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Analysis of Dermatologic Procedures Billed Independently by Non-Physician Practitioners in the United States

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Abstract

Background: Non-physician practitioners (NPPS), including nurse practitioners (NPs) and physician assistants (PAs) are expanding their scope of practice outside of primary care and performing more procedures in dermatology.

Objective: To understand the scope and geographic pattern of practice by NPs and PAs in dermatology in the US.

Methods: Cross-sectional retrospective cohort analysis of dermatology practices in the 2014 Medicare Physician/Supplier Procedure Summary Master File, which reflects Part B carrier and durable medical equipment fee-for-service claims in the US.

Results: Over 4 million procedures were billed independently by NPs and PAs, which accounts for 11.51% of all. Injection, simple repair, and biopsy were the most commonly billed by non-physician practitioners, but complex procedures were also increasingly billed independently by NPs and PAs. Proportions of their claims are higher in the East Coast, Midwest, and Mountain states.

Limitations: Data is at the state level, limited to Medicare beneficiaries, and doesn't include billing incident-to physicians.

Conclusions: This study demonstrated the increasing scope of practice of NPs and PAs in dermatology, despite limited training and lack of uniform regulations. To ensure quality and safety of care, it is prudent to set benchmarks for proper supervision and utilization of procedures in dermatology.

Capsule Summary

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IRB status: This study did not use patient level data and thus was exempt from review.

- This study showed that non-physician practitioners in dermatology are expanding their scope of practices to more complicated procedures with higher proportions in the East Coast, Midwest, and Mountain states.
- It is prudent to recognize limitations of their training and to set benchmarks for proper supervision and utilization of dermatologic procedures.

Keywords

dermatology; non-physician practitioner; nurse practitioner; physician assistant; dermatology practice pattern; Medicare

Introduction

Non-physician practitioners (NPPs), including nurse practitioners (NPs) and physician assistants (PAs), have dramatically increased their scope of practice in the past decade. An often cited reason for this increase is to fill the gap from physician shortage, especially in primary care (1, 2, 3). The Association of American Medical Colleges (AAMC) estimates that by 2030, the US will face a physician shortage of 40,800–104,900, again mostly in primary care (1).

Although NPPs were originally expected to provide primary care, over the years, more and more NPs and PAs are seen practicing in subspecialties, especially those that do not require hospital privileges. Dermatology attracts an increasing number of NPPs, potentially due to increasing demand in the current skin cancer epidemic (4), and also the high compensation (5). According to the American Academy of Dermatology (AAD), there were 10,845 practicing dermatologists in 2016, corresponding to a density of 3.4 dermatologists per 100,000 people (6). This is lower than the required 4 dermatologists per 100,000 for adequate service (6). In addition, most dermatologists practice in urban settings, leaving the shortage in rural areas even worse. There were 2520 dermatology PAs practicing in the US in 2016 (7). However, most of them practice in urban settings as well, leaving rural areas still in need for dermatology providers (7).

NPPs also have increased their scope of practice over the years. NPs can practice independently in 22 states and the District of Columbia, while PAs still practice under the supervision of a physician (8). The Balanced Budget Act of 1997 allowed NPs and PAs to bill independently under certain conditions to receive 85% of the Medicare contracted rate. If billing “incident-to” a physician, they can receive 100% of the contracted rate (9). With increasing scope of practice and billing, many NPPs perform procedures that used to be only performed by physicians. A study by Coldiron on the Medicare data showed that over 4 million procedures were billed independently by NPs and PAs in 2012. Among these procedures, 54.8% were in dermatology (10). Another analysis in 2015 suggested that 15% of biopsies billed to Medicare were performed by NPPs. In comparison, most procedures were only performed by physicians in 2005 (11). To further investigate the amount and type of dermatologic procedures performed by NPs and PAs, we studied the Medicare database, with further analysis by regions in the US to understand geographic differences in the scope of practice by NPPs in dermatology.

Methods

We obtained the 2014 Medicare Physician/Supplier Procedure Summary (PSPS) Master File, which is a 100% summary of Part B Carrier and Durable Medical Equipment Regional Contractor claims processed through the Common Working File and stored in the National Claims History Repository (12). Data was received with all patient and provider identifiers removed. Therefore, with all data deidentified, the study was exempt from review by an institutional review board. The main outcome variable was the Submitted Service Count for dermatologic procedures coded by Current Procedural Terminology (CPT) codes. We searched for those billed by NPs and PAs using Provider Specialty Code 50 and 97, respectively. We selected those CPT codes that correspond to common dermatologic procedures as reported in a previous study by Coldiron and Ratnarathorn (10) and based on our own experience. Then we stratified results according to geographical regions using the carrier codes matched to states in the US (13). We also compared our data to that reported by Coldiron and Ratnarathorn (10), which was based on the 2012 Medicare PSPS Master File. Analysis was performed using SAS version 9.4 (SAS Institute Inc.) and Microsoft Excel 2013 (Microsoft Corp.).

Results

CPT codes representing twelve major dermatologic procedures were selected: simple repair, intermediate repair, complex repair, skin graft, adjacent tissue transfer, destruction of premalignant lesions, destruction of malignant lesions, biopsy, shaving of skin lesions, excision of malignant lesions, excision of benign lesions, and injection. These CPT codes were the most commonly billed and thus most representative of dermatologic services provided in different clinical settings (10). These were further stratified based on states in continental US according to carrier codes. A total of 36,900,799 counts of these dermatologic procedures were billed in continental US. Among these, 4,248,442 (11.51%) were billed by NPs and PAs independently, with NPs billing for 1,193,524 (3.23%) and PAs billing for 3,054,919 (8.28%) of these procedures (Table 1).

Among the twelve types of dermatologic procedures, simple repair had the highest percentage billed by NPs and PAs (25.73%), followed by injection (13.42%) and biopsy (13.03%). More complex procedures, however, also had high proportions billed by NPPs: 11.94% of destruction of premalignant lesions and 10.32% of shaving of skin lesions were billed by NPs and PAs. Even advanced procedures like skin grafts and tissue transfers were partially performed and billed independently by NPs and PAs (Table 1).

Procedures billed independently by NPPs have increased significantly from 2012 to 2014, as shown in Table 2. Data from 2012 was extracted from the paper by Coldiron and Ratnarathorn (10) based on the 2012 Medicare PSPS Master File. Simple repair, skin grafts, and adjacent tissue transfers were not reported in the study so were not compared here. The number of services independently billed by NPs and PAs increased by at least 30% from 2012 to 2014. Injection had the greatest increase of 94.58%, followed by intermediate repair at 80.49%.

Each type of dermatologic procedure was further stratified by states in continental US based on carrier codes (Table 3). Of note, District of Columbia (DC), Maryland (MD), and Virginia (VA) were grouped together because carrier codes of these regions were not differentiated. Idaho (ID) had the highest percentage of dermatologic procedures independently billed by NPs and PAs, which was 32.70%. This was followed by Vermont (VT) (27.80%) and Kansas (KS) (27.40%). States having the lowest percentages of dermatologic procedures independently billed by NPs and PAs were Louisiana (LA) (3.11%), California (CA) (5.47%), and Mississippi (MS) (5.98%). By region, states in the East Coast (SC, DC, MD, VA, NY, FL, GA, NC, DE, HI, CT, ME, MA, NH, RI) (14) had an average of 12.22% of these dermatologic procedures billed independently by NPs and PAs. This number for states in the West Coast (CA, OR, WA) was 8.79%, for the Midwest (ND, SD, IA, KS, MO, NE, IL, MN, WI, IN, MI, OH) was 13.21%, and 13.99% for the Mountain states (NV, ID, AZ, MT, UT, WY, CO, NM).

For simple procedures like injection, up to 40.23% were independently billed by NPs and PAs in South Dakota, followed by 34.23% in West Virginia and 33.63% in Idaho. Such rates were lowest in Mississippi, California and New Mexico, which were less than 6%. For biopsy, Idaho had the highest proportion (36.34%) billed independently by NPs and PAs, followed by Vermont (33.66%) and Kansas (30.93%). California, New York, and Louisiana had the lowest rates, which were all less than 7%. For more complex procedures like excision of malignant lesions, up to 18.18% were billed by NPPs in Vermont, followed by Idaho (16.73%) and Washington (13.97%). In eight states (VT, ID, SD, WA, TN, GA, OK, NJ), over 10% of intermediate repairs were billed by NPs and PAs. This number was even higher for simple repairs: over 30% were billed by NPPs independently in 19 states including DC. NPPs also billed independently for complicated procedures, including 8.46% of tissue transfers in North Carolina, and 9.53% of skin grafts in South Dakota.

Discussion

NPPs have mostly increased their range of services. As the results show, significant proportions of dermatologic procedures were billed independently by NPs and PAs. The number has increased significantly from 2012 to 2014 by 32% – 95% depending on the procedure group. Among the procedures, simple ones including simple repair, injection, and biopsy were the most commonly billed by NPs and PAs. More concerning is that significant proportions of more complex procedures, including destruction of malignant and premalignant lesions, tissue transfers, and even skin grafts, were also billed by NPPs. These procedures used to be performed by only dermatologists.

In addition to procedures, NPPs also independently billed for examinations of surgical pathologic specimens (15, 16). The studies by Adamson *et al.* and Zhang *et al.* revealed that close to \$0.6 million were billed by NPPs for pathology (15). The number of services billed in this category increased 72.3% from 13,022 in 2012 to 22,440 in 2015 (16). Surgical pathology is a highly specialized field in which the majority of pathologists obtain fellowship training. It is also critical given that diagnoses rely on accurate reading of pathologic specimens. Thus, quality of pathologic examinations performed by NPPs needs to be carefully reviewed.

Currently, there have been no systematic way to evaluate the quality of these services performed by NPs and PAs. The number needed to biopsy for any skin cancer almost doubled for NPPs (17). A study on cutaneous laser surgery showed that non-physician practitioners had increasing frequency of lawsuits (18). Anderson *et al.* has also shown in their recent study that in order to diagnose melanoma, PAs had to biopsy 39.4 pigmented lesions, compared to 25.4 for dermatologists. Furthermore, patients seeing PAs were less likely to be diagnosed with melanoma *in situ* compared to those seeing dermatologists (19). Therefore, it is important to investigate and ensure the quality of care provided by NPPs in dermatology.

In addition, training of NPPs is inconsistent. Dermatologists receive about 10,000 hours of training during the 3 years of residency and have to complete ongoing assessments to keep their board certification. In contrast, dermatology NPs and PAs receive only around 500–900 hours of clinical training, which is mostly focused on primary care (20, 21). In addition, there is no consistent regulation of the training requirement for NPs and PAs in dermatology. In a 2007 survey by AAD, only about 10% of the dermatologists reported that the NPs and PAs in their practices had formal training. Most of their training was “on the job” (22). The Dermatology Nurses’ Association (DNA) and the Society of Dermatology Physician Assistants (SDPA) provide some training sessions, online modules, and a few short residency programs, but still offer no formal guidelines for dermatology training (23, 24).

The current study showed that Idaho, Vermont, and Kansas had the highest proportions of procedures billed by NPs and PAs. These three states also have low density of dermatologists and non-physician clinicians (25). East Coast, Midwest, and Mountain states have higher-than-average proportions of procedures billed by NPPs. This study also shows that NPPs’ scope of practice has extended to more complicated procedures. Variations in their practice can be partially due to the inconsistent regulations on supervision. For example, the American Medical Association (AMA) pointed out the different state regulations over NPs’ practice and prescriptive authorities (26). Studies on laser use regulations have also shown inconsistent results among different states and even conflicting interpretations of state regulations by the medical and nursing boards (27). For example, New Jersey is the only state that requires a physician to operate the laser, while in 11 other states including Massachusetts, Colorado, Florida, Missouri, New York, Pennsylvania, there are no such limits (28). To ensure patient safety, more research is needed to investigate regulations on supervision, and to devise more consistent laws governing non-physician clinicians practicing dermatology.

The current study provides data on the billing patterns of NPPs in dermatology. It also gives insights on the scope and geographic distribution of dermatologic practice by NPs and PAs. NPPs are expanding their scope of practice. This phenomenon is also seen in other specialties, such as anesthesia. The rising number of procedures performed by them and the notable increase in their number needed to biopsy for skin cancer compared to dermatologists could contribute to overutilization of these procedures and unnecessary risks associated (29). Limitations of the study include that data was restricted to Medicare patients who were mostly over 65 years old. However, this is a comprehensive database which

provides a good starting point for investigation. Another limitation is that data is at the state level, not county level, and thus does not reflect intra-state variation in the density of practitioners. In addition, the dataset does not include information on billing incident-to a physician. This means even a higher proportion of services are performed by NPPs, if including procedures billed both independently and incident-to physicians.

Conclusion

NPs and PAs bill independently for a wide range of services in dermatology. These even include some complex procedures including skin grafts and tissue transfers. The pattern varies by states, potentially depending on state regulations and also density of dermatologists. The increasing scope of practice and expanding numbers of procedures independently billed by NPs and PAs in dermatology call into question the proper supervision and utilization of CPT codes. It might also contribute to overutilization of procedures including unnecessary biopsies and patient injury. Coldiron and Weinstein have published early work on developing benchmarks for proper dermatologic procedures (29). Nevertheless, it is necessary to further investigate the supervision of practice by NPPs and to develop benchmarks for proper utilization of dermatologic procedures.

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Abbreviations

NPPs	Non-physician practitioners
NPs	nurse practitioners
PAs	physician assistants
AAMC	Association of American Medical Colleges
AAD	American Academy of Dermatology
PSPS	Physician/Supplier Procedure Summary
CPT	Current Procedural Terminology
DNA	Dermatology Nurses' Association
SDPA	Society of Dermatology Physician Assistants
AMA	American Medical Association

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Table 1:

Number of service counts billed by nurse practitioners (NPs) and physician assistant (PAs) for each type of common dermatologic procedures.

Type of Procedure by CPT code	Total billed by all practitioners	Total billed by NPs and PAs	% Billed by NPs and PAs	Independently billed by NPs		Independently billed by PAs	
Simple Repair ^(a)	398691	102603	25.73%	29998	7.52%	72605	18.21%
Intermediate Repair ^(b)	521603	32772	6.28%	7006	1.34%	25766	4.94%
Complex Repair ^(c)	510201	14382	2.82%	1806	0.35%	12576	2.46%
Skin Grafts ^(d)	131229	1761	1.34%	274	0.21%	1487	1.13%
Adjacent Tissue Transfer ^(e)	469999	7281	1.55%	779	0.17%	6502	1.38%
Destruction of premalignant lesions ^(f)	26585465	3173897	11.94%	894581	3.36%	2279316	8.57%
Destruction of malignant lesions ^(g)	884912	69608	7.87%	17270	1.95%	52338	5.91%
Biopsy ^(h)	4918435	640755	13.03%	178819	3.64%	461936	9.39%
Shaving of skin lesions ⁽ⁱ⁾	932182	96187	10.32%	33071	3.55%	63116	6.77%
Excision of malignant lesions ^(j)	613053	28290	4.61%	5859	0.96%	22431	3.66%
Excision of benign lesions ^(k)	657622	43667	6.64%	14906	2.27%	28761	4.37%
Injection ^(l)	277407	37240	13.42%	9155	3.30%	28085	10.12%
Total	36900799	4248443	11.51%	1193524	3.23%	3054919	8.28%

a: consists of CPT codes 12001, 12002, 12004, 12005, 12006, 12007

b: consists of CPT codes 12031, 12032, 12042, 12051, 12052

c: consists of CPT codes 13101, 13121, 13132

d: consists of CPT codes 15100, 15120, 15200, 15220, 15260, 15240

e: consists of CPT codes 14000, 14001, 14020, 14021, 14040, 14041, 14060, 14061, 14301, 14302

f: consists of CPT codes 17000, 17003, 17004, 17110, 17111, 10040

g: consists of CPT codes 17261, 17262, 17281, 17260, 17263, 17271, 17272, 17280, 17282

h: consists of CPT codes 11100, 11101, 69100

i: consists of CPT codes 11300, 11301, 11302, 11306, 11307, 11310, 11311, 11312, 40490, 67810

j: consists of CPT codes 11601, 11602, 11603, 11622, 11641, 11642

k: consists of CPT codes 11200, 11400, 11401, 11402, 11403, 11421, 11422, 11440, 11441

l: consists of CPT codes 11900, 11901

Table 2:

List of common dermatologic procedures billed independently by nurse practitioners (NPs) and physician assistants (PAs) in 2014 compared to 2012.

Type of Procedure by CPT code ^(a)	Total No. billed by NPs and PAs		No. increase from 2012 to 2014	% increase from 2012 to 2014
	2012 ^(b)	2014		
Intermediate Repair	18157	32772	14615	80.49%
Complex Repair	8702	14382	5680	65.27%
Destruction of premalignant lesions	2052621	3173897	1121276	54.63%
Destruction of malignant lesions	46675	69608	22933	49.13%
Biopsy	421351	640755	219404	52.07%
Shaving of skin lesions	72336	96187	23851	32.97%
Excision of malignant lesions	20344	28290	7946	39.06%
Excision of benign lesions	29058	43667	14609	50.28%
Injection	19139	37240	18101	94.58%

^{a:} data on simple repair, skin grafts, and adjacent tissue transfer were not reported by Coldiron and Ratnarathorn (10) and thus are not compared here

^{b:} data obtained from Coldiron and Ratnarathorn (10) which was based on 2012 Medicare Physician/Supplier Procedure Summary Master File.

Table 3:

Number of dermatologic procedures billed independently by nurse practitioners (NPs) and physician assistant (PAs) in each US state. DC, MD, and VA were grouped together since the Medicare Carrier Codes for these regions are not differentiated.

State	Number of procedures billed by NPs		Number of procedures billed by PAs		Number of procedures billed by NPs and PAs		Total number of procedures billed by all practitioners
AK	158	0.71%	2599	11.63%	2757	12.33%	22353
AL	13991	1.74%	35448	4.40%	49439	6.14%	805256
AR	12882	2.93%	26930	6.13%	39812	9.06%	439387
AZ	33008	2.97%	104978	9.44%	137986	12.40%	1112643
CA	39878	0.95%	191167	4.54%	231045	5.49%	4211005
CO	6104	1.09%	48125	8.59%	54229	9.68%	560073
CT	4592	1.05%	23223	5.33%	27815	6.39%	435534
DC, MD, VA	58774	3.18%	100191	5.42%	158965	8.59%	1849562
DE	2491	1.65%	11562	7.67%	14053	9.32%	150825
FL	210755	4.10%	449599	8.76%	660354	12.86%	5135097
GA	30511	2.74%	186801	16.81%	217312	19.55%	1111564
IA	31010	8.06%	57314	14.90%	88324	22.96%	384712
ID	9723	5.33%	49926	27.37%	59649	32.70%	182385
IL	31314	3.09%	94203	9.29%	125517	12.38%	1013844
IN	28560	4.77%	29467	4.92%	58027	9.68%	599279
KS	38175	11.69%	51669	15.83%	89844	27.52%	326448
KY	22467	4.83%	35956	7.74%	58423	12.57%	464702
LA	10010	2.06%	5140	1.06%	15150	3.11%	486615
MA	50137	5.97%	44879	5.34%	95016	11.31%	840407
ME	14817	10.61%	8605	6.16%	23422	16.77%	139655
MI	10481	1.05%	119223	11.99%	129704	13.05%	994070
MN	9488	3.49%	24160	8.89%	33648	12.38%	271789
MO	36654	5.39%	27491	4.05%	64145	9.44%	679590
MS	9930	2.89%	10598	3.09%	20528	5.98%	343420
MT	8782	5.75%	22011	14.40%	30793	20.15%	152842
NC	19790	1.45%	188461	13.86%	208251	15.31%	1360163
ND	11423	19.96%	841	1.47%	12264	21.43%	57235
NE	1918	0.82%	36259	15.58%	38177	16.40%	232771
NH	7654	4.26%	18032	10.04%	25686	14.30%	179638
NJ	47321	4.41%	113152	10.55%	160473	14.96%	1072327
NM	2605	1.58%	8376	5.09%	10981	6.67%	164681
NV	11775	3.76%	52383	16.75%	64158	20.51%	312785
NY	29771	1.78%	83538	5.00%	113309	6.78%	1670253
OH	32308	3.74%	32811	3.80%	65119	7.54%	863937
OK	3563	0.82%	47548	10.99%	51111	11.81%	432675
OR	11141	2.95%	45429	12.04%	56570	14.99%	377414

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State	Number of procedures billed by NPs		Number of procedures billed by PAs		Number of procedures billed by NPs and PAs		Total number of procedures billed by all practitioners
PA	16734	1.60%	72664	6.95%	89398	8.55%	1045294
RI	12259	10.91%	18528	16.49%	30787	27.40%	112366
SC	43622	3.52%	90337	7.30%	133959	10.82%	1237713
SD	5653	4.40%	18664	14.54%	24317	18.94%	128374
TN	64172	7.88%	104674	12.86%	168846	20.75%	813860
TX	47021	1.95%	123443	5.12%	170464	7.07%	2412225
UT	7424	2.28%	28076	8.62%	35500	10.90%	325747
VT	4482	7.88%	11339	19.93%	15821	27.80%	56906
WA	46245	6.84%	128934	19.08%	175179	25.92%	675897
WI	17600	4.19%	42398	10.10%	59998	14.29%	419767
WV	16080	9.67%	26240	15.78%	42320	25.45%	166256
WY	8271	11.91%	1527	2.20%	9798	14.11%	69458
Average	24865	3.23%	63644	8.28%	88509	11.51%	768767
Total	1193524	3.23%	3054919	8.28%	4248443	11.51%	36900799

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