



Advanced Practice Professionals Methodology White Paper

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Summary

As clinicians, advanced practice professionals (APPs) play key roles in hospital and clinic-based care. In turn, efforts to use administrative claims data to characterize health care delivery in both ambulatory and hospital settings require accurate identification of APPs and the services they provide. Doing so requires addressing several issues. First, accurate identification of APPs in claims data requires careful distinction of provider identification numbers, given that some provide and bill for services under their own national provider identification numbers while others provide services and bill under supervising physicians' identification numbers. Second, APPs have often been categorized almost exclusively as primary care clinicians when many provide specialty or other types of care. Determining whether APPs provide primary versus specialty care is especially important for characterizing patterns of safety-net care given access barriers to the latter. Third, to generate insights about spending, it is important to accurately capture payments made to APPs for billed services. We addressed these issues through a series of analyses using Medicare fee-for-service claims and a variety of provider-based datasets. Collectively, this work demonstrates the feasibility of including APPs in future analyses of health care delivery and spending.

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Introduction

Advanced practice professionals (APPs), such as nurse practitioners and physician assistants, have evolved into key workforce members across ambulatory and hospital care settings in the US. In turn, efforts to use administrative claims data to characterize health care delivery and spending in these settings requires identification of these clinicians, the services they provide, and the costs of those services.

Doing so requires addressing several issues. First, APPs must be accurately identified in claims data, recognizing that some of these clinicians provide and bill for services under their own national provider identification (NPI) number while others provide services that are billed under the NPI of a supervising physician.

Second, it is imperative to understand if and when APPs provide primary versus specialty care. In practice, APPs deliver care through a range of different primary and specialty care settings. However, limited information in claims data about APP specialty has historically contributed to methods that count all APPs as primary care clinicians. This generalization can skew understanding of care delivered by APPs and lead to misclassification – a problem that can be further compounded when assessing care delivered through entities as opposed to individuals (e.g., APPs within group practices). This issue is particularly



important when characterizing care provided in the safety-net, given known access barriers for specialty care.

Third, it is important to accurately capture payments made to APPs for billed services. Per policy from multiple payers, APPs are reimbursed for qualifying services at 85% of physicians' reimbursement for the same service. Once APPs can be accurately identified, evaluations should ensure the veracity of this payment approach to generate insights about spending.

Collectively, addressing these issues can help policy and practice leaders assess how APPs contribute to care in ambulatory or hospital settings. To that end, we used a 20% sample of Medicare fee-for-service data to create a claims-based methodology for identifying APPs, determining when APPs provide primary versus specialty care, and verifying APP versus physician payment amounts in a subset of safety-net settings.

Identifying APPs in Claims Data

We identified several datasets that could be used to identify APPs in Medicare claims data.

These include the following:



National Plan and Provider Enumeration System (NPPES). NPPES includes and maintains a registry of NPI numbers assigned to health care professionals in the US. In this way, NPPES serves as a dictionary of all active NPI records for healthcare professionals across the US.

NPPES data is updated monthly into downloadable files that include clinicians' NPI numbers, as well as information about clinician demographics and organizational affiliations. Additionally, the dataset includes 57 taxonomy codes that provide information about APP specialty and type (Table 1).

| Code | Type | Specialty |
|-------------|--|---|
| 367A00000X | Certified Nurse Midwife | Midwife, Certified Nurse |
| 367500000X | Certified Registered Nurse Anesthetist | Nurse Anesthetist, Certified Registered |
| 363L00000X | Nurse Practitioner | Nurse Practitioner |
| 363LA2100X | Nurse Practitioner | Acute Care |
| 363LA2200X | Nurse Practitioner | Adult Health |
| 363LC1500X | Nurse Practitioner | Community Health |
| 363LC0200X | Nurse Practitioner | Critical Care Medicine |
| 363A00000X | Physician Assistant | Physician Assistant |
| 363AM0700X | Physician Assistant | Physician Assistant, Medical |
| 363AS0400X | Physician Assistant | Physician Assistant, Surgical |

Medicare Data on Provider Practice and Specialty (MD-PPAS). MD-PPAS includes information about clinician specialty (for physicians) and clinician type (for APPs). This information is combined into 12 categories denoting groups organized by clinician specialty and type:



- Physician – primary care
- Physician – medical specialty
- Physician – surgical specialty
- Physician – obstetrics/gynecology with no primary care specialty
- Physician – hospital-based specialty (includes designated hospitalists)
- Physician – psychiatry
- Non-physician – Nurse Practitioner and Physician Assistant
- Non-physician – Other Advanced Practice Registered Nurses (APRN)
- Non-physician – limited liability physicians (LLP)
- Non-physician – physical, occupational, and speech therapists
- Non-physician – others
- Specialty unknown

MD-PPAS also assigns individual clinicians to group practices based on tax identification number (TIN), a unique identifier used by groups of clinicians who ostensibly practice within the same organization and, in turn, bill and receive reimbursement from purchasers and payers as an entity.



Updated annually, MD-PPAS draws on three administrative data sources: Medicare Provider Enrollment, Chain and Ownership System (PECOS), NPPES (provider name and self-reported sex), and Medicare fee-for-service Part B non-institutional claims.

Physician Compare. Created by CMS, Physician Compare contains data about healthcare professionals who accept Medicare payments. The data are drawn from Medicare claims, PECOS, NPPES (provider NPI), quality reporting data captured through other CMS programs, as well as patient feedback and surveys.

Among these data, the Doctors and Clinicians National Downloadable File contains unique records at the clinician/enrollment record/group/address level – that is, information about multiple enrollment records for individual clinicians, as well as single enrollments connected to multiple practice locations for a given clinician or group. Like MD-PPAS, Physician Compare includes information about clinician specialty (for physicians) and clinician type (for APPs).

Each dataset has pros and cons (Table 1). For instance, MD-PPAS draws on several data sources, including claims data, to generate information. This enables identification of specific services delivered by APPs who bill for services under their own NPIs (e.g., direct



billing, split billing under APP) but omits services from APPs who bill under associated physicians' NPIs (e.g., incident to billing, split billing under physician).

Conversely, as a comprehensive NPI registry, NPPES includes all APPs regardless of billing approach. This scope encompasses specialties that may be underrepresented in MD-PPAS, which excludes clinicians who do not bill or otherwise participate in Medicare (e.g., pediatricians). However, NPPES cannot identify specific APP-delivered services.

As another example, information about clinician specialty may be more up to date in MD-PPAS than other datasets. MD-PPAS draws from PECOS, which is updated every five years. In comparison, NPPES includes one-time, self-reported information about clinical specialty and is more likely to be outdated.

| Dataset | Pros | Cons |
|----------------|--|---|
| MD-PPAS | <ul style="list-style-type: none"> • Information about group practice due to inclusion of TIN as a variable • Information about services delivered and billed directly by APPs due to use of Medicare Part B claims as underlying data source • Information about clinician specialty updated every 5 years due to use of PECOS as underlying data source | <ul style="list-style-type: none"> • Information about clinicians with valid NPI and qualifying Part B non-institutional claims only • Omits clinicians without qualifying claims, which may disproportionately affect certain specialties (e.g., pediatrics) |



| | | |
|--|--|---|
| <p>Physician Compare</p> | <ul style="list-style-type: none"> • Provides information at multiple levels (clinician, enrollment, record, group, address) • Comprehensive enrollment information for clinicians accepting Medicare payments | <ul style="list-style-type: none"> • Information about clinicians enrolled in Medicare only • Information about place of practice difficult to ascertain due to enrollment-based (versus service-based) records |
| <p>NPPES</p> | <ul style="list-style-type: none"> • Comprehensive national registry of NPIs • More frequent data updates (weekly, monthly) about active vs non-active clinicians | <ul style="list-style-type: none"> • Information about clinician specialty may be outdated due to self-report on a one-time basis |
| <p>NPI=National Provider Identification. PECOS= Provider Enrollment, Chain and Ownership. TIN=Tax Identification Number.</p> | | |

Based on these considerations, we incorporated all three datasets into a multi-step process for identifying APPs.

In Step 1, we began with a list of APPs with valid NPIs and qualifying Part B claims from MD-PPAS. We identified this cohort by combining MD-PPAS data across 2017-2019 and retaining the most recent record. Information about clinician specialty was used directly when available and based on the following categories: *Non-physician – Nurse Practitioner and Physician Assistant* and *Non-physician – Other Advanced Practice Registered Nurses (APRN)*. APPs with specialty listed as “unknown” in MD-PPAS were addressed in Step 2 below.



In Step 2, we accounted for MD-PPAS limitations using Physician Compare data. We incorporated NPIs from Physician Compare that were not included in MD-PPAS to capture APPs who may have been omitted by due to lack of direct billing under their own NPIs. We also used Physician Compare data to update clinician type data for APPs who were included in MD-PPAS but for whom clinician type was “unknown”. Clinician type categories used from Physician Compare included the following categories: *certified nurse midwife, certified registered nurse anesthetist, certified clinical nurse specialist, nurse practitioner, and physician assistant*. APPs with clinician type listed as “unknown” after incorporation of Physician Compare were addressed in Step 3.

In Step 3, we used NPPES data to account for MD-PPAS limitations and remaining gaps after incorporating Physician Compare. Using a similar process as in Step 2, we incorporated NPIs and clinician type data from NPPES that were not included in MD-PPAS or Physician Compare. Clinician type categories cross walked from CMS to NPPES included the following categories: *certified nurse midwife, certified registered nurse anesthetist, certified clinical nurse specialist, nurse practitioner, and physician assistant*.

This multi-step process yielded a list of APPs and associated NPIs and clinician type information for use in future analyses for care delivery in safety-net settings.



Defining APP Specialty in Claims Data

Efforts to use administrative claims data to characterize real-world care delivery requires identifying APPs who practice primary versus specialty care as part of group practices.

APPs who deliver primary care services often work in group practices alongside family medicine and internal medicine physicians and in clinic and community health center facilities. APPs who deliver specialty care services often work alongside specialty clinicians in hospitals or specialty ambulatory clinics.

To determine whether APPs provide primary or specialty care as part of group practices, we aggregated APPs and associated physicians into group practices based on TIN. As noted above, TIN is a unique identifier for groups of clinicians who ostensibly practice in the same organization and therefore use the same identifier to bill and receive reimbursement from purchasers and payers. While clinicians can practice in, and bill through, multiple TINs, we found from MD-PPAS that over 90% of individuals in our data billed under only one TIN or one dominant TIN ($\geq 90\%$ of claims lines) at any given time.

We first characterized TINs based on the clinical specialties of constituent physicians given that physician specialty information is included in all three datasets (MD-PPAS, Physician Compare, NPPES) whereas APP specialty information was completely (MD-PPAS,



Physician Compare) or partially (NPPES) lacking. Groups with physicians from primary care specialties only were defined as *primary care TINs*; groups with physicians from specialty care specialties only were defined as *specialty care TINs*; TINs with both primary care and specialty care physicians were defined as *mixed care TINs*. APPs were then assigned to primary, specialty, or mixed care TINs. Some TINs included non-physician clinicians only; these were defined as *unknown care TINs*.

For APPs who were not included in MD-PPAS but were identified through Physician Compare or NPPES data, our team used available NPPES taxonomy codes to categorize clinicians as *primary care APPs* or *specialty care APPs*. Clinicians for whom taxonomy codes had insufficient detail (e.g., Taxonomy Code 363A00000X, corresponding to a Physician Assistant without any clinical specialty information) were categorized as *unknown care APPs*.

Verifying APP Payments in Claims Data

Along with other payers, Medicare reimburses APPs who bill directly for services at 85% of the Physician Fee Schedule or 80% of the lesser charge. We sought to validate this point by using the 2019 Medicare carrier and as well as information for federally qualified health centers (FQHCs) and rural health clinics (RHCs) from the 2019 Medicare outpatient file. From these data, we captured information about Healthcare Common Procedure Coding



System (HCPCS) codes to identify claims corresponding to the ten most common services/procedures. This information enabled us to compare the average payment amount to physicians versus APPs for each service/procedure (Table 2).

| HCPCS | Physician Payment Amount (\$) | APP Payment Amount (\$) | APP/Physician Payment Proportion (%) |
|--------------|--------------------------------------|--------------------------------|---|
| 99214 | 82.25 | 69.69 | 85 |
| 99213 | 58.59 | 52.59 | 90 |
| 99232 | 60.1 | 49.53 | 82 |
| 36415 | 2.93 | 2.93 | 100 |
| 99233 | 85.07 | 70.84 | 83 |
| 93010 | 7.02 | 5.86 | 83 |
| 71045 | 7.51 | 9.97 | 133 |
| 99285 | 137.29 | 115.98 | 84 |
| 99308 | 59.25 | 49.45 | 83 |
| 85025 | 8.44 | 8.43 | 100 |

Consistent with expectations, APPs were reimbursed approximately 80-85% of what physicians were reimbursed for professional services on average. Exceptions included codes for diagnostic and laboratory tests, services that have their own statutory benefit categories and are subject to the rules applicable to their specific category, not those related to professional services (e.g., incident-to billing). Other reasons for deviation from the 80-85% range include other adjustments (e.g., geographic) should be explored for specific HCPCS codes and relevant benefit categories in future work.



Conclusion

We conducted analyses to address three issues related to APP clinicians in claims data: identifying APPs; defining primary versus specialty care clinicians; and verifying relative APP versus physician payment amounts in a subset of safety-net settings. Together, this work demonstrates the feasibility of capturing care delivered by APPs in analyses of health care delivery and spending.