IMPORTANCE  Fraud and abuse contribute to unnecessary spending in the Medicare program, and federal agencies have prioritized fund recovery and the exclusion of health care practitioners who violate policy. However, the human costs of fraud and abuse in terms of patient health are unknown.

OBJECTIVE  To assess whether Medicare beneficiaries' receipt of health care services from fraud and abuse perpetrators (FAPs) is associated with worse health outcomes.

DESIGN, SETTING, AND PARTICIPANTS  Retrospective cross-sectional study comparing mortality and emergency hospitalization rates of 8204 patients treated by an FAP with those among patients treated by a randomly selected non-FAP in 2013. Known FAPs were identified from the December 2018 List of Excluded Individuals/Entities (LEIE) published by the Office of the Inspector General in the Department of Health and Human Services. Patients were identified in a 5% sample of Medicare claims data and were enrolled in the Fee-for-Service program.

EXPOSURES  Treatment by a health care professional subsequently excluded from Medicare for fraud, patient harm, or a revoked license.

MAIN OUTCOMES AND MEASURES  All-cause mortality between 2013 and 2015 and 2013 emergency hospitalizations.

RESULTS  A total of 8204 Medicare beneficiaries in the study sample (mean [SD] age, 69.2 [14.2] years; 58.2% female, and 23.0% nonwhite) saw an FAP for the first time in 2013. Of these, 5054 (61.6%) were treated by fraud perpetrators, 1157 (14.1%) by patient harm perpetrators, and 1193 (24.3%) by revoked license perpetrators. Compared with 296 298 beneficiaries treated by non-FAPs (mean [SD] age, 71.1 [12.4] years; 58.6% female, and 16.5% nonwhite), beneficiaries exposed to an FAP were more likely to be eligible for both Medicare and Medicaid (34.7% [2845 of 8204] vs 21.9% [64 989 of 296 298]; P < .001) and more likely to be disabled at an age younger than 65 years (27.2% [2231 of 8204] vs 18.6% [55 168 of 296 298]; P < .001). All FAP exposures were associated with higher mortality and emergency hospitalization rates after risk adjustment and propensity score weighting: for mortality, exposures to fraud FAPs were associated with an increase of 4.58 percentage points (95% CI, 2.02-7.13; P < .001); to patient harm FAPs, with an increase of 3.34 percentage points (95% CI, 1.40-5.27; P = .001); and to revoked license FAPs, with an increase of 3.33 percentage points (95% CI, 1.58-5.09; P < .001). Increases were similar for emergency hospitalization rates: for fraud FAP exposures, 3.24 percentage points (95% CI, 0.01-6.46; P = .049); for patient harm FAP exposures, 9.34 percentage points (95% CI, 6.02-12.65; P < .001); and for revoked license FAP exposures, 9.28 percentage points (95% CI, 6.43-12.13; P < .001).

CONCLUSIONS AND RELEVANCE  This study's findings suggest that receiving medical care from FAPs may be associated with significantly higher rates of all-cause mortality and emergency hospitalization after risk adjustment. Identifying and permanently removing FAPs from the Medicare program may be associated with improved beneficiary health in addition to financial savings.

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Medicare fraud and abuse, defined broadly by the Centers for Medicare & Medicaid Services as “any practice, either directly or indirectly, that results in unnecessary costs to the Medicare program,” includes illicit activities such as billing for unnecessary health care services or for services never provided, providing medically inappropriate services, practicing without a license, and unlawfully distributing controlled substances. In 2018, more than 47,000 health care professionals, including physicians, nurses, and aides, were barred from participating in federal health care insurance programs because of fraudulent or abusive activities. These activities have been estimated to cost Medicare between $30 billion and $140 billion annually.

Although Medicare fraud and abuse are typically viewed by policy makers as financial problems, fraud and abuse perpetrators (FAPs) engage in a number of activities that could also harm patient health. A recent study found that 46% of the physicians excluded from federal health care insurance programs were excluded primarily for compromising patient health or safety. In addition, many crimes prosecuted as fraud because they involve billing Medicare for unnecessary or unsanctioned services also jeopardize patients’ well-being. Recent fraud cases included some resulting in the patient’s death after untrained workers read radiographs and failed to detect lethal findings; distribution of opioids and unsafe or counterfeit medications; and provision of lucrative but medically contraindicated procedures.

Fraud and abuse perpetrators disproportionately treat minority, disabled, and low-income Medicare beneficiaries, which may contribute to health outcome disparities; however, to our knowledge, no previous study has investigated the possibility of an association between exposure to FAPs and health care outcomes. In this study, we estimated the direct patient harm associated with health care services provided by professionals who are subsequently found to be FAPs. Using Medicare claims data to link health care professionals who had been excluded from Medicare and Medicaid programs to the Medicare beneficiaries they treated prior to their exclusion, we compared 3-year, all-cause mortality and emergency hospitalizations among beneficiaries with 3-year, all-cause mortality and emergency hospitalizations among beneficiaries who were treated by non-FAPs. The study was approved by the institutional review board of the National Bureau of Economic Research. Because we used deidentified patient data, informed patient consent was not required.

Methods

Fraud and Abuse Perpetrators

We identified known FAPs from the December 2018 List of Excluded Individuals/Entities (LEIE) published by the Office of the Inspector General in the Department of Health and Human Services. This list includes all health care professionals, facilities, and employees excluded from federal health care insurance programs from January 2012 to December 2018. We restricted our sample of FAPs to the 1364 health care professionals who billed Medicare under their own National Provider Identifier number prior to their exclusion for one or more of the following offenses classified as fraud and abuse: fraud (including fraud, theft, embezzlement, breach of fiduciary responsibility, and financial crimes); patient harm or improper drug dispensing (crimes related to health care delivery or meeting mental, physical, or emotional patient needs, including through controlled substance distribution); and practicing with a license that was revoked or suspended over concerns about competence, performance, or integrity. We included health care professionals whose crimes triggered either mandatory or permissive exclusion from Medicare. The LEIE lists only the crime against the federal programs, although there may be additional harms to beneficiaries. Many FAPs excluded for fraud were billing for illicitly acquired or unnecessary prescription drugs, using untrained and poorly paid staff to deliver medical care, and cycling patients unnecessarily through hospitals and nursing homes to maximize revenue. We did not include in our study categories of professionals, such as facility administrators, home health aides, and health care business owners, who cannot be matched to individual patients.

Study Population

We performed a retrospective cohort study using Medicare claims data from a 5% sample of Medicare beneficiaries enrolled in the Fee-for-Service (FFS) program with at least 1 claim in 2012 and 2013. We first used Medicare Carrier Claims to identify FFS beneficiaries treated at least once by a subsequently excluded FAP to quantify the magnitude of FAP exposure. Since it takes time for fraud and abuse to be detected and adjudicated, we matched health care professionals from the LEIE to earlier years of Medicare claims filed when they were still treating patients.

To assess the association between exposure to FAPs and patient outcomes, we constructed a cohort of patients with at least 1 Medicare claim filed in 2013 and no claims filed in 2012 by a subsequently excluded FAP. This process provided a baseline year of data (2012) without FAP contact, allowing us to characterize the patients’ comorbidities. We compared this cohort with a group of beneficiaries (comparison group) who were treated by a clinician from a randomly selected pool of 25,000 clinicians who billed Medicare in 2013 and were not on the LEIE as of December 2018. To restrict our comparison group to Medicare beneficiaries who had the opportunity to be treated by an FAP, we drew

Key Points

**Question** Is receiving treatment from fraud and abuse perpetrators (FAPs) associated with adverse health events among Medicare beneficiaries?

**Findings** In this cross-sectional study of 8204 Medicare beneficiaries who received health care services from FAPs in 2013 and 296,298 who received care from non-FAPs, the 3-year, risk-adjusted mortality was 3.3 to 4.6 percentage points (13% to 23%) higher, and rates of emergency hospitalization in 2013 were 3.2 to 9.3 percentage points (11% to 30%) higher for FAP-treated patients compared with patients treated by nonperpetrators.

**Meaning** This study’s findings suggest that avoidance of Medicare FAPs may be associated with improvements in beneficiary health and longevity.
our random sample from clinicians who practiced in counties with 1 or more practicing FAPs. Since beneficiaries treated by FAPs are seeking medical care, we reasoned that they might be sicker than the typical person enrolled in Medicare. Thus, we included in our comparison group only patients who also had 1 or more Medicare claims filed in 2013. We excluded beneficiaries from the comparison group if they were also treated by an FAP.

Mortality, Emergency Hospitalizations, and Control Variables

The primary outcome of interest was all-cause mortality between January 2013 and December 2015. We also compared the 2 cohorts’ rates of emergency hospitalization (ie, inpatient admission from the emergency department) in 2013 to assess whether FAP-exposed beneficiaries were more likely than non-FAP-exposed beneficiaries to experience serious health events that could lead to death. We controlled for factors that could alter mortality beyond treatment by an FAP and that might be confounders. We identified comorbidity indicators from diagnosis codes appearing in the 2012 Carrier Claims data according to the method of Elixhauser et al.13 We also constructed a categorical variable for the number of claims the beneficiary had in 2012, with categories defined by the quartile of the total number of claims since beneficiaries with a larger number of visits to a health care professional in 2012 would have encountered additional opportunities to have an FAP become part of their care team in 2013. We used the Medicare Denominator Files from 2012 to 2015 to identify each beneficiary’s age, sex, race, and vital status at the end of 2015; monthly enrollment status in Medicare Advantage; and 2012 characteristics, including dual (Medicare/Medicaid) eligibility, Social Security Disability Insurance receipt, end-stage renal disease status, and county of residence. We excluded beneficiaries younger than 18 years.

Statistical Analysis

We used ordinary least squares regression to estimate the associations between treatment by a subsequently excluded FAP in 2013, mortality between 2013 and 2015, and 2013 emergency hospitalizations. Our regression models included control variables for beneficiary age, sex, and nonwhite race; indicators for disability before age 65 years, dual eligibility, and end-stage renal disease status; the quartile of the number of claims in 2012; and interactions between age and sex, sex and race, disability and race, and comorbidities assessed from 2012 claims. In all models, we included county indicators and a set of indicator variables for each month from January 2012 to December 2013 indicating whether the beneficiary was enrolled in Medicare Part B. With the exception of 2013 FFS enrollment indicators, all covariates were measured in 2012 prior to potential FAP exposure. We estimated separate models for each of the 3 types of FAP exposure (fraud, patient harm, and licensing violation), with the comparison group including all Medicare beneficiaries in the analysis sample who were not treated by any type of FAP in 2013.

In light of the strong sociodemographic differences between patients treated by FAPs and those treated by non-FAPs, we weighted all observations by the propensity to be treated by each type of FAP. We generated propensity scores by performing logistic regressions of 2013 FAP exposure on all of the control variables from our regression models, beyond county and measures of patient health and use of health care services in 2012, so that we could use the same weights in models comparing 2012 and 2013 health outcomes.

We first estimated models with a single exposure variable capturing any treatment by an FAP in 2013. For a second set of regressions, we added an indicator for beneficiaries with 2 or more visits with any FAP to test the hypothesis that more frequent contact with an FAP is associated with a higher rate of harm. To assess whether the severity of the violation committed by the FAP was associated with patient health outcomes, we also compared FAPs whose crime was severe enough to trigger a mandatory exclusion with those whose violations left them subject to permissive exclusion by the Department of Health and Human Services. We considered a 2-sided P value of less than .05 to indicate statistical significance and clustered the SEs at the level of the sampling FAP or non-FAP. All data management and analysis were performed in Stata, version 14 (StataCorp LLC).

We assessed the sensitivity of our results to the use of other outcome measures, including mortality between 2014 and 2015 only, alternative criteria for identifying the non–FAP-treated comparison group, excluding from both patient groups all beneficiaries enrolled in any Medicare Advantage plan in 2012 or 2013, including beneficiaries who were treated by 1 type of FAP in the unexposed group for the analyses of other FAP types, and logistic regression for the dichotomous outcome measure (see the eAppendix in the Supplement).

Because FAP exposure might have been nonrandom, we conducted a falsification test to see whether there were differences in patient health and use of health care services across the 2 groups of beneficiaries in 2012, the year before they received services from an FAP or non–FAP health care professional. Specifically, we compared emergency hospitalizations and number of health care visits in 2012. If differences in health were responsible for observed differences in post–FAP exposure outcomes, those same health differences should be observable in pre–FAP exposure data as well.

Results

In our 5% sample, we identified 22 782 FFS-enrolled Medicare beneficiaries who were treated by 1272 subsequently excluded FAPs in 2012 and 18 355 who were treated by 1039 FAPs in 2013. Extrapolating from these results, we estimated that 455 640 Medicare beneficiaries were treated by FAPs in 2012 and 367 100 in 2013, with approximately 639 160 unique beneficiaries exposed over the 2-year period. Of the patients treated by FAPs, 5054 (61.6%) were treated by fraud perpetrators, 1157 (14.1%) by patient harm perpetrators, and 1193 (24.3%) by revoked license perpetrators. Fraud FAPs in our sample billed Medicare for more patient visits in 2013 than other health care professionals in our sample and had the highest mean billing per beneficiary. Compared with non–FAPs, all FAP types were more likely to be generalists (Table 1).

After applying the sample restrictions, our cohort for the mortality and emergency hospitalization regression analyses
Table 1. Characteristics of Sample Health Care Professionals by FAP Status

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Non-FAPs (n = 22 504)</th>
<th>Fraud and Abuse Perpetrators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FAP (n = 384)</td>
<td>Patient Harm (n = 153)</td>
</tr>
<tr>
<td>Beneficiaries treated per health care professional in 2013, mean (SD), No.</td>
<td>380 (564)</td>
<td>535 (1330)</td>
</tr>
<tr>
<td>Medicare payment per beneficiary in 2013, mean (SD), $</td>
<td>285 (394)</td>
<td>695 (1496)</td>
</tr>
<tr>
<td>Generalists, %</td>
<td>21</td>
<td>40</td>
</tr>
<tr>
<td>Mandatory exclusion, %</td>
<td>NA</td>
<td>87</td>
</tr>
</tbody>
</table>

Abbreviations: FAP, fraud and abuse perpetrator; NA, not applicable.

a Fraud and abuse perpetrator status was identified using the List of Excluded Individuals and Entities published by the Office of the Inspector General in the Department of Health and Human Services.2 Data on health professionals’ characteristics were derived from the 2013 summary of provider utilization and payment data compiled by the Centers for Medicare & Medicaid Services.14

Table 2. Characteristics of Medicare Beneficiaries by New Exposure to Fraud and Abuse in 2013 Status

<table>
<thead>
<tr>
<th>Beneficiary Health Care Outcomes and Baseline Characteristics</th>
<th>Non-Propensity Weighted</th>
<th>Propensity Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FAP Exposure (n = 296 298)</td>
<td>Any FAP Exposure (n = 8204)</td>
</tr>
<tr>
<td>Health outcomesb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2015 Mortality</td>
<td>19.6</td>
<td>25.0</td>
</tr>
<tr>
<td>2014-2015 Mortality</td>
<td>12.3</td>
<td>15.7</td>
</tr>
<tr>
<td>2012 Emergency hospitalization</td>
<td>18.9</td>
<td>22.2</td>
</tr>
<tr>
<td>2013 Emergency hospitalization</td>
<td>30.1</td>
<td>38.3</td>
</tr>
<tr>
<td>Matching covariates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>58.6</td>
<td>58.2</td>
</tr>
<tr>
<td>Age, mean (SD), y</td>
<td>71.1 (12.4)</td>
<td>69.2 (14.2)</td>
</tr>
<tr>
<td>Nonwhite race</td>
<td>16.5</td>
<td>23.0</td>
</tr>
<tr>
<td>Disability at age &lt;65 y</td>
<td>18.6</td>
<td>27.2</td>
</tr>
<tr>
<td>End-stage renal disease</td>
<td>1.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Medicare/Medicaid dual eligibility</td>
<td>21.9</td>
<td>34.7</td>
</tr>
<tr>
<td>Enrollment in FFS in 2012-2013, mean (SD), mo</td>
<td>23.7 (2.1)</td>
<td>23.4 (3.0)</td>
</tr>
</tbody>
</table>

Additional control variables, mean (SD)

| Claims in 2012b                                    | 36.4 (35.7)            | 37.4 (17.6)        | .02                     | 38.4 (38.0)        | 36.4 (35.7)       | .14                 |
| Non-FAP claims in 2013b                              | 46.2 (41.7)            | 51.9 (49.7)        | <.001                   | 52.9 (49.3)        | 46.2 (41.8)       | <.001               |
| Elixhauser comorbidities15                           | 3.5 (2.6)              | 3.7 (2.7)          | <.001                   | 4.3 (3.1)          | 3.9 (2.9)         | <.001               |

Abbreviations: FAP, fraud and abuse perpetrator; FFS, Fee-for-Service.

a FAP status was identified using the List of Excluded Individuals and Entities published by the Office of the Inspector General, Department of Health and Human Services.2 Data on health professionals’ characteristics were derived from the 2013 summary of provider utilization and payment data compiled by the Centers for Medicare & Medicaid Services.14

b Data are percentages unless otherwise indicated. Data were derived from a 5% sample of Medicare Carrier Claims for 2012-2013 and from Medicare Denominator Files for 2012-2015. Characteristics were measured in 2012 unless otherwise noted. Analyses compared all beneficiaries in a 5% random sample of Medicare claims with beneficiaries who were not treated by known FAPs in 2012 or 2013. The sample was restricted to beneficiaries who did not see a known FAP in 2012. Matching covariates were included in propensity scores and used as regression control variables.

Association Between Fraud and Abuse Perpetrators and Medicare Beneficiary Health Outcomes

Original Investigation Research

Table 2. Characteristics of Medicare Beneficiaries by New Exposure to Fraud and Abuse in 2013 Status

Included 8204 Medicare beneficiaries treated by 836 FAPs. Beneficiaries had a mean (SD) age of 69.2 (14.2) years; this cohort was 58.2% female (n = 4775) and 23.0% nonwhite (n = 1887) (Table 2). Our reference cohort included 296 298 beneficiaries who were not treated by known FAPs in 2012 or 2013. This group had a mean (SD) age of 71.1 (12.4) years, was 58.6% female (n = 173 631), and was 16.5% nonwhite (n = 48 889). Compared with beneficiaries treated by non-FAPs, those treated by FAPs were markedly more likely to be dually (Medicare/Medicaid) eligible (2845 [34.7%] vs 64 989 [21.9%]; P < .001) and disabled with age younger than 65 years (2231 [27.2%] vs 55 168 [18.6%]; P < .001). After propensity score weighting, there were no statistically significant differences in the sociodemographic characteristics of beneficiaries treated by FAPs vs those treated by non-FAPs (Table 2).

Raw mortality and emergency hospitalization rates were considerably higher among those treated by FAPs (2013-2015 mortality, 25.0% vs 19.6% for those treated by non-FAPs; P < .001; 2013 emergency hospitalizations, 38.3% vs 30.1%; P < .001). Adjustments for sociodemographic differences and comorbidities identified in 2012 attenuated but did not eliminate the differences in mortality and emergency hospitalizations associated with FAP treatment (Figure 1 and eTable 1 in the Supplement as well as Figure 2 and eTable 2 in the Supplement). Mortality among patients exposed to FAP fraud was 17.3% higher (percentage point increase, 4.58; 95% CI, 2.02-7.13; P < .001); among those exposed to patient harm, 13.7% higher (percentage point increase, 3.34; 95% CI, 1.40-5.27; P < .001); and among those exposed to license violations, 14.8% higher (percentage point increase, 3.33; 95% CI, 1.58-5.09; P < .001) (Figure 1). Mortality differences were
Although 2012 emergency hospitalization rates were higher for patient harm, and 9.28 (95% CI, 6.43-12.13; P = .049) after exposure to those excluded because their licenses were revoked (Figure 2).

Having multiple FAP exposures was not associated with additional differences in mortality beyond those observed among beneficiaries with a single exposure, but it was associated with lower rates of emergency hospitalization for patients of FAPs excluded for fraud (Table 3). These results might reflect financial crimes or the inability of sicker beneficiaries to return to an FAP.

Our results were not sensitive to alterations in model specifications, control variables, or definitions of FAP and non-FAP exposures. Our estimates of association between FAP exposure and subsequent mortality and emergency hospitalization rates were consistent across all of the robustness checks previously described (eTable 3 in the Supplement). In addition, we found no association between beneficiary exposure in 2013 to health care professionals later excluded for fraud or a revoked license and 2012 emergency hospitalization and fewer 2012 claims for fraud- and patient harm-exposed beneficiaries, suggesting that the post-FAP-exposure mortality and emergency hospitalization results are not advanced by unmeasured differences in beneficiaries’ pre-FAP exposure health (eTable 4 in the Supplement). Although 2012 emergency hospitalization rates were higher for beneficiaries exposed in 2013 to FAPs excluded for patient harm, the difference was much smaller in magnitude before than after FAP exposure (2.9 percentage points vs 9.35 percentage points, P < .001).

Based on our mortality models, we estimate that exposure to known FAPs may have contributed to an additional 6700 premature deaths among Medicare beneficiaries enrolled in the FFS program in 2013. These deaths represent a loss of 98 500 life-years (95% CI, 44 000-153 500 life-years), with an estimated value of $4.9 billion to $14.8 billion, using a minimum valuation of $50 000 per life-year to a maximum valuation of $150 000 (eTable 5 in the Supplement).

Discussion

The results of this quantitative assessment of patient harms associated with Medicare fraud and abuse suggest that Medicare beneficiaries treated by known FAPs may be more likely to die and more likely to experience emergency hospitalization within 3 years after this exposure than a comparison group of beneficiaries who did not have contact with FAPs. Fraud and abuse perpetrators treated nearly 1 million Medicare beneficiaries annually in recent years. The exposed beneficiaries were more likely to be nonwhite, dually eligible, and disabled than those treated by FAPs, although these demographic differences did not explain the mortality gap.

There are 2 possible interpretations of our results. The first is that FAPs engage in activities that directly jeopardize patient health and lead to premature mortality among the patients.
they treat. This explanation is consistent with numerous Federal Bureau of Investigation and Department of Justice reports of FAP crimes that investigators directly linked to patient deaths, such as using untrained staff to perform medical duties, falsifying medical records with incorrect diagnoses, cycling patients across facilities to maximize reimbursement, and illegally distributing prescription medication and counterfeit chemotherapy.15-19

However, our study was observational, and we cannot determine whether the observed mortality differences are attributable to FAP behavior, unobserved characteristics of Medicare beneficiaries treated by FAPs, or a combination of these factors. Although we used propensity score weights that minimized differences in observable characteristics across FAP-exposed and nonexposed beneficiaries and restricted our comparisons to beneficiaries living in geographic proximity to FAPs, there may be additional unobserved differences between the 2 groups that explain the mortality differences. For example, low-income patients with food insecurity might seek out FAPs who provide financial kickbacks for the use of their Medicare number for sham billing purposes or who buy back diabetic test strips for resale. In this scenario, the mortality differences we found could reflect sick and vulnerable Medicare beneficiaries clustering around FAPs who involve beneficiaries in illicit activities. The negligible differences in 2012 emergency hospitalizations and office visits suggest that any unobserved factor that explains the differences in postexposure health would have had to emerge around the same time as the FAP exposure, which is unlikely.

Both interpretations are concerning, particularly given the known actions of FAPs that directly compromised patient health

### Table 3. Percentage Point Differences in Medicare Beneficiaries’ 3-Year, All-Cause Mortality and Emergency Hospitalization Rates Associated With Exposure to FAPs in 2013a

<table>
<thead>
<tr>
<th>Outcome Measure by Type of Exposure</th>
<th>Beneficiaries Affected by Outcome, No. (%)</th>
<th>Absolute Rate Increaseb</th>
<th>Percentage Point Change (95% CI)</th>
<th>P Value</th>
<th>Intensity of FAP Exposure</th>
<th>Percentage Point Change (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mortality in 2013-2015</strong></td>
<td></td>
<td></td>
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<tr>
<td>Fraud (n = 301 186)c</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any FAP visit</td>
<td>1291 (26.4)</td>
<td>4.58 (2.02 to 7.13)</td>
<td>&lt;.001</td>
<td>3.47 (0.75 to 6.18)</td>
<td>.01</td>
<td>2.13 (−1.23 to 5.49)</td>
<td>.22</td>
</tr>
<tr>
<td>Multiple FAP visits</td>
<td>726 (26.9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No FAP visits</td>
<td>58 050 (19.6)</td>
<td>0 [Reference]</td>
<td>0 [Reference]</td>
<td></td>
<td></td>
<td>0 [Reference]</td>
<td></td>
</tr>
<tr>
<td>Patient harm (n = 297 549)d</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any FAP visit</td>
<td>304 (24.3)</td>
<td>3.34 (1.40 to 5.27)</td>
<td>.001</td>
<td>1.99 (−0.95 to 4.94)</td>
<td>.18</td>
<td>2.88 (−2.16 to 7.93)</td>
<td>.26</td>
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<tr>
<td>Multiple FAP visits</td>
<td>161 (28.2)</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>No FAP visits</td>
<td>58 050 (19.6)</td>
<td>0 [Reference]</td>
<td>0 [Reference]</td>
<td></td>
<td></td>
<td>0 [Reference]</td>
<td></td>
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<tr>
<td>Revoked license (n = 298 486)e</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Any FAP visit</td>
<td>493 (22.5)</td>
<td>3.33 (1.58 to 5.09)</td>
<td>&lt;.001</td>
<td>2.70 (0.28 to 5.12)</td>
<td>.03</td>
<td>1.56 (−2.62 to 5.75)</td>
<td>.46</td>
</tr>
<tr>
<td>Multiple FAP visits</td>
<td>208 (23.4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No FAP visits</td>
<td>58 050 (19.6)</td>
<td>0 [Reference]</td>
<td>0 [Reference]</td>
<td></td>
<td></td>
<td>0 [Reference]</td>
<td></td>
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<tr>
<td><strong>Emergency Hospitalizations in 2013</strong></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fraud (n = 301 186)c</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any FAP visit</td>
<td>1760 (36.0)</td>
<td>3.24 (0.01 to 6.46)</td>
<td>.049</td>
<td>6.46 (2.26 to 10.65)</td>
<td>.003</td>
<td>−6.18 (−9.82 to −2.54)</td>
<td>.001</td>
</tr>
<tr>
<td>Multiple FAP visits</td>
<td>898 (18.4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No FAP visits</td>
<td>89 250 (30.1)</td>
<td>0 [Reference]</td>
<td>0 [Reference]</td>
<td></td>
<td></td>
<td>0 [Reference]</td>
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<tr>
<td>Patient harm (n = 297 549)d</td>
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<td></td>
</tr>
<tr>
<td>Any FAP visit</td>
<td>508 (40.6)</td>
<td>9.34 (6.02 to 12.65)</td>
<td>.001</td>
<td>10.3 (5.30 to 15.17)</td>
<td>&lt;.001</td>
<td>−1.92 (−8.53 to 4.68)</td>
<td>.57</td>
</tr>
<tr>
<td>Multiple FAP visits</td>
<td>223 (18.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No FAP visits</td>
<td>89 250 (30.1)</td>
<td>0 [Reference]</td>
<td>0 [Reference]</td>
<td></td>
<td></td>
<td>0 [Reference]</td>
<td></td>
</tr>
<tr>
<td>Revoked license (n = 298 486)e</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any FAP visit</td>
<td>880 (40.2)</td>
<td>9.28 (6.43 to 12.13)</td>
<td>&lt;.001</td>
<td>8.59 (5.73 to 11.44)</td>
<td>.01</td>
<td>1.71 (−2.51 to 5.93)</td>
<td>.43</td>
</tr>
<tr>
<td>Multiple FAP visits</td>
<td>362 (16.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No FAP visits</td>
<td>89 250 (30.1)</td>
<td>0 [Reference]</td>
<td>0 [Reference]</td>
<td></td>
<td></td>
<td>0 [Reference]</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation: FAP, fraud and abuse perpetrator.

a Based on a comparison of all beneficiaries in a 5% random sample of national Medicare claims data who were treated by 1 or more known FAPs in 2013 with beneficiaries seen by a random sample of non-FAP health care professionals in 2013 and with no FAP exposure. The sample was restricted to Medicare Fee-for-Service beneficiaries who did not receive health care services from a health care professional in 2012 who was subsequently identified as a Medicare FAP.

b Absolute rate increase indicates the change in the probability that a beneficiary would die or be hospitalized on an emergency basis by 2015 after adjustment for sex, race, and age categorical variables in 5-year bins; dual eligibility status in 2012; younger than 65 years and disabled status; end-stage renal disease status; Elixhauser comorbidities; and interactions between sex and age, sex and race, and disability and race. All models included indicators for the quartile of the number of claims in 2012, indicators for each month of Medicare Fee-for-Service enrollment in 2012-2013, and county indicators as well as weighting for propensity to be treated by an FAP. Ninety-five percent CIs and P values are based on SEs clustered at the health care professional level.

c Any FAP exposure/any FAP visit indicates that the beneficiary had at least 1 claim in 2013 associated with health care services provided by a known FAP. Multiple FAP visits means that the beneficiary had more than 1 claim associated with a known FAP; this beneficiary group was analyzed as a subset of the group with any FAP exposure.

d Absolute rate intensity indicates the change in the probability that a beneficiary would die or be hospitalized on an emergency basis by 2015 after adjusting for all potential confounders.

e Any FAP exposure/any FAP visit indicates that the beneficiary had at least 1 claim in 2013 associated with health care services provided by a known FAP. Multiple FAP visits means that the beneficiary had more than 1 claim associated with a known FAP; this beneficiary group was analyzed as a subset of the group with any FAP exposure. Full model results are found in eTable 1 in the Supplement.
and safety. Our findings suggest that the benefits to the patient and to society of removing FAPs from practice may be greater than previously appreciated given the possibility of averting hospitalizations and deaths. Furthermore, coordination between the Centers for Medicare & Medicaid Services and investigative agencies could lead to strategies to identify Medicare beneficiaries requiring additional medical or social service intervention.

Our study contributes to a growing body of work highlighting the association of patients’ choice of health care professionals with disparities in health outcomes.20-25 Previous research has shown that racial and ethnic minority populations and low-income patients are more likely to use lowerperforming health care professionals, hospitals, and nursing homes across a range of quality metrics. The results of our study suggest that nonwhite, dually eligible, and disabled Medicare beneficiaries are also more likely to be treated by health care professionals whose actions lead to Medicare exclusion and possibly more likely to be harmed by this exposure.

**Limitations**

Our study has several limitations. We were able to classify health care professionals as FAPs only if they had been successfully identified and excluded from Medicare programs. Thus, our sample of non–FAP health care professionals likely includes some FAPs who had not yet been detected. Because their patients would have been included in our comparison group, our results might be biased against an association between FAP exposure and mortality, resulting in a lower bound estimate. Second, our classification of FAP types relies on the LEIE designation. Although this designation reflects the underlying conduct of health care professionals, it may also be a result of prosecutorial priorities. Third, our patient sample was limited to Medicare FFS beneficiaries, although FAPs likely treat patients with other sources of insurance as well. However, FFS patients accounted for nearly 30% of out-patient visits in the United States in 2015, and our results would still represent nontrivial harms associated with fraud and abuse if no other patients were treated by FAPs.26 Last, additional harms may have been caused by nonclinical staff who also were excluded for fraud and abuse but who could not be directly linked to the patients in their care. Thus, our results represent a lower bound estimate of the health outcomes associated with exposure to fraud and abuse.

The observational nature of our study precludes the identification of causal effects of FAP exposure. However, our baseline data suggest that both groups of beneficiaries had similar use of health care services prior to FAP exposure. Risk-adjusted mortality rates were highest among beneficiaries with multiple FAP visits, and emergency hospitalization rates sharply increased following FAP exposure.

**Conclusions**

This study’s findings suggest that receiving medical care from a health care professional subsequently excluded from Medicare may be associated with significantly higher rates of all-cause mortality and emergency hospitalization. Identifying and permanently removing FAPs from the Medicare program may be associated with improved beneficiary health in addition to financial savings.
The Human Costs of Medicare Fraud and Abuse

Joseph S. Ross, MD, MHS

The Centers for Medicare & Medicaid Services define Medicare fraud as knowingly submitting false claims to improperly obtain federal health care payments, as well as knowingly soliciting, receiving, or paying remuneration (eg, kickbacks, bribes, or rebates) to induce or reward referrals for items or services that are eligible for reimbursement by federal health care programs. Medicare abuse is defined as practices that may directly or indirectly result in unnecessary costs to the Medicare program, including providing patients with medically unnecessary services, as well as fraudulent billing practices such as upcoding. These activities are both illegal and unethical, costing the Medicare program, and thus the broader public, billions of dollars annually. To date, attention to these activities has been driven predominantly by the financial losses incurred.

In this issue of JAMA Internal Medicine, Nicholas and colleagues clarify the human costs of Medicare fraud and abuse. Using information from the Medicare claims database and from the Office of the Inspector General, they compared Medicare beneficiaries who received services from health care professionals later excluded from the program because of fraud or abuse with a reference group of beneficiaries who received services from physicians who were not later excluded on grounds of fraud or abuse. The raw, unadjusted data showed that the first group was more vulnerable and disadvantaged overall than the group that did not receive care from fraud and abuse perpetrators. Moreover, even after sophisticated propensity adjustment methods were applied, the results showed that patients who received care from a fraud and abuse perpetrator experienced higher rates of mortality and emergency hospitalization regardless of the type of fraud or abuse perpetrated. Importantly, rates of emergency hospitalization among these patients were no different in the year prior to their receiving health care services from fraud and abuse perpetrators.

The federal government has several avenues it can pursue when health care professionals are suspected of fraud and abuse, in order to exclude them from future participation in federal health care programs and recover financial costs. But the harms are not only financial. Patients may have received substandard medical care, which carries risks of harm, particularly for those who are vulnerable and disadvantaged. Nicholas and colleagues are commending for showing us the human costs of Medicare fraud and abuse and the associated harm incurred by beneficiaries.

Conflict of Interest Disclosures: None reported.


Original Investigation Research

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