

# Associations Between Psychiatric Inpatient Bed Supply and the Prevalence of Serious Mental Illness in Veterans Affairs Nursing Homes

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Over the past half century, the locus of psychiatric care has shifted from long-term inpatient psychiatric hospitals to community-based outpatient care settings,<sup>1</sup> with this “deinstitutionalization” movement resulting in a sharp decline in state psychiatric hospital beds.<sup>2</sup> This movement is regarded as a “disaster of the past,”<sup>3</sup> in part because of the inadequacy of outpatient services to meet the needs of symptomatic psychiatric patients.<sup>3,4</sup> In the absence of adequate community-based services, deinstitutionalization in name often resulted in transinstitutionalization in practice, as symptomatic patients were shifted to other institutional settings, such as general hospitals and nursing homes.<sup>1</sup>

Research investigating transinstitutionalization has mixed results. A 3-year follow-up of patients discharged from a state psychiatric hospital found rates of more than 20% admission to community inpatient psychiatric units, with an average of more than 75 yearly inpatient days per patient.<sup>5</sup> Similarly, a large-scale longitudinal evaluation of the Canadian mental health system found that reductions in inpatient psychiatric beds were associated with increased utilization of general hospital psychiatric beds, a pattern that continued for more than 2 decades until community mental health services expanded to meet the needs of psychiatric patients.<sup>6</sup> However, another evaluation of discharged state psychiatric patients found decreased rates of postdischarge jail and general hospital psychiatric unit utilization relative to the use of these services during the time that patients received state psychiatric care.<sup>7</sup>

There has been limited investigation into transinstitutionalization to community nursing home settings. The only large-scale study of transinstitutionalization to nursing home care was conducted in Norway, in which the effects of downsizing psychiatric hospitals were evaluated for more than 50 years. During the

**Objectives.** We assessed whether reductions in inpatient psychiatric beds resulted in transinstitutionalization to nursing home care of patients with serious mental illness (SMI) within the Veterans Health Administration (VHA).

**Methods.** We assessed trends in national and site-level inpatient psychiatric beds and nursing home patient demographics, service use, and functioning from the VHA National Patient Care Database, VHA Service Support Center Bed Control, and VHA Minimum Data Set. We estimated nursing home admission appropriateness using propensity score analyses based on Michigan Medicaid Nursing Facility Level of Care Determinations ratings.

**Results.** From 1999 to 2007, the number of VHA inpatient psychiatric beds declined (43 894–40 928), the average inpatient length of stay decreased (33.1–19.0 days), and the prevalence of SMI in nursing homes rose (29.4%–43.8%). At site level, psychiatric inpatient bed availability was unrelated to SMI prevalence in nursing home admissions. However, nursing home residents with SMI were more likely to be inappropriately admitted than were residents without SMI (4.0% vs 3.2%).

**Conclusions.** These results suggest the need for increased attention to the long-term care needs of individuals with SMI. Additional steps need to be taken to ensure that patients with SMI are offered appropriate alternatives to nursing home care and receive adequate screening before admission to nursing home treatment. (*Am J Public Health.* 2013;103:1325–1331. doi:10.2105/AJPH.2012.300783)

first 2 decades, there was evidence for transinstitutionalization because patients previously treated in state-run psychiatric facilities were enrolled in increasing numbers in nursing homes. Similar to the Canadian evaluation, this pattern continued until community-based mental health services evolved to meet the needs of these psychiatric patients, with transinstitutionalization to nursing home care ending by the early 1970s.<sup>8</sup>

Many nursing homes are unable to offer the specialized treatment required by patients discharged from state mental hospitals.<sup>9</sup> Concerns about such shortcomings led to the Omnibus Budget Reconciliation Act of 1987 (OBRA-87). This legislation set guidelines for standardized mental health screening and treatment within nursing homes, with the goal of reducing inappropriate admissions and improving the care of patients with

psychiatric conditions already enrolled in nursing home care. Although OBRA-87 had positive effects,<sup>10,11</sup> it also has its shortcomings.<sup>12</sup>

Despite OBRA-87, available data suggest that nursing homes continue to have sizeable proportions of residents with serious psychiatric disorders. In a study of more than 9000 Veterans Health Administration (VHA) nursing home residents, nearly one fifth of residents (17.9%) met criteria for serious mental illness (SMI).<sup>13</sup> Similar levels of SMI prevalence were found in nursing home populations outside of the VHA.<sup>14,15</sup> It is unclear at this time whether these patients were placed appropriately into nursing home care or inappropriately admitted in the absence of adequate inpatient psychiatric services.

Reductions in psychiatric inpatient bed availability have continued in recent years. There has been a national reduction from 99 223 psychiatric beds in 1990 to 55 576 beds in

2009 within hospitals.<sup>16</sup> Meanwhile, nursing home bed availability has increased. The number of available beds within skilled nursing homes increased from 512 107 in 1990 to more than 1.5 million in 2009.<sup>16</sup>

Transinstitutionalization demonstrates the interconnectedness of institutional settings.<sup>17</sup> To date, however, few studies assessed relationships between psychiatric inpatient and long-term care services in a single health system. Although transinstitutionalization to nursing homes was observed in previous decades, it is unclear whether these patterns continued in recent years. This study examined trends in psychiatric inpatient resources in the VHA health system, in association with VHA-funded nursing home care, which includes both VHA-owned nursing homes (which are today known as Community Living Centers) and VHA-contracted community nursing homes. To further evaluate the potential for transinstitutionalization between these settings, changes in the process of inpatient psychiatric care were tracked to evaluate evidence for unmet psychiatric needs. This study had 3 primary objectives: (1) to assess trends in VHA inpatient psychiatric beds from fiscal year 1999 (FY99) to FY07, (2) to assess relationships between changes in VHA inpatient psychiatric bed supply and the prevalence of SMI in VHA nursing home residents, and (3) to assess potential relationships between VHA psychiatric inpatient bed availability and the appropriateness of VHA nursing home admissions for patients with SMI.

## METHODS

We analyzed patient level administrative data from the VHA National Patient Care Database and Minimum Data Set records for VHA nursing home residents from FY99 to FY07.

We identified all recipients of VHA nursing home care, including residents of VHA Community Living Centers and VHA-funded community nursing homes. We identified nursing home stays based on VHA service codes specific to nursing home care.

Resident demographics and diagnostic data were collected from records during the stay or previous 6 months. These data were used to calculate Charlson comorbidity index scores<sup>18</sup>

and to identify dementia, substance abuse, and depression status. SMI status (schizophrenia, bipolar disorder, or other psychotic disorder) was assessed based on review of all VHA encounters during the resident's stay and up to 3 years before admission.

For each cohort, we assessed previous VHA service utilization in the form of previous-year VHA nursing home care, inpatient general medicine, and inpatient psychiatry days. We assessed inpatient psychiatric bed availability using administrative data from the VHA Service Support Center Bed Control briefing book and calculated full-year assessments of VHA nursing home stays, individuals with stays, and average length of stay.

To evaluate site-level relationships between inpatient psychiatric bed availability and nursing home care admission, we classified each VA parent treatment site ( $n = 110$ ) as either experiencing a "closure" or "nonclosure," based on a cutoff of a 25% or greater reduction in the number of inpatient psychiatric beds or an absolute decrease of at least 25 beds. We performed difference-in-difference analyses of the percentage of nursing home admissions constituted by patients with SMI, percentage of admissions to nursing home care from inpatient psychiatric units, and percentage of nursing home admissions with a history of inpatient psychiatric treatment. For all difference-in-difference analyses, we compared years before closure with years after closure, and sites were evaluated based on 1- and 2-year trends around the year of closure. For sites that did not have a reduction in inpatient bed availability, a year was randomly selected within the study period for the pre-post comparisons.

Appropriateness of nursing home admissions was determined via a multistep process. The Michigan Medicaid Nursing Facility Level of Care Determination (MI-LOCD)<sup>19</sup> is an evaluation that certifies individuals as functionally or medically eligible for nursing home-level care. A completed MI-LOCD evaluation is based on 7 areas (dependence in activities of daily living, cognitive performance, physician involvement, treatments and conditions, skilled rehabilitation therapies, behavior, or service dependence) and results in the determination of whether a patient was appropriately admitted to nursing home care based on their

level of functioning in these areas. Using available MI-LOCD community living center admission evaluations performed during FY05 through FY08 ( $n = 149\ 946$ ), we used propensity score methodology to create a profile of resident characteristics associated with in-appropriate admission status. We then applied this profile to patients admitted to VHA nursing home care during FY99 through FY07, with each individual receiving a score reflecting their probability of receiving an inappropriate admission, based on the level of agreement between their characteristics and the profile. We used this approach because MI-LOCD ratings were not available for patients admitted to VHA community nursing home care during the study or for patients admitted to VHA community living center care during FY99 through FY04.

## RESULTS

Table 1 presents results of analyses evaluating inpatient psychiatric bed utilization across the entire VHA system. For simplicity of presentation, we reported information for select years in FY99 through FY07. The number of VHA inpatient psychiatric beds decreased from 6570 in FY99 to 4745 in FY07, and the number of available psychiatric beds per 1000 VHA patients decreased from 1.93 to 0.93. Also, the average length of inpatient psychiatric stay decreased from 33.1 days in FY99 to 19.0 days in FY07 ( $t [155,344] = 7.91; P < .001$ ), and the percentage of inpatient admissions of less than 7 days increased from 40.6% in FY01 to 45.2% in FY07 ( $\chi^2 [1] = 1277; P < .001$ ), whereas the percentage of longer admissions decreased in every length of stay category ( $\geq 14$  days: 35.2% in FY99 to 29.7% in FY07;  $\chi^2 [1] = 832.10; P < .001$ ;  $\geq 30$  days: 13.0% in FY99 to 12.3% in FY07,  $\chi^2 [1] = 26.50; P < .001$ ;  $\geq 100$  days: 2.8% in FY99 to 2.4% in FY00;  $\chi^2 [1] = 49.10; P < .001$ ). Psychiatric bed occupancy decreased from 79.1% in FY00 to 64.9% in FY07, whereas the annual number of VHA patients increased (from 3 405 268 in FY99 to 5 124 211 in FY07); the number of inpatient psychiatric stays decreased (from 135 905 in FY99 to 112 348 in FY07); and the average number of yearly admissions per patient remained stable (1.6 in FY99 vs 1.6 in FY07).

**TABLE 1—Trends in Veterans Affairs Inpatient Psychiatric Bed Availability and Use: Bed Supply and the Prevalence of Serious Mental Illness in Veterans Affairs Nursing Homes, Select Years, 1999–2007**

Characteristic	FY99, No. (%) or Mean ±SD	FY02, No. (%) or Mean ±SD	FY04, No. (%) or Mean ±SD	FY07, No. (%) or Mean ±SD	FY99 vs FY07		
					$\chi^2$ or t	df	P
VHA total beds	43 894	42 277	41 711	40 928			
Inpatient psychiatric beds	6570	5721	5167	4745			
Average daily census	NA	3773	3351	3078			
Bed occupancy, %	NA	66.10	64.90	64.90			
VHA patients	3 405 268	4 448 734	4 884 726	5 124 211			
Psychiatric beds/1000 patients	21.93	1.29	1.06	0.93			
Stays	135 905	115 826	114 327	112 348			
Individuals	84 587	74 334	73 123	72 114			
Stays per individual	1.6 ±1.3	1.6 ±1.2	1.6 ±1.2	1.6 ±1.2	155 344	7.91	<.001
Length of stay, d	33.1 ±272.4	24.4 ±180	20.8 ±126.2	19 ±83	165 625	18.12	<.001
< 7	51 798 (38.10)	48 199 (41.60)	49 430 (43.20)	50 790 (45.20)	1277	1.00	<.001
≥ 7–13	84 107 (61.90)	67 627 (58.40)	64 897 (56.80)	61 558 (54.80)	1277	1.00	<.001
≥ 14–29	47 839 (35.20)	35 940 (31.00)	34 346 (30.00)	33 415 (29.70)	832.1	1.00	<.001
≥ 30–99	17 668 (13.00)	13 528 (11.70)	13 116 (11.50)	13 829 (12.30)	26.5	1.00	<.001
≥ 100	3836 (2.80)	2900 (2.50)	2614 (2.30)	2664 (2.40)	49.1	1.00	<.001

Note. FY = fiscal year; NA = not available; VHA = Veterans Health Administration.

### Nursing Home Utilization

Table 2 presents results of analyses assessing changes in the characteristics of individuals receiving nursing home care across the entire VHA system. The percentage of VHA nursing home recipients with SMI increased from 29.4% in FY99 to 43.8% in FY07 ( $\chi^2[1] = 662.20$ ;  $P < .001$ ). An increase in prevalence from FY99 to FY07 was consistent across all SMI diagnostic groups, with the prevalence of schizophrenia rising from 16.8% to 20.7%, the prevalence of bipolar disorder rising from 4.5% to 6.4%, and the prevalence of other psychotic diagnoses rising from 8.1% to 16.7%. The prevalence of other comorbid mental health concerns nearly doubled during this same period (17.7%–31.5% in substance use disorders [ $\chi^2(1) = 767.10$ ;  $P < .001$ ]; 10.9%–22.3% in depressive disorders [ $\chi^2(1) = 703.60$ ;  $P < .001$ ]).

The demographic characteristics of veterans admitted to nursing homes were fairly stable, with minimal changes in age, medical comorbidity, or gender. There were modest changes in marital status (38.9% married, 41.4% never married, 19.1% not married in FY99; 37.6% married, 42.0% never married, 20.0% not married in FY07;  $\chi^2[2] = 8.30$ ;  $P < .05$ ) and race (80.7% White, 17.4%

African American, 1.1% other in FY99; 79.4% White, 16.9% African American, 2.2% other in FY07;  $\chi^2[2] = 91.30$ ;  $P < .001$ ). The percentage of veterans admitted with a service-related disability of 70% or higher rose from 25.4% in FY99 to 56.7% in FY07 ( $\chi^2[1] = 3007.60$ ;  $P < .001$ ). These results are presented in Table 2.

Table 2 also presents analyses of previous-year VHA service use of nursing home care recipients. The percentage of patients admitted to nursing homes who had a previous-year inpatient psychiatric stay decreased (83.6% in FY99 to 82.1% in FY07 [ $\chi^2(1) = 29.70$ ;  $P < .001$ ]), although there was an accompanying moderate decrease in the average number of previous-year inpatient psychiatric days (25.5 in FY99 vs 16.6 in FY07;  $\chi^2[1] = 35.30$ ;  $P < .001$ ). Previous-year nursing home days decreased slightly (17.3 in FY99 to 16.0 in FY07;  $\chi^2[1] = 3.90$ ;  $P < .001$ ), whereas inpatient medical treatment days were reduced by half (6.2 in FY99 to 3.3 in FY07;  $\chi^2[1] = 14.50$ ;  $P < .001$ ).

### Site-Level Evaluations of Nursing Home Admissions

Table 3 presents information related to site-level relationships between changes in

inpatient psychiatric bed capacity and nursing home admission. During the study, 20 sites experienced a closure of inpatient psychiatric beds, whereas 90 did not experience such a closure. Nonclosure sites did not experience significant 1- or 2-year changes in percentage of admissions of veterans with SMI (1-year change: 0.06%;  $P > .05$ ; 2-year change:  $-0.01\%$ ;  $P > .05$ ), percentage of nursing home admissions from inpatient psychiatric care (1-year change:  $-0.19\%$ ;  $P > .05$ ; 2-year change:  $-0.54\%$ ;  $P > .05$ ), or percentage of nursing home admissions with a history of inpatient psychiatric treatment (1-year change: 0.02%;  $P > .05$ ; 2-year change:  $-0.49\%$ ;  $P > .05$ ). Similarly, sites that experienced a closure of inpatient psychiatric beds did not experience significant 1- or 2-year changes in percentage of admissions of veterans with SMI (1-year change:  $-0.07\%$ ;  $P > .05$ ; 2-year change: 1.47%;  $P > .05$ ), percentage of nursing home admissions from inpatient psychiatric care (1-year change: 1.28%;  $P > .05$ ; 2-year change: 0.81%;  $P > .05$ ), or percentage of nursing home admissions with a history of inpatient psychiatric care (1-year change: 0.35%;  $P > .05$ ; 2-year change: 1.53%;  $P > .05$ ).

Comparisons between closure and nonclosure sites similarly did not reflect significant

**TABLE 2—Demographics of Veterans Health Administration Nursing Home Residents: Bed Supply and the Prevalence of Serious Mental Illness in Veterans Affairs Nursing Homes, Select Years, 1999–2007**

Characteristic	FY99 (n = 15 234), No. (%) or Mean ±SD	FY02 (n = 13 347), No. (%) or Mean ±SD	FY04 (n = 13 570), No. (%) or Mean ±SD	FY07 (n = 14 323), No. (%) or Mean ±SD	FY99 vs FY07		
					$\chi^2$ or t	df	P
Female	518 (3.4)	468 (3.5)	459 (3.4)	487 (3.4)	0	1.00	.999
Age at entry, y	72.7 ±11.4	73.1 ±11.6	73.1 ±12	72.9 ±12.7	28 686	-1.65	.099
Service connection ≥ 70%	3869 (25.4)	4030 (30.2)	4976 (36.7)	8127 (56.7)	3007.6	1.00	<.001
Race					91.3	3.00	<.001
White	12 298 (80.7)	10 781 (80.8)	10 869 (80.1)	11 372 (79.4)			
African American	2648 (17.4)	2316 (17.4)	2372 (17.5)	2419 (16.9)			
Other	171 (1.1)	204 (1.5)	273 (2)	321 (2.2)			
Marital status					8.3	3.00	.041
Married	5924 (38.9)	5161 (38.7)	5036 (37.1)	5385 (37.6)			
Never Married	6313 (41.4)	5658 (42.4)	5908 (43.5)	6008 (42)			
Not Married	2913 (19.1)	2483 (18.6)	2588 (19.1)	2866 (20)			
Any SMI	4483 (29.4)	4614 (34.6)	5208 (38.4)	6279 (43.8)	662.2	1.00	<.001
SMI category					796.2	3.00	<.001
Schizophrenia	2562 (16.8)	2309 (17.3)	2417 (17.8)	2965 (20.7)			
Bipolar disorder	686 (4.5)	676 (5.1)	804 (5.9)	920 (6.4)			
Other psychoses	1235 (8.1)	1629 (12.2)	1987 (14.6)	2394 (16.7)			
Dementia	7174 (47.1)	6606 (49.5)	6709 (49.4)	6938 (48.4)	5.4	1.00	.021
Substance abuse or dependence	2690 (17.7)	3531 (26.5)	4006 (29.5)	4512 (31.5)	767.7	1.00	<.001
Depression	1657 (10.9)	2534 (19)	2816 (20.8)	3196 (22.3)	703.6	7.00	<.001
Charlson score	2.81 ±2.26	3.19 ±2.47	3.19 ±2.42	2.81 ±2.25	29 555	0.12	.905
Prior-year service utilization							
Inpatient psychiatric stay	8493 ±55.8	9578 ±71.8	10 127 ±74.4	11 121 ±77.6	1	1585	<.001
VHA nursing home care, d	27.7 ±80.4	36.5 ±91.8	35.7 (88.6)	64.5 ±116.8	25 218	31.4	<.001
Inpatient medical care, d	7.3 ±39.6	13.7 ±58.9	13.8 ±58.4	13.1 ±53.6	26 289	10.5	<.001
Days of inpatient psychiatric care	24.2 ±56.9	27.4 ±60.7	23.1 ±52.1	19 ±42.2	28 040	9.00	<.001

Note. FY = fiscal year; SMI = serious mental illness; VHA = Veterans Health Administration.

differences between the 2 in terms of 1- or 2-year changes in percentage of nursing home admissions with SMI (1-year difference: -0.13%;  $P > .05$ ; 2-year difference: -3.20%;  $P > .05$ ), percentage of nursing home admissions from inpatient psychiatric care (1-year difference: 1.47%;  $P > .05$ ; 2-year difference: 1.35%;  $P > .05$ ), or percentage of nursing home admissions with a history of inpatient psychiatric care (1-year difference: 0.33%;  $P > .05$ ; 2-year difference: 2.01%;  $P > .05$ ).

### Appropriateness of Nursing Home Admissions

Table 4 presents analyses of nursing home admissions appropriateness, by SMI status. Utilizing the appropriateness profile generated from MI-LOCD ratings of community living center

admissions, the probability of inappropriate admission for patients with SMI decreased (0.048 in FY99 to 0.041 in FY07), with an average overall probability of inappropriate admission of 0.040 during the study. The average probability of inappropriate VHA nursing home admission for non-SMI veterans decreased from 0.037 to 0.029, with an overall probability of inappropriate admission of 0.32 during the study. This difference met statistical significance ( $t [126,560] = -47.89$ ;  $P < .001$ ), with patients with SMI more likely to receive an inappropriate admission to nursing home care.

### DISCUSSION

Reductions in inpatient psychiatric bed supply and concurrent increases in the prevalence

of SMI among nursing home residents suggests the potential for inappropriate shifts in the locus of care for VHA patients with SMI.

### Decrease in Inpatient Psychiatric Beds and Inpatient Care Changes

Over the course of the study, several trends suggested changes in access to and delivery of VHA inpatient psychiatric services. Decreases in average bed occupancy and number of patients admitted despite substantial increases in overall VHA patient counts suggested that steps were being taken to redirect patients to outpatient treatment alternatives. Additionally, reductions in the average length of inpatient psychiatric stay suggested that inpatient treatments were being administered in a manner that focused on short-term symptom management and referral to outpatient

**TABLE 3—Site-Level Difference in Differences for Admissions of Patients to Nursing Home Care, Before and After Closure of Inpatient Psychiatric Units: Bed Supply and the Prevalence of Serious Mental Illness in Veterans Affairs Nursing Homes, 1999–2007**

Outcome	No Closure (n = 90)				Closure (n = 20)				Difference in Differences		
	% Before (A)	% After (B)	Change (C = B - A)	P	% Before (D)	% After (E)	Change (F = E - D)	P	Estimate (G = F - C)	95% CI	P
Admissions % SMI, 1 y	25.44	25.50	0.06	.919	28.41	28.34	-0.07	.942	-0.13	-2.39, 2.13	.91
Admissions % SMI, 2 y	24.78	24.77	-0.01	.991	27.97	29.44	1.47	.515	1.48	-3.20, 6.17	.535
Admissions from inpatient psychiatric unit, 1 y	1.53	1.34	-0.19	.115	1.99	3.27	1.28	.223	1.47	-0.60, 3.55	.165
Admissions from inpatient psychiatric unit, 2 y	0.20	1.46	-0.54	.175	2.48	3.29	0.81	.668	1.35	-2.42, 5.12	.484
Admissions with history of inpatient psychiatric treatment, 1 y	2.37	2.39	0.02	.925	3.57	3.91	0.35	.597	0.33	-1.00, 1.66	.628
Admissions with history of inpatient psychiatric treatment, 2 y	2.83	2.34	-0.49	.278	3.09	4.62	1.52	.178	2.01	-0.37, .40	.098

Note. CI = confidence interval; SMI = serious mental illness.

follow-up. These trends were in contrast to the stable number of average admissions per patient, suggesting a stable need for intensive, inpatient psychiatric services during the study.

**Changes in Percentage of Patients With Serious Mental Illness**

During the study, there was a large increase in the percentage of VHA nursing home patients with SMI, with the percentage of patients with SMI in VHA nursing home care in FY07 comparable to those seen in the general population following deinstitutionalization in the early 1980s (43.8% in this study vs 44% in 1980<sup>20</sup>). During this same period, the prevalence of other comorbid mental health conditions also greatly increased, with nearly a doubling in substance use disorders and more than doubling in depression in VHA nursing home patients. This suggested an increase in the level of

psychiatric disability of patients admitted to VHA nursing home care during the study.

Such an increase in psychiatric disability was contrasted with the decreased length of previous-year inpatient medical and psychiatric service use of VHA nursing home admissions, suggesting that patients admitted to VHA nursing homes utilized outpatient services to manage their various treatment needs before their admission and that outpatient care was not sufficient for effective management of their various treatment needs. These patients' need for intensive psychiatric care was further suggested by the consistently high rates of previous-year inpatient psychiatric treatment (> 80%).

Another important finding was the drastic increase in the percentage of veterans admitted to VHA nursing home care with a high level of service-connected disability. Such an increase might be partially because of legislation passed in 2000<sup>21</sup> that requires the VHA to provide

nursing home care to any veteran who is service connected at 70% or more and would benefit from such care. Because veterans with SMI tend to receive service-connected disability levels higher than other diagnostic groups, an increase in SMI in VHA nursing homes might also be partially because of the effects of this legislation on screening and referral of older SMI veterans.

**Site-Level Changes, Bed Availability, and Admission Rate**

Site-level evaluations failed to find relationships between inpatient psychiatric bed availability and admissions to nursing home care. No differences were found in terms of percentage of patients with SMI admitted to nursing home care, percentage of admissions to nursing home care from inpatient psychiatric care, or percentage of nursing home admissions with a history of inpatient psychiatric treatment between sites that experienced

**TABLE 4—Probability of Inappropriateness of Nursing Home Admissions by Serious Mental Illness Status, Based on Appropriateness Profile: Bed Supply and the Prevalence of Serious Mental Illness in Veterans Affairs Nursing Homes, Select Years, 1999–2007**

SMI status	FY99, b (95% CI)	FY01, b (95% CI)	FY03, b (95% CI)	FY05, b (95% CI)	FY07, b (95% CI)	Average, FY99–07, b (95% CI)
No SMI	0.037 (0.037, 0.038)	0.036 (0.035, 0.036)	0.029 (0.028, 0.029)	0.027 (0.026, 0.027)	0.029 (0.028, 0.029)	0.032 (0.032, 0.032)
SMI	0.048 (0.047, 0.049)	0.045 (0.044, 0.046)	0.036 (0.035, 0.036)	0.036 (0.035, 0.037)	0.041 (0.040, 0.042)	0.040 (0.040, 0.041) <sup>a</sup>

Note. CI = confidence interval; FY = fiscal year; SMI = serious mental illness.  
<sup>a</sup>t(77,355) = -44.37; P < .001

a sizable reduction in inpatient psychiatric beds ( $\geq 25\%$  or  $\geq 25$  beds) and sites without such a reduction. Furthermore, a lack of such relationships was seen when considering both 3-year (1 year before and after the reduction year) as well as 5-year (2 years before and after the reduction year) trends. These results suggested that VHA patients with SMI were not being inappropriately admitted to nursing home care because of an absence of adequate inpatient psychiatric services.

### Inappropriate Admissions and Decrease of Inpatient Beds

During this study, the probability of inappropriate admission to VHA nursing home care slightly decreased for patients, independent of SMI status. Inappropriate admission to nursing home care is concerning because of efforts to place patients into the least-restrictive treatment setting that can meet their needs (e.g., the Olmstead Act<sup>22</sup>) and because such inappropriate placement can result in the loss of a needed care opportunity for another patient appropriate for nursing home treatment. Although the chance of inappropriate admission remained low for both groups, patients with SMI were significantly more likely to be inappropriately admitted to VHA nursing home care than were patients without SMI. These results suggested that the majority of patients admitted to VHA nursing homes were appropriately matched to treatment setting, although patients with SMI were more likely to be inappropriately matched than were patients without SMI. As the number of available VHA inpatient psychiatric beds decreased, the rate of inappropriate VHA nursing home admissions for patient with SMI slightly decreased.

Many other factors appeared to influence this situation. Some factors (e.g., more accurate screening of appropriateness<sup>11</sup> or increased availability of intensive outpatient treatment options<sup>23</sup>) might reduce the chances of inappropriate admission, whereas others (e.g., mandates that all veterans with 70% or higher levels of service-connected disability receive VHA nursing home care<sup>21</sup>) might contribute to inappropriate admissions. Slow reductions in the probability of inappropriate admission might be the result of

improvements in outpatient care and screening to appropriately address the treatment needs of patients with SMI in the face of reductions of high-intensity psychiatric treatment options. Additional work is merited to evaluate the differential effects of these various factors.

### Summary and Future Directions

This study suggested that reductions in available inpatient psychiatric beds did not directly contribute to the inappropriate admission to nursing home care of veterans with SMI. However, independent of cause, such inappropriate admissions continue to occur for veterans with SMI at an elevated rate relative to veterans without SMI. This study represented the first large-scale evaluation of associations between inpatient psychiatric bed supply and SMI prevalence in nursing homes within the VHA health system. The results of this study suggested the need for increased attention to the long-term care needs of individuals with SMI. Additional steps need to be taken to ensure that patients with SMI are offered appropriate alternatives to nursing home care and receive adequate screening before admission.

There were caveats related to the findings within this study. Estimations of nursing home appropriateness represented a rough estimate of this area and were not good substitutes for direct individual evaluations of specific patients performed by trained staff. Finally, many other factors that affected the process of care and patient and treatment matching could not be accounted for during the course of this study—future work should attempt to address the effects of such factors. ■

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### Contributors

N. W. Bowersox, B. J. Szymanski, and J. F. McCarthy all conceptualized the study and analytical design. B. J. Szymanski collected and analyzed data relevant to this project. Analysis results were reviewed and interpreted by N. W. Bowersox, B. J. Szymanski, and J. F. McCarthy. N. W. Bowersox drafted the article, and B. J. Szymanski and J. F. McCarthy provided critical revisions.

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### Human Participant Protection

This study was approved by the institutional review board of the Ann Arbor Veterans Affairs Medical Center.

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