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Brief Report

Nurse practitioners and physician assistants in emergency medical services who billed independently, 2012–2016☆

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ABSTRACT

Objective: As nurse practitioners (NPs) and physician assistants (PAs) become an integral part of delivering emergency medical services, we examined the involvement of NPs and PAs who billed independently in emergency departments (EDs).
Methods: We used Medicare provider utilization and payment data from 2012 to 2016 to conduct a retrospective analysis. We examined the changes in the number of each clinician type who billed independently for four common emergency services (CPT codes: 99282-5), the change in their service volume, and the change in their average number of services billed.
Results: Between 2012 and 2016, the proportion of NPs and PAs billing independently increased from 18% to 22% for ED visits of low severity (99282), 23% to 29% for visits with moderate severity (99283), 21% to 27% for visits with high severity (99284), 18% to 24% for visit with the highest severity (99285), and 23% to 29% across all four services. The proportion of services provided by emergency physicians decreased from 66% to 63% across all four services, and from 11% to 9% for internists and family physicians. The number of NPs, PAs billing independently, and emergency physicians increased by 65%, 35% and 12% respectively.
Conclusions: NPs and PAs are increasingly billing emergency services of all levels of severity, independent of physicians. This trend is driven by a growing number of NPs and PAs independently billing services, despite a relatively stable number of emergency physicians (excepting the decline in rural areas), and diminished involvement of family physicians and internists in EDs.

1. Introduction

The growing demand for emergency services accompanied by relatively stable supply of emergency physicians is necessitating changes in the clinician workforce in emergency departments (EDs) [1]. Increasing involvement of nurse practitioners (NPs) and physician assistants (PAs) is one important response to the growing demand as well as the ongoing effort of hospitals and clinician groups to control spending [2-4]. NPs and PAs are increasingly being utilized in emergency care and their supply is forecasted to grow [1].

Prior studies estimated the proportion of ED visits seen by NPs and PAs independently (without direct physician involvement) were approximately 7% during 1993–2005, 6% during 2006–2009 [5,6]. In 2014, almost 25% of emergency medicine clinicians were found to be NPs or PAs [4]. Recent studies in specific geographic areas have found higher levels of NPs and PAs practicing independently of direct physician involvement. Among EDs in Iowa in 2012, only 12% were staffed exclusively with emergency physicians and 61% had NPs/PAs working alone for at least part of the week [7]. In 2014, 46% of critical access hospitals in Washington had NPs and PAs in their EDs, 75% of which only had PAs see patients [8].

The current literature, however, has not examined the recent trends of NPs and PAs billing independently in EDs at the national level, in aggregation or for specific common service. In this study, we used the Medicare provider dataset to examine these national trends and discuss their implications.

2. Methods

2.1. Data

We used Medicare provider utilization and payment data from 2012 to 2016, a time period for which data are available, published by the Center for Medicare and Medicaid Services (CMS) [9]. Data includes

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national provider identifier (NPI), medical specialty, and Medicare utilization for clinicians who billed services to Medicare beneficiaries and submitted Medicare part B non-institutional claims. Under Medicare rules, NPs and PAs are allowed to deliver these services independent of direct physician involvement and bill Medicare under their own NPI. We excluded clinicians who reported less than $100 annual Medicare allowed amount for each service billed to Medicare patients.

2.2. Common emergency services

Our focus was on four common ED evaluation and management services that are dominantly billed by emergency physicians and uniquely delivered in emergency settings. In 2016, four services were billed by more than 5000 emergency physicians: (1) ED visit with high severity (CPT code: 99284; by 36,866 emergency physicians, 63% of all clinicians); (2) ED visit with highest severity (CPT code: 99285; by 36,727 emergency physicians, 67% of all clinicians); (3) ED visit with moderate severity (CPT code: 99283; by 34,090 emergency physicians, 62% of all clinicians); and (4) ED visit with low severity (CPT code: 99282; by 5544 emergency physicians, 64% of all clinicians). We excluded critical care initial 30–74 min (CPT code: 99251; by 26,616 emergency physicians, 44% of all clinicians), because less than half of the care was billed by emergency physicians.

2.3. Clinician types

We included five types of clinicians in our analysis: emergency physician, family physician, internist, NP, and PA. These are the dominant providers of common emergency services. In 2016, they represented 96%, of all clinicians who billed for ED visit with low severity (99282), and 97% of all clinicians who billed for ED visit with moderate severity (99283), high severity (99284), and highest severity (99285).

2.4. Variable measurement

We calculated the percentage of each type of clinician billing independently for each of the four services by dividing the number of a given type of clinician by the total number of PAs, NPs, emergency physicians, family physicians, and internists who also billed the same service in each year. We measured the distributions of service as the number of service billed by a given type of clinician who billed independently divided by the overall number of service billed by the five types of clinicians in each year. In addition, we measured the average number of each service billed by each type of clinician in each year.

2.5. Statistical analyses

First, we conducted analyses at the level of clinician by studying the change in the number of each type of clinician and the change in the composition of clinicians from 2012 to 2016, for each common service and for all common services combined. Next, we conducted analysis at the level of service. For each common emergency service, we examined the change in the number of services for each type of clinician from 2012 to 2016 and the change in the composition of clinicians for each service. Moreover, we analyzed the change in the average number of service billed by each type of clinician to understand the trend of service

Table 1
Number of clinicians billing independently for Medicare beneficiaries, 2012–2016.

	2012	2013	2014	2015	2016	2012–2016
CPT code: 99282 (ED visit, low to moderately severe problem)						
NP	612 (5%)	541 (6%)	518 (6%)	591 (7%)	633 (8%)	3%
PA	1471 (13%)	1326 (14%)	1169 (13%)	1126 (13%)	1179 (14%)	−20%
Emergency physician	7776 (68%)	6583 (67%)	6104 (68%)	5842 (68%)	5544 (67%)	−29%
Family physician	1169 (10%)	1015 (19%)	846 (9%)	800 (9%)	721 (9%)	−38%
Internist	450 (4%)	357 (4%)	325 (4%)	294 (3%)	250 (3%)	−44%
Total	11,478 (100%)	9822 (100%)	8962 (100%)	8653 (100%)	8327 (100%)	−27%
CPT code: 99283 (ED visit, moderately severe problem)						
NP	3246 (7%)	3630 (7%)	3968 (8%)	4493 (9%)	5139 (10%)	58%
PA	7533 (16%)	8266 (17%)	8817 (18%)	9305 (18%)	10,037 (19%)	33%
Emergency physician	31,663 (67%)	32,240 (66%)	32,992 (66%)	33,501 (65%)	34,090 (64%)	8%
Family physician	3358 (7%)	3269 (7%)	3088 (6%)	3036 (6%)	2978 (6%)	−11%
Internist	1523 (3%)	1443 (3%)	1327 (3%)	1221 (2%)	1190 (2%)	−22%
Total	47,323 (100%)	48,848 (100%)	50,192 (100%)	51,556 (100%)	53,434 (100%)	13%
CPT code: 99284 (ED visit, problem of high severity)						
NP	3030 (6%)	3495 (7%)	3929 (8%)	4451 (8%)	5297 (9%)	75%
PA	7340 (15%)	8112 (16%)	8754 (17%)	9345 (17%)	10,187 (18%)	39%
Emergency physician	33,032 (69%)	34,135 (68%)	35,103 (67%)	35,917 (66%)	36,866 (65%)	12%
Family physician	3144 (7%)	3092 (6%)	3049 (6%)	3011 (6%)	3023 (5%)	−4%
Internist	1620 (3%)	1548 (3%)	1458 (3%)	1328 (2%)	1305 (2%)	−19%
Total	48,166 (100%)	50,382 (100%)	52,293 (100%)	54,052 (100%)	56,678 (100%)	18%
CPT code: 99285 (ED visit, problem with significant threat to life or function)						
NP	2164 (5%)	2529 (5%)	2938 (6%)	3485 (7%)	4261 (8%)	97%
PA	5660 (13%)	6483 (14%)	7060 (15%)	7721 (15%)	8660 (16%)	53%
Emergency physician	32,512 (74%)	33,617 (72%)	34,591 (72%)	35,611 (70%)	36,727 (69%)	13%
Family physician	2366 (5%)	2362 (5%)	2421 (5%)	2457 (5%)	2511 (5%)	6%
Internist	1419 (3%)	1389 (3%)	1295 (3%)	1239 (2%)	1214 (2%)	−14%
Total	44,121 (100%)	46,380 (100%)	48,305 (100%)	50,513 (100%)	53,373 (100%)	21%
Across 4 CPT codes: 99282–99285						
NP	3635 (7%)	4078 (8%)	4523 (8%)	5120 (9%)	5986 (10%)	65%
PA	8396 (16%)	9172 (17%)	9825 (18%)	10,454 (18%)	11,301 (19%)	35%
Emergency physician	33,968 (66%)	34,994 (65%)	35,983 (65%)	36,951 (64%)	38,037 (63%)	12%
Family physician	3755 (7%)	3644 (7%)	3503 (6%)	3456 (6%)	3425 (6%)	−9%
Internist	1943 (4%)	1835 (3%)	1740 (3%)	1605 (3%)	1531 (3%)	−21%
Total	51,697 (100%)	53,723 (100%)	55,574 (100%)	57,586 (100%)	60,280 (100%)	17%

Notes: The percentages in brackets indicate the ratio of the number of a given type of clinician to the total number of the five types of clinicians. The percentages in the column 2012–2016 indicate the change in the number of a given type of clinician between 2012 and 2016, ignoring changes in the middle years.

Table 2
Service volume billed by clinicians for Medicare beneficiaries, 2012–2016.

	2012	2013	2014	2015	2016	2012–2016
CPT code: 99282 (ED visit, low to moderately severe problem)						
NP	17,058 (5%)	14,787 (5%)	13,346 (6%)	15,349 (7%)	17,224 (8%)	1%
PA	38,257 (12%)	31,757 (11%)	26,207 (11%)	25,705 (11%)	27,666 (12%)	−28%
Emergency physician	216,092 (65%)	180,929 (65%)	164,072 (68%)	157,257 (67%)	144,831 (65%)	−33%
Family physician	43,555 (13%)	36,501 (13%)	28,506 (12%)	26,230 (11%)	24,132 (11%)	−45%
Internist	16,930 (5%)	12,410 (4%)	10,446 (4%)	9728 (4%)	8769 (4%)	−48%
Total	331,892 (100%)	76,384 (100%)	242,577 (100%)	234,269 (100%)	222,622 (100%)	−33%
CPT code: 99283 (ED visit, moderately severe problem)						
NP	211,088 (6%)	224,368 (7%)	242,528 (7%)	266,121 (8%)	287,736 (9%)	36%
PA	515,113 (14%)	514,885 (15%)	534,644 (16%)	556,089 (17%)	570,146 (18%)	11%
Emergency physician	2,476,535 (69%)	2,318,820 (68%)	2,254,032 (67%)	2,194,873 (66%)	2,081,038 (65%)	−16%
Family physician	270,734 (8%)	243,384 (7%)	229,034 (7%)	218,952 (7%)	199,392 (6%)	−26%
Internist	122,876 (3%)	106,260 (3%)	94,273 (3%)	87,581 (3%)	78,425 (2%)	−36%
Total	3,596,346 (100%)	3,407,717 (100%)	3,354,511 (100%)	3,323,616 (100%)	3,216,737 (100%)	−11%
CPT code: 99284 (ED visit, problem of high severity)						
NP	195,192 (3%)	216,520 (4%)	246,864 (4%)	284,277 (5%)	329,205 (6%)	69%
PA	474,665 (8%)	512,932 (9%)	570,657 (10%)	603,570 (11%)	655,866 (12%)	38%
Emergency physician	4,423,121 (79%)	4,350,345 (78%)	4,359,527 (77%)	4,340,623 (77%)	4,276,368 (75%)	−3%
Family physician	330,691 (6%)	312,804 (6%)	310,151 (6%)	306,927 (5%)	301,386 (5%)	−9%
Internist	171,456 (3%)	162,042 (3%)	148,170 (3%)	137,427 (2%)	128,739 (2%)	−25%
Total	5,595,125 (100%)	5,554,643 (100%)	5,635,369 (100%)	5,672,824 (100%)	5,691,564 (100%)	2%
CPT code: 99285 (ED visit, problem with significant threat to life or function)						
NP	145,270 (1%)	169,147 (2%)	203,381 (2%)	254,849 (2%)	321,835 (3%)	122%
PA	390,360 (4%)	437,956 (4%)	507,251 (5%)	576,599 (5%)	673,337 (6%)	72%
Emergency physician	8,909,252 (88%)	9,038,401 (88%)	9,237,126 (87%)	9,556,004 (86%)	9,746,434 (85%)	9%
Family physician	410,836 (4%)	400,127 (4%)	418,896 (4%)	444,172 (4%)	464,825 (4%)	13%
Internist	286,716 (3%)	274,667 (3%)	248,187 (2%)	251,524 (2%)	253,250 (2%)	−12%
Total	10,142,434 (100%)	10,320,298 (100%)	10,614,84 (100%)	11,083,148 (100%)	11,459,681 (100%)	13%

Notes: The percentages in brackets indicate the ratio of the number of services billed independently by a given type of clinician to the total number of services billed by the five types of clinicians. The percentages in the column 2012–2016 indicate the change in the number of services billed for a given type of clinician between 2012 and 2016, ignoring changes in the middle years.

intensity. Finally, we repeated the analyses above for clinicians practicing in rural areas [10].

3. Results

3.1. Change in the number of clinicians for each service

Table 1 presents the changes in the number of clinicians who billed common emergency services between 2012 and 2016. For ED visit with low severity (99282), the number of all clinicians, except for NPs, declined between 2012 and 2016. For more severe ED visits (99283–99285), the number of NPs and PAs billing independently increased by at least 30%, the number of emergency physicians increased by 8–13%. These changes resulted in a growth in the proportion of PAs and NPs (from 23% to 29%) billing independently and a corresponding decline in the proportion of physicians (from 77% to 72%).

In Table 1, we also presented the proportional distribution of clinicians who billed any of the four common emergency services. Overall, more clinicians participated in emergency care (a 17% increase 2012–2016). The proportion of PAs and NPs billing independently increased from 7% to 10% and 16% to 19%, respectively; the proportion of emergency physicians decreased from 66% to 63%, and the proportion of family physician and internists combined decreased from 11% to 9%.

3.2. Change in service volume

Table 2 presents the change in the number of services for each type of clinicians and the change in the proportion of services by each type of clinician. These changes are largely consistent with the trends shown in Table 1. For ED visit with low severity (99282), the total number of services billed by all clinicians declined. For ED visit with moderate and high severity (99283 and 99284), the proportion of services billed by PAs and NPs increased substantially (20% to 27% for 99283; 11% to 18% for 99284), which contrasts with the drop in the proportion of emergency physicians (69% to 65% for 99283; 79% to 75% for 99284) and of family physicians and internists combined (11% to 8% for 99283; 9% to 7% for 99284).

Table 3
Average annual number of services per clinicians billing independently for Medicare beneficiaries, 2012–2016.

	2012	2013	2014	2015	2016	2012–2016
CPT code: 99282 (ED visit, low to moderately severe problem)						
NP	28	27	26	26	27	−2%
PA	26	24	22	23	23	−10%
Emergency physician	28	27	27	27	26	−6%
Family physician	37	36	34	33	33	−10%
Internist	38	35	32	33	35	−7%
CPT code: 99283 (ED visit, moderately severe problem)						
NP	65	62	61	59	56	−14%
PA	68	62	61	60	57	−17%
Emergency physician	78	72	68	66	61	−22%
Family physician	81	74	74	72	67	−17%
Internist	81	74	71	72	66	−18%
CPT code: 99284 (ED visit, problem of high severity)						
NP	64	62	63	64	62	−4%
PA	65	63	65	65	64	0%
Emergency physician	134	127	124	121	116	−13%
Family physician	105	101	102	102	100	−5%
Internist	106	105	102	103	99	−7%
CPT code: 99285 (ED visit, problem with significant threat to life or function)						
NP	67	67	69	73	76	13%
PA	69	68	72	75	78	13%
Emergency physician	274	269	267	268	265	−3%
Family physician	174	169	173	181	185	7%
Internist	202	198	192	203	209	3%

Notes: The percentages in the column 2012–2016 indicate the change in the average number of services billed for a given type of clinician between 2012 and 2016, ignoring changes in the middle years.

For ED visit with the highest severity (99285), the total number of services billed independently by PA and NP almost doubled between 2012 and 2016, and that of physicians increased slightly, except for internists. Although emergency physicians still billed the vast majority of services (85%) in 2016, the proportion dropped from 88% in 2012, while the proportion of services independently billed by PAs and NPs increased (5% to 9%).

3.3. Change in the average number of service per clinician

Table 3 presents the changes in the average number of service billed per clinician in the period of 2012–2016. For ED visits with low and moderate severity (99282 and 99283), the average number of service billed per clinician dropped at comparable rates across all five clinician types. For ED visits with high and highest severity (99284 and 99285), the average number of service per emergency physician is the highest, followed by family physician and internist.

3.4. Clinicians in rural areas

The trends in rural areas, as summarized in Table 4, are similar to the overall trends shown in Tables 1–3, with two notable distinctions. First, the number of emergency physicians who provided emergency services dropped by 5% in rural areas (overall: grew by 12%) from 2012 to 2016, which leads to a reduction of the proportion of emergency physicians among the five clinicians from 47% in 2012 to 44% in 2016 (overall: 66% to 63%). Second, only half of moderate emergency services (99282-3) in rural areas were provided by emergency physicians in 2016 (overall: 65%); fewer than 70% of more severe services (99284-5) in rural areas were provided by emergency physicians in 2016 (overall: 75–85%).

4. Discussion and conclusions

Our CPT-code-level temporal trend analysis complements the recent demonstration of the ED workforce [4]. We found that between 2012 and 2016, relative to ED physicians, both the size and the average service volume of PAs and NPs who independently billed expanded. The number of emergency physicians increased but their proportion decreased slightly. The involvement of family physicians and internists in emergency care declined. Specifically, the proportion of NPs and PAs billing independently increased from 18% to 22% for ED visits of low severity (99282), 23% to 29% for ED visits with moderate severity (99283), 21% to 27% for ED visits with high severity (99284), 18% to 24% for ED visit with the highest severity (99285), and 23% to 29% across all four services. The proportion of services provided by emergency physicians decreased from 66% to 63% across all four services, and from 11% to 9% for internists and family physicians. The number of NPs, PAs billing independently, and emergency physicians increased by 65%, 35% and 12% respectively. Taken together, the involvement of NPs and PAs in emergency care, as measured by independent billing, has increased for patients of all levels of severity examined, and is expanding fastest in

Table 4
Clinicians billing independently for Medicare beneficiaries in rural areas, 2012–2016.

	Number of clinicians			Number of service			Average		
	2012	2016	2012–2016	2012	2016	2012–2016	2012	2016	2012–2016
CPT code: 99282 (ED visit, low to moderately severe problem)									
NP	159 (7%)	215 (12%)	35%	5961 (6%)	7406 (12%)	24%	37	34	−8%
PA	293 (12%)	220 (12%)	−25%	10,135 (10%)	6739 (11%)	−34%	35	31	−11%
Emergency physician	1256 (51%)	920 (51%)	−27%	50,129 (52%)	31,272 (50%)	−38%	40	34	−15%
Family physician	588 (24%)	367 (20%)	−38%	24,779 (26%)	13,482 (22%)	−46%	42	37	−13%
Internist	143 (6%)	76 (4%)	−47%	6149 (6%)	3610 (6%)	−41%	43	48	10%
Total	2439 (100%)	1798 (100%)	−26%	97,153 (100%)	62,509 (100%)	−36%			
CPT code: 99283 (ED visit, moderately severe problem)									
NP	689 (10%)	1024 (15%)	49%	44,525 (7%)	67,771 (13%)	52%	65	66	2%
PA	1004 (15%)	1240 (18%)	24%	77,506 (12%)	82,828 (16%)	7%	77	67	−13%
Emergency physician	3357 (49%)	3162 (46%)	−6%	376,940 (58%)	276,497 (52%)	−27%	112	87	−22%
Family physician	1470 (21%)	1194 (17%)	−19%	118,864 (18%)	82,480 (16%)	−31%	81	69	−15%
Internist	357 (5%)	282 (4%)	−21%	34,060 (5%)	21,454 (4%)	−37%	95	76	−20%
Total	6877 (100%)	6902 (100%)	0%	651,895 (100%)	827,030 (100%)	−19%			
CPT code: 99284 (ED visit, problem of high severity)									
NP	616 (9%)	1054 (15%)	71%	44,483 (5%)	80,850 (10%)	82%	72	77	6%
PA	943 (14%)	1223 (17%)	30%	74,484 (8%)	98,399 (12%)	32%	79	80	2%
Emergency physician	3418 (51%)	3248 (46%)	−5%	584,586 (66%)	492,029 (59%)	−16%	171	151	−11%
Family physician	1356 (20%)	1207 (17%)	−11%	137,676 (16%)	122,852 (15%)	−11%	102	102	0%
Internist	368 (5%)	304 (4%)	−17%	39,339 (4%)	32,900 (4%)	−16%	107	108	1%
Total	6710 (100%)	7036 (100%)	5%	880,586 (100%)	827,030 (100%)	−6%			
CPT code: 99285 (ED visit, problem with significant threat to life or function)									
NP	413 (7%)	816 (13%)	98%	26,571 (2%)	70,569 (6%)	166%	64	86	34%
PA	686 (12%)	1015 (16%)	48%	56,291 (5%)	101,309 (8%)	80%	82	100	22%
Emergency physician	3282 (59%)	3145 (51%)	−4%	859,331 (75%)	838,385 (69%)	−2%	262	267	2%
Family physician	913 (16%)	935 (15%)	2%	143,655 (13%)	154,962 (13%)	8%	157	166	5%
Internist	312 (6%)	273 (4%)	−13%	54,749 (5%)	55,196 (5%)	1%	175	202	15%
Total	5606 (100%)	6184 (100%)	10%	1,140,597 (100%)	1,220,421 (100%)	7%			
Across 4 CPT codes: 99282–99285									
NP	772 (10%)	1208 (16%)	56%						
PA	1111 (15%)	1364 (18%)	23%						
Emergency physician	3506 (47%)	3333 (44%)	−5%						
Family physician	1653 (22%)	1384 (18%)	−16%						
Internist	437 (6%)	335 (4%)	−23%						
Total	7479 (100%)	7624 (100%)	2%						

Notes: The percentages in brackets indicate the ratio of the number of a given type of clinician to the total number of the five types of clinicians. The percentages in the column 2012–2016 indicate the change in the number of a given type of clinician between 2012 and 2016, ignoring changes in the middle years. Rural areas were identified based on the zip codes where clinicians practiced.

severe coded services for conditions with the high complexity. This trend, accompanied by a slightly growing number of emergency physicians and a declining number of family physicians and internists, suggests an increasingly important role played by NPs and PAs in EDs. Their role is becoming especially prominent in rural areas due to the decline in the number of emergency physicians, family physicians, and internists practicing there.

While most states have laws regulating NP/PA practice, such as requiring physician review of PA medical records [6], no regulation or guideline exists regarding how EDs should make staffing decisions based on the severity of episodes or at what level of severity NPs and PAs can provide emergency care. The limited supply of emergency physicians to meet the demand of emergency services and the development of training programs to prepare NPs and PAs for emergency care may be responsible for the trend of growing involvement of NPs and PAs in emergency care [4,11]. In rural areas, attracting a full complement of emergency physicians can prove difficult and the involvement of NP/PA in emergency care is more pronounced [4].

Higher utilization of NP/PA is also attributable to the development of emergency care oriented NP/PA training programs. An increasing number of postgraduate training programs have been established to prepare NPs and PAs for emergency care [12,13]. The challenge is how to combine the expertise and advantages of emergency physicians and NPs/PAs to deliver effective and cost-conscious care. The response to this challenge will have important implications on the education and training of all clinician types and the practice of emergency medicine by all clinicians involved.

This study has several limitations. First, CPT codes reflect strength of documentation as much as provider involvement and patient severity. We relied on CPT codes since initial emergency severity index (ESI) information was not in the dataset. Second, we do not have data to identify the facility where emergency clinicians practice and thus cannot examine the potential variation of NP/PA utilization across facilities. Third, the potential quality difference across different types of emergency clinician, which cannot be addressed using our data, remains a promising topic for future research to explore. Fourth, the generalizability of this study might be limited since Medicare patients do not represent the overall patient population served by emergency clinicians. Fifth, the occurrence of discretionary coding cannot be addressed using the data. Finally, the independence in billing by NPs and PAs does not necessarily indicate their independence in care delivery by NPs and PAs. Who primarily delivered care for each visit cannot be determined from our data.

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