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A High Risk of Hospitalization Following Release From Correctional Facilities in Medicare Beneficiaries:

A Retrospective Matched Cohort Study, 2002 to 2010

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Abstract

IMPORTANCE—Little is known about the risk of individuals who are released from correctional facilities, a time where their may be discontinuity in care.

OBJECTIVE—To study the risk for hospitalizations among former inmates soon after their release from correctional facilities.

DESIGN—Retrospective cohort study.

PARTICIPANTS—Data from Medicare administrative claims for 110 419 fee-for-service beneficiaries who were released from a correctional facility from 2002 through 2010 and controls matched by age, sex, race, Medicare status, and residential zip code.

MAIN OUTCOMES AND MEASURES—Hospitalization rates and specifically those for ambulatory care–sensitive conditions 7, 30, and 90 days after release.

RESULTS—Of 110 419 released inmates, 1559 individuals (1.4%) were hospitalized within 7 days after release; 4285 individuals (3.9%) within 30 days; and 9196 (8.3%) within 90 days. The odds of hospitalization was higher for released inmates compared with those of matched controls (within 7 days: odds ratio [OR], 2.5 [95% CI, 2.3-2.8]; within 30 days: OR, 2.1 [95% CI, 2.0-2.2]; and within 90 days: OR, 1.8 [95% CI, 1.7-1.9]). Compared with matched controls, former inmates were more likely to be hospitalized for ambulatory care–sensitive conditions (within 7 days: OR,

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1.7 [95% CI, 1.4-2.1]; within 30 days: OR, 1.6 [95% CI, 1.5-1.8]; and within 90 days: OR, 1.6 [95% CI, 1.5-1.7]).

CONCLUSIONS AND RELEVANCE—About 1 in 70 former inmates are hospitalized for an acute condition within 7 days of release, and 1 in 12 by 90 days, a rate much higher than in the general population.

Correctional health care systems are constitutionally responsible for health care while patients are incarcerated but not on release.[1] As a result, individuals leave a system in which their care is provided and access is guaranteed to one with considerable barriers to access. Many people experience this transition in the United States, where 1 of 100 adults are incarcerated in jail (correctional facilities that house individuals awaiting adjudication of a crime or serving sentences of ≤1 year) or prison (facilities that house individuals serving sentences of >1 year).[2] Almost all of these individuals are eventually released to the community, signaling a vulnerable period that may be amenable to intervention.

Released inmates have high rates of poverty, unemployment, and homelessness.[3,4] There are estimates that 80% of released individuals have chronic medical, psychiatric, or substance abuse problems, yet only 15% to 25% report visiting a physician outside of the emergency department in the first year after release.[4,5] At the time of release, few inmates are discharged with any medications or referred for primary care or substance abuse or mental health treatment.[6-8] In addition, all but 5 states terminate rather than suspend Medicaid and Medicare outpatient coverage for inmates if they have been incarcerated for more than 12 months, so that on release they are uninsured and must actively seek this coverage through administrative channels.[9]

Several studies have shown a worsening of health status[10,11] and high risk of death among inmates recently released from prison[3,12,13] or jail.[14] But the risk of hospitalizations following release has not been characterized, in spite of potential implications for community health care systems, particularly safety net hospitals. We used administrative data from the Centers for Medicare & Medicaid Services (CMS) to estimate the rates of hospitalizations and deaths of Medicare beneficiaries recently released from correctional facilities. Although incarcerated populations are predominantly young men, the number of older and infirm individuals who are incarcerated has been steadily increasing, justifying the focus on the Medicare population.[15,16] We hypothesized that hospitalizations that are preventable with regular engagement in primary care (including asthma, hypertension, and diabetes mellitus) would be higher among recently released inmates compared with the general population given their barriers to accessing community primary care.

Methods

We conducted a retrospective cohort study of Medicare feefor-service beneficiaries released from US jails and prisons between January 1, 2002, and December 31, 2010, to compare their risk of hospitalization and death on release with a matched population of Medicare beneficiaries. We identified Medicare beneficiaries who had been incarcerated and released using 3 variables in Medicare's enrollment database, which indicate whether a beneficiary has ever been incarcerated and start and end dates of each incarceration episode. The CMS

systematically has collected this information since 2002 because the Social Security Administration prohibits the use of federal funds to cover treatment costs incurred by inmates.[9] Each day the Social Security Administration sends the CMS a list of beneficiaries who have been incarcerated. The CMS then sends an updated file monthly of the incarcerated beneficiaries back to the Social Security Administration to obtain the exact dates of incarceration. These dates are provided directly by correctional facilities, which receive incentive payments ($200-$400 per inmate) to report individuals who are receiving Social Security income or Social Security disability income at the time of incarceration.[17] All federal prisons and almost 80% of state prisons and local jails participate in the Social Security Administration program, which incentivizes the reporting of inmates,thusstrengtheningtheaccuracyofourmeasurement.[18] Incarceration events could have included both short jail terms and longer prison terms.

After identifying Medicare beneficiaries who had been incarcerated and released between 2002 and 2010, we used a data crosswalktolinkthesedatawiththeMedicareDenominatorFile and the Medicare Provider Analysis and Review (MedPAR), which include demographic information, principal diagnosis, and procedure codes for all hospitalizations and dates of hospitalizations and deaths for all beneficiaries. The matching rate using this crosswalk was nearly a 100% match, with less than 0.2% of beneficiaries who were incarcerated not matched to the MedPAR file.

Study Cohort and Baseline Characteristics

We identified 144 323 Medicare fee-for-service beneficiaries who had been incarcerated and released from a correctional facility. Released inmates are more likely to be young, male, black, of low socioeconomic status, and eligible for Medicare owing to disability compared with the general population of Medicare beneficiaries.[4] Given these differences, we created a comparison group in the following way. For each beneficiary who was incarcerated, we used the individual's year of release from a correctional facility and found beneficiaries in that same year who had never been incarcerated with the same age, sex, race (white, black, other), residential zip code, and Medicare status (including disability, end-stage renal disease [ESRD], and/or age ≥65 years). We ascertained age, sex, race, residential zip code, and Medicare status from the Medicare enrollment database. For example, if a Medicare beneficiary was released from a correctional facility in 2002, we randomly matched that person to a beneficiary who was not incarcerated between 2002 and 2010 and who was a Medicare beneficiary in 2002. Once a beneficiary had been matched, she or he is no longer eligible to be matched again. If the beneficiary was incarcerated more than once, we included the most recent incarceration in these analyses. We found a match for 110 419 released inmates (77%). Our matching procedure created a cohort balanced by covariates and created a match for only 77% of incarcerated Medicare beneficiaries. Those for whom we identified a matched control compared with those for whom we did not identify a matched control were more likely to be white (66% vs 42%; $P < .001$), older (mean [SD] age, 48.1 [12.3] years vs 39.6 [12.6] years; $P < .001$) or live in a residential zip code with more than 7 released inmates (79% vs 53%; $P < .001$). However, unmatched incarcerated beneficiaries were no more likely to be hospitalized within 30 or 90 days of release than

those who were matched (within 30 days: 3.9% vs 3.9%; $P = .95$; within 90 days: 8.4% vs 8.3%; $P = .92$).

Primary Outcomes

The primary study outcomes were hospitalization rates at different time intervals: within 7 days, within 30 days, and within 90 days after release from a correctional facility. For those never incarcerated, we used the date of release of the matched beneficiary to define these time intervals. We also calculated mortality rates 30 days and 90 days after release for the matched cohort. The MedPAR database includes primary diagnoses for each hospitalization, classified using the International Classification of Diseases, Ninth Revision. To identify potentially preventable hospitalizations, we applied the Agency of Health-care Research and Quality's Prevention Quality Indicators (PQI) to categorize the primary diagnoses of hospitalizations. These are population-based measures that can be used with hospital inpatient discharge data to identify quality of care for "ambulatory care–sensitive conditions," ones for which primary medical care can potentially prevent the need for hospitalization or for which early intervention can prevent more severe disease.[19,20] Ambulatory care–sensitive conditions include uncontrolled diabetes mellitus, short- and long-term complications of diabetes mellitus, lower extremity amputation in patients with diabetes mellitus, perforated appendix, chronic obstructive pulmonary disease, asthma in younger and older adults, hypertension, heart failure, dehydration, bacterial pneumonia, urinary tract infection, and angina without procedure. We obtained the dates of death from the Medicare Denominator File, which has been used for CMS measure development and public reporting.

Statistical Analysis

We described the distribution of baseline characteristics among beneficiaries released from correctional facilities. Beneficiaries were stratified by age (<40 years, 40 to <50 years, 50 to <60 years, 60 to <65 years, 65 to <70 years, 70 to <75 years, and ≥75 years), sex, race (white, black, other), and Medicare status (≥65 years without ESRD, ≥65 years with ESRD, disabled without ESRD, disabled with ESRD, and ESRD only). We used McNemar test to compare the 2 groups in the matched cohort in each of the hospitalization and mortality outcomes and used conditional logistic regression models to calculate the odds ratio (OR) and 95% confidence intervals.[21] We used Kaplan-Meier survival curves for our event-free analyses to compare time with the first hospitalization and death between the 2 matched groups after release. Data were censored at the time of death or the end of the observation period. Finally, we compared hospitalizations with the specified diagnosis codes between the 2 groups and examined whether being released from a correctional facility was associated with different risks for hospitalizations for ambulatory care–sensitive conditions compared with the matched control using McNemar tests and conditional logistic regression. Statistical significance was set at $P = .05$ using 2-sided tests. We used SAS software (version 9.3) for all analyses. Institutional review board review and approval were obtained through the Yale University human investigation committee. Medicare data were protected through a data use agreement with CMS.

Results

Baseline Characteristics

The mean (SD) age at release was 48.1 (12.3) years (range, 19-93 years). Most released inmates were male (83.7%) and white (65.8%) and qualified for Medicare by receiving disability income through the Social Security Administration (85.0%). The remainder qualified because they were 65 years or older (14.8%) or had ESRD (0.02%). The mean (SD) length of incarceration was 0.9 (1.2) years (range, 0-10.9 years) (Table 1).

Hospitalizations After Release From a Correctional Facility

A week after release from a correctional facility, 1.4% of released inmates were hospitalized compared with 0.6% of the control group. Released inmates had a 2.5-times higher odds of being hospitalized compared with the control group (OR, 2.5 [95% CI, 2.3-2.8]) (Table 2). A month following release, released inmates still had a 2-times higher odds of being hospitalized compared with the control group (OR, 2.1 [95% CI, 2.0-2.2]); nearly 4% of released inmates were hospitalized compared with 2% of the demographically matched population. Between 30 and 90 days, another 4% of former inmates were hospitalized compared with another 3% of the matched control group ($P < .001$) (Table 2). During the first 90 days after release, patients released from a correctional facility had 1.8-times higher odds of being hospitalized compared with the matched control (OR, 1.8 [95% CI, 1.7-1.9]). We found statistically significantly higher rates of hospitalizations among patients recently released from a correctional facility compared with the control group in all categories of age, race, sex, or Medicare status, with the exception of those with ESRD (Table 3). We found that inmates who were incarcerated for 1 year or more were less likely to be hospitalized 30 days following release compared with those incarcerated for less than 1 year (3.2% vs 4.1%; $P < .001$). In event-free analyses, former inmates were more likely to be hospitalized compared with the control group within 1 year following release (Figure, A).

At 7 days following release from a correctional facility, patients had a 1.7-times higher odds of being hospitalized owing to any ambulatory care–sensitive condition compared with the matched control group (OR, 1.7 [95% CI, 1.4-2.1]) (Table 2). A higher proportion of released inmates were hospitalized for short-term complications of diabetes mellitus and lower extremity amputation compared with the matched control group (eTable 1 in the Supplement). At 30 days after release, patients released from a correctional facility still had 1.6-times higher odds of being hospitalized owing to an ambulatory care– sensitive condition compared with the matched control group (OR, 1.6 [95% CI, 1.5-1.8]). A higher proportion of released inmates were hospitalized for complications of diabetes mellitus, chronic obstructive pulmonary disease, asthma, hyper-tension, dehydration, bacterial pneumonia, and angina without cardiac procedure compared with the matched control group (Table 4). At 90 days after release, former inmates continued to have a higher proportion of hospitalizations compared with the control group owing to the same ambulatory care–sensitive conditions but now had higher rates of hospitalizations owing to congestive heart failure compared with those never incarcerated (eTable 2 in the Supplement).

Mental health conditions were the most common reason for hospitalizations among former inmates 30 days after release (22.1%) (Table 4). Diseases of the circulatory system (14.0%), injury and poison (12.7%), and diseases of the respiratory system (10.5%) were also common reasons for hospitalization among released inmates.

Deaths After Release From a Correctional Facility

Among former inmates, 352 (0.32%) died within 30 days of release compared with 170 individuals (0.15%) of the demographically matched population ($P < .001$). Patients released from a correctional facility had a 2-times higher odds of dying 30 days after release compared with the control group (OR, 2.1 [95% CI, 1.7-2.5]) (Table 2). Released inmates were more likely to die outside of the hospital compared with the matched control group (0.27% vs 0.11%; $P < .001$). After 90 days following release, patients released from a correctional facility still had a 2-times higher odds of death compared with the matched control (OR, 2.0 [95% CI, 1.8-2.2]). Released inmates had higher rates of death compared with the control group in all categories of race, sex, age younger than 60 years, and qualifying for Medicare owing to disability ($P < .001$). Former inmates were more likely to die compared with the control group within 1 year following release (Figure, B).

Discussion

Among Medicare beneficiaries incarcerated between 2002 and 2010, 1 in 70 released inmates is hospitalized for an acute condition within 7 days of release, and 1 in 12 by 90 days, a rate much higher than the general population of Medicare beneficiaries. Beneficiaries recently released from a correctional facility had a higher risk for hospitalization after release compared with beneficiaries of the same age, sex, race, residential zip code, and reason for Medicare eligibility. This higher risk for hospitalizations was observed in all subgroups, defined by age, sex, race, or reason for Medicare enrollment.

As we hypothesized, released inmates have higher rates of hospitalizations for some ambulatory care–sensitive conditions following release compared with the matched control group. Higher rates of hospitalizations for ambulatory care– sensitive conditions such as diabetes mellitus, hypertension, and asthma among former inmates may reflect higher rates of chronic medical conditions among released inmates. Released inmates have higher rates of diabetes mellitus, hyper-tension, and asthma compared with the general population.[22] Alternative explanations include an acute decline in their health status owing to barriers in obtaining medications or primary care immediately after release[6] or poor quality of health care during incarceration. Higher rates of hospitalizations for conditions like lower extremity amputations from diabetes mellitus 7 days after release may reflect some correctional facilities inappropriately releasing individuals who are acutely ill. While the risk for hospitalizations owing to ambulatory care– sensitive conditions was higher among released inmates, they did not account for most hospitalizations. Individuals released from correctional facilities were most likely to be hospitalized owing to mental health conditions and poisoning, which includes accidental and intentional poisoning and overdose from illicit drugs, although some of these hospitalizations are also preventable among released inmates.[23]

Former inmates' risks for hospitalizations are higher up to 1 year following release even after accounting for their increased risk of death after release. Individuals released from a correctional facility were 2 times more likely to die within 30 days and 90 days of release. These data were consistent with findings from single-state studies that also found a higher risk of death following prison release but did not adjust for socioeconomic status.[3,13] Released inmates were more likely to die outside of the hospital compared with the matched control group, also suggesting that many released inmates have barriers to accessing health care following acute events and that death was not a competing risk for hospitalizations.

Our data suggest that transitions between correctional facilities and the community may be a high-risk period and have potential implications for both the correctional health care and community health care systems. There are many potential ways of reducing this risk for hospitalization, particularly hospitalizations attributable to ambulatory care–sensitive conditions, including providing sufficient discharge medications, arranging appointments for medical and mental health care, and ensuring the reinstatement of Medicare before release, although these remain untested. Similarly, community-based interventions that provide expedited primary care to released inmates and assistance navigating the community health care system may also reduce the risk for hospitalization immediately following release from a correctional facility. Finally, modifying national policies, such that Medicare Part B, which pays for outpatient care, is not terminated on incarceration, might improve utilization of primary care after release.

Our study has several limitations. We were unable to adjust for medical comorbidity in our study. Individuals with a history of incarceration are more likely to have chronic physical, mental health, and substance abuse conditions than the general population,[24] and we are unable to distinguish whether higher rates of hospitalization following release are attributable to inherently worse inmate health or the quality of health care in correctional facilities or after release. We also are unable to account for what proportion of hospitalizations were for patients "compassionately released" for a terminal illness. Misclassification of persons with a history of incarceration was possible. It is plausible that correctional facilities did not report when individuals are incarcerated, especially short stays, which would bias our study findings toward the null hypothesis. Also, individuals who were enrolled in Medicare between 2002 and 2010 and incarcerated prior to their enrollment were considered never incarcerated, which would bias our study toward the null hypothesis. Data on Medicare beneficiaries are not generalizable to the larger population of released inmates. While the Medicare population is a small minority of all inmates, with estimates ranging from 2% to 10% among inmates with chronic medical problems,[4,25] to our knowledge, these data are the first national data on hospitalizations of released inmates and provide insights at least into the oldest and most infirm of this population, whose care is the most costly.[26] By using the most recent incarceration for individuals who were incarcerated multiple times in these analyses, we are unable to make conclusions about the impact of 1 or multiple incarcerations on the risk of hospitalization. We relied on PQI measures to capture hospitalizations that may have been preventable with regular engagement in primary care. While patients who have more continuity of care with a regular health care provider have lower rates of hospitalizations for chronic ambulatory care–sensitive conditions,[20] these

measures do not encompass all preventable hospitalizations, particularly those involving mental health and substance abuse.

As the number of individuals released from correctional facilities continues to grow, local communities must confront the challenge of caring for this population in times of limited resources. In states that have adopted Medicaid expansion of the Patient Protection and Affordable Care Act, 30% to 65% of recently released inmates who were previously uninsured may be newly eligible for Medicaid, but providing coverage is only the first step in reducing preventable hospitalizations after release.[27] An improved understanding of health care utilization for returning inmates will be important to improving transitions from correctional facilities to the community, reducing cost to the health care system, and ultimately improving the health of our most vulnerable patients.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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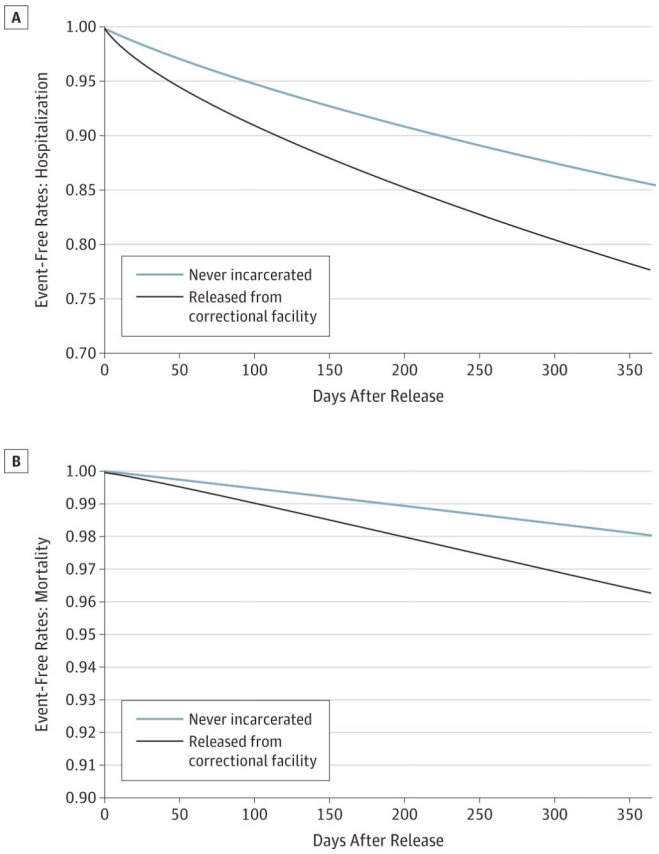

Figure. Time to First Hospitalization and Death

Time to first hospitalization (A) and death (B) stratified by incarceration status in the matched cohort of Medicare beneficiaries.

Table 1

Percentages of Baseline Characteristics of the Matched Cohort of Medicare Beneficiaries

Characteristic	Never Incarcerated (n = 110 419)	Released From Correctional Facility (n = 110 419)
Year		
2002	3.17	3.17
2003	7.77	7.77
2004	8.78	8.78
2005	10.53	10.53
2006	12.29	12.29
2007	13.96	13.96
2008	15.79	15.79
2009	17.91	17.91
2010	9.79	9.79
Age, mean (SD), y	48.1 (12.3)	48.1 (12.3)
Age groups		
<40	23.96	23.96
40 to <50	34.79	34.79
50 to <60	22.40	22.40
60 to <65	5.52	5.52
65 to <70	8.18	8.18
70 to <75	3.51	3.51
≥75	1.65	1.65
Female		
No	83.67	83.67
Yes	16.33	16.33
Race		
White	65.75	65.75
Black	30.47	30.47
Other	3.77	3.77
Medicare status		
≥65 y without ESRD	14.80	14.80
≥65 y with ESRD	0.02	0.02
Disabled without ESRD	85.00	85.00
Disabled with ESRD	0.17	0.17
ESRD only	0.00	0.00
Years in incarceration		
Mean (SD)	NA	0.89 (1.21)
Median (Q1-Q3)	NA	0.43 (0.17-1.06)
Range	NA	0.00-10.90
5%-95% Interval	NA	0.03-3.43

Abbreviations: ESRD, end-stage renal disease; NA, not applicable; Q, quartile.

Table 2

Hospitalizations and Death After Release Stratified by Incarceration Status in the Matched Cohort of Medicare Beneficiaries

Interval After Release, d	No. (%)		Unadjusted OR (95% CI)
	Never Incarcerated (n = 110 419)	Released From Correctional Facility (n = 110 419)	
All hospitalizations			
7	620 (0.56)	1559 (1.41)	2.5 (2.3-2.8)
30	2127 (1.93)	4285 (3.88)	2.1 (2.0-2.2)
90	5306 (4.81)	9196 (8.33)	1.8 (1.7-1.9)
Hospitalizations owing to ambulatory care-sensitive conditions			
7	139 (0.13)	241 (0.22)	1.7 (1.4-2.1)
30	490 (0.44)	799 (0.72)	1.6 (1.5-1.8)
90	1218 (1.10)	1888 (1.71)	1.6 (1.5-1.7)
Mortality			
30	170 (0.15)	352 (0.32)	2.1 (1.7-2.5)
90	506 (0.46)	983 (0.89)	2.0 (1.8-2.2)

Abbreviation: OR, odds ratio.

Table 3

Incarceration Status and Hospitalization Rates Within 30 Days and 90 Days After Release by Patient Characteristics in the Matched Cohort of Medicare Beneficiaries

Description	30 Days				90 Days		
	Description	Never Incarcerated, % (n=110419)	Released From Correctional Facility, % (n=110419)	*P* Value	Never Incarcerated, % (n=110419)	Released From Correctional Facility, % (n=110419)	*P* Value
Year of match							
2002	1.71	3.31	<.001	4.46	7.91	<.001	
2003	1.95	3.84	<.001	4.87	8.94	<.001	
2004	1.66	3.65	<.001	4.78	8.43	<.001	
2005	2.00	3.95	<.001	4.91	8.38	<.001	
2006	1.94	3.83	<.001	4.77	8.30	<.001	
2007	1.83	3.76	<.001	4.62	8.06	<.001	
2008	1.88	3.88	<.001	5.01	8.31	<.001	
2009	2.15	3.89	<.001	5.06	8.34	<.001	
2010	1.92	4.44	<.001	4.28	8.26	<.001	
Age groups, y							
<40	1.52	2.86	<.001	3.94	6.32	<.001	
40 to <50	2.15	3.95	<.001	5.10	8.48	<.001	
50 to <60	2.11	4.48	<.001	5.35	9.48	<.001	
60 to <65	2.10	4.92	<.001	5.45	10.11	<.001	
65 to <70	1.67	3.71	<.001	4.09	8.11	<.001	
70 to <75	1.78	4.28	<.001	4.88	9.63	<.001	
≥75	1.54	5.71	<.001	5.10	11.09	<.001	
Female							
No	1.89	3.90	<.001	4.71	8.26	<.001	
Yes	2.11	3.78	<.001	5.31	8.68	<.001	
Race							
White	1.78	3.83	<.001	4.54	8.31	<.001	
Black	2.27	3.96	<.001	5.47	8.38	<.001	
Other	1.66	4.03	<.001	4.06	8.21	<.001	
Medicare status							
≥65 y	1.60	4.06	<.001	4.28	8.84	<.001	
≥65 y with ESRD	10.53	36.84	.05	21.05	36.84	.26	
Disabled	1.95	3.80	<.001	4.84	8.16	<.001	
Disabled with ESRD	14.58	21.88	.07	31.25	43.23	.01	

Abbreviation: ESRD, end-stage renal disease.

Table 4

Hospital Events Within 30 Days After Release Stratified by Incarceration Status in the Matched Cohort of Medicare Beneficiaries[a]

Principal Diagnosis for Hospitalization	No. (%)		*P* Value
	Never Incarcerated (n=110419)	Released From Correctional Facility (n=110419)	
Any hospitalization	2127 (1.93)	4285 (3.88)	<.001
Any hospitalization for ambulatory care-sensitive condition	490 (0.44)	799 (0.72)	<.001
Diabetes mellitus, short-term complications	23 (0.02)	77 (0.07)	<.001
Perforated appendix	7 (0.01)	10 (0.01)	.47
Diabetes mellitus, long-term complications	43 (0.04)	73 (0.07)	.005
Chronic obstructive pulmonary disease	73 (0.07)	117 (0.11)	.001
Asthma in older adults	38 (0.03)	59 (0.05)	.03
Hypertension	10 (0.01)	23 (0.02)	.02
Heart failure	94 (0.09)	99 (0.09)	.71
Dehydration	15 (0.01)	35 (0.03)	.005
Bacterial pneumonia	90 (0.08)	136 (0.12)	.002
Urinary tract infection	31 (0.03)	32 (0.03)	.90
Angina without procedure	6 (0.01)	16 (0.01)	.03
Uncontrolled diabetes mellitus	7 (0.01)	28 (0.03)	<.001
Asthma in younger adults	38 (0.03)	59 (0.05)	.03
Lower extremityamputation in patients with diabetes mellitus	73 (0.07)	181 (0.16)	<.001
Infectious and parasitic diseases	114 (0.10)	192 (0.17)	<.001
Neoplasms	65 (0.06)	101 (0.09)	.005
Diseases of the blood and blood-forming organs	40 (0.04)	62 (0.06)	.03
Mental disorders	201 (0.18)	945 (0.86)	<.001
Diseases of the nervous system and sensory organs	58 (0.05)	85 (0.08)	.02
Diseases of the circulatory system	365 (0.33)	599 (0.54)	<.001
Diseases of the respiratory system	297 (0.27)	448 (0.41)	<.001
Diseases of the digestive system	278 (0.25)	425 (0.38)	<.001
Diseases of the genitourinary system	106 (0.10)	161 (0.15)	<.001
Complications of pregnancy and childbirth	12 (0.01)	24 (0.02)	.05
Diseases of the skin and subcutaneous tissue	73 (0.07)	211 (0.19)	<.001
Symptoms, signs, and ill-defined conditions	152 (0.14)	384 (0.35)	<.001
Injury	74 (0.07)	203 (0.18)	<.001
Poisoning	149 (0.13)	346 (0.31)	<.001

[a] McNemar test for matched pair data.