ORIGINAL RESEARCH

Increased Hospital and Emergency Department Utilization by Individuals with Recent Criminal Justice Involvement: Results of a National Survey

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BACKGROUND: Individuals involved with the criminal justice system have increased health needs and poor access to primary care.

OBJECTIVE: To examine hospital and emergency department (ED) utilization and related costs by individuals with recent criminal justice involvement.

DESIGN: Cross-sectional survey.

PARTICIPANTS: Non-institutionalized, civilian U.S. adult participants ($n=154,356$) of the National Survey on Drug Use and Health (2008–2011).

MAIN MEASURES: Estimated proportion of adults who reported past year 1) hospitalization or 2) ED utilization according to past year criminal justice involvement, defined as 1) parole or probation, 2) arrest without subsequent correctional supervision, or 3) no criminal justice involvement; estimated annual expenditures using unlinked data from the Medical Expenditure Panel Survey.

KEY RESULTS: An estimated 5.7 million adults reported parole or probation and an additional 3.9 million adults reported an arrest in the past year. Adults with recent parole or probation and those with a recent arrest, compared with the general population, had higher rates of hospitalization (12.3 %, 14.3 %, 10.5 %; $P<0.001$) and higher rates of ED utilization (39.3 %, 47.2 %, 26.9 %; $P<0.001$). Recent parole or probation was an independent predictor of hospitalization (adjusted odds ratio [AOR], 1.21; 95 % confidence interval [CI], 1.02–1.44) and ED utilization (AOR, 1.35; 95 % CI, 1.12–1.63); Recent arrest was an independent predictor of hospitalization (AOR, 1.26; 95 % CI, 1.08–1.47) and ED utilization (AOR, 1.81; 95 % CI, 1.53–2.15). Individuals with recent criminal justice involvement make up 4.2 % of the U.S. adult population, yet account for an estimated 7.2 % of hospital expenditures and 8.5 % of ED expenditures.

CONCLUSIONS: Recent criminal justice involvement is associated with increased hospital and ED utilization and costs. The criminal justice system may offer an important point of contact for efforts to improve the

healthcare utilization patterns of a large and vulnerable population.

KEY WORDS: vulnerable populations; emergency medicine; hospital medicine; health care costs.

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In prisons, jails and in the community through parole and probation, the criminal justice system currently supervises more than 7 million Americans, or one in every 31 adults.^{1–4} In this population, more than 80 % report a physical health, mental health, or substance use problem.⁵ Mortality rates are increased, particularly during the period following release from prison or jail.^{6–9} Once in the community, individuals with criminal justice involvement face many challenges: high rates of poverty; low rates of employment and education; and poor access to health insurance and a regular source of healthcare.⁵

Previous studies have documented increased healthcare utilization by this population, but have been geographically limited or focused on specific subgroups.^{10–14} This healthcare utilization will become increasingly relevant to state and federal policymakers with implementation of the Patient Protection and Affordable Care Act, as an estimated 53–57 % of individuals leaving prison will be eligible for Medicaid or subsidized private insurance.¹⁵ Early evidence suggests that programs to improve access to care on release from prison may prevent high-cost utilization in the community.¹⁶ Further investments in such programs will benefit from a better understanding of healthcare utilization by individuals with criminal justice system involvement, yet no national estimates of this utilization exist.¹⁷

Therefore, we examined utilization of hospital and emergency department (ED) services among a nationally representative sample of individuals with recent criminal justice involvement using the National Survey on Drug Use

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and Health.¹⁸ We estimated the costs of this utilization separately using the Medical Expenditure Panel Survey.¹⁹ We hypothesized that recent criminal justice involvement is associated with increased utilization and costs compared with the general population, and that this association is strongest among individuals with recent parole or probation.

METHODS

Data Source

Data are from the 2008 through 2011 National Survey of Drug Use and Health (NSDUH) public use files. The NSDUH is an annual cross-sectional survey that provides nationally representative estimates of substance use and other health-related behaviors among members of the non-institutionalized U.S. civilian population aged 12 years or older. We restricted our analysis to adult respondents aged 18 and older. The NSDUH sampling frame includes residents of households or non-institutional group quarters, persons with no permanent residence (i.e., homeless people in shelters) and civilians living on military bases. The survey uses a 50-state design with an independent, multistage area probability sample for each state. The NSDUH contains sample weights for each respondent, which account for selection probability, adjust for nonresponse, and allow nationally representative estimates for all aspects of the survey.

The NSDUH uses a combination of computer-assisted personal interviewing conducted by a trained interviewer and audio computer-assisted self-interviewing (ACASI). ACASI provides respondents with a private and confidential means of responding to questions to maximize validity of reporting of sensitive behaviors such as criminal justice history.²⁰ The response rate was between 74 and 76 % from 2008 to 2011. The NSDUH is sponsored by the Center for Behavioral Health Statistics and Quality within the Substance Abuse and Mental Health Services Administration (SAMHSA) and is conducted by RTI International, Research Triangle Park, North Carolina.^{21–24} Additional details are available online (<http://oas.samhsa.gov/nsduh/methods.cfm>).

NSDUH data are de-identified and publicly available. All survey respondents provide informed consent prior to participation. Conduct of the NSDUH was approved by the Research Triangle Institute's Institutional Review Board.²⁵ This analysis was approved by the Partners Healthcare Human Research Committee.

Main Measures

Our independent variable was self-reported past year criminal justice involvement. We created three mutually exclusive categories: 1) Individuals with recent parole or

probation; 2) Individuals with a recent arrest without subsequent correctional supervision (i.e., no past year parole or probation); and 3) Individuals without recent criminal justice involvement. Parole is a period of correctional supervision in the community following a prison term; probation is also a period of supervision in the community, and is generally an alternative to prison but often involves time in jail.³ Both parole and probation require fulfillment of conditions such as participation in treatment or job training programs and avoidance of criminal activity. We defined this group based on affirmative responses to the following two questions: "Were you on parole, supervised release, or other conditional release from prison at any time during the past 12 months?" and "Were you on probation at any time during the past 12 months?" Next, among respondents who did not report past year parole or probation, we defined the second group based on non-zero responses to the question, "Not counting minor traffic violations, how many times during the past 12 months have you been arrested and booked for breaking a law?" We created this comparison group to identify individuals more likely to have been engaged in criminal activity, yet not exposed to incarceration or community supervision (presumably due to the nature or severity of the offense). Finally, all other respondents comprised the referent group.

Our main dependent variables were past year hospitalization and past year ED utilization. We defined past year hospitalization based on affirmative responses to the question, "During the past 12 months, have you stayed overnight or longer as an inpatient in a hospital?" We defined past year ED utilization based on non-zero responses to the question, "During the past 12 months... how many different times have you been treated in an emergency room for any reason?" Additionally, we analyzed reported total past year utilization (i.e. total hospital days and total ED visits) in secondary analyses in order to estimate total expenditures. Respondents were asked: "During the past 12 months, how many nights were you an inpatient in a hospital?" Response options for both questions ranged from 0 to 30 or "31 or more." Responses of "31 or more" occurred in less than 0.1 % of respondents for each dependent variable and were analyzed as equal to 31 past year encounters.

Covariates

We identified sociodemographic and clinical characteristics based on a priori hypotheses regarding potential confounders of the association of interest. Sociodemographic variables included gender, age, race/ethnicity, marital status, education, employment, insurance status, family income and rural residence. We dichotomized self-reported health status as 'excellent/very good/good health' versus 'fair/poor

health' and assessed psychological distress with the K6 Psychological Distress Scale, a validated screening tool for serious mental illness.²⁶

To indicate self-reported past year disease diagnoses, we created three dichotomous variables using responses to the following question: "Which, if any, of these conditions did a doctor or other medical professional tell you that you had in the past 12 months?" We combined anxiety and depression into "psychiatric diagnoses"; asthma, bronchitis, cirrhosis, coronary heart disease, hypertension and pancreatitis into "non-communicable medical diagnoses"; and hepatitis, HIV, sexually transmitted disease and tuberculosis into "communicable medical diagnoses." We created aggregate variables, as NSDUH reliability criteria limited reporting of several diagnoses of interest, such as human immunodeficiency virus infection.

Based on diagnostic criteria for substance abuse and dependence as specified in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV), we identified past year abuse or dependence of 1) alcohol, 2) marijuana, 3) prescription psychotherapeutics (defined as analgesics, sedatives, tranquilizers or stimulants) or 4) other illicit drugs. We identified past month nicotine dependence if respondents met criteria by either the Nicotine Dependence Syndrome Scale or a single question from the Fagerström Test of Nicotine Dependence.^{27–29}

Expenditure Estimates

We used data from a second data set, the Medical Expenditure Panel Survey (MEPS) 2008–2010, via its online MEPSNet Query Tool to obtain nationally representative estimates of the average cost of a single hospital day and of a single ED visit, stratified by patient age (18–25, 26–34, 35+), gender and survey year.¹⁹ To estimate total annual expenditures for each population, we multiplied total self-reported past year encounters from the NSDUH by average per-encounter expenditures from the MEPS.

Statistical Analyses

We used the chi-squared test to assess for differences in respondent characteristics, stratified by recent criminal justice involvement status. We report unadjusted rates of past year utilization and 95 % confidence intervals (CI). We created logistic regression models to characterize the independent association between criminal justice involvement and hospital and ED utilization, adjusting for all covariates noted in Table 2. Pre-specified interaction terms were added individually to each model and retained only if significant at $P < 0.05$. We report model results as adjusted odds ratios (AOR) and 95 % CI. For each criminal justice involvement group, we compared total encounters and total

expenditures to the general population using pairwise t -tests. In secondary subgroup analyses, we conducted pre-specified analyses according to age,³⁰ race/ethnicity,³¹ gender,³² insurance status³³ and substance use.³⁴ Using logistic regression models within each subgroup, we adjusted for all other covariates from our main models.

We performed all analyses as recommended by SAMHSA and used the Surveyfreq, Surveylogistic, Surveymeans and Surveyreg procedures in SAS 9.3 (SAS Institute Inc., Cary, NC, USA) to account for the complex sampling design of the

Table 1. Characteristics of United States, Civilian, Non-Institutionalized Adults by Past Year Criminal Justice Involvement, NSDUH 2008–2011 (N=154,356)

	Parole/ Probation, % (N=6,212)	Arrest Only, % (N=4,586)	No Criminal Justice Involvement, % (N=143,558)
Age			
18–25	32.5	35.4	13.9
26–34	27.0	24.3	15.4
35–49	27.2	25.0	27.7
50+	13.3	15.3	43.0
Male sex	71.6	73.8	47.2
Race/ethnicity*			
White	57.1	55.6	68.5
Black	18.9	23.0	11.2
Hispanic	19.8	17.3	13.7
Other race†	4.1	4.1	6.6
Insurance*			
Private	34.5	35.3	68.5
Medicaid	15.1	16.7	5.5
Medicare	4.8	6.1	7.6
Other insurance‡	5.1	6.1	3.3
Uninsured	40.5	35.9	15.0
High school graduate	68.8	69.5	85.8
Family income			
<\$20,000	34.5	36.9	17.4
\$20,000–49,999	39.3	36.1	32.6
\$50,000–74,999	11.8	13.3	17.7
>\$75,000	14.5	13.6	32.3
Unemployed	16.4	16.2	5.2
Fair/poor health status	16.8	19.1	13.2
Serious psychological distress	23.9	23.2	9.8
Past year diagnoses			
Medical	21.8	24.7	31.4
Communicable disease	3.8	3.1	1.5
Psychiatric	16.9	15.7	9.4
Substance abuse/dependence			
Alcohol*	27.4	33.5	6.4
Prescription drug	5.2	5.8	0.7
Marijuana*	8.0	10.7	1.2
Other illicit drug	5.6	6.1	0.4
Nicotine dependence	41.6	38.3	13.2

154,356 respondents represent 229 million civilian, non-institutionalized adults in the United States annually. Note: $P < 0.001$ for three-way comparisons of all covariates using the chi-squared test NSDUH National Survey on Drug Use and Health

*"Parole/Probation" and "Arrest Only" group differences statistically significant with $P < 0.05$. All other pairwise comparisons between these groups not statistically significant

†Other race was most commonly Asian (69 % of category), more than one race (18 %), Native American (7 %), Native Hawaiian (5 %)

‡Other insurance includes Tricare/Veterans Affairs/Champus (48 % of category) and other health insurance (52 %)

§Serious psychological distress defined as score ≥ 13 on K6 Psychological Distress Scale

NSDUH. All statistical tests were two-sided and were considered statistically significant when $P < 0.05$.

RESULTS

Our study sample consisted of 154,356 respondents, representing an estimated 229 million civilian, non-institutionalized adults in the United States. An estimated 9.5 million American adults, or 4.2 % of the adult population (95 % CI, 4.0–4.3 %), reported past year criminal justice involvement (i.e., recent parole, probation or arrest). A majority of this group, an estimated 5.7 million adults, reported past year parole or probation (Table 1). An estimated 3.9 million adults reported arrest without subsequent correctional supervision. Adults with recent criminal justice involvement were more likely to be young, male, black or Hispanic, publicly insured or uninsured, less educated and poor compared with the general population. These individuals were also more likely to report serious psychological distress, psychiatric or communicable disease diagnoses and to meet criteria for each of five substance use disorder diagnoses ($P < 0.001$).

Adults with recent parole or probation (12.3 %) or recent arrest only (14.3 %) were more likely to have been hospitalized in the past year compared with the general population (10.5 %; $P < 0.001$) (Table 2). Additionally, adults with recent parole or probation (39.3 %) or recent arrest only (47.2 %) were more likely to have visited the ED in the past year compared with the general population (26.9 %; $P < 0.001$). In multivariable modeling, recent parole or probation was an independent predictor of past year hospitalization (AOR, 1.21; 95 % CI, 1.02–1.44; Fig. 1) and ED utilization (AOR, 1.35; 95 % CI, 1.12–1.63); arrest only was an independent predictor of past year hospitalization (AOR, 1.26; 95 % CI, 1.08–1.47) and ED utilization (AOR, 1.81; 95 % CI, 1.53–2.15).

In secondary analyses, this pattern of increased hospital and ED utilization persisted in nearly all subgroups examined after

adjustment for covariates (Fig. 1). Specifically, recent criminal justice involvement was significantly associated with both hospital and ED utilization among vulnerable subgroups, including the uninsured, those with a substance use disorder and those reporting serious psychological distress. Of note, after adjustment for covariates, criminal justice involvement was associated with a lower likelihood of ED utilization among Black respondents, the only subgroup in which a negative association was found.

Finally, individuals with past year criminal justice involvement reported significantly more total hospital days and total ED visits compared with the general population (Table 3). This increased utilization translated into significantly increased estimated per capita expenditures for both hospital and ED utilization. Individuals with recent parole, probation or arrest make up 4.2 % of the U.S. adult population, yet account for an estimated 7.2 % of hospital expenditures and 8.5 % of ED expenditures, or an additional \$8.5 billion in hospital expenditures and \$5.2 billion in ED expenditures, compared with the general population.

DISCUSSION

In this nationally representative sample of adults with recent criminal justice involvement, rates of both past year hospitalization and ED utilization were increased compared with the general population. Increased rates of hospital and ED utilization persisted after adjustment for important sociodemographic and clinical characteristics, suggesting a link between the experience of criminal justice involvement and utilization of hospital and ED services. This association was present in nearly all subgroups examined. Additionally, total hospital days, total ED visits and estimated expenditures were significantly increased compared with the general population.

Our findings from this national study corroborate findings of previous studies of a single location or select vulnerable

Table 2. Association Between Self-Reported Past Year Criminal Justice Involvement and Hospital and Emergency Department Utilization, NSDUH 2008–2011 (N=154,356)

	Past Year Hospitalization		Past Year ED Utilization	
	Unadjusted Rate, % (95 % CI)	Adjusted Odds Ratio, OR (95 % CI)*	Unadjusted Rate, % (95 % CI)	Adjusted Odds Ratio, OR (95 % CI)†
Parole/Probation (N=6,212)	12.3 (11.0–13.6)	1.21 (1.02–1.44)	39.3 (37.1–41.4)	1.26 (1.08–1.47)
Arrest Only (N=4,586)	14.3 (12.1–16.5)	1.35 (1.12–1.63)	47.2 (44.2–50.2)	1.81 (1.53–2.15)
No Criminal Justice Involvement (N=143,558)	10.5 (10.2–10.8)	1 [Reference]	26.9 (26.5–27.3)	1 [Reference]

Both models adjusted for age, gender, race/ethnicity, education, insurance, family income, employment, marital status, rural location, self-rated health, past year serious psychological distress, past year diagnoses (medical, communicable & psychiatric), past year substance abuse or dependence (alcohol, prescription drug, marijuana, other illicit drug) and past month nicotine dependence

NSDUH National Survey on Drug Use and Health; ED Emergency Department; OR odds ratio; CI confidence interval

*Model included interaction terms for age and past year serious psychological distress

†Model included interaction terms for age and race/ethnicity

Figure 1. Association between past year criminal justice involvement and hospital and emergency department utilization, stratified by subgroup, NSDUH 2008–2011. NSDUH National Survey on Drug Use and Health; ED Emergency Department; OR odds ratio; CI confidence interval; SUD Substance use disorder; SPD Serious psychological distress. *Other race comprised of Asian (69 % of category), more than one race (18 %), Native American (7 %) and Native Hawaiian (5 %). §Other insurance includes Tricare/Veterans Affairs/Champus (48 % of category) and other health insurance (52 %). ¶SUD defined as past year abuse or dependence on alcohol, marijuana, prescription psychotherapeutics or other illicit drugs. #SPD defined as score ≥ 13 on K6 Psychological Distress Scale.

populations following release from correctional facilities. In a cohort of 820 drug-involved ex-prisoners in Delaware, rates of hospitalization were increased more than threefold compared with a national sample.¹⁰ In a separate study of 476 adult women recently released from New York City jails, half reported ED use and 24 % reported a hospitalization over an

average of 15 months.¹¹ In a cohort of 151 ex-prisoners with HIV infection in Connecticut, 56 % had at least one ED visit in the 12 months following release.¹² Finally, a recent analysis of Medicare beneficiaries released from correctional facilities showed a significant increase in hospitalization compared to matched controls.¹⁴ Our findings build on this work by

Table 3. Past Year Criminal Justice Involvement and Estimated Per Capita Annual Hospital and Emergency Department Expenditures

	Past Year Hospitalization		Past Year ED Utilization	
	Per Capita Hospital Days, mean (SD)*	Estimated Per Capita Expenditures, mean (SD)*	Per Capita ED Visits, mean (SD)†	Estimated Per Capita Expenditures, mean (SD)†
Parole/Probation	6.5 (0.7)	\$1,995 (233)	2.6 (0.2)	\$969 (72)
Arrest Only	6.7 (0.7)	\$2,378 (321)	2.8 (0.2)	\$1,251 (101)
No Criminal Justice Involvement	4.7 (0.1)	\$1,209 (30)	1.9 (0.01)	\$506 (7)

Nationally representative visit-level expenditure estimates produced from unlinked data from the Medical Expenditure Panel Survey (MEPS), 2008–2010 NSDUH National Survey on Drug Use and Health; ED Emergency Department; SD standard deviation

* $P=0.001$ and † $P<0.001$ in pairwise comparisons to “No Criminal Justice Involvement” group

documenting similarly high utilization of hospital and ED services among a nationally representative sample relative to a general population comparison group.

Unique to our study was the finding of a potential independent effect of criminal justice involvement on hospital and ED utilization. This effect may be explained in part by disruptions in insurance coverage³³ or access to outpatient care and prescription medications,³⁵ leading to use of acute care services for non-urgent or preventable conditions. Additionally, the well-documented risks of community re-entry (i.e., substance use, exposure to violence and other risky behaviors) may play a role.⁸ The increases in the rates of utilization seen here are substantial and warrant consideration of criminal justice involvement as an opportunity to identify and intervene on a population with high use of acute care services.

The association between recent criminal justice involvement and acute care utilization was generally stronger among individuals who were arrested without subsequent correctional supervision compared to those reporting parole or probation (despite the sociodemographic similarities between these groups). This finding has several potential explanations. First, correctional supervision in the community may have a protective effect. For instance, mandated substance abuse treatment for those on parole or probation may positively impact health, access to care or both, leading to a decreased need for acute care services. Second, individuals on parole, many of whom were recently incarcerated, likely had access to correctional healthcare, potentially leading to a decreased need for hospital and ED services. Alternatively, this finding may reflect the fact that events such as intoxication or interpersonal violence may lead to emergency care at the time of an individual's arrest.

Subgroup analyses revealed a persistent and positive association between recent criminal justice involvement and hospital and ED utilization. The effect of criminal justice involvement was most pronounced in groups with high medical needs such as those with Medicare or Medicaid, and in groups with traditionally poor access to primary care such as the uninsured and those with serious psychological distress.^{36,37} Differences in effect size across subgroups (and direction in the case of race/ethnicity) highlight the fact that the exposure of interest, criminal justice involve-

ment, is not evenly distributed in our society and can have very different consequences for different subgroups.³⁸ Further work is needed to understand the mechanisms underlying these findings.

Calls to improve the quality of care for criminal justice populations and more fully capitalize on the public health opportunities created by our nation's high rate of incarceration are not new.^{39–41} However, this need may soon be greater than ever. Expanding insurance coverage under the Patient Protection and Affordable Care Act is expected to have a significant impact on access to care among individuals with criminal justice involvement. The availability of insurance options not linked to employment is particularly important for these individuals, given the lasting detrimental effects of incarceration on employment and income.^{15,38} We believe our findings demonstrate an additional incentive to decrease this population's need for and utilization of acute care services, namely, the costs of these services. Interventions such as care coordination, peer support or expedited insurance enrollment offer potential savings but remain unproven. Such programs should consider engaging the criminal justice system at its various points of contact in prisons and parole offices, as well as in jails and courthouses. These efforts should be tailored to the unique needs of this vulnerable population and should target those most likely to benefit.

Our findings should be interpreted in the context of the potential limitations of our study. First, data were self-reported. Underreporting of criminal justice involvement may be present, and criminal justice involvement that occurred greater than 12 months prior to a respondent's interview date was not captured. Both would be expected to bias our findings toward the null. Second, the survey is cross-sectional. We cannot attribute causality nor can we exclude residual confounding. The robust association across subgroups, especially in groups most likely to experience incarceration, supports our main findings but should be interpreted as exploratory. Due to the cross-sectional nature of our data, we cannot determine whether healthcare utilization occurred before, during or after criminal justice involvement. We were also unable to assess whether respondents were incarcerated in the past year, though recent incarceration and its constitutional guarantee of access

to correctional healthcare⁴² would likely bias our findings toward the null. Third, the NSDUH does not sample persons in institutional group quarters (i.e., hospitals and prisons). We have therefore likely underestimated both the size of the population of interest and this group's utilization of hospital and ED services. Fourth, the NSDUH does not probe respondents' access to and use of primary care services, factors which likely affect need for acute care services. As the survey does not collect information for specific hospitalizations and ED visits, we are not able to examine the "appropriateness" of these encounters. Finally, expenditure data from the MEPS are not linked to NSDUH respondents. While our methods make national estimates possible, future work should directly characterize the costs of healthcare utilization by this high-risk group.

In conclusion, we found increased hospital and ED utilization and estimated expenditures among a nationally representative sample of adults with recent criminal justice involvement. An improved understanding of the healthcare needs of these individuals will be important to improving transitions from correctional facilities to communities, reducing costs and ultimately improving the health of this vulnerable population.

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Conflict of Interest: The authors declare that they do not have a conflict of interest.

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