

# Assessment of Out-of-Network Billing for Privately Insured Patients Receiving Care in In-Network Hospitals

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**IMPORTANCE** Although surprise medical bills are receiving considerable attention from lawmakers and the news media, to date there has been little systematic study of the incidence and financial consequences of out-of-network billing.

**OBJECTIVE** To examine out-of-network billing among privately insured patients with an inpatient admission or emergency department (ED) visit at in-network hospitals.

**DESIGN, SETTING, AND PARTICIPANTS** A retrospective analysis using data from the Clinformatics Data Mart database (Optum), which includes health insurance claims for individuals from all 50 US states receiving private health insurance from a large commercial insurer was conducted of all inpatient admissions ( $n = 5\,457\,981$ ) and ED visits ( $n = 13\,579\,006$ ) at in-network hospitals between January 1, 2010, and December 31, 2016. Data were collected and analyzed in March 2019.

**EXPOSURES** Receipt of a bill for care from at least 1 out-of-network physician or medical transport service associated with patient admission or ED visit.

**MAIN OUTCOMES AND MEASURES** The incidence of out-of-network billing and the potential amount of patients' financial liability associated with out-of-network bills from the admission or visit.

**RESULTS** Of 5 457 981 inpatient admissions and 13 579 006 ED admissions between 2010 and 2016, the percentage of ED visits with an out-of-network bill increased from 32.3% to 42.8% ( $P < .001$ ) during the study period, and the mean (SD) potential financial responsibility for these bills increased from \$220 (\$420) to \$628 (\$865) ( $P < .001$ ; all dollar values in 2018 US\$). Similarly, the percentage of inpatient admissions with an out-of-network bill increased from 26.3% to 42.0% ( $P < .001$ ), and the mean (SD) potential financial responsibility increased from \$804 (\$2456) to \$2040 (\$4967) ( $P < .001$ ).

**CONCLUSIONS AND RELEVANCE** Out-of-network billing appears to have become common for privately insured patients even when they seek treatment at in-network hospitals. The mean amounts billed appear to be sufficiently large that they may create financial strain for a substantial proportion of patients.

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In the United States, physicians who are part of an insurer's network typically agree to accept a set amount from the insurer as payment in full for their services. However, out-of-network physicians can seek additional payment from the patient, a practice known as out-of-network or balance billing. Many clinicians have a standard charge for their services that is larger than the rate paid by the insurer. Under out-of-network billing, physicians may bill the patient for the difference between the 2 amounts. This amount increases the patient's financial responsibility beyond any coinsurance or copayments under the terms of the patient's insurance plan. Although federal legislation bans balance billing for Medicare beneficiaries,<sup>1</sup> no federal protections against out-of-network billing for privately insured patients exist. In particular, while the Affordable Care Act prevents insurers from levying additional copayments for out-of-network emergency department care, these protections do not prevent out-of-network billing by physicians.<sup>2</sup> As of June 2019, 25 states had enacted legislation providing patients some protection against out-of-network billing, ranging from dispute resolution processes to provisions holding the insurer responsible for the balance-billed amount; these protections, however, are rarely comprehensive.<sup>3,4</sup> In other states and the Congress, pending legislation would limit the scope and effects of out-of-network billing.<sup>3,5,6</sup>

In theory, out-of-network billing could benefit patients by providing flexibility for them to see out-of-network physicians. Such flexibility would require the patient to be aware in advance that the physician is out-of-network and may send a balance bill. More commonly, however, the patient is unaware of these possibilities. For example, at many hospitals, some physicians (eg, anesthesiologists) are not hospital employees and make decisions separate from the hospitals about participating in insurance. Thus, even if the hospital and the admitting physician are in-network, the patient could still be cared for by out-of-network physicians and be sent balance bills.

Although out-of-network billing has received news media attention,<sup>7-10</sup> to date there has been little systematic study of its incidence and financial consequences. Studies have examined the incidence of out-of-network billing by emergency department (ED) physicians,<sup>11-13</sup> but to our knowledge billing by other physicians and ambulance transport services has not been fully explored. One report analyzed out-of-network billing for air ambulances,<sup>14</sup> and studies have examined the incidence but not the financial liabilities of out-of-network billing for inpatient admissions.<sup>15,16</sup>

Using a national data set of people with private health insurance, we characterized the incidence and potential financial consequences of out-of-network billing among patients undergoing an ED visit or inpatient admission at in-network hospitals between 2010 and 2016.

## Methods

We obtained data from the Clinformatics Data Mart database (Optum), which includes health insurance claims for individuals from all 50 US states receiving private health insurance from a large commercial insurer,<sup>17-19</sup> with approximately 13 million cov-

## Key Points

**Question** What are the incidence and financial consequences of out-of-network billing for inpatient admissions and emergency department visits?

**Findings** In this analysis of 5 457 981 inpatient admissions and 13 579 006 emergency department admissions between 2010 and 2016 in a large national sample of privately insured patients, the incidence of out-of-network billing increased from 32.3% to 42.8% of emergency department visits, and the mean potential liability to patients increased from \$220 to \$628. For inpatient admissions, the incidence of out-of-network billing increased from 26.3% to 42.0%, and the mean potential liability to patients increased from \$804 to \$2040.

**Meaning** It appears that out-of-network billing is becoming more common and potentially more costly in both the emergency department and inpatient settings.

ered lives annually.<sup>20,21</sup> The individuals in the database represent about 19% of those with commercial health insurance,<sup>15</sup> and their geographic distribution broadly matches the geographic distribution of the US population.<sup>22</sup> We used claims submitted between January 1, 2010, and December 31, 2016. Data were collected and analyzed in March 2019. For each claim, the database reports information such as service dates (ie, physician specialty or medical transport service) and whether the claim was paid as in-network or out-of-network. In addition, each claim reports financial variables including the amount charged by the clinician and a standardized cost, which broadly represents the national mean amount insurance companies would pay an in-network clinician or medical transport service (ie, ambulance) for the service. The database has been used in a variety of health services and health policy studies.<sup>17,23,24</sup> As the study used deidentified data, the Stanford University Institutional Review Board (IRB) determined it did not meet the definition of human subjects research and therefore required no further review from the IRB or written and informed patient consent.

The initial sample consisted of all inpatient admissions (n = 6 454 236) and ED visits (n = 17 073 129) to in-network hospitals between January 1, 2010, and December 31, 2016. We confined the analysis to care received at in-network hospitals because unexpected out-of-network billing from physicians would be more likely in this setting. Inpatient admissions were directly identified in the data by a unique coded identifier which is assigned to all claims (ie, hospital claims, claims for services performed by physicians) associated with a given inpatient admission. In constructing the sample of inpatient admissions, we included admissions from the emergency department as well as admissions from other sources (ie, elective admissions), and excluded admissions to observation status. We identified ED visits by searching for claims with a procedure code consistent with an evaluation and management visit in the ED setting (*Current Procedural Terminology* codes 99281-99285). Any claims submitted on the same day as a claim with the relevant ED codes (ie, claims submitted for consults from other specialties) were considered to be associated with that ED visit.

After construction of the initial sample, we excluded visits and admissions with claims for charges that were either \$0

or negative ( $n = 92\,901$  ED visits;  $76\,688$  inpatient admissions) and those for which the network status of the clinician or medical transport service was unknown or missing ( $n = 3\,264\,060$  ED visits;  $864\,435$  inpatient admissions). Last, visits with charges in the top 1% of all visits and admissions ( $n = 137\,162$  ED visits;  $55\,132$  inpatient admissions) were removed to avoid the inclusion of outliers, resulting in a final sample of  $13\,579\,006$  ED visits and  $5\,457\,981$  inpatient admissions. A flow diagram outlining sample construction is available in the eFigure in the Supplement.

We analyzed 2 primary outcomes. The first outcome was whether the patient received any out-of-network bill during the inpatient admission or ED visit, which was directly reported on the claim. In measuring this outcome, we restricted the analysis to claims submitted by physicians (of any specialty) or medical transport services. The latter was included because patients typically have little choice about their transport and thus may be more likely to be subject to unexpected out-of-network billing.<sup>14</sup>

The second outcome was the amount of money the patient could potentially be liable for as a result of having received care from the out-of-network clinician or medical transport service. Consistent with previous work,<sup>11,25</sup> this amount was defined as the difference between the amount charged by the out-of-network physician or transport service, which is directly reported, and the amount the insurer would pay in-network for the same service. For the in-network payments, we used the standardized costs included in the database. Although the actual amount the insurer may have paid an in-network clinician or transport service for a specific claim may be higher or lower, this approach can provide reliable estimates for national-level analyses, and has been used in previous studies.<sup>25</sup> All dollar values are reported in 2018 US\$.

For  $1\,080\,616$  ED visits (20.4%) and  $547\,467$  inpatient admissions (27.1%), the patient's estimated potential financial responsibility was negative (ie, the amount charged by out-of-network physicians and/or medical transport services was less than the standardized mean cost). For these visits and admissions, we set the patient's potential additional financial liability to \$0, and also performed sensitivity analyses, as described below. We adjusted all dollar amounts to 2018 dollars with the Consumer Price Index.<sup>26</sup>

### Statistical Analysis

We calculated the incidence of out-of-network billing (defined as ED visits or inpatient admissions with at least 1 out-of-network physician or medical transport service) and the patient's potential financial liability on an annual basis. We calculated the incidence of out-of-network billing by physician specialty and medical transport service for the entire sample period. We characterized the distribution of out-of-network billing across hospitals by calculating the percentage of ED visits and inpatient admissions to a given hospital that resulted in at least 1 out-of-network bill. In calculating these hospital-level measures of the incidence of balance billing, hospitals with fewer than 100 inpatient admissions ( $n = 5771$  of 9067 hospitals) or 100 ED visits ( $n = 5151$  of 9179 hospitals) during the sample period were excluded.

We assessed the statistical significance of differences across groups with a  $t$  test for continuous variables and a  $\chi^2$  test for dis-

crete variables, using Stata, version 14.0 (StataCorp Inc). All tests were 2-sided with  $P < .05$  indicating statistical significance.

### Sensitivity Analyses and Subgroup Analyses

With a subgroup analysis, we examined the incidence and magnitude of out-of-network billing for medical and surgical inpatient admissions separately. Surgical admissions were defined as admissions in which the patient received care (ie,  $\geq 1$  claim submitted) by a physician from a surgical specialty, such as general surgery, orthopedics, and obstetrics and gynecology (eTable 1 in the Supplement).

The main analysis assigned a potential financial responsibility of \$0 to the patient in situations where the out-of-network physician or medical transport service charged less than the insurer's in-network payment. With 2 sensitivity analyses, we explored the consequences of this decision. The first reanalyzed the data after excluding these cases, and the second included them and assigned them the mean potential financial responsibility for that year.

In another sensitivity analysis, we included the 13.3% of inpatient admissions and 19.1% of emergency department visits excluded from the main analysis because the network status of at least 1 involved physician (or the medical transport service) was unknown. This analysis conservatively treated any physician or medical transport service whose network status was unknown as in-network.

Although patients generally would have little choice of physician or medical transport service for ED visits and emergency inpatient admissions, they could have more choice for elective inpatient admissions (ie, choosing an out-of-network surgeon to perform an elective surgery), so out-of-network billing, if it occurred, would not necessarily be unexpected. To exclude the bills least likely to be unexpected, we performed an additional analysis for elective inpatient admissions ( $n = 2\,149\,893$ ; defined as admissions with no claims from an emergency department physician or a medical transport service) which only included out-of-network billing by hospital-based physicians (diagnostic radiology, anesthesiology, pathology, and critical care medicine), over whom the patient would likely have limited choice.

## Results

### ED Visits

Among all  $13\,579\,006$  ED visits to in-network hospitals,  $5\,303\,390$  (39.1%) resulted in an out-of-network bill (Table 1). The incidence of out-of-network billing among ED visits increased from 32.3% in 2010 to 42.8% in 2016 ( $P < .001$ ). The potential financial responsibility associated with out-of-network billing also substantially increased, from a mean (SD) of \$220 (\$420) in 2010 (median, \$107; interquartile range [IQR], \$5-\$300) to a mean (SD) of \$628 (\$865) in 2016 (median \$482; IQR, 181-891). The potential financial responsibility among the top decile of patients who received an out-of-network bill increased from \$575 in 2010 to \$1364 in 2016.

Out-of-network billing for ED visits was particularly common for ambulance transport: 85.6% of encounters with ambulance services resulted in an out-of-network bill to the patient, with

**Table 1. Annual Incidence and Magnitude of Out-of-Network Billing for Emergency Department Visits**

Year	No. of Visits <sup>a</sup>	Visits With Out-of-Network Bill, No. (%) <sup>b</sup>	Potential Out-of-Network Responsibility, \$ <sup>c</sup>					
			Mean (SD)	10th	25th	50th	75th	90th
2010	1 458 291	470 978 (32.3)	220 (420)	0	5	107	300	575
2011	1 656 869	584 628 (35.3)	268 (483)	0	24	149	361	683
2012	1 833 907	691 592 (37.7)	326 (572)	0	42	191	448	795
2013	1 923 205	774 042 (40.2)	418 (651)	0	84	270	581	1001
2014	1 909 557	792 623 (41.5)	478 (733)	6	118	323	658	1108
2015	2 146 751	855 960 (39.9)	558 (809)	18	155	409	774	1272
2016	2 650 426	1 133 567 (42.8)	628 (865)	23	181	482	891	1364
Overall	13 579 006	5 303 390 (39.1)	419 (671)	0	73	266	588	1003

<sup>a</sup> Total annual emergency department visits to an in-network hospital.

<sup>b</sup> Number of visits to an in-network emergency department with at least 1 claim submitted by an out-of-network physician or medical transport service.

<sup>c</sup> Patient's responsibility for out-of-network services reported by percentiles and

defined as the difference between the physician or medical transport charge and the amount typically paid by the insurer for an in-network service. These amounts are in addition to any other out-of-pocket payments (eg, payments for deductible and coinsurance). All dollar values are adjusted to 2018 US\$.

**Table 2. Incidence and Magnitude of Out-of-Network Billing for Medical Transport Services and the 10 Most Common Physician Specialties for Emergency Department Visits**

Specialty	No. of Visits <sup>a</sup>	Visits With Out-of-Network Bill, No. (%) <sup>b</sup>	Potential Out-of-Network Responsibility, \$ <sup>c</sup>					
			Mean (SD)	10th	25th	50th	75th	90th
Emergency medicine	11 811 471	3 853 305 (32.6)	396 (382)	19	117	292	576	910
Radiology	7 286 182	1 319 676 (18.1)	115 (203)	11	20	49	150	294
Medical transport	1 661 978	1 422 134 (85.6)	244 (801)	0	0	25	296	704
Cardiology	1 537 176	321 230 (20.9)	64 (344)	7	15	25	58	96
Internal medicine	1 387 236	329 787 (23.8)	186 (308)	0	23	103	237	452
Family practice	1 026 329	206 147 (20.1)	255 (359)	0	32	132	347	682
Unknown	774 159	149 746 (19.3)	284 (425)	9	81	181	372	682
Pediatrics	221 995	18 656 (8.4)	323 (394)	0	23	178	565	761
General surgery	200 980	26 650 (13.3)	676 (2236)	0	40	157	439	1341
Anesthesiology	167 185	38 196 (22.8)	568 (855)	0	44	268	763	1504

<sup>a</sup> Total emergency department visits with at least 1 claim submitted by the given specialty.

<sup>b</sup> Total emergency department visits with at least 1 out-of-network claim submitted by the given specialty.

<sup>c</sup> Patient's responsibility for out-of-network services reported by percentiles and

defined as the difference between the physician or medical transport charge and the amount typically paid by the insurer for an in-network service. These amounts are in addition to any other out-of-pocket payments (eg, payments for deductible and coinsurance). All dollar values are adjusted to 2018 US\$.

a mean (SD) potential financial responsibility of \$244 (\$801); **Table 2** presents the 10 most commonly encountered specialties and **eTable 1** in the **Supplement** presents all specialties. Of patients receiving care from an emergency physician, 32.6% received an out-of-network bill (mean [SD] potential responsibility, \$396 [\$382]), as did nearly a quarter of patients receiving care from an internist (23.8%; mean [SD], \$186 [\$308]) or anesthesiologist (22.8%; mean [SD], \$568 [\$855]).

**Inpatient Admissions**

During the entire study period, 37.0% of inpatient admissions to in-network hospitals (2 019 922 of 5 457 981) resulted in at least 1 out-of-network bill, with the incidence of out-of-network billing increasing from 26.3% in 2010 (159 609 of 607 160) to 42.0% in 2016 (397 447 of 947 111;  $P < .001$ ) (**Table 3**). As for ED visits, the mean (SD) potential financial responsibility substantially increased during the study period, from \$804 (\$2456) in 2010 (median, \$285; IQR, \$30-\$794) to \$2040 (\$4967) in 2016 (median, \$984; IQR, \$325-\$2084). In 2016, the top decile of patients with out-of-network bills faced a potential liability of \$4112 or more.

Among the physician specialties with the most frequent billing for inpatient care, the incidence of out-of-network bill-

ing ranged from 0.8% for obstetrics and gynecology (mean [SD] potential responsibility, \$1228 [\$3457], median, \$293; IQR, 91-1075; see **Table 4** for 10 most commonly encountered specialties and **eTable 2** in the **Supplement** for all specialties) to 81.6% for ambulance services (mean [SD] potential responsibility \$424 [\$2176]; median, \$44; IQR, \$0-\$365).

**Distribution Across Hospitals**

The incidence of out-of-network billing for inpatient admissions across hospitals followed a bimodal distribution (**Figure**). For approximately half (1606 of 3296) of hospitals, the incidence was less than 10%. The incidence of out-of-network billing for ED visits was less than 10% for approximately one-quarter (1002 of 4028) of hospitals. By comparison, more than 90% of inpatient admissions resulted in an out-of-network bill at 500 hospitals (15.2% of all hospitals), and more than 90% of ED visits were accompanied by an out-of-network bill at 942 hospitals (23.3% of all hospitals).

**Subgroup and Sensitivity Analyses**

In a subgroup analysis, the incidence of out-of-network billing was lower for surgical admissions (30.9% vs 42.0%;

Table 3. Annual Incidence and Magnitude of Out-of-Network Billing for Inpatient Admissions

Year	No. of Admissions <sup>a</sup>	Admissions With Out-of-Network Bill, No. (%) <sup>b</sup>	Potential Out-of-Network Responsibility, \$ <sup>c</sup>					
			Mean (SD)	10th	25th	50th	75th	90th
2010	607 160	159 609 (26.3)	804 (2456)	0	30	285	794	1684
2011	573 457	175 610 (30.6)	990 (2876)	0	73	389	971	2060
2012	830 824	301 568 (36.3)	1277 (3899)	0	125	508	1194	2568
2013	867 523	338 715 (39.0)	1483 (4188)	16	192	653	1428	2950
2014	803 425	327 676 (40.8)	1731 (4698)	25	244	760	1682	3474
2015	828 481	319 297 (38.5)	1920 (5157)	35	291	853	1842	3791
2016	947 111	397 447 (42.0)	2040 (4967)	44	325	984	2084	4112
Overall	5 457 981	2 019 922 (37.0)	1574 (4382)	8	183	667	1538	3215

<sup>a</sup> Total annual inpatient admissions to an in-network hospital.

<sup>b</sup> Number of inpatient admissions with at least 1 claim submitted by an out-of-network physician or medical transport service.

<sup>c</sup> Patient's responsibility for out-of-network services reported by percentiles and

defined as the difference between the physician or medical transport charge and the amount typically paid by the insurer for an in-network service. These amounts are in addition to any other out-of-pocket payments (eg, payments for deductible and coinsurance). All dollar values are adjusted to 2018 US\$.

Table 4. Incidence and Magnitude of Out-of-Network Billing for Medical Transport Services and the 10 Most Common Physician Specialties for Inpatient Admissions

Specialty	No. of Admissions <sup>a</sup>	Admissions With Out-of-Network Bill, No. (%) <sup>b</sup>	Potential Out-of-Network Responsibility, \$ <sup>c</sup>					
			Mean (SD)	10th	25th	50th	75th	90th
Radiology	3 181 749	720 698 (22.6)	267 (759)	15	33	121	307	615
Emergency medicine	2 132 940	908 430 (42.6)	595 (575)	44	203	477	858	1267
Internal medicine	2 007 554	507 014 (25.3)	450 (1133)	9	65	206	483	999
Anesthesiology	1 961 192	378 239 (19.3)	1369 (1807)	0	233	794	1825	3362
Cardiology	1 701 819	333 769 (19.6)	328 (1438)	10	19	52	196	612
Unknown	1 115 844	214 992 (19.3)	544 (1489)	29	106	265	614	1136
Pathology	987 225	219 335 (22.2)	297 (542)	16	63	145	303	676
Medical transport	947 744	773 218 (81.6)	424 (2176)	0	0	44	365	832
Family practice	783 703	142 455 (18.2)	384 (1330)	0	49	148	364	798
Obstetrics & gynecology	760 049	6220 (0.8)	1228 (3457)	18	91	293	1075	1075

<sup>a</sup> Total inpatient admissions with at least 1 claim submitted by the given specialty.

<sup>b</sup> Total inpatient admissions with at least 1 out-of-network claim submitted by the given specialty.

<sup>c</sup> Patient's responsibility for out-of-network services reported by percentiles and

defined as the difference between the physician or medical transport charge and the amount typically paid by the insurer for an in-network service. These amounts are in addition to any other out-of-pocket payments (eg, payments for deductible and coinsurance). All dollar values are adjusted to 2018 US\$.

$P < .001$ ; eTable 3 in the Supplement), but the potential financial liabilities were higher (mean [SD] liability \$2406 [\$6108] vs \$914 [\$1962];  $P < .001$ ).

The sensitivity analyses performed to investigate potential mismeasurement of the potential financial liability for cases where the estimated potential financial liability was negative had qualitatively similar results to the main analysis (eTable 4 and eTable 5 in the Supplement). Sensitivity analyses that included emergency department visits where physician or ambulance service network status was unknown also had qualitatively similar results to the main analysis (eTables 6-9 in the Supplement). The analysis that was restricted to out-of-network billing by hospital-based physicians for elective inpatient admissions found a lower incidence overall of out-of-network billing (17.6% for the study period), with the incidence increasing from 13.1% to 20.5% of elective inpatient admissions during the study period (eTable 10 in the Supplement); by comparison, in the main analysis the overall incidence of out-of-network billing was 37.0%, and the incidence of out-of-network billing increased from 26.3% to 42.0% during the sample period. For patients who received an out-of-network bill, this analysis found potential financial responsibilities that were lower than in the main analysis (mean [SD], \$1190

[\$1965]; median, \$431; IQR, \$85-\$1557; main analysis mean [SD], \$1547 [\$4382]; median, \$667; IQR, \$183-\$1538).

## Discussion

In a national sample of US patients with private health insurance, the incidence of out-of-network billing at in-network hospitals substantially increased between 2010 and 2016, from 32.3% to 42.8% of ED visits and from 26.3% to 42.0% of inpatient admissions. Moreover, the potential financial consequences of out-of-network billing in both settings nearly doubled during this period, and the top 10% of patients faced liabilities of more than \$1000 for ED visits and more than \$3000 for inpatient care. Sensitivity analyses suggested a lower incidence of unanticipated out-of-network billing for elective inpatient admissions, but showed a similar increase during the study period, with potential financial liabilities for patients that were similar to those in the main analysis. Overall, our findings suggest a growing risk to patients of incurring burdensome unexpected out-of-network bills.

Our study builds on previous work by characterizing the incidence and magnitude of out-of-network billing for inpatient



admissions and for physicians other than emergency physicians. Previous studies<sup>11-13</sup> have found the incidence of out-of-network billing to be about 20% of ED visits, although one of these studies did not measure incidence directly<sup>13</sup>; by comparison, our estimate is 39%. The difference between these findings may reflect differences in the geographic area or time periods studied. In addition, some previous studies<sup>11,25</sup> only considered out-of-network billing by the attending emergency physician; our study, however, examined billing by all physician specialties and medical transport services. A recent report using an alternative source of commercial claims data (the Health Care Cost Institute) from 37 states and the District of Columbia in 2016 found that the state-level incidence of out-of-network billing for inpatient admissions ranged from 1.7% in Minnesota to 26.3% in Florida (the report did not characterize the amount of financial responsibility).<sup>15</sup>

From a policy perspective, a potential benefit of balance billing is that patients have flexibility to choose to receive care from out-of-network physicians. However, inherent to this benefit is patients' awareness that balance billing may occur and their willingness to pay the additional amount. Our findings are notable because out-of-network billing was common among medical transport services and hospital-based physicians (eg, emergency physicians, radiologists, and anesthesiologists) providing care at in-network hospitals. In such circumstances, patients could easily assume that the entire hospital team is in network and thus the balance billing may come as a surprise. Further, in these contexts, patients may have limited ability to choose an in-network physician or ambulance.

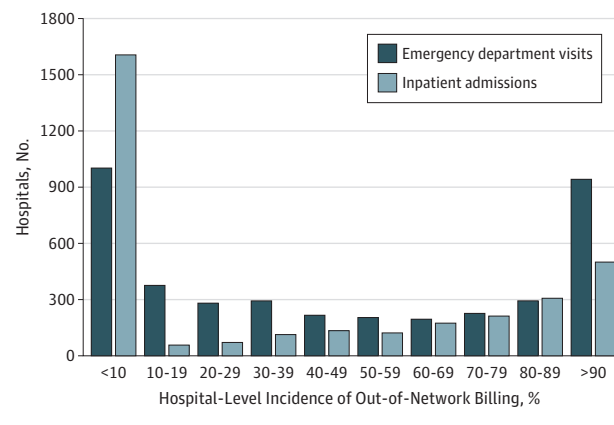
Even modest unexpected bills can create financial stress for patients. A recent survey found that 4 in 10 Americans would be unable to pay an unexpected expense of \$400 without selling something or borrowing money.<sup>27</sup> The median amounts for which patients in our study were sent balance bills (\$984 for inpatient admissions and \$482 for emergency visits in 2016) exceed that level. Further, the top decile of patients with out-of-network bills faced substantial potential financial responsibility: \$4112 for inpatient admissions and \$1364 for ED visits.

Because out-of-network bills most commonly originated from clinical services (ie, medical transport, emergency medicine) about which patients have little choice, policy solutions centered on disclosure and consent at the point of care may not meaningfully address a large part of the problems patients face.<sup>28</sup> Policies that limit the ability of physicians and medical transport services to balance bill patients—for example, by shifting some portion of the patient's responsibility to insurers—offer stronger protection. Even in the absence of such interventions, greater understanding of variations in out-of-network billing across hospitals may be helpful in identifying facilities whose financial strategy involves heavy reliance on out-of-network physicians to staff core services (ie, facilities where out-of-network billing is extremely common), which may allow insurers and other parties to better inform patients about the potential financial consequences of receiving care at these facilities.

### Limitations

Our study has limitations. First, unexpected out-of-network billing could not be isolated, although as previously noted, out-of-

Figure. Incidence of Out-of-Network Billing Across Hospitals, 2010-2016



Shown are the number of hospitals for which the incidence of out-of-network billing (defined as an emergency department visit or inpatient admission with at least 1 claim submitted by an out-of-network physician or medical transport service) fell within the given range.

network billing could easily be unexpected among patients who present at an in-network hospital, and previous work has found that most out-of-network billing in the inpatient setting is involuntary.<sup>29</sup> Second, the data did not include information on the proportion of balance-billed amounts that patients actually paid. Physicians and medical transport services may be willing to negotiate the amount owed, although there are limited data on how often patients are able to negotiate lower payments. One study found that only 19% of patients attempted to negotiate balance-billed amounts, and slightly more than half of patients who did so were successful in obtaining any reduction in the amount owed.<sup>30</sup> Moreover, these negotiations may not happen before the matter is sent to collections, which could jeopardize the patient's credit rating. Third, we excluded visits to out-of-network hospitals, where unexpected out-of-network billing would be harder to measure because patients may have specifically chosen the hospital and may have less expectation that physicians there would be in-network. Fourth, our analysis excluded approximately 20% of visits where the network status of at least 1 physician or medical transport service could not be determined, although subsequent sensitivity analyses including these visits showed qualitatively similar results. Fifth, our analysis may underestimate the extent of out-of-network billing, as it did not account for billing from sources other than physicians and medical transport services (eg, laboratory charges). Sixth, in estimating the potential financial liability, we used the national mean paid in-network for a given service, which while accurate, could underestimate or overestimate the potential financial liability for any individual patient. In addition, the data were limited to a sample of patients from a single private insurer.

### Conclusions

Our findings appear to support current efforts to strengthen legislative protections against out-of-network billing in circumstances that are likely to involve surprise bills.

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*Acquisition, analysis, or interpretation of data:* Sun, Mello, Moshfegh.

*Drafting of the manuscript:* Sun, Moshfegh.

*Critical revision of the manuscript for important intellectual content:* Mello, Moshfegh, Baker.

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