealthCares program, which is designed to encourage recently graduated physicians and dentists to maintain or increase their caseload of beneficiaries in California's Medicaid program (Medi-Cal) (Physicians for a Healthy California 2019b). Physicians and dentists are eligible to receive up to $300,000 for loan repayment in exchange for a five-year service obligation during which Medi-Cal beneficiaries must constitute at least 30 percent of their patient caseload. Physicians in any specialty are eligible to apply. Although applicants are not required to practice in a HPSA, practicing in a HPSA is one of the factors used to determine awards (Physicians for a Healthy California 2019a). The program has $220 million in funding for 5 years and will make awards to about 125 physicians and 20 dentists per year.

Department of Defense programs

DoD has two primary programs to recruit and train physicians for the military: (1) the Health Professions Scholarship Program (HPSP) and (2) a medical school: The Uniformed Services University of the Health Sciences (USUHS) (Government Accountability Office 2018a).[12] These programs are not limited to specific physician specialties. Under the HPSP, the Army, Navy, and Air Force pay tuition, educational fees, a signing bonus, and a monthly stipend for students enrolled in civilian medical schools and training programs for other health professionals (e.g., dentists, nurses, optometrists, and clinical psychologists) (Congressional Research Service 2016, Department of the Army 2012, Government Accountability Office 2018a). In exchange, students agree to serve six months of active duty for each six months of benefits received, with a two-year minimum obligation. After graduation, most scholarship recipients go on active duty and begin residency training in military hospitals, while others are granted deferments to receive residency training in civilian hospitals. In fiscal year (FY) 2016, about 3,000 medical students participated in the HPSP, and the program spent about $150 million on their educational costs (Government Accountability Office 2018a).[13] USUHS—located in Bethesda, MD—trains physicians, nurses, NPs, and other health professionals (Government Accountability Office 2018a). Medical students do not pay tuition and receive a salary and benefits as commissioned officers. After physicians graduate from USUHS and complete their residency, they are required to serve seven years of active duty. There were 681 medical students at USUHS in FY 2016 (Government Accountability Office 2018a).

Programs for civilian federal employees

The Veterans Health Administration (VHA) of the Department of Veterans Affairs and the Indian Health Service (IHS) of the Department of Health and Human Services have scholarship and loan repayment programs for health professionals who are civilian employees. The VHA operates a scholarship program that provides tuition, fees, and a stipend to students pursuing degrees in certain health professions (Department of Veterans Affairs 2019). In FY 2019, these degrees include master of science in nursing for mental health practitioners and master of physician assistant studies. In exchange for the scholarship, participants who were full-time students must work for the VHA for two to three years. Under the Veterans Affairs Mission Act of 2018, the VHA expects to also offer scholarships to medical and dental students in FY 2020 (Department of Veterans Affairs 2019). In addition, the VHA will begin a loan repayment program for VHA physicians who are board certified in specialties for which recruitment or retention is difficult, but it has not yet implemented this program. The IHS runs a loan repayment program for health professionals who practice in IHS facilities (Indian Health Service 2019). In exchange for a two-year service commitment, clinicians may receive up to $40,000 to repay educational loans.

The National Health Service Corps

The NHSC was created in 1970 to encourage primary care providers to practice in underserved areas (Congressional Research Service 2018). The program is run by HRSA. As of 2018, there were about 10,900 NHSC providers furnishing care to 11.5 million people at more than 5,000 ambulatory care sites (Health Resources & Services Administration 2019b, Health Resources & Services

Administration 2018d). NHSC providers include primary care physicians, PAs, NPs, nurse midwives, dentists, dental hygienists, and mental and behavioral health providers.[14] In 2016, physicians, PAs, and NPs in the program treated about 6 million patients. A 2016 survey of recent graduates of family medicine residency programs found that, of the 30 percent of respondents who reported participating in a loan repayment program, 13 percent participated in NHSC programs (3.9 percent of all the respondents) (Nagaraj et al. 2018). An evaluation conducted in 2012 found that 55 percent of NHSC clinicians continued to practice in underserved areas 10 years after completing their service commitment (Health Resources & Services Administration 2016). As of February 2011, 42 percent of NHSC clinicians served in rural areas (Pathman and Konrad 2012).

We do not have data on the payer type or other characteristics of patients who receive care from NHSC providers. However, over 60 percent of NHSC clinicians serve in federally qualified health centers (FQHCs), and HRSA collects data on the payer mix of FQHC patients (Health Resources & Services Administration 2018c). About half of FQHC patients in 2017 were covered by Medicaid, 23 percent were uninsured, 17 percent had private insurance, and 9 percent were covered by Medicare (including dual-eligible beneficiaries who were covered by both Medicare and Medicaid) (Health Resources & Services Administration 2019a).

Health care sites that participate in the NHSC Sites that participate in the NHSC include FQHCs, rural health clinics, private practices, Indian Health Service facilities, and community mental health centers. To participate in the NHSC, sites must be located in or serve HPSAs, which are specified geographic areas; certain population groups within a specified geographic area (e.g., migrant farmworkers); or designated facilities with a shortage of primary care, dental, or mental health providers (Health Resources & Services Administration 2018b). To determine a HPSA score, HRSA considers the area's provider-to-population ratio, the share of the population below 100 percent of the federal poverty level, and travel time to the nearest source of care outside of the area (Health Resources & Services Administration 2018a).

The NHSC consists of three types of programs The NHSC consists of three types of programs: (1) the Scholarship Program, (2) federal loan repayment programs, and (3) the State Loan Repayment Program (Table 5-2, p. 140). They all require recipients to serve at an NHSC-approved site in an underserved area for a minimum amount of time. The largest set of programs is the federal loan repayment programs, followed by the State Loan Repayment Program and the Scholarship Program (Congressional Research Service 2018).

Scholarship Program The NHSC Scholarship Program pays for students' tuition, other educational costs, and a living stipend for up to four years while students train to become physicians, dentists, PAs, NPs, or nurse midwives (National Health Service Corps 2018b). In exchange, students agree to serve as a primary care provider in an underserved area for two to four years upon graduation, depending on the length of the scholarship. In FY 2018, the NHSC awarded 222 new scholarships (Health Resources & Services Administration 2019b).

Federal loan repayment programs There are three NHSC federally funded loan repayment programs:

- the Loan Repayment Program (LRP),
- the Students to Service Loan Repayment Program (S2S LRP), and
- the Substance Use Disorder (SUD) Workforce Loan Repayment Program.

Primary care physicians, PAs, NPs, nurse midwives, dentists, dental hygienists, and mental and behavioral health providers who are fully trained and licensed in their discipline are eligible to apply for the LRP. It pays full-time clinicians up to $50,000 toward repaying their loans and part-time clinicians up to $25,000 (National Health Service Corps 2018a). These clinicians must be employed by or have accepted an offer to work at an NHSC-approved site. In exchange, recipients commit to serve for two years. Recipients who have completed two years of service and still have educational debt may extend their service in exchange for additional loan repayment funds. In FY 2018, there were 3,262 new LRP agreements and 2,384 continuing LRP agreements between the NHSC and clinicians (Health Resources & Services Administration 2019b).

Full-time students in their last year of medical or dental school are eligible to apply for the S2S LRP, which HRSA established in 2012 with the goal of increasing the number of physicians and dentists in the NHSC pipeline. Medical students who receive an award must complete a postgraduate training program in primary

TABLE 5–2 **National Health Services Corps scholarship and loan repayment programs**

Program		Eligibility	Minimum service commitment	Number of new awards in FY 2018	Benefit
Scholarship Program		Students training to become physicians, dentists, NPs, PAs, NMs	2–4 years	222	Pays students' tuition, other educational costs, and living stipend
Federal loan repayment programs	Loan Repayment Program	Primary care physicians, NPs, PAs, NMs, mental and behavioral health providers who are trained and licensed	2 years	3,262	Pays full-time clinicians up to $50,000 and part-time clinicians up to $25,000 for an initial two-year obligation
	Students to Service Loan Repayment Program	Full-time students in their last year of medical or dental school; recipients who are medical students must complete a postgraduate training program in primary care	3 years	162	Pays full-time physicians and dentists up to $120,000
	Substance Use Disorder Workforce Loan Repayment Program	Primary care physicians, NPs, NMs, PAs, behavioral health professionals, substance use disorder counselors, RNs, pharmacists	3 years	N/A[a]	Pays full-time professionals up to $75,000 and part-time professionals up to $37,500
State Loan Repayment Program		Primary care physicians, NPs, PAs, NMs, mental and behavioral health providers[b]	2 years[c]	625	Loan repayment for qualified educational debt (amount varies by state)

Note: FY (fiscal year), NP (nurse practitioner), PA (physician assistant), NM (nurse midwife), RN (registered nurse), N/A (not applicable).
[a]Because the Health Resources and Services Administration recently created the Substance Use Disorder Workforce Loan Repayment Program, the agency has not yet made any awards.
[b]States may choose to expand or limit the types of clinicians who are eligible to participate in their programs.
[c]States may require more than two years of service in exchange for loan repayments.

Source: Congressional Research Service 2018, Health Resources & Services Administration 2019b, National Health Service Corps 2018a, National Health Service Corps 2018b, National Health Service Corps 2018c, National Health Service Corps 2018d, National Health Service Corps 2017.

care. In exchange for a three-year commitment to provide primary care services in a high-priority HPSA, full-time physicians and dentists may receive up to $120,000 toward repaying their loans (National Health Service Corps 2017). In addition, recipients who have completed their three-year commitment and have remaining debt may apply to continue in the program in exchange for additional loan repayment funds. In FY 2018, there were 162 new S2S LRP agreements with physicians and dentists (Health Resources & Services Administration 2019b).

The SUD Workforce Loan Repayment Program, created by HRSA in 2018 to support the recruitment and retention of health professionals in HPSAs, is intended to expand access to opioid and substance use treatment and prevent overdose deaths (Sigounas 2019). Providers in certain disciplines who are fully trained and licensed in their discipline are eligible to apply for this program.[15] These providers must be employed at, or have accepted a position at, a SUD treatment site approved by the NHSC. Such sites include FQHCs, rural health clinics, and office-based opioid treatment facilities. This program pays full-time professionals up to $75,000 for three years

of service and part-time professionals up to $37,500 for three years of service. Because HRSA has just started to implement this program, the agency has not yet made any awards.

State Loan Repayment Program The State Loan Repayment Program is similar to the federal loan repayment programs except for three differences: (1) It is a federal grant program that requires matching grants from states that participate, (2) states may choose to expand or limit the types of primary care clinicians who are eligible for their programs (e.g., they may choose to include registered nurses and pharmacists), and (3) states may require more than two years of service in exchange for loan repayment (Congressional Research Service 2018). HRSA has awarded a total of $19 million to the 41 states and the District of Columbia that participate in this program (National Health Service Corps 2019). In FY 2018, there were 625 new loan repayment agreements with clinicians (Health Resources & Services Administration 2019b). The annual award amount for each clinician varies by state (National Health Service Corps 2018d).

As NHSC funding has increased, clinician participation has grown rapidly, especially among nurse practitioners and mental and behavioral health clinicians An expansion of funding for the NHSC has been accompanied by rapid growth in the number of clinicians participating in the program since 2009. In 2009, America's Recovery and Reinvestment Act designated $300 million to expand the NHSC (Pathman and Konrad 2012). As a result, the number of clinicians in the NHSC more than doubled between March 2009 and February 2011, from 3,017 to 7,713. Since FY 2011, the NHSC has received about $300 million per year in mandatory funding, which is scheduled to expire after FY 2019 (Congressional Research Service 2018). In FY 2018 and FY 2019, the program also received over $100 million in discretionary funding (Department of Health and Human Services 2019). Substantial growth in the number of clinicians in the NHSC between FY 2008 and FY 2018—from about 3,600 to about 10,900—suggests that scholarships and loan repayment assistance are a strong incentive for primary care clinicians to practice in underserved areas. However, it is unclear whether the clinicians who participate in the NHSC would have practiced primary care in underserved areas even in the absence of the program. Despite the increase in the number of NHSC clinicians, there is a large unmet demand for them at ambulatory care sites in underserved areas. In April 2018, there were 4,605 open, unfilled positions for NHSC clinicians at NHSC sites.

Between 2009 and 2018, the distribution of NHSC clinicians shifted from physicians (including psychiatrists) to NPs and mental and behavioral health clinicians (e.g., psychologists and licensed clinical social workers). Although the number of NHSC physicians increased during this period from 1,689 to 2,149, their share of the total number of NHSC clinicians declined from 35 percent to 20 percent (Figure 5-2, p. 142). Between 2009 and 2018, NPs' share of the total grew from 13 percent to 23 percent, and mental and behavioral health clinicians' share of the total increased from 22 percent to 29 percent.

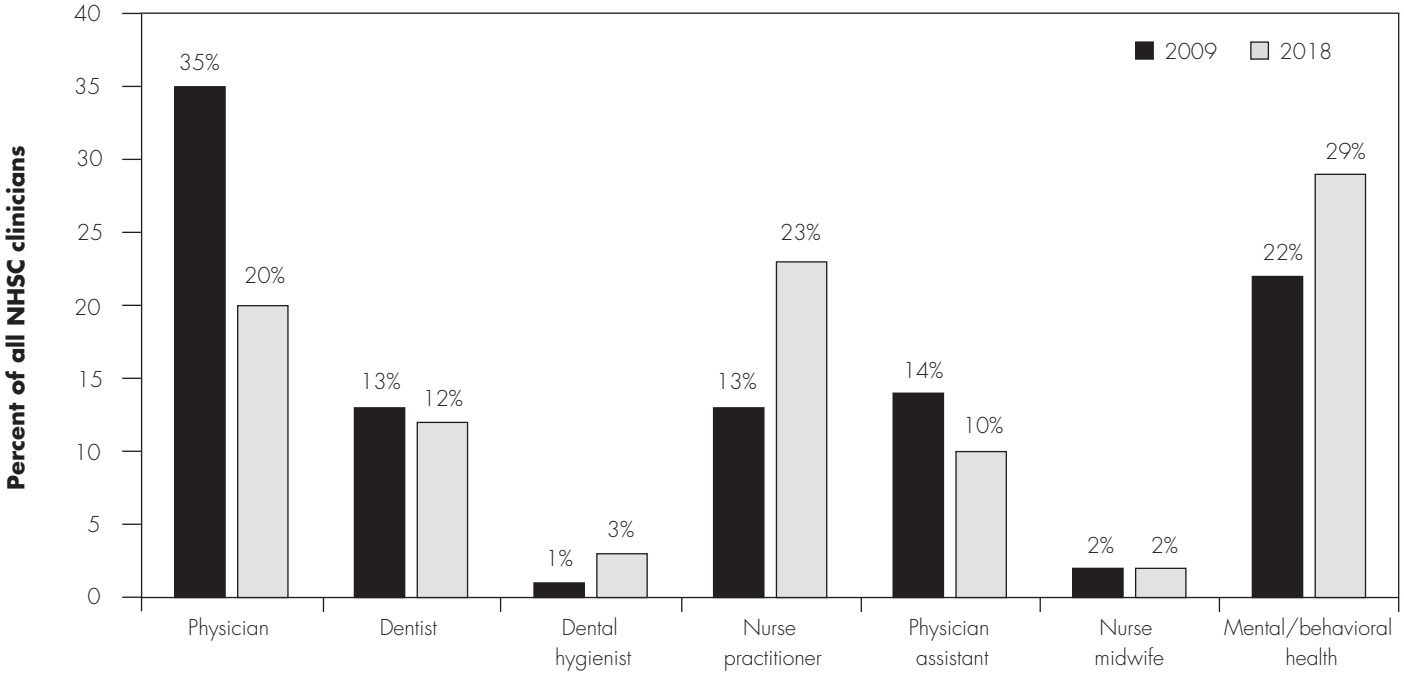
A relatively high share of NHSC clinicians are from racial and ethnic minorities Clinicians from racial and ethnic minorities account for a higher share of NHSC clinicians than for the health care workforce nationally. In FY 2016, African American physicians represented 17 percent of NHSC physicians, compared with 4 percent of the physician workforce nationally (Health Resources & Services Administration 2016). In the same year, African Americans accounted for 18 percent of NHSC NPs (compared with 8 percent of NPs nationally) and 9 percent of NHSC PAs (compared with 4 percent of PAs nationally) (Health Resources & Services Administration 2018e). Similarly, in the same year, Hispanic or Latino physicians represented 18 percent of NSHC physicians, compared with 4 percent of the physician workforce nationally (Health Resources & Services Administration 2016). In addition, Hispanics or Latinos accounted for 7 percent of NHSC NPs (compared with 3 percent of NPs nationally) and 12 percent of NHSC PAs (compared with 7 percent of PAs nationally) (Health Resources & Services Administration 2018e).

The Primary Care Loan program

The PCL program provides low-interest loans (at 5 percent interest rates) to medical students in exchange for a commitment to practice primary care for a certain amount of time (Health Resources & Services Administration 2018f, Health Resources & Services Administration 2011). By comparison, interest rates for federal graduate and professional loans disbursed between July 1, 2018, and June 30, 2019, ranged from 6.6 percent to 7.6 percent (Association of American Medical Colleges 2018c).[16] HRSA runs the PCL program under Title VII of the Public Health Service Act. Students who receive a loan agree to complete a residency in primary care and practice primary

FIGURE 5–2

Distribution of NHSC clinicians shifted from physicians to nurse practitioners and mental/behavioral health clinicians, 2009–2018



Note: NHSC (National Health Service Corps). The physician category includes psychiatrists. The mental/behavioral health category includes psychologists, licensed clinical social workers, marriage and family therapists, psychiatric nurse specialists, and licensed professional counselors but excludes psychiatrists.

Source: Health Resources & Services Administration 2019b, National Health Service Corps 2009.

care after residency; the combined time in residency and in primary care practice must equal at least 10 years, unless the loan is repaid sooner.[17] Unlike the NHSC, the PCL program does not provide scholarship or loan repayment options and does not require participants to practice in underserved areas. It is much smaller than the NHSC.

The PCL program is funded through a revolving fund that includes loan repayments from borrowers, penalty assessments on borrowers who make late payments or default on loans, a federal contribution, and matching contributions from each medical school that participates in the program (Health Resources & Services Administration 2018e). The program does not receive annual appropriations. Medical schools must meet certain requirements to participate in the program: (1) a minimum share of their graduates must practice primary care and (2) they must match one-ninth of the federal loans received by their students and contribute this amount to the revolving fund. Of the nation's 154 accredited medical schools, 101 participate in the program (62 of them are public).

In the 2016–2017 academic year (the most recent year for which data are available), the program had 2,573 active borrowers, compared with 4,518 in the 2009–2010 academic year (Health Resources & Services Administration 2018e).[18] Borrowers owed a total of $18.3 million in the 2016–2017 academic year, down from $23.4 million in the 2009–2010 academic year (Health Resources & Services Administration 2018e). Three factors have likely contributed to the decline in the number of borrowers and the total loan amount: (1) The program's 10-year obligation to practice primary care makes it less attractive than other loan programs, such as the PSLF, which do not require participants to practice a specific specialty; (2) the NHSC program has grown since 2009 and PCL borrowers are not eligible to participate in the NHSC; and (3) interest rates for federal graduate and professional loans fell below 5 percent for several years.

A small proportion of PCL borrowers serve in medically underserved areas or in rural areas.[19] Among borrowers who graduated from medical school four years earlier, 9.4 percent were practicing in a medically underserved area and only 1.5 percent were practicing in a rural area in the 2016–2017 academic year (Health Resources & Services Administration 2018e). Racial and ethnic minorities account for a small share of PCL borrowers. Among PCL borrowers who were enrolled in medical school in the 2016–2017 academic year, only 2.3 percent were African American and only 2.5 percent were Hispanic or Latino (Health Resources & Services Administration 2018e). By comparison, African American physicians and Hispanic or Latino physicians each represent about 4 percent of the physician workforce nationally (Health Resources & Services Administration 2016).

Policy option: Create scholarship or loan repayment program for geriatricians who treat Medicare beneficiaries

Policymakers may wish to consider establishing a scholarship or loan repayment program for physicians who provide primary care to Medicare beneficiaries for a minimum number of years. (Because of the rapid increase in the number of APRNs and PAs (see p. 150), the Commission concludes that there is no need to create a new program to stimulate additional growth of APRNs and PAs.) Although physicians in several specialties (e.g., family medicine, general internal medicine, and geriatrics) furnish primary care to beneficiaries, a Medicare-specific scholarship or loan repayment program should target those physicians most likely to treat beneficiaries to ensure the best use of scarce resources. In addition, because Medicare serves disabled and elderly beneficiaries, the goals of a Medicare-specific program will differ from the goals of other programs that focus on different populations (e.g., patients in underserved areas or members of the military). Therefore, a Medicare-specific program could target geriatricians because they focus on treating elderly patients.

Geriatricians specialize in managing the unique health and treatment needs of elderly individuals, many of whom have multiple chronic conditions, use many medications, and require additional time for treatment and care coordination (Health Resources & Services Administration 2017). Most geriatricians are board certified in internal or family medicine and have completed a one-year fellowship in geriatric medicine. Despite the importance of geriatricians to the Medicare population, only 1,830 geriatricians treated beneficiaries in FFS Medicare in 2017 (less than 1 percent of all physicians who treated FFS beneficiaries in that year).[20] Between the 2013–2014 academic year and the 2017–2018 academic year, the number of geriatric medicine residents declined by 2 percent, which raises concerns about the future pipeline of geriatricians (Accreditation Council for Graduate Medical Education 2018).

In a 2008 report, the Institute of Medicine (IOM) called for increasing the number of specialists in geriatric medicine and improving the geriatric competence of the entire health care workforce to meet the needs of the growing number of elderly Americans (Institute of Medicine 2008). Geriatricians are needed both for their clinical expertise and their critical role in educating and training the rest of the workforce in geriatric issues. Although geriatricians receive more training than other primary care physicians, the report found that they have lower incomes, which may discourage physicians from pursuing geriatrics. To increase the number of geriatricians, the report recommended that states and the federal government create loan forgiveness, scholarship, and direct financial incentive programs for professionals who enter geriatrics.

By reducing or eliminating educational debt, a Medicare-specific scholarship or loan repayment program could provide medical students and residents with a financial incentive to choose geriatrics. However, it is difficult to anticipate how medical students and residents would respond to such an incentive. The evidence on whether educational debt influences specialty choice is mixed (see pp. 134–136). The availability of a scholarship or loan repayment subsidy may convince some medical students and residents to choose geriatrics over another specialty, while others may choose a different specialty regardless of the subsidy. Medical students who graduate without debt would not need help repaying loans (about 30 percent of medical students graduated in 2018 without debt). Further, some students and residents would probably choose geriatrics with or without a Medicare-specific scholarship or loan repayment program, as is the case today. Nevertheless, policymakers could consider such a program as an option to address concerns about the future pipeline of geriatricians.

A Medicare-specific scholarship or loan repayment program focused on geriatricians would probably be much smaller than the ones offered by the NHSC, which received about $400 million in total funding and made new awards to over 4,200 clinicians in 2018 (Congressional Research

Service 2018, Health Resources & Services Administration 2018d). In the 2017–2018 academic year, there were 315 residents in geriatrics (Accreditation Council for Graduate Medical Education 2018). Even if the number of residents in geriatrics doubled and all of them decided to participate in a Medicare-specific scholarship or loan repayment program, the number of participants in such a program would be about 600 per year.

Design issues

There are several issues to consider in designing a scholarship or loan repayment program for geriatricians:

- how the program should be financed,
- whether the program should provide scholarships or loan repayments,
- the minimum number of Medicare beneficiaries participants would be required to treat, and
- the length of the service commitment.

The design and experience of existing programs—such as the NHSC and California's CalHealthCares program—could help inform these design choices.

A key issue is how to finance a Medicare scholarship or loan repayment program. There are two options that would finance the program with funds that are currently spent on Medicare clinician services. One is to fund it with savings from the Commission's recommendation to eliminate the Merit-based Incentive Payment System (MIPS) (Medicare Payment Advisory Commission 2018b). Under MIPS, $500 million is appropriated each year from 2019 to 2024 for exceptional performance (or $3 billion over that time frame). When the Commission recommended eliminating MIPS, our intent was not to produce budget savings but to consider policies that would reinvest these funds elsewhere in Medicare clinician payment (Medicare Payment Advisory Commission 2018b). One possibility is to use these funds to finance a Medicare scholarship or loan repayment program for geriatricians. The second option is to finance the program with savings from the Commission's recommendation to require APRNs and PAs to bill Medicare directly, eliminating "incident to" billing for services they provide (pp. 160–162). We estimate that this recommendation will reduce Medicare program spending by $50 million to $250 million in the first year and by $1 billion to $5 billion over the first five years.

Another issue is whether the program should provide scholarships, loan repayments, or both. The advantage of scholarships is that they could attract students from low-income backgrounds who might be less likely to apply to medical school because of its high cost. The advantage of loan repayments is that they are targeted to medical students who are closer to graduation (or have already graduated) and therefore have a stronger idea of whether they would like to pursue a career in geriatrics. The program could offer both options, as the NHSC does.

The program would need to determine the minimum number of Medicare beneficiaries whom participating physicians would be required to treat. This standard could be expressed as the absolute number of beneficiaries, Medicare patients' share of a physician's total caseload, or a combination of the two (e.g., a physician must treat at least 500 beneficiaries per year and beneficiaries must account for at least 25 percent of the physician's caseload). California's CalHealthCares program requires that Medi-Cal beneficiaries constitute at least 30 percent of participants' patient caseloads. However, the easiest measure to validate would be the absolute number of beneficiaries treated because it could be determined from Medicare claims data alone, whereas the other options would also require data from commercial insurance and Medicaid. It would also be prudent to set a minimum standard for the share of a physician's Medicare fee schedule services that are primary care services (e.g., ambulatory E&M services) to ensure that participants are focused on primary care.

In addition, the program would need to determine the minimum service time for participants, which could vary based on the amount of the scholarship or loan repayment received. For example, students who participate in the NHSC's scholarship program serve for two to four years upon graduation, depending on the length of the scholarship. A Medicare-specific program would be less restrictive than the NHSC because it would not require that clinicians serve at designated sites in certain geographic areas. Therefore, it could require additional years of service. One option is to require two to eight years of service (two years for each year of scholarship or loan repayment), which would be twice as long as the maximum service requirement of the NHSC's scholarship program. By comparison, the PSLF and PCL programs require 10 years of service (unless the loan is repaid sooner), and the CalHealthCares program requires 5 years of service.

Because of limited resources and the difficulty of predicting the impact of a scholarship or loan repayment

program on the career choices of medical students and residents, it would be preferable to target one specialty (geriatrics). After the program is implemented, researchers could evaluate its cost, its impact on physicians' career decisions, and program operations. Policymakers could use this information to improve the program and decide whether to expand it to other primary care specialties.

The supply of APRNs and PAs in Medicare

While the Commission has concerns about the supply of primary care physicians, the number of advanced practice registered nurses (APRNs) and physician assistants (PAs) has increased rapidly and is projected to continue to do so in the future. As a consequence, Medicare beneficiaries rely on APRNs and PAs to provide an increasingly substantial share of their medical needs. However, Medicare collects little up-to-date information regarding the specialties in which APRNs and PAs practice, and Medicare's knowledge regarding who these clinicians treat is obscured by "incident to" billing, which allows APRNs and PAs to bill under the national provider identifier (NPI) of a supervising physician if certain conditions are met. These limitations obscure increasingly substantial amounts of important information on the clinicians who treat beneficiaries and inhibit Medicare's ability to identify and support clinicians furnishing primary care.

PAs are clinicians who have graduated from a PA educational program (most commonly a master's degree program), are certified by the National Commission on Certification of Physician Assistants, and are licensed by the state in which they practice. PA graduate programs are commonly 27 months (3 academic years) (American Academy of Physician Assistants 2018c). PAs train as generalists; their education is modeled after medical school curricula and includes both didactic training in basic medical science and clinical rotations. PAs are trained to work in collaboration with physicians. Currently, most state laws require PAs to have an agreement with a specific physician to practice.

APRNs are registered nurses who have completed additional training (most commonly a master's degree), are certified by one of several certifying bodies, and are licensed by the state in which they practice. There are four categories of APRNs: NPs, clinical nurse specialists (CNSs), certified registered nurse anesthetists (CRNAs), and certified nurse midwives (CNMs).

Both NPs and PAs provide a broad range of services to Medicare beneficiaries. In contrast, other categories of APRNs provide a relatively narrow set of services to Medicare beneficiaries (e.g., CRNAs predominantly provide anesthesia services) or directly bill Medicare for relatively few services (e.g., CNMs predominantly treat non-Medicare patients). (Because of these and other differences in Medicare payment policies, this chapter focuses on NPs and PAs.)

While NPs and PAs have historically been concentrated in primary care, a large share of NPs and PAs do not work in primary care, and more recent patterns suggest that NPs and PAs are increasingly practicing in specialty fields.[21] One study found that the share of PAs practicing in family medicine (one subcategory of primary care) was approximately 40 percent in 1996 but declined to 27 percent in 2008 (Hooker et al. 2010). As of 2017, about 27 percent of certified PAs work in primary care, defined as family medicine/general practice, general internal medicine, and general pediatrics (National Commission on Certification of Physician Assistants 2017). For NPs, one study found that the share of NPs practicing in primary care fell from 59 percent for those who graduated in 1992 or earlier to 47 percent for those who graduated in 2008 or later (Chattopadhyay et al. 2015). While estimates of the share of NPs working in primary care vary substantially, one national survey and another study that relied on the specialties of the professionals with whom NPs worked found that roughly half of NPs practiced in primary care (Agency for Healthcare Research and Quality 2011, Health Resources & Services Administration 2014).

Medicare's coverage of NP and PA services

Medicare covers services performed by NPs and PAs if the services are:

- considered physician services if performed by a physician;
- performed by a clinician meeting the qualifications of an NP or PA;
- performed in collaboration with a physician (NP requirement) or under the general supervision of a physician (PA requirement);[22]
- not otherwise excluded from Medicare coverage; and

- limited to those services an NP or PA is legally authorized to perform in accordance with state law (Centers for Medicare & Medicaid Services 2018a).

In practice, Medicare generally covers all medically necessary services provided by NPs and PAs in accordance with state law. In other words, Medicare generally does not impose additional restrictions beyond state law regarding what services these clinicians can provide. The few restrictions Medicare places on these clinicians involve requiring physicians, as opposed to NPs or PAs, to certify, order, or supervise certain services. For example, only physicians can order home health and hospice services and can certify the need for diabetic shoes (Centers for Medicare & Medicaid Services 2019, 42 CFR §418.22, 42 CFR §424.22).

State scope-of-practice laws

For NPs, scope-of-practice laws vary substantially from state to state. The American Association of Nurse Practitioners (AANP) groups state scope-of-practice laws into three categories: full practice authority, reduced practice authority, and restricted practice authority.[23] AANP includes states in the full practice authority category if they allow NPs to evaluate and diagnose patients, order and interpret diagnostic tests, and initiate and manage treatments—including prescribing medications and controlled substances—under the exclusive licensure authority of the state board of nursing. AANP includes states in the reduced practice authority category if they reduce the ability of NPs to engage in at least one element of NP practice and meet other criteria, such as requiring a career-long regulated collaborative agreement with another health provider. AANP includes states in the restricted practice authority category if they restrict the ability of NPs to engage in at least one element of NP practice and require a career-long supervision, delegation, or team management by another health provider. As of 2018, AANP included 22 states and Washington, DC, in the full practice authority category, 16 states in the reduced practice authority category, and 12 states in the restricted practice authority category (American Association of Nurse Practitioners 2018a).

Because PAs are generally required to have closer working relationships with physicians, PA scope-of-practice laws are often less specific. Most states now allow the details of each PA's scope of practice to be decided at the practice level instead of prescribed by the state (American Academy of Physician Assistants 2018b). In other words, physicians may use their professional judgment and familiarity with the PA's education and training to delegate work to PAs. When states do restrict PAs' practice, restrictions may include limitations on their prescribing authority (e.g., limiting their ability to prescribe controlled substances) and a cap on the number of PAs who can be supervised by one physician.

Over time, many states have liberalized their scope-of-practice laws, giving NPs and PAs a greater degree of authority and autonomy. One study found that, from 2001 to 2010, 10 states loosened requirements for physician involvement in the diagnosis and treatment of patients treated by NPs. For example, the study found that Arizona, Colorado, Hawaii, Idaho, Michigan, Rhode Island, Washington, and Wyoming went from requiring collaborative relationships between NPs and physicians to requiring no physician involvement at all (Gadbois et al. 2015). Over the same period, the study found that 17 states increased the prescribing authority of PAs (e.g., allowing PAs to prescribe controlled substances or certain types of controlled substances).

Medicare's billing and payment policies for NPs and PAs

Medicare allows NPs and PAs to bill under the NPI of a supervising physician if certain conditions are met, a practice known as "incident to" billing. Medicare's "incident to" rules were likely not designed to cover the breadth of services NPs and PAs currently furnish to Medicare beneficiaries. As the professions have grown in number of clinicians and types of services performed, Medicare has gradually allowed NPs and PAs to bill the program directly in more circumstances. As a result, Medicare currently allows NPs and PAs to bill in two different ways—directly and "incident to," in certain situations.

Development of Medicare billing and payment policies for NPs and PAs

Medicare's "incident to" policies can be traced to the creation of Medicare. The Social Security Amendments of 1965 defined the coverage of medical and other health services to include physician services and services and supplies "furnished as an incident to a physician's professional service, of kinds which are commonly furnished in physicians' offices and are commonly either rendered without charge or included in the physicians' bills" (U.S. House of Representatives

1965). Contemporaneous reports suggest that the "incident to" benefit covered "services of aides," but neither the legislation nor these reports indicate that NP and PA services were contemplated as being included in the definition of "incident to" services (U.S. Senate Committee on Finance 1965). The first NP and PA programs were not created until 1965, with the first students graduating in the years thereafter (American Academy of Physician Assistants 2018a, American Association of Nurse Practitioners 2018b). Therefore, given the nascence of the professions and the lack of any explicit reference to these clinicians in Medicare's original authorizing statute or other contemporaneous reports, Medicare's "incident to" benefit was unlikely to have contemplated covering services provided by NPs or PAs and especially not the type of services furnished by NPs and PAs today.

Nonetheless, NP and PA services were billed "incident to" in the years after Medicare was established because these clinicians could not bill Medicare directly. While NPs and PAs can still bill "incident to" today, Medicare's billing rules have changed incrementally over time to allow NPs and PAs to be paid directly for their services in more circumstances. For example, in the 1970s, the Congress was concerned with the lack of primary care physicians in rural areas and observed that, in some isolated rural communities, NPs and PAs were the lone source of primary care. However, Medicare often did not reimburse for medical services furnished by NPs and PAs in these rural locations because these clinicians could not bill Medicare directly and the services often did not meet the definition of "incident to" services. At the time, Medicare's "incident to" requirement had "been interpreted to mean that two requirements must be met. The first is that there must be direct physician supervision of the services provided by the nonphysician personnel. The second is that the services provided by the nonphysician personnel cannot be physician-type services, that is, they cannot be actual medical services" (U.S. House of Representatives Committee on Ways and Means 1977). The services provided by NPs and PAs in some rural communities at the time met neither of these two criteria because the services were of the type normally performed only by physicians and physician supervision of the services was only indirect (U.S. House of Representatives Committee on Ways and Means 1977). To address this issue, the Congress passed the Rural Health Clinic Services Act of 1977, which (among other provisions) provided for cost-based reimbursement for rural health clinic services, the definition of which included NP and PA services (U.S. House of Representatives 1977).

While a full review of the changes to direct and "incident to" billing for NPs and PAs is beyond the scope of this report, other significant pieces of legislation that expanded billing privileges for NPs and PAs include the Omnibus Budget Reconciliation Act (OBRA) of 1986, OBRA 1987, OBRA 1989, OBRA 1990, and the Balanced Budget Act of 1997. For example, among other changes, OBRA 1989 expanded coverage to include NP services provided in a skilled nursing facility (U.S. House of Representatives 1989). The Balanced Budget Act of 1997 granted NPs and PAs the ability to bill Medicare directly across the entire country and in all practice settings (U.S. House of Representatives 1997).

Current Medicare billing and payment policies for NPs and PAs

Currently, Medicare allows services furnished by NPs and PAs to be billed under their NPIs or a supervising physician's NPI if certain conditions are met. If billed under an NP or PA's NPI, Medicare pays 85 percent of the standard physician fee schedule rate, and assignment is mandatory (that is, balance billing is not allowed).[24] If the services are instead billed under the physician's NPI, Medicare pays the full physician fee schedule rate, and assignment is not mandatory. To bill in this manner, Medicare's "incident to" rules must be followed.

Medicare's "incident to" rules are complex and apply only to services furnished to certain patients and in certain settings. Under Medicare's current "incident to" rules, services must be furnished in noninstitutional settings. For example, NPs practicing in a hospital outpatient department cannot bill under Medicare's "incident to" rules. Other "incident to" requirements include the following provisions:

- The physician must initiate treatment and maintain active involvement in the patient's case, meaning that "incident to" billing is not allowed for new patients or established patients with new problems; and
- The services must generally be rendered under a physician's direct supervision. *Direct supervision* means the physician must be present in the office suite and immediately available to furnish assistance and direction (it does not mean that the physician must be present in the room when the service is furnished) (42 CFR §410.26, Noridian Healthcare Solutions 2018).[25]

In addition to allowing NPs and PAs to bill "incident to" physician services, Medicare also allows other individuals to bill "incident to" NP and PA services (Noridian Healthcare Solutions 2018). For example, a registered nurse could perform a service and bill under an NP's NPI so long as all of Medicare's "incident to" rules are met. In this case, the service would be paid at 85 percent of the standard physician fee schedule rate (because the service would be billed as if it were provided by the NP).

Comparing the quality and cost of care provided by NPs and PAs with the care provided by physicians

Services historically delivered by physicians are increasingly being delivered by NPs and PAs. As these shifts have occurred, researchers have studied the effects of NP- and PA-provided care relative to physician-provided care on clinical quality outcomes, patient experience, utilization, spending, and other metrics. Our ability to draw definitive conclusions from the studies in this area, despite it being a well-studied area of health policy, is somewhat constrained by several methodological factors.

Studies may not isolate the effects of clinician type (NP/PA vs. physicians) from other systematic differences

Of the numerous studies in this area, few use a randomized design, assigning each patient to an NP, PA, or physician and then comparing costs, quality, and patient experience.

In lieu of random assignment, many studies use claims data, encounter data, or custom surveys, and they retrospectively adjust for patient severity, practice environment, and clinician mix. Such analyses are valuable and can yield important insights. However, practices that employ both NPs or PAs and physicians might systematically direct lower acuity patients to NPs or PAs. Patients may also choose among physicians, NPs, and PAs based on their preferences or perceived severity of illness. To the extent systematic differences exist in the types of patients treated by physicians compared with those treated by NPs or PAs that are not observable in the data (and thus cannot be adjusted for), these studies may not effectively isolate the effects of clinician type from other confounding factors.[26]

Many studies are small, lack sufficient statistical power to detect meaningful differences, or are limited in applicability

Of the studies we reviewed for this chapter, many had small sample or case sizes, limiting the ability of the studies to detect smaller differences in outcomes or spending. Other studies were conducted in certain settings that could limit their generalizability (e.g., many studies evaluate care provided by the Veterans Health Administration), studied only certain types of care (e.g., HIV/AIDS treatment or cardiovascular care), or assessed trends in limited settings (e.g., a convenience sample of one large practice). In addition, some studies found statistically significant differences, but the magnitude of the differences was small.

Studies that use Medicare claims are confounded by "incident to" billing

For claims-based studies, Medicare's and other payers' "incident to" policies obscure researchers' ability to determine who actually performed a service because a substantial portion of services performed by NPs and PAs appears in claims data to have been performed by physicians.

Studies can become dated quickly

Rapid changes in this field suggest that analyses may become outdated more quickly than in other fields. The number of clinically active NPs and PAs has expanded rapidly over the last two decades. NPs and PAs graduate from an increasing number of programs from across the country and could be different from prior cohorts of NPs and PAs (e.g., experience, education). Also, NPs' and PAs' respective scopes of practice have expanded over time so that a larger number of NPs and PAs are providing a larger array of services with more autonomy. These facts suggest that ongoing research will be needed to assess the effects of NPs and PAs on costs and quality of care.

Findings of existing literature

Notwithstanding these limitations, existing research suggests that NPs and PAs, within the confines of their respective scopes of practice, provide care that is substantially similar to that of physicians in terms of clinical quality outcomes and patient experience. The evidence regarding the impact of NPs and PAs on the cost of care for payers, such as Medicare, is less robust and somewhat mixed, as at least a few studies suggest that NPs

and PAs order more services. These conclusions are based on a high-level review of over 100 peer-reviewed journal articles, including meta-analyses and original research. A few findings from the literature are summarized as follows:

- ***Clinical quality outcomes and patient experience.*** A large body of research, including both randomized clinical trials and retrospective studies using claims and surveys, suggests that care provided by NPs and PAs produces health outcomes that are equivalent to physician-provided care (Kurtzman and Barnow 2017, Naylor and Kurtzman 2010). Many studies focus on certain conditions (e.g., HIV/AIDS and diabetes care) or care provided in certain settings (e.g., the Veterans Health Administration) and find no detectable differences in quality or health outcomes (Faza et al. 2018, Wilson et al. 2005). In addition, a variety of studies have also found that patient experience is comparable when patients are treated by NPs or PAs versus physicians (Hooker et al. 2005, Naylor and Kurtzman 2010, Newhouse et al. 2011). One older study using a randomized design to allocate patients between NPs and physicians showed no difference in patient outcomes, either initially or after a two-year follow-up (Lenz et al. 2004, Mundinger et al. 2000). Another randomized study from England during the same period found no difference in health outcomes but did find that NPs had longer visits and ordered more tests than physicians (Venning et al. 2000).

- ***Cost savings and utilization.*** Cost savings are often discussed in two different contexts: savings for providers that employ NPs or PAs and savings for payers. NPs and PAs nearly always lower costs (and increase profits) for their employers because their salaries are less than half of physician salaries, on average, but their services can be billed at the full physician rate or at a modest discount (e.g., 15 percent discount in Medicare). Whether NPs and PAs generate cost savings for payers such as Medicare is dependent on payment rates and how NPs and PAs affect utilization, including utilization directly controlled by NPs and PAs and downstream utilization. When NPs and PAs bill under their own NPIs, Medicare and beneficiaries save 15 percent up front; when services are billed "incident to," Medicare receives no such savings. Beyond the upfront 15 percent savings, some research suggests that NPs and PAs generate additional savings for Medicare and other payers by reducing downstream costs, such as lower inpatient costs or reduced total episode costs (Perloff et al. 2016, Spetz et al. 2013). In contrast, others suggest that NPs and PAs could increase costs, or at least mitigate the savings generated by their lower payment rates, because patients treated by NPs and PAs might need more follow-up visits with other clinicians and because NPs and PAs might have higher prescribing rates (e.g., Part D drugs) and rates of ordering ancillary services (e.g., diagnostic imaging) (Hemani et al. 1999). Evidence to support this hypothesis is mixed. For example, one study using Medicare claims found a higher rate of diagnostic imaging by NPs and PAs compared with physicians in the episode of care after an E&M visit, ordering 0.3 more images per episode (Hughes et al. 2015). Other studies find no detectible differences in ordering or referring patterns among physicians, NPs, and PAs for an episode of care (Begaz et al. 2017, Liu et al. 2017).

Medicare FFS billing trends for APRNs and PAs

Medicare's "incident to" rules obscure the true breadth and depth of the services APRNs and PAs furnish to Medicare FFS beneficiaries. In other words, the utilization figures we present in this chapter underestimate the actual number of APRNs and PAs who provide care for Medicare beneficiaries, the number of services they perform, and the number of beneficiaries they treat. Notwithstanding this limitation, trends in the number of services, allowed changes, and unique APRNs and PAs who billed Medicare over the last several years indicate that the program is increasingly reliant on these clinicians.

Total Medicare FFS allowed charges billed by APRNs and PAs reached nearly $7.3 billion in 2017, more than doubling from 2010 to 2017 (Table 5-3, p. 150). NPs accounted for the largest share of these allowed charges in 2017 (about $3.8 billion). Combined, NPs and PAs accounted for more than 80 percent of APRN and PA billings in 2017. Total allowed charges billed by NPs and PAs also grew rapidly from 2010 to 2017, averaging 17 percent and 14 percent growth per year, respectively. Over the same time, the number of Medicare Part B FFS beneficiaries grew by an average of less than 1 percent per year (data not shown).

TABLE 5–3

Total allowed charges billed by APRNs and PAs grew rapidly from 2010 to 2017

Practitioner type	Total allowed charges billed (in millions) 2010	2017	Average annual growth rates, 2010–2017	Total percent growth, 2010–2017
Nurse practitioner	$1,249	$3,757	17%	201%
Physician assistant	916	2,249	14	145
Certified registered nurse anesthetist	869	1,197	5	38
Clinical nurse specialist	54	72	4	33
Certified nurse midwife	2	5	19	239
Total	**3,090**	**7,281**	**13**	**136**

Note: APRN (advanced practice registered nurse), PA (physician assistant). There are four categories of APRNs: nurse practitioners, certified registered nurse anesthetists, clinical nurse specialists, and certified nurse midwives. Growth rates are calculated from unrounded numbers. These figures do not account for services billed "incident to." Components may not sum to totals due to rounding.

Source: MedPAC analysis of the Physician/Supplier Procedure Summary file.

An increasing number of NPs and PAs billing Medicare predominantly drove the rapid growth in total allowed charges. From 2010 to 2017, the total number of NPs and PAs who billed Medicare FFS more than doubled, from roughly 95,000 to 212,000 (Table 5-4). Similar to the trends in allowed charges, the growth in the number of NPs billing Medicare was slightly higher than the growth in the number of PAs billing Medicare—an average annual growth rate of 14 percent for NPs versus 10 percent for PAs.

The rapid growth in the number of NPs and PAs billing Medicare is consistent with the rapid growth in the supply of these practitioners nationally. For example, the number of new NP graduates in the U.S. nearly tripled between 2003 and 2014, from 6,611 per year to 18,484 per year (Salsberg 2015). Over the same period, the number of newly certified PAs grew from 4,337 per year to 7,578 per year (Salsberg 2015). While NPs and PAs constitute a disproportionate share of clinicians in rural areas, research suggests that growth in the number of NPs and PAs is occurring in both urban and rural areas (Barnes et al. 2018).

The rapid expansion in the supply of NPs and PAs has been met with equally robust demand from hospital

TABLE 5–4

Total number of nurse practitioners and physician assistants who billed Medicare more than doubled from 2010 to 2017

Practitioner type	Unique number of practitioners billing FFS Medicare (in thousands) 2010	2017	Average annual growth rates, 2010–2017	Total percent growth, 2010–2017
Nurse practitioner	52	130	14%	151%
Physician assistant	43	82	10	91
Total	**95**	**212**	**12**	**124**

Note: FFS (fee-for-service). Clinicians were assigned to the specialty under which they billed a plurality of allowed charges in 2017. These figures do not account for NPs and PAs who always bill "incident to."

Source: MedPAC analysis of 100 percent carrier standard analytic files.

TABLE 5–5

Number of beneficiaries for whom a nurse practitioner or physician assistant billed at least one service grew rapidly from 2010 to 2017

	2010		2017	
Category	**Number of unique beneficiaries (in thousands)**	**Share of beneficiaries**	**Number of unique beneficiaries (in thousands)**	**Share of beneficiaries**
Nurse practitioner	5,216	16%	11,317	34%
Physician assistant	4,461	14	8,784	26
Total (nurse practitioner or physician assistant)	8,443	26	16,020	48
Total Part B fee-for-service	32,189	100	33,582	100

Note: The total number of beneficiaries for whom a nurse practitioner (NP) or physician assistant (PA) billed at least one service does not sum to the total because some beneficiaries had a service billed by both an NP and a PA. These figures do not account for "incident to" billing.

Source: MedPAC analysis of 100 percent carrier standard analytic file and the annual reports of the Boards of Trustees of the Medicare trust funds.

systems, physician groups, and other employers (e.g., retail health clinics). The strong demand for NPs and PAs is evidenced by their increasing salaries, which suggest employers are offering higher salaries to recruit them. For example, between 2010 and 2017, PAs' median annual salary grew from about $86,000 to $105,000, an average annual growth rate of 2.8 percent. This salary growth exceeded inflation, which increased at an average annual rate of 1.7 percent over the same period (Bureau of Labor Statistics 2018, Bureau of Labor Statistics 2017a, Bureau of Labor Statistics 2010). Strong demand could be driven by a number of factors, including difficulties recruiting physicians in certain areas (e.g., rural areas) and NPs' and PAs' lower relative employment costs. For example, as part of the Commission's annual focus groups, one primary care physician who owned a practice succinctly summarized the cost advantage of hiring an NP or PA rather than a physician: "You're billing the same rate but not paying the same amount. As an owner, I want to hire more nurse practitioners."

As the number of NPs and PAs grows, Medicare beneficiaries are increasingly relying on them. In 2010, approximately 8.4 million beneficiaries had at least one service billed by an NP or PA, constituting roughly 26 percent of Medicare Part B FFS beneficiaries (Table 5-5). By 2017, the numbers increased to 16.0 million beneficiaries and 48 percent of Medicare Part B FFS beneficiaries.

NPs and PAs bill Medicare FFS predominantly for E&M services. In 2017, roughly 80 percent of NPs' total allowed charges were for E&M services (Table 5-6, p. 152). For PAs, the share was slightly lower at 65 percent. In the E&M services category, office visits represented the largest subcategory of services. For NPs, the next largest E&M subcategory was nursing facility services, and for PAs, the next largest subcategory was emergency department services (data not shown). Beyond E&M services, PAs' billings were more concentrated than NPs' billings in the major procedures and other procedures categories. Within procedures, PAs' billings were concentrated in services involving beneficiaries' skin or musculoskeletal system (data not shown).

Because E&M office visits constituted the largest subcategory of services billed by both NPs and PAs in 2017, we examined how billing patterns for those services changed over time for all APRNs and PAs relative to specialists and primary care physicians. From 2010 to 2017, the number of E&M office visits billed by APRNs and PAs increased from 11 million to 31 million, an increase of 184 percent (Table 5-7, p. 153). Over the same period, the number of E&M office visits billed by primary care physicians decreased by 16 percent; the number billed by specialists increased by 6 percent. The rapid increase in E&M office visits billed by APRNs and PAs underscores the growing role APRNs and PAs play in providing care to Medicare beneficiaries.

TABLE 5–6

Nurse practitioners and physician assistants billed Medicare predominantly for evaluation and management services in 2017

	Nurse practitioners		Physician assistants	
Type of service	**Allowed charges, 2017 (in millions)**	**Share of total**	**Allowed charges, 2017 (in millions)**	**Share of total**
Evaluation and management	$3,013	80%	$1,457	65%
Procedures (other)	228	6	344	15
Procedures (major)	23	1	163	7
Imaging	24	1	38	2
Tests	34	1	16	1
Other	435	12	231	10
Total	**3,757**	**100**	**2,249**	**100**

Note: "Other" includes laboratory tests, Part B drugs, unclassified services, anesthesia services, and durable medical equipment, prosthetics, orthotics, and supplies. Numbers may not sum to total due to rounding. These figures do not account for "incident to" billing.

Source: MedPAC analysis of the Physician/Supplier Procedure Summary file.

Neither the growing role of APRNs and PAs nor the decline in office visits billed by primary care physicians is unique to the Medicare program. For example, from 2012 to 2016, one analysis of private-payer data found a decline of 18 percent in the number of office visits to primary care physicians and a corresponding increase of 129 percent in office visits to NPs and PAs (Health Care Cost Institute 2018). Similar declines occurring in both the privately insured and Medicare populations suggest that Medicare's relatively lower payment rates for physician services is unlikely to be driving the decline. Instead, the decline could reflect changes in the broader health care system.

Prevalence of "incident to" billing for NPs and PAs

While these utilization and spending figures illustrate the rapid growth in services billed by NPs and PAs, they undercount the number of services NPs and PAs actually furnished and the number of NPs and PAs who treated Medicare beneficiaries.[27] However, the magnitude of the undercount is not known because the existing literature on the prevalence of "incident to" billing is limited. Specifically, we identified only two estimates of the share of NPs whose services are billed "incident to," but to our knowledge, no published research has examined the share of NPs' or PAs' services that are billed "incident to" or the number of PAs whose services are billed "incident to." We therefore conducted two original analyses to provide greater insight into the prevalence of "incident to" billing. Our first analysis focused on E&M office visits for established patients in physician offices because NPs and PAs commonly perform these services and "incident to" billing is allowed for established patients in physician offices. For this analysis, we estimate that, in 2016, 43 percent and 31 percent of E&M office visits performed by NPs and PAs, respectively, for established patients in physician offices were billed under a physician's NPI. Our second analysis looked more broadly at the share of NPs and PAs whose services may be billed "incident to." We found that at least some of the services provided by 51 percent of NPs and 43 percent of PAs were likely billed "incident to" in 2016.

Review of the literature on "incident to" billing for NPs and PAs

Researchers have typically taken one of two approaches to measure "incident to" billing. The first approach involves

TABLE 5–7

Number of E&M office visits billed by APRNs or PAs grew rapidly while the overall number of E&M office visits increased modestly from 2010 to 2017

	Millions of visits								Percent change,
Practitioner type	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2010–2017**
APRN or PA	11	13	15	18	20	24	28	31	184%
Primary care physician	97	95	93	91	88	86	84	81	–16
Specialist	133	134	136	142	140	141	143	141	6
Total	**241**	**242**	**244**	**251**	**249**	**251**	**255**	**253**	**5**

Note: E&M (evaluation and management), APRN (advanced practice registered nurses), PA (physician assistant). The primary care physician category includes internal medicine, family medicine, pediatric medicine, geriatric medicine, and (in 2017) hospitalists. Many physicians who previously billed under the internal medicine specialty began billing as hospitalists when Medicare introduced a hospitalist specialty code in April 2017. The change does not affect these results because hospitalists billed relatively few E&M office visits in 2017. "Specialist" is defined as not being a primary care physician, APRN, or PA. Numbers may not sum to totals due to rounding. These figures do not account for "incident to" billing.

Source: MedPAC analysis of the Physician/Supplier Procedure Summary; Healthcare Common Procedure Coding System® codes 99201–99205 and 99211–99215.

using physician time assumptions that underlie Healthcare Common Procedure Coding System (HCPCS) codes in the physician fee schedule to identify outliers. Specifically, researchers search for all claims billed by a physician during a given period, such as a day or week. They then sum all the physician work time that is assumed to be associated with each HCPCS code. If a physician bills for more than a reasonable amount of time, then researchers conclude that the physician may be billing for services other practitioners actually performed. For example, in a 2009 study, the Health and Human Services Office of Inspector General (OIG) determined that when physicians billed for more than 24 hours of services in a day, half of the services were not performed personally by a physician; the report further found that unqualified nonphysicians, such as medical assistants, performed 21 percent of the services that physicians did not perform personally (Office of Inspector General 2009).

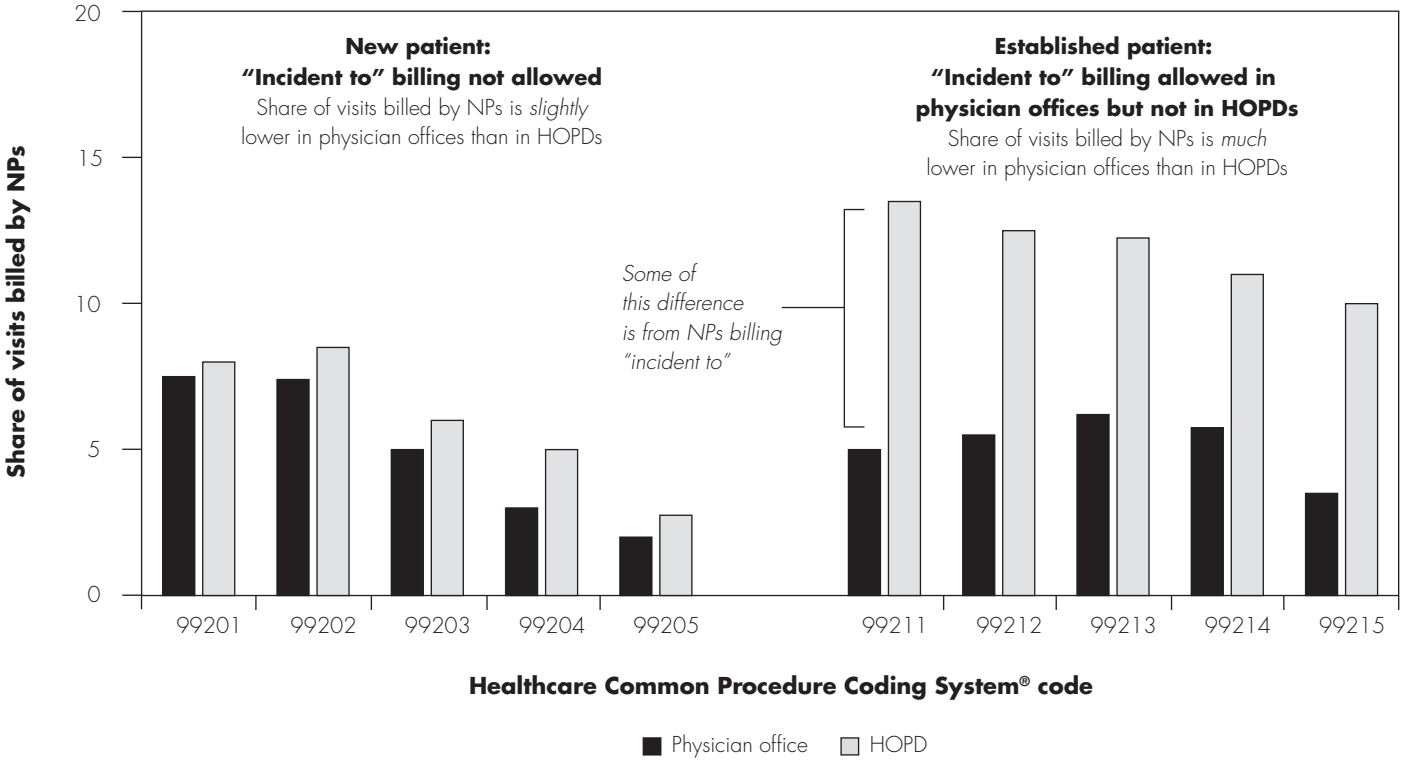
While this methodology could be helpful in identifying potential abuses and outliers, its utility is limited with respect to explaining the prevalence of "incident to" billing. First, such methodologies reliably identify only outliers because many other physicians likely employ NPs and PAs but do not bill for 24 hours of services in a day.[28] Second, such methodologies are time intensive and cannot be applied broadly. To determine who actually performed the services billed by physicians who billed for more than 24 hours of services in a day, OIG had to directly solicit information from physicians, after conducting a claims-based analysis.

The second common approach to measuring the prevalence of "incident to" billing is through surveys. We identified two surveys that queried NPs regarding the extent to which they billed under their own NPI or the NPI of their supervising physician. (To our knowledge, no published research has examined the prevalence of "incident to" billing for PAs.) In one survey, 29 percent of primary care NPs who worked with a primary care physician reported that all services they rendered were billed under a physician's NPI, and 24 percent indicated that some of their services were billed under a physician's NPI (Buerhaus et al. 2015). The second survey found that about 63 percent of clinically active NPs with an NPI reported ever using it for billing, which suggests that the remaining 37 percent of NPs could be billing under their supervising physician's NPI (Health Resources & Services Administration 2014).

Both surveys provide useful information regarding the prevalence of "incident to" billing. However, the surveys were fielded in 2011 and 2012, so, given the rapidly expanding number of NPs in practice, the findings could be somewhat dated. Also, surveys might not accurately capture the prevalence of this billing practice because NPs

FIGURE 5–3

Nurse practitioners likely performed a greater share of E&M office visits for established patients in 2016 than Medicare billing data indicate because of "incident to" billing



Note: E&M (evaluation and management), NP (nurse practitioner), HOPD (hospital outpatient department).

Source: MedPAC analysis of 100 percent carrier standard analytic file.

are typically salaried employees for whom their employer bills, and thus they might be unaware how their services are billed.[29]

Commission analyses of "incident to" billing for NPs and PAs

Given the age, potential shortcomings, and paucity of the existing literature regarding the prevalence of "incident to" billing, we conducted two analyses to better establish the prevalence of such billing in FFS Medicare. Because claims data lack any indication that a particular claim was billed "incident to," our estimates are intended to provide approximations of the prevalence of "incident to" billing as opposed to precise estimates.

The first analysis capitalizes on differences in Medicare's "incident to" rules depending on the setting in which a service is performed and whether a beneficiary is a new or established patient to produce an estimate of the share of E&M office visits for established patients that were billed "incident to" in 2016. Medicare does not permit "incident to" billing for services performed in hospital outpatient departments (HOPDs) but does allow the practice in physician offices. This means that all NPs' and PAs' services provided in HOPDs should be billed under their own NPIs, but NPs and PAs may bill under the NPI of a physician in a physician office.[30] In addition, Medicare does not permit "incident to" billing for new patients, regardless of the setting in which the service is performed, but does for established patients. Thus, whenever an NP or PA provides a service to a new patient, regardless of the setting, the service should be billed under the NP's or PA's own NPI. These different billing rules allow us to compare NPs' and PAs' billing patterns in situations in which the

performing NPI field in claims data accurately reflects the clinician who performed the service (i.e., where "incident to" billing is not allowed) to situations where the performing NPI field might not accurately reflect the clinician who performed the service (i.e., situations where such billing is allowed) to produce estimates of "incident to" billing.

In 2016, we found that NPs billed for a substantially higher share of E&M office visits for established patients in HOPDs (where "incident to" billing is not permitted) versus physician offices (where such billing is permitted). For example, for a Level 3 office visit with an established patient (HCPCS code 99213), NPs billed for nearly twice the share of visits in HOPDs that they did in physician offices (12.5 percent vs. 6.4 percent) (Figure 5-3). This finding suggests one of two possibilities: NPs actually furnished a higher share of office visits in HOPDs (compared with physician offices) or a substantial amount of services furnished in physician offices by NPs were billed under a physician's NPI.

To examine the possibility that NPs actually furnished a higher share of office visits in HOPDs, we examined the share of office visits billed by NPs for new patients (for whom "incident to" billing is not allowed, regardless of setting). In contrast to our findings for established patients, we found that the share of office visits billed by NPs for new patients in HOPDs was only slightly higher than the share NPs billed for in physician offices. For example, for a Level 3 office visit for a new patient (HCPCS code 99203), NPs billed for 6.2 percent of visits in HOPDs compared with 4.9 percent in physician offices, a difference of 1.3 percentage points (Figure 5-3).

The combination of these two findings suggests that NPs might actually perform a slightly higher share of E&M office visits in HOPDs versus physician offices but that the magnitude of this difference is likely too small to account for the large observed differences between settings for established patients. Instead, Medicare's "incident to" billing policy appears to be the more likely reason for the preponderance of the observed difference.

Based on these data, we can also estimate the share of NPs' E&M office visits for established patients performed in physician offices that were billed "incident to" in 2016. To do so, we assumed that the relative difference (between HOPDs and physician offices) in the share of office visits performed by NPs was the same for established patients as it was for new patients.[31] Using this assumption, we estimate that approximately 43 percent of all NPs' E&M office visits for established patients performed in physician offices were likely billed "incident to" in 2016 and therefore appear, in the claims data, as though they were performed by a physician. We also conducted this analysis for PAs and estimate that 31 percent of their E&M office visits for established patients performed in physician offices were likely billed "incident to" in 2016 (data not shown).

The second original analysis we conducted estimates the share of NPs and PAs for whom some or all of their services might have been billed "incident to" in 2016.

Because Medicare's payment rates are higher when fee schedule services are billed under a physician's NPI, employers of NPs and PAs have a financial incentive to bill for their services under a physician's NPI. However, no similar financial incentive exists to put a physician's NPI in the claim field indicating who ordered a service or Part D drug. Therefore, the NPIs of NPs and PAs who treat Medicare beneficiaries might not be used to bill for services but could appear in the referring or prescribing provider fields on claims. For example, an NP might furnish an office visit to a beneficiary, and this service might be billed under a physician's NPI to receive the higher payment. However, the NP's NPI might be included in the referring provider field if the NP ordered a laboratory test for the same beneficiary because there is no financial incentive to put a physician's NPI in that field.

We examined patterns of NPIs appearing in the performing and referring/ordering fields in claims to produce an estimate of the number of NPs and PAs who might have treated Medicare beneficiaries but had some or all of their services billed under a physician's NPI. To do so, we determined the number of FFS beneficiaries in 2016 for whom services were billed under an NP's NPI. (We consider a service billed under an NP's NPI when that NP's NPI appears in the performing provider field in the carrier file.) For the same year, we also determined the number of FFS beneficiaries for whom each NP ordered any one of several common services or products—a Part D drug; laboratory test; imaging procedure (performed in a physician office or an independent diagnostic testing facility); or durable medical equipment, prosthetics, orthotics, and supplies. We then compared these two lists of NPs and sorted them into three categories based on the number of FFS beneficiaries for whom they appeared in the performing provider field versus the number of FFS beneficiaries for whom they ordered services or drugs (Table 5-8, p. 156).

TABLE 5–8

Grouping nurse practitioners into three categories of "incident to" billing based on their billing and referring patterns in 2016

Category	Summary	Definition	Illustrative example
Category 1	All physician fee schedule services likely billed "incident to"	NPs who never appeared in the performing provider field but ordered services/drugs for at least one FFS beneficiary	NP never appeared in the performing provider field but ordered services/drugs for 25 FFS beneficiaries in 2016
Category 2	Some physician fee schedule services likely billed "incident to"	NPs who appeared in the performing provider field for at least one FFS beneficiary but ordered services/drugs for more FFS beneficiaries than they appeared in the performing provider field for	NP appeared in the performing provider field for 50 beneficiaries and ordered services/drugs for 100 beneficiaries in 2016
Category 3	Physician fee schedule services likely not billed "incident to"	NPs who appeared in the performing provider field for the same number or more FFS beneficiaries as they ordered services/drugs for	NP appeared in the performing provider field for 200 beneficiaries and ordered services/drugs for 100 beneficiaries in 2016

Note: NP (nurse practitioner), FFS (fee-for-service). The "performing provider field" refers to the field in carrier file claims data. "Incident to" billing allows NPs (and certain other clinicians) to bill under the national provider identifier of a supervising physician if certain conditions are met.

Source: MedPAC analysis.

In 2016, the total number of NPs who appeared in the performing provider field or ordered a service or drug for at least one FFS beneficiary totaled nearly 138,000 (Figure 5-4). We found that over 23,000 of these NPs (17 percent) never appeared in the performing provider field but ordered services or drugs for at least 1 FFS beneficiary (Category 1). Many of these NPs treated a limited number of Medicare FFS beneficiaries in 2016, but when they did treat Medicare beneficiaries and their services were billed under the fee schedule, the services were presumably billed "incident to."[32] For NPs in Category 2 (some services likely billed "incident to"), we found that over 46,000 NPs appeared in the performing provider field for at least 1 FFS beneficiary but ordered services or drugs for more FFS beneficiaries than they appeared in the performing provider field for. These NPs constitute about 34 percent of our total count of NPs.[33] The remainder of NPs are in Category 3 and appeared in the performing provider field for the same number or more FFS beneficiaries than the number for whom they ordered services or drugs, meaning that their fee schedule services were likely not billed "incident to." Together, these analyses suggest that some or all of the fee schedule services performed by 51 percent of NPs could have been billed "incident to" in 2016 and the services of the remaining 49 percent of NPs likely were not billed as such.

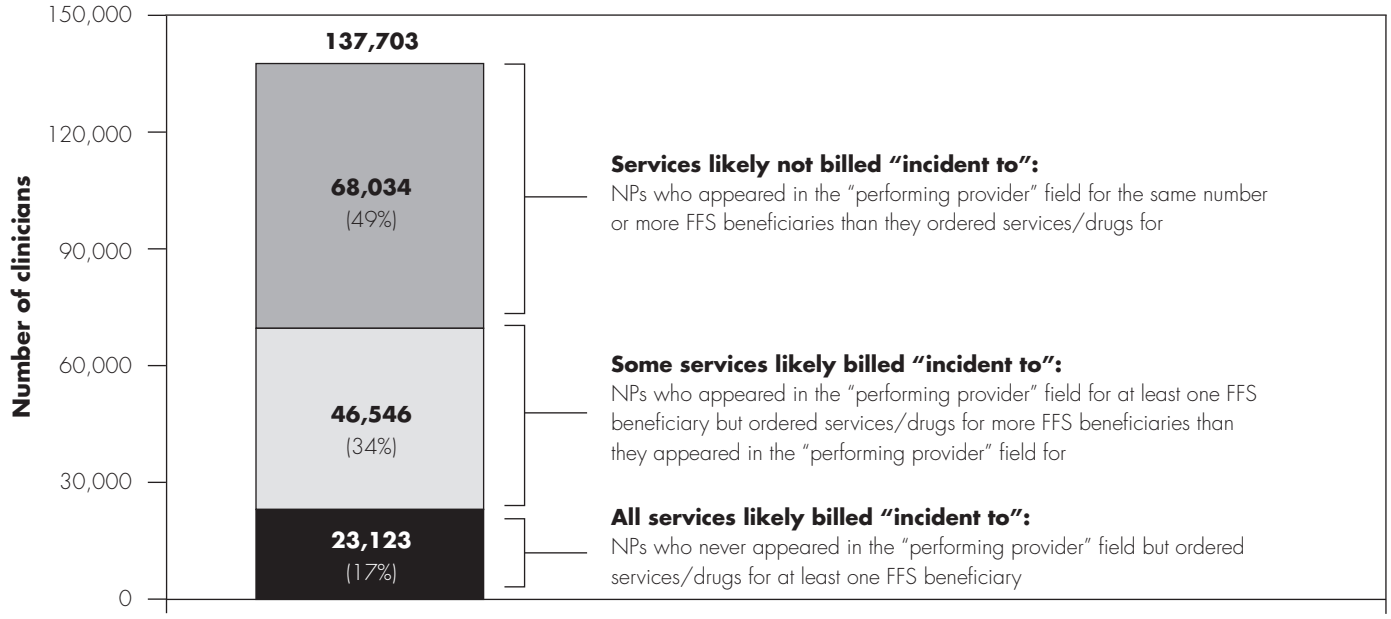
We also performed the same analysis for PAs in 2016 and found that some or all of the services performed by 43 percent of PAs were likely billed "incident to," while the services performed by 57 percent of PAs likely were not. Specifically, of the total 88,524 PAs, we conclude that all the fee schedule services performed by 13,071 PAs (15 percent) were likely billed "incident to" and that some of the fee schedule services performed by 24,628 PAs (28 percent) were likely billed "incident to" in 2016. The services performed by the remaining 50,825 PAs (57 percent) were likely not billed "incident to" in 2016 (data not shown).

Despite their limitations, both of our original analyses suggest that a substantial share of services performed by NPs and PAs for Medicare beneficiaries are likely billed under the NPI of a physician.

Regarding the analysis of the number of NPs and PAs whose services were billed "incident to" in 2016, our categories are likely somewhat imprecise and capture a

FIGURE 5–4

Half of nurse practitioners likely had some or all of their physician fee schedule services billed "incident to" in 2016



Note: NP (nurse practitioner), FFS (fee-for-service). Analysis includes NPs who billed at least one claim as the performing provider in the carrier file and NPs who ordered at least one clinical laboratory service; imaging service (performed in a physician office or an independent diagnostic testing facility); durable medical equipment, prosthetics, orthotics, and supplies product; or Part D drug in 2016. Analysis was limited to fee-for-service beneficiaries with no months of Medicare Advantage coverage. "Incident to" billing allows NPs (and certain other clinicians) to bill under the national provider identifier of a supervising physician if certain conditions are met.

Source: MedPAC analysis of carrier standard analytic file (SAF), DME SAF, and the Part D drug event file.

multitude of different employment arrangements. For example, our methodology might classify NPs as always billing "incident to" when they are employed by the Department of Veterans Affairs and write prescriptions for Medicare beneficiaries to fill through Part D; in reality, the services performed by such an NP might not be billed under Medicare's physician fee schedule.[34] Having said that, our estimate of the share of NPs whose services are sometimes or always billed "incident to" (51 percent) was only slightly lower than one previous, survey-based estimate from 2012 of primary care NPs (53 percent) (Buerhaus et al. 2015).[35]

To our knowledge, no existing research has examined the share of NPs' or PAs' services billed "incident to" or the share of PAs who bill "incident to." So, our estimates cannot be directly compared with prior research.

However, two trends are worth noting. First, both of our analyses suggest that services performed by PAs might be less likely to be billed "incident to" compared with NPs' services. This pattern could be due to PAs performing a higher share of their services in settings where such billing is not allowed (e.g., hospitals), the fact that PAs more commonly work for specialists, or some other reason.[36] Second, our analyses suggest that much of the "incident to" billing that occurs is attributable to some of an NP's or PA's services being billed "incident to" and others being billed directly. This finding comports with the fact that Medicare allows "incident to" billing only in certain circumstances. It also suggests that many practices should be able to easily transition to direct billing if "incident to" billing were eliminated because they are already billing directly for NP and PA services in many circumstances.

Eliminating "incident to" billing for APRNs and PAs

The rapidly expanding number of APRNs and PAs and states' decisions to increase their authority and independence means that Medicare's "incident to" rules increasingly obscure policymakers' knowledge of who provides care to Medicare beneficiaries. Eliminating this type of billing for APRNs and PAs and requiring these clinicians to bill under their own NPIs would change Medicare's billing policies so that claims better reflect which clinicians deliver care, thus enhancing transparency and improving program integrity.

Eliminating "incident to" billing for APRNs and PAs would be a change in how services are billed under Medicare, but would not require changes in state supervision requirements or care delivery. First, eliminating "incident to" billing for APRNs and PAs would not change any supervision or collaboration requirements states establish in their scope-of-practice laws. For example, many states allow physicians to use their professional judgment and familiarity with a PA's education and training to delegate work to them; this process of physicians delegating services based on their clinical expertise would be unaffected by changes in Medicare's "incident to" billing rules.[37] Second, eliminating "incident to" billing would not directly require changes in the way care is provided, including care delivered by a team of clinicians. Many care teams consist of physicians, APRNs/PAs, and other professionals. However, the entire team does not see a beneficiary on every visit. Rather, for some cases, such as a follow-up visit after minor surgery, an APRN or PA might furnish the entire service. For other cases, a beneficiary might see multiple clinicians during one visit. The clinical decision regarding the unique level of care needed by each beneficiary would continue to be the province of the clinical team if "incident to" billing was eliminated, with the main difference being that Medicare claims would more accurately reflect the team member who directly furnished care at a point in time.

Motivations for eliminating "incident to" billing for APRNs and PAs

Medicare's "incident to" rules were first established roughly 50 years ago, before APRNs' and PAs' rapid expansion in number and importance in the health care delivery system. Eliminating "incident to" billing for APRNs and PAs and instead requiring these clinicians to bill Medicare directly would update Medicare's payment policies to better reflect current clinical practice. In addition to improving policymakers' foundational knowledge of who provides care for Medicare beneficiaries, direct billing could create substantial benefits for the Medicare program, beneficiaries, clinicians, and researchers that range from improving the accuracy of the physician fee schedule, reducing expenditures, enhancing program integrity, and allowing for better comparisons between the cost and quality of care provided by physicians and APRNs/PAs.[38] More detailed descriptions of potential benefits are summarized in Table 5-9.

While eliminating "incident to" billing for APRNs and PAs could create substantial benefits, some stakeholders have suggested that CMS carefully monitor the implementation of any change for potential unintended consequences and other implementation challenges.

First among issues to monitor is beneficiaries' access to primary care. Specifically, the concern is that eliminating "incident to" billing could adversely affect beneficiary access to primary care because some services rendered by NPs, PAs, and CNSs that were previously billed under a physician's NPI (and paid at 100 percent of fee schedule rates) would be billed under their own NPIs (and paid at 85 percent of fee schedule rates). The Commission believes primary care is the foundation of a well-functioning health care delivery system. The Commission annually measures beneficiaries' access to primary care and has consistently found that Medicare FFS beneficiaries have access as good as or better than commercially insured individuals (Medicare Payment Advisory Commission 2019). Nonetheless, the Commission has proactively recommended several policies to boost primary care and continues to work to ensure Medicare beneficiaries have access to an adequate supply of primary care clinicians.[39] While the Commission believes in a robust primary care system, it is not clear that paying for services furnished by NPs, PAs, and CNSs at 85 percent of fee schedule rates would reduce access to primary care. Most of these clinicians' services are already paid at this lower rate, and yet the supply of these clinicians has increased dramatically over the last several years. Additionally, the salary differential between NPs, PAs, and CNSs versus physicians is large enough that employing them likely would remain attractive even if all of their services were paid at 85 percent of physician fee schedule rates. Median

TABLE 5–9 **Potential benefits associated with requiring direct billing for APRNs and PAs**

Benefit	Description
Fee schedule valuations	A major contributor to Medicare's payment rates for physician fee schedule services is the amount of physician work time that is assumed to be required for each service. Thus, ensuring the accuracy of time assumptions is critical to an accurate fee schedule. If physicians perform a service faster than what is assumed, the payment rates for those services would be too high (relative to other services). Requiring APRNs and PAs to bill directly could help CMS and other relevant stakeholders identify potentially misvalued Healthcare Common Procedure Coding System® codes. For example, if a physician bills for services with abnormally high time estimates (e.g., 100 hours a week), it could be due to a number of factors, including "incident to" billing, misvalued services, or fraudulent and abusive practices. Requiring APRNs and PAs to bill under their own NPIs would remove one reason for aberrant billing patterns and allow CMS to more accurately identify those services for which time assumptions are potentially inaccurate.
Reducing Medicare spending and beneficiary financial liability	Requiring APRNs and PAs to bill under their own NPIs would produce savings for the Medicare program and beneficiaries because Medicare pays 15 percent below physician fee schedule rates when NPs, clinical nurse specialists, and PAs bill under their own NPIs. (Medicare pays for services performed by certified registered nurse anesthetists and certified nurse midwives at 100 percent of the physician fee schedule rate, regardless of whether the service is billed under their NPI or a physician's NPI.)
Provider efficiency and beneficiary access	Medicare's "incident to" rules are numerous and complex. First, complying with these rules likely involves some level of administrative burden. Second, while physician practices might comply with the rules in order to receive higher payments, these billing rules could keep physicians from optimally structuring their practice for efficiency and access. For example, because "incident to" billing applies only to established patients, physician practices have an incentive to use APRNs and PAs to treat established patients (to get the higher payment) when their time might be better spent dealing with new patients with certain injuries or illnesses.
Program integrity	The current "incident to" rules are difficult to enforce. MACs cannot easily identify claims billed under Medicare's "incident to" rules because of a lack of identifying information on the claims. To the extent a MAC suspects that a practice is not complying with the rules, the MAC would likely be required to review medical records. This process is time intensive and expensive, and even after going through this process, MACs would not necessarily be able to determine whether the billing provider appropriately complied with Medicare's "incident to" rules. Therefore, requiring APRNs and PAs to bill under their NPIs would narrow a rule that Medicare currently has a limited capacity to enforce but one that involves the distribution of substantial revenues to clinicians. Requiring APRNs and PAs to bill under their own NPIs could also improve CMS's ability to identify providers who are engaging in fraudulent billing because the billing data would be more accurate.
Comparing the care provided by physicians and NPs/PAs	Many studies that evaluate whether NPs and PAs produce similar health outcomes, order more or fewer diagnostic tests, or save money compared with physicians rely on retrospective claims-based analyses. However, the existing literature and Commission analyses suggest that a substantial share of NP and PA services cannot be identified in claims data because of Medicare's "incident to" rules. Requiring direct billing would improve the quality of future studies.
Other	Researchers have suggested other benefits associated with eliminating or restricting "incident to" billing, including improved quality measurement under the Medicare Access and CHIP Reauthorization Act of 2015, improved workforce planning, and limiting reputational harm to physicians from the appearance of excessive billing in publicly published physician utilization data (Buerhaus et al. 2018).

Note: APRN (advanced practice registered nurse), PA (physician assistant), NPI (national provider identifier), MAC (Medicare administrative contractor), NP (nurse practitioner).

Source: MedPAC analysis.

annual compensation for NPs and PAs was about $105,000 in 2017 (Bureau of Labor Statistics 2017b, Bureau of Labor Statistics 2017c). By comparison, in 2017, median annual compensation was $242,000 for primary care physicians, $432,000 for dermatologists, $488,000 for gastroenterologists, and $570,000 for orthopedic surgeons (Zuckerman et al. 2019).

Further, paying more for services billed "incident to" is an imprecise mechanism to help ensure access to primary care because both primary care and non–primary care services can be billed "incident to." While NPs and PAs have historically been concentrated in primary care, over time, a large share of NPs and PAs have moved into specialty care. Recent estimates suggest that half of NPs and only 27 percent of PAs work in primary care (Agency for Healthcare Research and Quality 2011, Health Resources & Services Administration 2014, National Commission on Certification of Physician Assistants 2017). Given current specialty distributions and trends in specialty selection, allowing APRNs and PAs to bill "incident to" likely provides substantial and growing amounts of additional revenue for specialty care, such as dermatology and orthopedic surgery, suggesting that policies other than "incident to" billing could likely better target resources toward primary care.

Other concerns regarding the implementation of direct billing for APRNs and PAs are more minor or technical. First, some stakeholders have suggested that some APRNs and PAs do not have NPIs. However, industry stakeholders and survey data indicate that nearly all APRNs and PAs who provide patient care already have NPIs and are permitted by Medicare to bill for their services directly. For example, one survey from 2012 found that about 95 percent of NPs providing patient care reported having an NPI (Health Resources & Services Administration 2014). Second, some have raised concerns regarding how eliminating "incident to" billing would affect care coordination, given that these services are often performed by multiple clinicians. While our conversations with private payers do not suggest that eliminating "incident to" billing would negatively affect care coordination, policymakers could consider exempting certain care coordination codes from a general prohibition on "incident to" billing. Such an exemption would be a narrow one, as all care coordination/management services accounted for less than 1 percent of Medicare physician fee schedule spending in 2017, and could mirror private-payer policies (Medicare Payment Advisory Commission 2019). For example, one private payer generally prohibits NPs and PAs from billing "incident to" but allows the practice for a small number of HCPCS codes that are considered inherently collaborative, such as certain care coordination services (PacificSource Health Plans 2018).[40]

The third implementation issue involves establishing rules regarding which NPI to include as the performing provider on a claim when an APRN/PA and a physician both see a beneficiary during the same visit in a physician office. Currently, such services, referred to as shared or split visits, can be billed only under the physician's NPI if they comply with Medicare's "incident to" rules, which would no longer be applicable if such billing were prohibited for APRNs and PAs. However, beneficiaries see only an APRN or PA (not an APRN/PA plus a physician) during many visits, so this concern is likely not applicable to many visits. In addition, Medicare already does not allow "incident to" billing in institutional settings, such as HOPDs, and we are not aware that hospitals have encountered substantial issues deciding which NPI to include on claims for split visits that occur in HOPDs.[41] In HOPDs, the split visit can be billed under the physician's NPI if the physician provides any face-to-face portion of the E&M visit with the patient (Centers for Medicare & Medicaid Services 2018b). Therefore, if APRNs and PAs are required to bill with their own NPIs, Medicare could institute a policy for noninstitutional settings similar to the current split visit policy for HOPDs or institute a similar policy (e.g., requiring a service be billed under the clinician who performed most of the service).

Requiring APRNs and PAs to bill Medicare using their own NPIs would eliminate "incident to" billing for these clinicians. The Commission focused on reforming the billing rules for APRNs and PAs because of their rapid growth in recent years, the financial incentive to bill many of their services "incident to," and Medicare's growing reliance on such clinicians to deliver primary and specialty care. Medicare also allows services provided by other clinicians, such as registered nurses and physical therapists, to be billed under its "incident to" rules. These clinicians are outside the scope of this report, but the Commission could consider examining them in the future. See the text box on "incident to" billing for clinicians other than APRNs or PAs.

RECOMMENDATION 5-1

The Congress should require advanced practice registered nurses and physician assistants to bill the Medicare program directly, eliminating "incident to" billing for services they provide.

"Incident to" billing for clinicians other than APRNs or PAs

In addition to advanced practice registered nurses (APRNs) and physician assistants (PAs), Medicare allows others to bill "incident to," including individuals who cannot bill Medicare directly and clinicians who can bill directly.

Certain individuals who provide services to Medicare beneficiaries do not have a separate benefit category and therefore cannot bill Medicare directly under the physician fee schedule. Examples of such individuals include registered nurses, licensed practical nurses, and medical assistants. Little systematic information exists regarding how often such individuals provide discrete services to Medicare beneficiaries and the types of services provided. Conversations with experts in the field suggest that these individuals might appropriately perform some services independently; the Health and Human Services Office of Inspector General has also documented that some have inappropriately performed complex services, such as micrographic surgical removal of tumors (Office of Inspector General 2009). Unless multiple new benefit categories were added, continuing to allow physicians (and other clinicians who can directly bill Medicare) to bill for these individuals' services under Medicare's "incident to" rules is the only manner in which the services they provide can be directly paid.

Some private payers require claims modifiers when individuals who cannot bill the payer directly furnish services and bill under the national provider identifier (NPI) of a physician or other clinician. For example, one private payer that generally does not allow "incident to" billing for APRNs and PAs allows such billing for providers that are not eligible to be credentialed by the plan, but claims for services performed by such individuals must include the "SA" modifier (PacificSource Health Plans 2018). Several other private payers use the SA modifier more broadly to identify "incident to" services.

In addition, other types of clinicians, such as physical and occupational therapists, can bill Medicare directly and can bill "incident to." These clinicians tend to provide a narrow range of services relative to physicians, nurse practitioners, or PAs. In addition, most of these clinicians do not have a financial incentive to bill under a physician's NPI because Medicare pays 100 percent of the physician fee schedule rate regardless of whether the service is billed under the physician's or other clinician's NPI.[42] ■

RATIONALE 5-1

Medicare beneficiaries increasingly use APRNs and PAs for both primary and specialty care. This increasing reliance is evidenced by the rapid growth in the number of APRNs and PAs billing Medicare and commensurately high growth rates in allowed charges and beneficiaries for whom these clinicians billed services. Concurrent with these rapid increases, states, which are responsible for regulating APRNs' and PAs' scopes of practice, have increasingly given these clinicians more authority and autonomy. The result is that, over time, APRNs and PAs are furnishing a larger share and a greater variety of services for Medicare beneficiaries than they did in the past.

Despite this growing reliance, Medicare does not have a full accounting of the services delivered and beneficiaries treated by APRNs and PAs because the program's "incident to" billing rules allow services delivered by these clinicians to be billed under the NPI of a physician. As the number of APRNs and PAs has grown, the use of "incident to" billing means that the program increasingly lacks information about who is treating beneficiaries. This lack of transparency creates several problems. For example, "incident to" billing may undermine the appropriate valuation of fee schedule services and create a potential program integrity vulnerability because Medicare pays higher rates for services when they are billed "incident to" but has a limited capacity to enforce its "incident to"

rules. Eliminating "incident to" billing for APRNs and PAs and requiring such clinicians to bill under their own NPIs would address these issues. Medicare would then pay NPs, PAs, and CNSs 85 percent of fee schedule rates instead of the full fee schedule rate that is paid when services are billed "incident to."

IMPLICATIONS 5-1

Spending

- The recommendation is expected to reduce Medicare program spending by $50 million to $250 million in the first year and by $1 billion to $5 billion over the first five years compared with current law.

Beneficiary and provider

- The recommendation is expected to reduce beneficiaries' financial liabilities. The recommendation is not expected to adversely affect beneficiaries' access to care. APRN and PA services would be billed under their own NPIs instead of physicians' NPIs, thereby improving policymakers' knowledge of who provides care for Medicare beneficiaries. Some practices that employ NPs, PAs, and CNSs would experience a decline in revenues.[43]

Medicare's specialty designations for APRNs and PAs

Medicare has limited data on the specialties in which APRNs and PAs practice. CMS predominantly relies on specialty data from two sources—the National Plan and Provider Enumeration System (NPPES) and the Provider Enrollment, Chain, and Ownership System (PECOS). Providers apply for NPIs through NPPES; as part of that process, providers select a primary specialty and up to two secondary specialties. CMS does not verify the self-selected specialty data (Bindman 2013). Providers enroll in PECOS to be able to bill the Medicare program; when enrolling, providers specify their specialty. The provider specialty that appears on Medicare FFS claims data is pulled from PECOS using providers' NPIs to link claims to PECOS.

Both of these sources of specialty data have shortcomings. First, the specificity of the data are limited. In PECOS, NPs and PAs select "nurse practitioner" or "physician assistant" as their specialty; no information is reported regarding the specialty in which NPs and PAs actually practice. In NPPES, the specialty data are more granular, but providers can still select specialties that do not allow CMS to determine the specialty in which NPs or PAs practice. For example, a PA can select a generic taxonomy code (363A00000X) or one indicating that the clinician practices in a medical field (363AM0700X) or surgical field (363AS0400X) (Table 5-10).

Private payers have more information about the specialties in which APRNs and PAs practice compared with Medicare. Some private payers collect specialty information from APRNs and PAs through the credentialing process, allow plan enrollees to designate NPs and PAs as their primary care providers, and allow APRNs and PAs to self-designate a specialty to be included in a plan's online provider directory. For example, Aetna allows APRNs and PAs to designate a practitioner type (e.g., NP, PA, CNS, CRNA, and CNM), the specific degree obtained, one of three practice types (primary care, OB/GYN, or specialty), and specialty within that practice type (e.g., primary care–geriatrics) (Aetna 2018).

Another issue with APRN and PA specialty data from NPPES is how often the data are updated. While providers are instructed to update their data when a change occurs, there are no regularly scheduled data updates and no explicit penalty for a provider having out-of-date information in NPPES (Bindman 2013). Updating specialty information for APRNs and PAs is particularly important because they have a greater ability to switch specialties compared with physicians. When physicians change specialties, they often must go through an additional residency in the new specialty. In contrast, fewer barriers exist for APRNs and PAs to switch specialties. Accordingly, one study found that 49 percent of clinically active PAs changed specialties sometime in their careers (Hooker et al. 2010).

Motivations for refining Medicare's specialty designations for APRNs and PAs

The Medicare program often relies on specialty information to target payments, construct alternative payment models, and achieve other goals. In those instances, more refined specialty information on APRNs and PAs could improve the operation of the programs. For example:

- ***Targeting payments to primary care.*** Medicare's Primary Care Incentive Payment (PCIP) program lasted from 2011 through 2015 and made an

TABLE 5–10

Physician assistant taxonomy codes from the National Plan and Provider Enumeration System

Provider type	National Plan and Provider Enumeration System taxonomy code	Taxonomy code label
Physician assistant	363A00000X	Physician Assistants & Advanced Practice Nursing Providers/ Physician Assistant
	363AM0700X	Physician Assistants & Advanced Practice Nursing Providers/ Physician Assistant, Medical
	363AS0400X	Physician Assistants & Advanced Practice Nursing Providers/ Physician Assistant, Surgical

Source: National Plan and Provider Enumeration System provider taxonomy codes.

additional payment of 10 percent to certain primary care providers for delivering primary care services. NPs, CNSs, and PAs could be considered primary care providers if at least 60 percent of their allowed charges under the physician fee schedule during a specified time period were for certain E&M services (Centers for Medicare & Medicaid Services 2014). However, because NPs and PAs predominantly provide E&M services but many do not work in primary care, these types of payment adjustments are not well targeted. For example, such policies would distribute extra funding to a PA who predominantly conducts office visits in a dermatology practice. While the PCIP is no longer in effect, future efforts to boost payment rates for primary care could suffer from the same flaw.

- ***Assessing resource use and quality.*** Medicare's current quality programs use a specialty adjustment for some cost measures to account for a perceived difference in unmeasured patient severity between clinicians in certain specialties. Treating all NPs or PAs as the same specialty, given the diversity of practice environments and types of services provided, is misleading.

- ***Attributing beneficiaries to accountable care organizations (ACOs).*** CMS's process to assign beneficiaries to ACOs relies on accurately identifying primary care practitioners. For example, in the Medicare Shared Savings Program, beneficiaries are attributed to ACOs in the first step of the process using primary care physicians plus NPs, PAs, and CNSs. However, many NPs, PAs, and CNSs do not practice in primary care, so counting them as primary care providers for the purposes of ACO attribution is, in many cases, incorrect (Centers for Medicare & Medicaid Services 2018c).

While the refined specialty designations could help address these issues, more specific categories would likely have some limitations. Similar to physician specialties, the refined specialty categories would be self-reported by APRNs and PAs, which could lead to some designations being inaccurate. In addition, APRNs and PAs might work across specialties, such as an NP who works in a multispecialty practice. In such cases, APRNs and PAs could report the specialty under which they predominantly practice, but the classification would be imperfect.

In addition, more refined specialty codes could increase administrative burden for clinicians (who would need to pick a new specialty designation) and CMS (who would need to create the new specialty codes). However, the added administrative burden should be modest given that APRNs and PAs are already required to select a specialty category when they enroll in Medicare, and while CMS has not refined the categories for APRNs and PAs, the agency has introduced a number of refined specialty codes for physicians in the last several years. For example, a few of the specialties to which CMS has assigned a new specialty code since 2012 include sleep medicine, interventional cardiology, hospitalist, advanced heart failure and transplant cardiology, medical toxicology, and undersea and hyperbaric medicine.

RECOMMENDATION 5-2

The Secretary should refine Medicare's specialty designations for advanced practice registered nurses and physician assistants.

RATIONALE 5-2

NPs (the largest subset of APRNs) and PAs have historically been concentrated in primary care. More recently, however, greater shares of NPs and PAs are practicing in various specialty fields, with recent estimates suggesting that only half of NPs and 27 percent of PAs work in primary care. For various Medicare programs and policy objectives, such as attributing beneficiaries to ACOs, Medicare often considers all NPs, PAs, and CNSs to be primary care providers because the program has limited details on the specialty in which these clinicians actually practice. Because of the shifts in specialty selection over time for NPs and PAs, this assumption increasingly inhibits Medicare's efforts to identify and support clinicians furnishing primary care.

Therefore, at a minimum, Medicare's specialty designations should allow the program to differentiate between NPs, PAs, and CNSs who practice in primary care versus a specialty field.[44] Because of the career flexibility of APRNs and PAs, the data should be required to be updated on a regular basis. Both of these objectives could be achieved through the PECOS enrollment process because clinicians are already required to designate a specialty when first enrolling in PECOS and PECOS data are already required to be revalidated every five years (42 CFR §424.515).[45]

IMPLICATIONS 5-2

Spending

- The Commission's recommendation is not expected to affect Medicare program spending in the first year or over five years compared with current law.

Beneficiary and provider

- No changes are expected in beneficiaries' access to care or financial liabilities. Certain APRNs and PAs would need to select a refined specialty category. Otherwise, this recommendation is not expected to substantially affect providers.

Conclusion

Although Medicare beneficiaries have generally adequate access to clinician services, the Commission is concerned about the pipeline of future primary care physicians and whether beneficiaries will have sufficient access to primary care physicians in the future. It is especially important to ensure an adequate supply of geriatricians. The Commission has made several recommendations to improve payment accuracy for primary care services and increase payments for primary care clinicians. If policymakers want to have a larger, more immediate impact on the supply of primary care physicians, they could consider creating a scholarship or loan repayment program for certain primary care physicians who treat Medicare beneficiaries. To ensure the best use of scarce resources, such a program could target geriatricians because they specialize in managing the unique health needs of elderly individuals. There are several design choices to consider in establishing this program, which we plan to revisit in future work.

Although the Commission has concerns about the supply of primary physicians, the number of APRNs and PAs has increased rapidly and is projected to continue to do so in the future. Medicare beneficiaries rely on APRNs and PAs to provide an increasingly substantial share of their medical services. However, Medicare collects little up-to-date information regarding the specialty in which APRNs and PAs practice, and Medicare's knowledge regarding who these clinicians treat is obscured by "incident to" billing. Therefore, the Commission recommends that (1) the Congress require APRNs and PAs to bill the Medicare program directly, eliminating "incident to" billing for services they provide, and (2) the Secretary refine Medicare's specialty designations for APRNs and PAs. These recommendations will give the Medicare program a fuller accounting of the breadth and depth of services provided by APRNs and PAs and improve policymakers' ability to target resources toward primary care. ■

Endnotes

1 Geriatric medicine is a subspecialty of both family medicine and internal medicine.

2 The survey was part of the Internal Medicine In-Training Examination®, which is administered annually at nearly all accredited internal medicine residency programs. The survey results for third-year residents for 2009 through 2011 are based on 16,781 respondents.

3 The nonsurgical, procedural specialties in the analysis are cardiology, dermatology, gastroenterology, pulmonary medicine, and hematology/oncology.

4 These first-year residents changed their career plans to subspecialties or hospital medicine or were undecided.

5 In this study, *lifestyle* was defined as leisure time, opportunities to enjoy life and pursue activities outside of work, predictable work hours, and family time.

6 This study used data from the AAMC's Medical School Graduation Questionnaire, which includes information on educational debt, educational experiences, medical schools, and residency programs and data on career specialty and location from the American Medical Association's Physician Masterfile.

7 Dollar amounts were adjusted to 2016 dollars using the consumer price index for all urban consumers.

8 Between 2010 and 2016, the specialties with the largest absolute increase in the share of graduates with no debt were radiology, dermatology, neurology, obstetrics/gynecology, ophthalmology, and pathology (Grischkan et al. 2017).

9 The data from 2018 are based on responses from 16,223 graduates, representing 83 percent of the medical students who graduated from July 1, 2017, through June 30, 2018.

10 The estimate assumes that $156,000 of interest accrues on the loan and that the interest rate ranges from 6.6 percent to 7.6 percent.

11 The data are from the Family Medicine National Graduates Survey.

12 The military also has other programs that support physician training, such as the Health Professions Loan Repayment Program, which repays educational loans in exchange for an active duty obligation (Government Accountability Office 2018a).

13 Educational costs include tuition, books, fees, and other educational expenses. They do not include stipends or allowances, which are funded by the military's personnel accounts.

14 Primary care physicians include the following specialties: family medicine, general internal medicine, general pediatrics, obstetrics/gynecology, geriatrics, and psychiatry.

15 Eligible provider types include primary care physicians, NPs, certified nurse midwives, PAs, mental and behavioral health professionals, substance use disorder counselors, registered nurses, and pharmacists.

16 The interest rate for a Direct Unsubsidized Loan was 6.6 percent and the rate for a Direct PLUS Loan was 7.6 percent. These rates change annually.

17 Approved residencies include family medicine, internal medicine, pediatrics, preventive medicine, and general practice. Acceptable practice activities include primary care, preventive medicine, public health, occupational medicine, geriatrics, pediatrics, urgent care, sports medicine, and hospital medicine.

18 Active borrowers include those who are enrolled in medical school, in a grace period, in deferment status, and in repayment status.

19 Medically underserved areas are designated by HRSA based on the ratio of population to primary care providers, the share of the population below the federal poverty level, the share of the population over age 65, and the infant mortality rate.

20 The number of geriatricians treating Medicare beneficiaries includes those with a caseload of more than 15 beneficiaries during the year.

21 While the share of NPs and PAs who practice in primary care may have decreased over time, the actual number of these clinicians practicing in primary care may be increasing, given the large increase in the number of such clinicians.

22 Collaboration is a process in which an NP works with one or more physicians to deliver health care services, with medical direction and appropriate supervision as required by the law of the state in which the services are furnished. In the absence of state law governing collaboration, collaboration is to be evidenced by NPs documenting their scope of practice and indicating the relationships that they have with physicians to deal with issues outside their scope of practice (Centers for Medicare & Medicaid Services 2018a).

23 States' various approaches to regulating NPs can be categorized differently. For example, the National Conference of State Legislatures classifies state scope-of-practice laws based on whether a physician relationship is required, transition to independent practice is allowed, or full independent practice authority is allowed (National Conference of State Legislatures 2018).

24 Medicare's payment policies for CNSs are similar, but the policies for CNMs and CRNAs are different. CNMs and CRNAs are paid 100 percent of the physician fee schedule amount when they bill under their own NPI. In addition, CRNAs are paid 100 percent of the anesthesia fee schedule amount if they administer anesthesia without medical direction by an anesthesiologist. If an anesthesiologist provides medical direction or supervision, Medicare pays 50 percent of the fee schedule amount to the CRNA and makes an additional payment to the anesthesiologist, the amount of which varies based on the number of concurrent procedures for which the physician is providing medical direction or supervision (Centers for Medicare & Medicaid Services 2018b).

25 There are exceptions to the direct supervision requirements. For example, designated care management services may be furnished under the general supervision of a physician. General supervision means the service is furnished under the physician's overall direction and control, but the physician's presence is not required during the performance of the service.

26 In addition to differences between NPs/PAs and physicians, there could also be differences in the care delivered by NPs and PAs. Exploring this hypothesis is constrained by many of the same factors that limit our ability to compare care provided by NPs/PAs relative to physicians, such as "incident to" billing. A further complicating factor is that many studies group NPs and PAs together to compare the care they deliver with care provided by physicians.

27 The absolute counts of services billed by NPs and PAs is an undercount of the services they actually furnished. However, it is unclear whether the *growth* in services billed by NPs or PAs is lower than the growth in services actually furnished.

28 Also, to the extent the hour threshold is lowered (e.g., 16 hours billed per day) to identify more physicians who bill for services their employees perform, such methodologies are likely to become less precise.

29 For example, in the same survey in which 29 percent of primary care NPs who worked with a primary care physician reported always billing under a physician's NPI, only 17 percent of primary care physicians who worked with NPs responded that all of their NPs' services were billed under a physician's NPI. The difference in these two reported numbers could be due to physicians or NPs better understanding how NPs' services are billed, differences in the populations surveyed, random variation, or some other reason.

30 In HOPDs, visits in which an NP/PA and physician see the patient (e.g., a split/shared visit) can be billed under the physician's NPI if the physician provides any face-to-face portion of the E&M visit with the patient (Centers for Medicare & Medicaid Services 2018b).

31 For example, NPs billed for 1.3 percentage points more Level 3 office visits for new patients (99203) in the HOPD versus the physician office. To estimate the prevalence of "incident to" billing, we assumed NPs performed 1.3 percentage points more Level 3 office visits for established patients (99213) in the HOPD versus the physician office. So, instead of performing 6.4 percent of Level 3 office visits for established patients in physician offices (as the claims data indicate), we assumed NPs provided 11.2 percent of such visits—1.3 percentage points less than the 12.5 percent of Level 3 office visits for established patients who NPs provided in the HOPD.

32 We concluded that many of these NPs likely treated a limited number of Medicare FFS beneficiaries based on their referral patterns. For example, 61 percent of these NPs ordered services/drugs for fewer than 10 FFS beneficiaries in 2016.

33 Some of an NP's services might be billed "incident to" for several reasons. For example, Medicare does not permit "incident to" billing for new patients or established patients with new problems. This pattern could also be related to Medicare's supervision requirements for "incident to" billing. For example, an NP employed by a gastroenterologist might be unable to bill "incident to" when his or her supervising physician is performing colonoscopies in a facility and therefore cannot provide direct supervision, a requirement to bill "incident to."

34 In addition, misclassifications might also occur in the other direction. For example, an NP who does not often order the products and services we examined and bills "incident to" sometimes might be classified as likely not having billed "incident to" in our analysis.

35 While our overall estimate is similar to the survey results, our estimates suggest that a lower share of NPs always bill "incident to" and a larger share sometimes bill "incident to." This difference could represent a trend over time toward NPs billing "incident to" sometimes instead of always, or the difference could be an artifact of the different methodologies.

36 PAs are more likely to work in specialties outside of primary care relative to NPs. Certain specialists might maximize practice revenue if their employed PAs do not bill "incident to" because being physically present in the office suite with PAs (a requirement for "incident to" billing) could limit the

specialist's opportunity to perform more lucrative services outside of the office, such as surgeries or other procedures.

37 Eliminating "incident to" billing would eliminate Medicare's requirement for a physician to be present in the office suite when APRNs or PAs perform services that are billed "incident to." However, Medicare has a limited ability to enforce this requirement, so it is unclear the extent to which clinicians currently abide by this requirement. Also, to the extent physicians are present in an office suite predominantly to meet "incident to" billing guidelines, it is unclear the extent to which such practices offer a clinical benefit to beneficiaries. Finally, even in the absence of "incident to" billing, we would expect physicians to continue to provide oversight to the extent it is clinically necessary or required by state law.

38 Eliminating "incident to" billing for APRNs and PAs would predominantly affect employers of NPs, PAs, and CNSs. Medicare pays 85 percent of fee schedule rates when services are billed under the NPI of an NP, PA, or CNS and 100 percent when billed under a physician's NPI. In contrast, no similar payment differential exists for CRNA and CNM services—Medicare pays 100 percent of the physician fee schedule rate for services performed by CRNAs and CNMs, regardless of the NPI under which they are billed.

39 For example, in 2015, the Commission recommended establishing a prospective per beneficiary payment to replace the Primary Care Incentive Payment program (Medicare Payment Advisory Commission 2015).

40 There is already a precedent for CMS exempting some care coordination services from certain Medicare "incident to" rules. For example, physicians are required to provide only general supervision of chronic care management services that are billed "incident to" instead of direct supervision that is required for other services when billed "incident to."

41 In addition, while Medicare allows APRNs and PAs to bill under a physician's NPI, some private plans prohibit the practice, and we are unaware that providers who contract with these plans have encountered substantial issues deciding which NPI to include on claims for split visits. For example, as of 2017, BlueCross BlueShield of Montana does not recognize "incident to" billing and, instead, requires claims be billed under the name of the provider who actually rendered the service (BlueCross BlueShield of Montana 2017).

42 While most of these clinicians are paid at 100 percent of fee schedule rates, licensed clinical social workers are paid 75 percent of fee schedule rates when they bill under their own NPI and 100 percent when they bill "incident to."

43 Revenues for practices that employ CRNAs or CNMs would be unaffected because Medicare pays these clinicians 100 percent of physician fee schedule amounts when they bill under their own NPIs. In addition, CRNAs predominantly bill for anesthesia services. Medicare reimburses anesthesia services differently from physician services. Therefore, this recommendation does not apply to anesthesia services.

44 There is less of a need to refine the specialty categories for the other two types of APRNs—CNMs and CRNAs. CNMs and CRNAs perform a relatively narrow set of services and their current designations might contain sufficient specificity.

45 APRNs and PAs could also be required to update their specialty information in PECOS more frequently than every five years to the extent a change occurs.

References

Accreditation Council for Graduate Medical Education. 2018. *Data resource book: Academic year 2017–2018*. Chicago, IL: ACGME.

Aetna. 2018. Mid-level practitioner form. https://www.aetna.com/health-care-professionals/forms/mid-level-practitioner.html.

Agency for Healthcare Research and Quality. 2011. *Primary care workforce facts and stats, no. 2: The number of nurse practitioners and physician assistants practicing primary care in the United States*. Rockville, MD: AHRQ. https://www.ahrq.gov/sites/default/files/publications/files/pcwork2.pdf.

American Academy of Physician Assistants. 2018a. History of the PA profession. https://www.aapa.org/about/history/.

American Academy of Physician Assistants. 2018b. PA scope of practice. https://www.aapa.org/wp-content/uploads/2017/01/Issue-brief_Scope-of-Practice_0117-1.pdf.

American Academy of Physician Assistants. 2018c. What is a PA: Frequently asked questions. https://www.aapa.org/wp-content/uploads/2018/06/Frequently_Asked_Questions_4.3_FINAL.pdf.

American Association of Nurse Practitioners. 2018a. 2018 nurse practitioner state practice environment. https://www.aanp.org/legislation-regulation/state-legislation/state-practice-environment#alaska.

American Association of Nurse Practitioners. 2018b. Historical timeline. https://www.aanp.org/about-aanp/historical-timeline.

Association of American Medical Colleges. 2019a. Colorado Health Service Corps Loan Repayment Program. Fact sheet. https://services.aamc.org/fed_loan_pub/index.cfm?fuseaction=public.program&program_id=115.

Association of American Medical Colleges. 2019b. The Steven M. Thompson Physician Corps Loan Repayment Program. Fact sheet. https://services.aamc.org/fed_loan_pub/index.cfm?fuseaction=public.program&program_id=113.

Association of American Medical Colleges. 2018a. An exploration of the recent decline in the percentage of U.S. medical school graduates with education debt. *Analysis in Brief* 18, no. 4 (September).

Association of American Medical Colleges. 2018b. *Medical school graduation questionnaire: 2018 all schools summary report*. Washington, DC: AAMC.

Association of American Medical Colleges. 2018c. Medical student education: Debt, costs, and loan repayment fact card. https://store.aamc.org/medical-student-education-debt-costs-and-loan-repayment-fact-card-2018-pdf.html.

Association of American Medical Colleges. 2008. *Diversity of U.S. medical students by parental income.* Analysis in brief, vol. 8, no. 1. Washington, DC: AAMC.

Barnes, H., M. R. Richards, M. D. McHugh, et al. 2018. Rural and nonrural primary care physician practices increasingly rely on nurse practitioners. *Health Affairs* 37, no. 6 (June): 908–914.

Begaz, T., D. Elashoff, T. R. Grogan, et al. 2017. Differences in test ordering between nurse practitioners and attending emergency physicians when acting as provider in triage. *American Journal of Emergency Medicine* 35, no. 10 (October): 1426–1429.

Bindman, A. B. 2013. Using the national provider identifier for health care workforce evaluation. *Medicare & Medicaid Research Review* 3, no. 3.

BlueCross BlueShield of Montana. 2017. "Incident-to" billing not allowed by BCBSMT. https://www.bcbsmt.com/provider/education-and-reference/news?lid=j5gmcoxj.

Brooks, R. G., M. Walsh, R. E. Mardon, et al. 2002. The roles of nature and nurture in the recruitment and retention of primary care physicians in rural areas: A review of the literature. *Academic Medicine* 77, no. 8 (August): 790–798.

Buerhaus, P., J. Skinner, B. McMichael, et al. 2018. The integrity of MACRA may be undermined by "incident to billing" coding. *Health Affairs* blog. January 8.

Buerhaus, P. I., C. M. DesRoches, R. Dittus, et al. 2015. Practice characteristics of primary care nurse practitioners and physicians. *Nursing Outlook* 63, no. 2 (March–April): 144–153.

Bureau of Labor Statistics, Department of Labor. 2018. Databases, tables & calculators by subject: CPI-all urban consumers (current series). https://data.bls.gov/timeseries/CUUR0000SA0.

Bureau of Labor Statistics, Department of Labor. 2017a. Occupational employment statistics: OES data. https://www.bls.gov/oes/special.requests/oesm17nat.zip.

Bureau of Labor Statistics, Department of Labor. 2017b. Occupational Outlook Handbook: Nurse anesthetists, nurse midwives, and nurse practitioners. https://www.bls.gov/ooh/healthcare/nurse-anesthetists-nurse-midwives-and-nurse-practitioners.htm.

Bureau of Labor Statistics, Department of Labor. 2017c. Occupational Outlook Handbook: Physician assistants. https://www.bls.gov/ooh/healthcare/physician-assistants.htm.

Bureau of Labor Statistics, Department of Labor. 2010. Occupational employment statistics: OES data. https://www.bls.gov/oes/special.requests/oesm10nat.zip.

Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2019. Local coverage article: Therapeutic shoes for persons with diabetes: Policy article (A52501). https://www.cms.gov/medicare-coverage-database/details/article-details.aspx?articleId=52501&ver=23&LCDId=33369&Date=&DocID=L33369&bc=iAAAABAAgAAA&.

Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2018a. *Medicare benefit policy manual.* Baltimore, MD: CMS.

Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2018b. *Medicare claims processing manual.* Baltimore, MD: CMS.

Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2018c. *Medicare Shared Savings Programs: Shared savings and losses and assignment methodology.* Baltimore, MD: CMS.

Centers for Medicare & Medicaid Services, Department of Health and Human Services. 2014. *MLN matters: Summary information regarding Medicare's Primary Care Incentive Payment program (PCIP).* Baltimore, MD: CMS.

Chattopadhyay, A., G. Zangaro, and K. White. 2015. Practice patterns and characteristics of nurse practitioners in the United States: Results from the 2012 national sample survey of nurse practitioners. *Journal for Nurse Practitioners* 11, no. 2 (February): 170–177.

Congressional Research Service. 2018. *The National Health Service Corps.* Washington, DC: CRS.

Congressional Research Service. 2016. *Federal support for graduate medical education: An overview.* Washington, DC: CRS.

Consumer Financial Protection Bureau. 2017. *Staying on track while giving back.* Washington, DC: CFPB.

Dalen, J. E., and K. J. Ryan. 2016. United States medical school expansion: Impact on primary care. *American Journal of Medicine* 129, no. 12 (December): 1241–1243.

Department of Health and Human Services. 2019. *Fiscal year 2020: Budget in brief.* Washington, DC: HHS.

Department of the Army. 2012. Army awards health professions scholarships. https://www.army.mil/article/79689/army_awards_health_professions_scholarships.

Department of Veterans Affairs. 2019. Health Professional Scholarship Program. https://www.vacareers.va.gov/Benefits/EducationSupport/#scholarships.

Dorsey, E. R., D. Jarjoura, and G. W. Rutecki. 2003. Influence of controllable lifestyle on recent trends in specialty choice by US medical students. *Journal of the American Medical Association* 290, no. 9 (September 3): 1173–1178.

Faza, N. N., J. M. Akeroyd, D. J. Ramsey, et al. 2018. Effectiveness of NPs and PAs in managing diabetes and cardiovascular disease. *Journal of the American Academy of Physician Assistants* 31, no. 7 (July): 39–45.

FinAid. 2019. Frequently asked questions about income-based repayment and public service loan forgiveness. http://www.finaid.org/loans/ibrfaq.phtml.

Gadbois, E. A., E. A. Miller, D. Tyler, et al. 2015. Trends in state regulation of nurse practitioners and physician assistants, 2001 to 2010. *Medical Care Research and Review* 72, no. 2 (April): 200–219.

Government Accountability Office. 2018a. *Military personnel: Additional actions needed to address gaps in military physician specialties.* GAO–18–77. Washington, DC: GAO.

Government Accountability Office. 2018b. *Physician workforce: HHS needs better information to comprehensively evaluate graduate medical education funding.* GAO–18–240. Washington, DC: GAO.

Government Accountability Office. 2018c. *Public service loan forgiveness: Education needs to provide better information for the loan servicer and borrowers.* GAO–18–547. Washington, DC: GAO.

Grischkan, J., B. P. George, K. Chaiyachati, et al. 2017. Distribution of medical education debt by specialty, 2010–2016. *JAMA Internal Medicine* 177, no. 10 (October 1): 1532–1535.

Hauer, K. E., S. J. Durning, W. N. Kernan, et al. 2008. Factors associated with medical students' career choices regarding internal medicine. *Journal of the American Medical Association* 300, no. 10 (September 10): 1154–1164.

Health Care Cost Institute. 2018. *HCCI brief: Trends in primary care visits.* Washington, DC: HCCI. https://www.healthcostinstitute.org/research/publications/hcci-research/entry/trends-in-primary-care-visits.

Health Resources & Services Administration, Department of Health and Human Services. 2019a. 2017 health center data. https://bphc.hrsa.gov/uds/datacenter.aspx?q=tall&year=2017&state=&fd.

Health Resources & Services Administration, Department of Health and Human Services. 2019b. *Fiscal year 2020: Health Resources and Services Administration justification of estimates for appropriations committees.* Rockville, MD: HRSA.

Health Resources & Services Administration, Department of Health and Human Services. 2018a. Health professional shortage area (HPSA) application and scoring process. https://bhw.hrsa.gov/shortage-designation/hpsa-process.

Health Resources & Services Administration, Department of Health and Human Services. 2018b. Health professional shortage areas (HPSAs). https://bhw.hrsa.gov/shortage-designation/hpsas.

Health Resources & Services Administration, Department of Health and Human Services. 2018c. HRSA celebrates Corps Community Month. https://www.hhs.gov/blog/2018/10/18/hrsa-celebrates-corps-community-month.html.

Health Resources & Services Administration, Department of Health and Human Services. 2018d. National Health Service Corps. https://bhw.hrsa.gov/loansscholarships/nhsc.

Health Resources & Services Administration. 2018e. Personal email communication with author, October 5.

Health Resources & Services Administration, Department of Health and Human Services. 2018f. Primary care loan (PCL) FAQs. https://bhw.hrsa.gov/sites/default/files/bhw/grants/pclfaqs.pdf.

Health Resources & Services Administration, Department of Health and Human Services. 2017. *National and regional projections of supply and demand for geriatricians: 2013–2025.* Rockville, MD: HRSA.

Health Resources & Services Administration, Department of Health and Human Services. 2016. *National Health Service Corps: Report to Congress for the year 2016.* Rockville, MD: HRSA.

Health Resources & Services Administration, Department of Health and Human Services. 2014. *Highlights from the 2012 National Sample Survey of Nurse Practitioners.* Rockville, MD: HRSA. https://bhw.hrsa.gov/health-workforce-analysis/nssnp.

Health Resources & Services Administration, Department of Health and Human Services. 2011. *Student financial aid guidelines: Health professions programs.* Rockville, MD: HRSA.

Health Resources & Services Administration, Department of Health and Human Services. 2006. *The rationale for diversity in the health professions: A review of the evidence.* Rockville, MD: HRSA. October. ftp://ftp.hrsa.gov/bhpr/workforce/diversity.pdf.

Hemani, A., D. A. Rastegar, C. Hill, et al. 1999. A comparison of resource utilization in nurse practitioners and physicians. *Effective Clinical Practice* 2, no. 6 (November–December): 258–265.

Hooker, R., D. Cipher, and E. Sekscenski. 2005. Patient satisfaction with physician assistant, nurse practitioner, and physician care: A national survey of Medicare beneficiaries. *Journal of Clinical Outcomes Measurement* 12, no. 2 (February): 88–92.

Hooker, R. S., J. F. Cawley, and W. Leinweber. 2010. Career flexibility of physician assistants and the potential for more primary care. *Health Affairs* 29, no. 5 (May): 880–886.

Hughes, D. R., M. Jiang, and R. Duszak, Jr. 2015. A comparison of diagnostic imaging ordering patterns between advanced practice clinicians and primary care physicians following office-based evaluation and management visits. *JAMA Internal Medicine* 175, no. 1 (January): 101–107.

Indian Health Service, Department of Health and Human Services. 2019. Loan Repayment Program. https://www.ihs.gov/loanrepayment/.

Institute of Medicine. 2008. *Retooling for an aging America: Building the health care workforce*. Washington, DC: National Academy Press.

Institute of Medicine. 2004. *In the nation's compelling interest: Ensuring diversity in the health care workforce*. Washington, DC: National Academy Press.

Jolly, P., C. Erikson, and G. Garrison. 2013. U.S. graduate medical education and physician specialty choice. *Academic Medicine* 88, no. 4 (April): 468–474.

Kurtzman, E. T., and B. S. Barnow. 2017. A comparison of nurse practitioners, physician assistants, and primary care physicians' patterns of practice and quality of care in health centers. *Medical Care* 55, no. 6 (June): 615–622.

Lenz, E. R., M. O. Mundinger, R. L. Kane, et al. 2004. Primary care outcomes in patients treated by nurse practitioners or physicians: Two-year follow-up. *Medical Care Research and Review* 61, no. 3 (September): 332–351.

Liu, H., M. Robbins, A. Mehrotra, et al. 2017. The impact of using mid-level providers in face-to-face primary care on health care utilization. *Medical Care* 55, no. 1 (January): 12–18.

Medicare Payment Advisory Commission. 2019. *Report to the Congress: Medicare payment policy*. Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2018a. *Report to the Congress: Medicare and the health care delivery system*. Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2018b. *Report to the Congress: Medicare payment policy*. Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2015. *Report to the Congress: Medicare payment policy*. Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2011. Moving forward from the sustainable growth rate (SGR) system. Letter to the Congress. October 14.

Medicare Payment Advisory Commission. 2010a. *Report to the Congress: Aligning incentives in Medicare*. Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2010b. *Report to the Congress: Medicare payment policy*. Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2009. *Report to the Congress: Improving incentives in the Medicare program*. Washington, DC: MedPAC.

Medicare Payment Advisory Commission. 2008. *Report to the Congress: Reforming the delivery system*. Washington, DC: MedPAC.

Mundinger, M. O., R. L. Kane, E. R. Lenz, et al. 2000. Primary care outcomes in patients treated by nurse practitioners or physicians: A randomized trial. *Journal of the American Medical Association* 283, no. 1 (January 5): 59–68.

Nagaraj, M., M. Coffman, and A. Bazemore. 2018. 30% of recent family medicine graduates report participation in loan repayment programs. *Journal of the American Board of Family Medicine* 31, no. 4 (July–August): 501–502.

National Commission on Certification of Physician Assistants. 2017. *2017 statistical profile of certified physician assistants: Annual report*. Johns Creek, GA: NCCPA. http://prodcmsstoragesa.blob.core.windows.net/uploads/files/2017StatisticalProfileofCertifiedPhysicianAssistants%206.27.pdf.

National Conference of State Legislatures. 2018. Nurse practitioners overview. http://scopeofpracticepolicy.org/practitioners/nurse-practitioners/.

National Health Service Corps, Department of Health and Human Services. 2019. State Loan Repayment Program contacts. https://nhsc.hrsa.gov/loanrepayment/stateloanrepaymentprogram/contacts.html.

National Health Service Corps, Department of Health and Human Services. 2018a. *National Health Service Corps Loan Repayment Program: Fiscal year 2018 application and program guidance*. Rockville, MD: Health Resources & Services Administration.

National Health Service Corps, Department of Health and Human Services. 2018b. *National Health Service Corps Scholarship Program: School year 2018–2019 application & program guidance*. Rockville, MD: Health Resources & Services Administration.

National Health Service Corps, Department of Health and Human Services. 2018c. *National Health Service Corps Substance Use Disorder Workforce Loan Repayment Program: Fiscal year 2019 application & program guidance*. Rockville, MD: Health Resources & Services Administration.

National Health Service Corps, Department of Health and Human Services. 2018d. State Loan Repayment Program. https://nhsc.hrsa.gov/sites/default/files/NHSC/downloads/Loan-Repayment/nhsc-slrp-fact-sheet.pdf.

National Health Service Corps, Department of Health and Human Services. 2017. *National Health Service Corps Students to Service Loan Repayment Program: FY 2018 application and program guidance*. Rockville, MD: Health Resources & Services Administration.

National Health Service Corps, Department of Health and Human Services. 2009. National Health Service Corps field strength: Master report (base & ARRA). Rockville, MD: Health Resources & Services Administration. https://nhsc.hrsa.gov/.

Naylor, M. D., and E. T. Kurtzman. 2010. The role of nurse practitioners in reinventing primary care. *Health Affairs* 29, no. 5 (May): 893–899.

Newhouse, R. P., J. Stanik-Hutt, K. M. White, et al. 2011. Advanced practice nurse outcomes 1990–2008: A systematic review. *Nurse Economics* 29, no. 5 (September–October): 230–250; quiz 251.

Newton, D. A., M. S. Grayson, and L. F. Thompson. 2005. The variable influence of lifestyle and income on medical students' career specialty choices: Data from two U.S. medical schools, 1998–2004. *Academic Medicine* 80, no. 9 (September): 809–814.

Noridian Healthcare Solutions. 2018. "Incident to" services. https://med.noridianmedicare.com/web/jeb/topics/incident-to-services.

O'Malley, A. S., E. C. Rich, A. Maccarone, et al. 2015. Disentangling the linkage of primary care features to patient outcomes: A review of current literature, data sources, and measurement needs. *Journal of General Internal Medicine* 30 Supplement 3 (August): S576–585.

Office of Inspector General, Department of Health and Human Services. 2009. *Prevalence and qualifications of nonphysicians who performed Medicare physician services*. Washington, DC: OIG.

Organisation for Economic Co-operation and Development. 2018. Doctors. https://data.oecd.org/healthres/doctors.htm.

PacificSource Health Plans. 2018. Provider manual: Commercial plans. https://pacificsource.com/provider/manual/complete-provider-manual.pdf.

Pathman, D. E., L. Goldberg, T. R. Konrad, et al. 2013. State repayment programs for health care education loans. *Journal of the American Medical Association* 310, no. 18 (November 13): 1982–1984.

Pathman, D. E., and T. R. Konrad. 2012. Growth and changes in the National Health Service Corps (NHSC) workforce with the American Recovery and Reinvestment Act. *Journal of the American Board of Family Medicine* 25, no. 5 (September–October): 723–733.

Perloff, J., C. M. DesRoches, and P. Buerhaus. 2016. Comparing the cost of care provided to Medicare beneficiaries assigned to primary care nurse practitioners and physicians. *Health Services Research* 51, no. 4 (August): 1407–1423.

Petterson, S., R. McNellis, K. Klink, et al. 2018. *The state of primary care in the United States: A chartbook of facts and statistics*. Washington, DC: Robert Graham Center.

Phillips, J. P., S. M. Petterson, A. W. Bazemore, et al. 2014. A retrospective analysis of the relationship between medical student debt and primary care practice in the United States. *Annals of Family Medicine* 12, no. 6 (November–December): 542–549.

Phillips, J. P., D. P. Weismantel, K. J. Gold, et al. 2010. Medical student debt and primary care specialty intentions. *Family Medicine* 42, no. 9 (October): 616–622.

Phillips, R., M. Dodoo, S. Petterson, et al. 2009. *Specialty and geographic distribution of the physician workforce: What influences medical student and resident choices?* Washington, DC: The Robert Graham Center.

Physicians for a Healthy California. 2019a. CalHealthCares: Frequently asked questions. https://www.phcdocs.org/Programs/CalHealthCares.

Physicians for a Healthy California. 2019b. CalHealthCares Proposition 56 Medi-Cal Physicians and Dentists Loan Repayment Program: Application instructions. https://www.phcdocs.org/Programs/CalHealthCares.

Rosenblatt, R. A., and C. H. Andrilla. 2005. The impact of U.S. medical students' debt on their choice of primary care careers: An analysis of data from the 2002 Medical School Graduation Questionnaire. *Academic Medicine* 80, no. 9 (September): 815–819.

Salsberg, E. 2015. The nurse practitioner, physician assistant, and pharmacist pipelines: Continued growth. *Health Affairs* blog. May 26.

Senf, J. H., D. Campos-Outcalt, and R. Kutob. 2003. Factors related to the choice of family medicine: A reassessment and literature review. *Journal of the American Board of Family Practice* 16, no. 6 (November–December): 502–512.

Sigounas, G. 2019. New HRSA loan repayment program to support substance use disorder treatment in underserved communities. *Health Affairs* blog. February 8. https://www.healthaffairs.org/do/10.1377/hblog20190207.72828/full/?utm_source=Newsletter&utm_medium=email&utm_content=HRSA+Loan+Repayment+Program+to+Support+Substance+Use+Disorder+Treatment%3B+The+ACA+in+the+House%3B+Managing+Cancer+Patients++Expectations&utm_campaign=HAT&.

Spetz, J., S. T. Parente, R. J. Town, et al. 2013. Scope-of-practice laws for nurse practitioners limit cost savings that can be achieved in retail clinics. *Health Affairs* 32, no. 11 (November): 1977–1984.

U.S. House of Representatives. 1997. Balanced Budget Act of 1997. 105th Cong., 1st sess., H.R. 2015.

U.S. House of Representatives. 1989. Omnibus Budget Reconciliation Act of 1989. 95th Cong., 1st sess., H.R. 8422.

U.S. House of Representatives. 1977. The Rural Health Clinic Services Act of 1977. 101th Cong., 1st sess., H.R. 3299.

U.S. House of Representatives. 1965. Social Security Amendments of 1965. 89th Cong., 1st sess., H.R. 6675.

U.S. House of Representatives Committee on Ways and Means. 1977. *Rural health clinic services: Report 95–548 Part 1*. Washington, DC: Government Printing Office.

U.S. Senate Committee on Finance. 1965. Elements of entitlement and benefits available under the hospital insurance benefits for the aged and the supplementary medical insurance benefits for the aged programs provided in the social security amendments of 1965: Public law 97. 89th Cong., 1st sess.

Venning, P., A. Durie, M. Roland, et al. 2000. Randomised controlled trial comparing cost effectiveness of general practitioners and nurse practitioners in primary care. *British Medical Journal* 320, no. 7241 (April 15): 1048–1053.

West, C. P., M. M. Drefahl, C. Popkave, et al. 2009. Internal medicine resident self-report of factors associated with career decisions. *Journal of General Internal Medicine* 24, no. 8 (August): 946–949.

West, C. P., and D. M. Dupras. 2012. General medicine vs subspecialty career plans among internal medicine residents. *Journal of the American Medical Association* 308, no. 21 (December 5): 2241–2247.

Wilson, I. B., B. E. Landon, L. R. Hirschhorn, et al. 2005. Quality of HIV care provided by nurse practitioners, physician assistants, and physicians. *Annals of Internal Medicine* 143, no. 10 (November 15): 729–736.

Zuckerman, S., A. Shartzer, R. Berenson, et al. 2019. *Analysis of disparities in physician compensation*. Report prepared for the Medicare Payment Advisory Commission. Washington, DC: MedPAC.