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ABSTRACT

Objectives: To describe older jail inmates' predetainment use of acute care (Emergency Department (ED) or hospitalization in the 3 months prior to arrest) and their plans for using acute care after release.

Methods: Cross-sectional study of 247 jail inmates age 55 or older assessing sociodemographic characteristics, health and geriatric conditions associated with predetainment and anticipated post-release acute care use.

Results: 52% of older inmates reported predetainment acute care use and 47% planned to use the ER after release. In modified Poisson regression, homelessness was independently associated with predetainment use (RR 1.42, CI 1.10 – 1.83) and having a primary care provider was inversely associated with planned use (RR 0.69, CI 0.53 – 0.89).

Conclusions: The Affordable Care Act extends Medicaid eligibility to all persons leaving jail in an effort to decrease post-release acute care use in this high-risk population. In addition, jail-to-community transitional care models that address the health, geriatric and social factors prevalent in older adults leaving jail, with specific focuses on linkages to housing and primary care, are needed to enhance the impact of ACA policies on acute care use for this population.

INTRODUCTION

Jail has become a critical site for linking medically vulnerable older adults to community healthcare. Approximately 12 million Americans pass through jails each year and nearly all return to the community within 6 months where many struggle to access non-emergency medical care. Between 1996 and 2008 the number of "older" or "geriatric" inmates (age 55 or older) increased 278% compared to a 53% growth in the overall jail population.^{1,2} Now, approximately 550,000 older adults spend time in jail each year, comprising 10% of all inmates. Yet little is known about their healthcare and social service needs.

Reducing acute care use (hospitalizations and emergency department [ED] use) and improving insurance access for former inmates is a priority in the Affordable Care Act (ACA).³ While most inmates are without health insurance,⁴ those with insurance demonstrate reduced recidivism and better access to mental health and substance abuse treatment when released.⁵⁻⁷ The ACA expands Medicaid eligibility for low-income adults and allows eligible inmates to apply for coverage while in jail.^{3,8} Since most persons passing through jails will be eligible for Medicaid in states participating in the expansion, an estimated 4 to 6 million jail inmates will gain new coverage by the end of 2014 through outreach and patient navigator assistance.⁹

For community-dwelling older adults, health and social factors beyond insurance drive community acute care use, such as functional impairment, uncontrolled symptoms, and housing instability.¹⁰⁻¹² This may also be true for older former inmates, many of whom experience "accelerated aging" due to high rates of disability and chronic disease at relatively young ages.¹³ Therefore, we conducted a study of older jail inmates

to describe predetainment acute care use and anticipated plans for using acute care after release, and to assess the factors associated with use.

METHODS

Study Design and Sample

We conducted a cross-sectional study with 247 inmates age 55 or older in the San Francisco County Jail between May 15 and November 15, 2012. Eligibility included speaking English, Spanish or Cantonese; not posing a safety risk (according to the Sheriff's deputy, regardless of housing unit); and answering all questions about acute care use. We obtained research consent using a teach-to-goal method.¹⁴ Native-speaking interviewers read questionnaires to participants and staff abstracted medical records. Consistent with federal regulations governing prisoner research,¹⁵ permitted practice in California,¹⁶ and relevant ethical considerations,¹⁷ we deposited \$10 in participants' jail accounts as compensation for their time. The study was approved by the Human Research Protection Program at the University of California, San Francisco.

Measures

Acute care use

We asked: "In the 3 months before jail, did you ever visit a hospital emergency room?"

and/or "In the 3 months before jail, did you ever stay overnight in a hospital?"

Anticipated post-release acute care use was defined as responding to "after you are released from jail, where will you go for healthcare?" with "emergency room", "hospital", or "jail". Few inmates receive discharge planning in jail and few of our study participants would have received it before our interviews, which were conducted soon after incarceration.

Sociodemographics and Health conditions.

We assessed sociodemographics including annual income (categorized as ≤\$15,000 vs. > \$15,000 based on the new ACA cut-off for Medicaid minimum income eligibility criteria of 133% of the federal poverty level in 2013³). We assessed health conditions through a combination of chart review and self-report using previously validated questions from the Health and Retirement Study.¹⁸ Serious mental illness was identified through the same method using the Bureau of Justice Statistics' definition of "Serious Mental Illness" (major depressive, mania, or psychotic disorder).¹⁹ Self-report is well-validated in older adults^{20,21} including with vulnerable populations such as the homeless.²² Medical chart review of all participants who consented (93%) was conducted to increase detection of diagnoses for those participants who do not know their medical conditions.

Geriatric conditions

We assessed the following geriatric conditions commonly associated with acute care use: persistent symptoms (pain and shortness of breath)^{23,24}, functional impairment, and recent falls.^{10,12,25} Functional impairment included any self-reported Activity of Daily Living difficulty [bathing, feeding, dressing, transferring, or toileting]^{26,27} or a mobility impairment [needing an assistive device (e.g. cane, walker) to help with daily activities]²⁸ in the two weeks before detainment.

Social and behavioral health factors

We assessed homelessness medication insecurity, and food insecurity.²⁹⁻³¹ Additionally, we assessed illicit drug use through jail medical record documentation of current use or a positive screen on a Drug Abuse Screening Test item.³² We defined problem alcohol

use as medical record documentation of current alcohol use disorder or a positive screen on the 3-item AUDIT-C.³³

Statistical Analysis

We used descriptive statistics to describe participant characteristics and the prevalence of pre-detainment acute care use and anticipated acute care use. Associations with acute care use were assessed using Chi-Square analyses. All variables significant in the bivariate analyses at $p < 0.2$ were included in the multivariate modified Poisson regression models. Analyses were conducted using Stata, version 12.⁴⁷ Study data were managed using Research Electronic Data Capture (REDCap) application.³⁴

RESULTS

Study participants

Of 319 adults aged 55 or older in jail over the study period, 23 (7%) did not meet inclusion criteria: 7 (2%) did not speak English, Spanish or Cantonese and 16 (5%) were deemed a safety risk by the Sheriff's department. Of the remaining 296, 44 (15%) declined and 252 (85%) were enrolled. Two (<1%) withdrew and three (1%) did not answer the acute care use questions, resulting in a sample of 247. Overall, 230 (93%) consented to medical chart review. Those who did not meet inclusion criteria, declined to participate, or declined permission for medical chart review did not differ in age from participants.

Participant characteristics

Most participants were male (95%) and black (63%) and the mean age was 59 years (range 55 to 75, Table 1). Over half (52%) reported using acute care within three months of detainment. Of these, 69 (54%) used ED services and were not hospitalized, 50

(39%) used ED services and were hospitalized, and 9 (7%) were hospitalized without ED use. Nearly as many (47%) anticipated using acute care after release (Table 1). Predetainment users were no more likely to anticipate using acute care after release than non-users (50% vs 43%, $p=0.26$, Table 2). Overall, 73% used acute care within three months of detainment and/or anticipated using it after release.

Characteristics according to acute care use

Participants reporting predetainment acute care use were more likely to have congestive heart failure (10% versus 3%; $p=0.04$), poor or fair self-rated health (60% versus 45%; $p=0.03$), persistent pain (57% versus 43%; $p=0.02$), and falls (39% versus 22%; $p=0.01$). Social factors associated with predetainment acute care use included homelessness (55% versus 36%; $p < 0.01$), medication insecurity (50% versus 33%; $p=0.01$), and food insecurity (70% versus 57%; $p=0.04$) (Table 1).

Participants who anticipated using acute care after release were less likely to have a primary care provider (61% versus 79%; $p < 0.01$), problem alcohol use (54% versus 66%; $p=0.05$), or hypertension (55% versus 70% $p=0.01$) (Table 1).

Independent predictors of acute care use

After multivariable adjustment, homelessness remained independently associated with predetainment acute care use (RR 1.42, 95% CI 1.10-1.83) while having a primary care provider was associated with a 31% decreased risk of anticipated acute care use (RR 0.69, 95% CI 0.53-0.89, Table 2). Other factors inversely associated with anticipated use were hypertension (RR 0.71, 95% CI 0.55-0.93) and problem alcohol use (RR 0.72, 95% CI 0.55-0.94). Having HIV was associated with a 59% increased risk of anticipated acute care after release (RR 1.59, 95% CI 1.03-2.47).

DISCUSSION

Over half of older jail inmates reported using acute care in the three months prior to jail, and nearly half anticipated using acute care after release. Overall, the majority (73%) reported using acute care before jail and/or anticipating use of acute care after release. Most participants in this study were between ages 55 and 64 and therefore did not meet the Medicare age requirements and most reported an annual income that would make them eligible for Medicaid under the ACA. Moreover, identifying a primary care provider was associated with a reduced risk of planning to use acute care after release. These findings suggest that older jail inmates may benefit from the ACA's effort to facilitate access to primary care for former jail inmates by enrolling them in Medicaid using evidence-based strategies such as patient navigation.^{7,9}

This study also suggests that factors beyond access to insurance likely lead to acute care use in this medically complex population. Consistent with the “accelerated aging” of incarcerated populations,¹³ participants in this study with an average age of 59 reported poor or fair health (52%), chronic lung disease (16%), and recent falls (30%) at rates similar to those reported in community-based lower-income older adults with an average age of 71.7 years (51% poor or fair health, 23% lung disease, and 22% recent fall).³⁵ Three-month ED use (48%) in this study was similar to rates found in community-dwelling persons approaching the end of life (51%)³⁶ and far exceeded the 19.1% 1-year ED use found in nationally representative community-dwellers with a similar average age (59.6 years).²²

Expanded Medicaid enrollment for jail inmates may not sufficiently reduce their post-release acute care use. Although this study's participants had access to

“Healthy San Francisco”, a program that extends community clinic care access to all San Franciscans regardless of insurance, there remained a high rate of predetainment acute care use. Reasons for high acute care utilization could include poor understanding of the benefits of primary care due to low health literacy common in incarcerated *and* older populations, a struggle to access primary care due to functional impairments (45% in this study), or seeking acute care for pressing social service or behavioral health needs. In this study, nearly half (46%) of those who reported recent acute care use visited an ED without requiring hospitalization, suggesting the possibility of low medical acuity. Additionally, homelessness remained the primary factor independently associated with acute care use in multivariate analyses. Taken together, these findings suggest that older jail inmates may require access to social service programs in addition to insurance if acute care utilization rates are to be reduced.

The cross-sectional design limited our ability to determine the causes of acute care use or anticipated acute care use after release, though in our analysis we included the health, geriatric and social factors that drive acute care use in community-dwelling older adults.^{10-12,37} Acute care use was based on self-report. However, self-reported acute care use is validated in older adults and has been used to describe pre-incarceration acute care use in jail inmates.³⁸⁻⁴⁰ Important next steps include determining rates and appropriateness of acute care use longitudinally, understanding the association between plans to use acute care and actual use, and identifying the causes of acute care use in diverse populations of former jail inmates. This study was conducted in one urban jail system, which could limit its generalizability to other

settings. However, since jail populations are aging nationwide and acute care use in this population has not been described, this study constitutes a critical first step to quantifying the high rates of acute care use in older inmates and the complex factors associated with that use.

As criminal justice populations age, jails increasingly represent critical health care delivery sites where medically vulnerable older adults can be reached. New ACA provisions address this opportunity by specifically targeting jail inmates for insurance enrollment upon their release. Our findings support prior studies showing that interventions that extend beyond access to insurance are also an important means of improving care for vulnerable populations. These include primary care homes, patient navigation for vulnerable populations, and case management-based transitional care programs.⁴¹⁻⁴³ As the number of older jail inmates grows, ACA programs used to enhance insurance enrollment, such as patient navigation, should also be applied to directly facilitate use of non-acute care following release.

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Contributors

All persons who have made substantial contributions to the work reported in this manuscript are included here as authors and all listed authors meet authorship criteria. The authors have complied with the *Principles of Ethical Practice of Public Health*.

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Prior Presentations

This work was presented as a poster presentation at the 2013 Annual Meetings of the Society for General Internal Medicine.

Conflict Of Interest

One author of this manuscript has served as an expert witness and as a court consultant in legal cases related to conditions of confinement for prisoners in an effort to improve healthcare in prisons and jails. These relationships have included: the ACLU; the Disability Rights Legal Center; Hunton and Williams LLP; Holland and Knight LLP;

The University of Denver Student Law Office; and The Office of the Independent Medical Monitor, MI. These relationships had no role in the decision to write this manuscript and did not influence the preparation, review, or approval of the manuscript. No other authors have conflicts of interest to report.

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Table 1. Predetainment acute care use and plans to use acute care after release according to participant characteristics, N=247.

Characteristic	All Participants (N=247)	No Predetainment Acute Care Use ^a (N=119, 48%)	Predetainment Acute Care Use (N=128, 52%)	<i>P</i> Value	No Anticipated Acute Care Use ^b (N=132, 53%)	Anticipated Acute Care Use (N=115, 47%)	<i>P</i> Value
Mean Age, yrs (range) ^c	59 (55-75)	59 (55-75)	59 (55-70)	0.91	60 (55-75)	59 (55-68)	0.13
Other sociodemographics, N (%)							
Age 55-64	221 (90)	106 (89)	115 (90)	0.84	115 (87)	106 (92)	0.20
Race/ethnicity							
Black	155 (63)	74 (62)	81 (63)		87 (66)	68 (59)	
White / Non-Latino	50 (20)	21 (18)	29 (23)	0.66	24 (18)	26 (23)	0.73
Latino	22 (9)	12 (10)	10 (8)		12 (9)	10 (9)	
Asian / Pacific Islander	14 (6)	8 (7)	6 (5)		7 (5)	7 (6)	
Female	12 (5)	4 (3)	8 (6)	0.38	9 (7)	3 (3)	0.15
Annual Income <\$15,000	197 (80)	93 (78)	109 (85)	0.15	107 (81)	95 (83)	0.91
High School, GED, or more	183 (74)	91 (76)	92 (72)	0.41	97 (73)	86 (75)	0.82

a Recent acute care use was defined as answering yes” to the questions “In the 3 months before jail, did you ever visit a hospital emergency room?” and/or to “In the 3 months before jail, did you ever stay overnight in a hospital?”

b Plans for acute care use after release was defined as answering “emergency room”, “hospital”, named a specific emergency room, or replied “I get my healthcare in the jail” to the question “after you are released from jail, where will you go for healthcare?”

c Age analyzed using t-tests. All other factors analyzed using chi-square tests.

Health Conditions, N (%)^d							
Self-Rated Health Status							
Poor or Fair	129 (52)	53 (44)	77 (60)		71 (53)	59 (51)	
Good, Very Good, or Excellent	117 (48)	66 (56)	51 (40)	0.016	61 (47)	56 (49)	0.738
Hypertension	154 (62)	76 (64)	80 (62)	0.83	92 (70)	63 (55)	0.01
Diabetes	42 (17)	22 (18)	20 (16)	0.55	25 (19)	17 (15)	0.39
Heart attack or coronary disease	49 (20)	18 (15)	31 (24)	0.07	30 (23)	19 (17)	0.22
Congestive Heart Failure	17 (7)	4 (3)	13 (10)	0.04	12 (9)	5 (4)	0.11
Stroke	25 (10)	10 (8)	15 (12)	0.39	16 (12)	9 (8)	0.26
	18 (7)	5 (4)	13 (10)	0.07	9 (7)	9 (8)	0.76
Chronic Lung Disease	39 (16)	18 (15)	21 (17)	0.76	25 (19)	14 (12)	0.14
HIV / AIDS	13 (5)	5 (4)	8 (6)	0.46	4 (3)	9 (8)	0.15
Hepatitis C	121 (49)	53 (45)	69 (54)	0.18	67 (51)	55 (48)	0.64
Alzheimer's, dementia, senility ^f	24 (10)	8 (7)	16 (13)	0.12	16 (12)	8 (7)	0.18
Arthritis or Rheumatism	124 (50)	61 (51)	63 (50)	0.13	65 (49)	60 (52)	0.69
3 or More Chronic Conditions	116 (47)	50 (42)	66 (52)	0.13	68 (52)	48 (42)	0.13
Serious Mental Illness ^g	118 (48)	50 (42)	75 (59)	0.07	60 (46)	58 (50)	0.47

^d Health conditions determined through self-report and/or documentation in the jail medical record.

^e Excluding minor skin cancers.

^f Determined through documentation in the jail medical record and/or answering "yes" to the following question from the Health and Retirement Survey: Do you have or have you ever been told by a medical professional that you have Alzheimer's, dementia, or senility?" 18.Growing Older in America: The Health & Retirement Study. National Institute on Aging, National Institutes of Health, U.S. Department of Health and Human Services. 2012 Participant Lifestyle Questionnaire available from: http://hrsonline.isr.umich.edu/modules/meta/2012/core/qnaire/online/HRS2012_SAQ_Final.pdf. Last accessed June 4, 2013.

Persistent Pain	124 (50)	51 (43)	74 (57)	0.02	64 (48)	61 (53)	0.52
Persistent Shortness of Breath ^h	37 (15)	13 (11)	25 (19)	0.08	24 (18)	13 (12)	0.15
	110 (45)	34 (29)	51 (40)	0.06	47 (36)	38 (33)	0.67
	75 (30)	26 (22)	49 (39)	<0.01	42 (32)	33 (29)	0.60
Social and Behavioral Health Factors. N (%)							
	134 (54)	66 (55)	70 (54)	0.71	76 (58)	58 (50)	0.26
Problem Alcohol Use ⁱ	148 (60)	70 (59)	79 (61)	0.68	87 (66)	62 (54)	0.05

g Serious Mental Illness includes any major depressive, manic or psychotic disorder and was determined through self-report and/or documentation in the jail medical record.¹⁹James DJ, Glaze LE. Mental Health Problems of Prison and Jail Inmates. NCJ 213600. U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, Washington D.C. 2006.

h "Persistent" defined as a symptom described as "moderate or severe" and occurring "constantly or frequently".²³Portenoy RK, Thaler HT, Kornblith AB, et al. The Memorial Symptom Assessment Scale: an instrument for the evaluation of symptom prevalence, characteristics and distress. Eur J Cancer 1994;30A(9):1326-1336, 24. Smith AK, Cenzer IS, Knight SJ, et al. The epidemiology of pain during the last 2 years of life. Ann Intern Med Nov 2 2010;153(9):563-569.

i Functional impairment defined as having difficulty with one or more Activities of Daily Living (bathing, eating, transferring, toileting or dressing)²⁷.Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of Illness in the Aged. The Index of Adl: A Standardized Measure of Biological and Psychosocial Function. Jama Sep 21 1963;185:914-919. and/or needing a cane, wheelchair, walker or other aid to help with daily activities.

j Defined as any self-reported fall to the ground within the last 3 months ²⁵.Tinetti ME. Clinical practice. Preventing falls in elderly persons. N Engl J Med Jan 2 2003;348(1):42-49.

k Drug use defined as documentation of current drug use in the jail medical record and/or answering "no" to "In the last year, could you get through the week without using drugs?"³².Skinner HA. The drug abuse screening test. Addictive behaviors 1982;7(4):363-371.

l Problem alcohol use defined as documentation of current alcohol use disorder in jail medical record or a positive screen on the validated, 3-item AUDIT-C.³³Bush K, Kivlahan DR, McDonell MB, Fihn SD, Bradley KA. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief

Homelessness ^m	112 (45)	42 (36)	71 (55)	<0.01	61 (46)	52 (45)	0.17
Medication insecurity ⁿ	100 (40)	39 (33)	64 (50)	0.01	55 (41)	49 (42)	0.88
Food Insecurity ⁿ	152 (62)	68 (57)	89 (70)	0.04	79 (60)	79 (68)	0.17
Has Primary Care Provider	174 (70)	89 (70)	85 (71)	0.74	104 (79)	70 (61)	<0.01
Recent Acute Care Use	128 (52)	-	-	-	64 (48)	64 (56)	0.26
Anticipated acute care post-release	115 (47)	64 (54)	64 (50)	0.42	-	-	-

screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. Arch Intern Med Sep 14 1998;158(16):1789-1795.

^m Homelessness defined as needing to spend one or more nights outside in a homeless shelter in the 30 days prior to jail. 29. Homeless Emergency Assistance and Rapid Transition to Housing: Defining "Homeless" (24 CFR Parts 91, 582, and 283 [Docket No. FR-5333-F-02] RIN 2506-AC26)(2010).

ⁿ Medication and food insecurity defined as answering "yes" to "Was there a time in the last year when you did not have enough money for medications/food?"³¹. Recommended Sociodemographic Measures. University of California, San Francisco, Center for Aging in Diverse Communities, Measurement and Methods Core. Available at: <http://dgim.ucsf.edu/cadc/mm/mseenglish.pdf>. Last accessed June 24, 2013.

Table 2. Factors independently associated with recent acute care use and anticipated acute care use after release.

	Adjusted relative risk for predetainment acute care use (95% CI)	Adjusted relative risk for planning to use acute care after release (95% CI)
Age	1.01 (0.97,1.04)	0.99 (0.95,1.02)
Female Gender	--	0.52 (0.20, 1.34)
Smoking	1.19 (0.89,1.60)	--
Very Poor or Poor Self-Rated Health Status	0.88 (0.65,1.19)	--
Hypertension	--	0.71 (0.55,0.93)
Any heart disease	1.23 (0.95,1.59)	0.80 (0.53,1.21)
Cancer	1.28 (0.92,1.77)	--
Chronic Lung Disease	--	0.70 (0.4,1.23)
HIV	--	1.59 (1.03, 2.47)
Hepatitis C	0.96 (0.74,1.24)	--
Alzheimer's disease, dementia, senility or serious memory problem	1.20 (0.86,1.67)	0.69 (0.32,1.48)
Serious Mental Illness	1.10 (0.85,1.42)	--
Functional Impairment	0.93 (0.69,1.26)	--
Persistent Pain	1.12 (0.83,1.51)	--
Persistent Shortness of Breath	0.98 (0.71,1.34)	1.06 (0.61,1.85)
Recent Fall(s)	1.19 (0.88, 1.6)	--
Problem Alcohol Use	--	0.72 (0.55,0.94)
Homelessness	1.42 (1.10,1.83)	0.90 (0.69,1.18)
Has Primary Care Provider	--	0.69 (0.53,0.89)