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# Comparison of Resource Utilization for Medicaid Dementia Patients Using Nursing Homes Versus Home and Community Based Waivers for Long-Term Care

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# Comparison of Resource Utilization for Medicaid Dementia Patients Using Nursing Homes Versus Home and Community Based Waivers for Long-Term Care

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**Background:** Medicaid waiver home and community-based long-term care services (HCBS) may provide a partial solution to the escalating costs of long-term care. Persons with dementia can have complex caregiving needs; it is unknown whether their expenditures and resource utilization differ between community-based versus institutional settings.

**Objective:** To compare expenditures and resource utilization for Medicaid recipients with dementia who received long-term care through a nursing home versus HCBS waivers.

**Design:** Twelve-month cohort study.

**Setting:** Indiana Medicaid administrative data from 2001 through 2004.

**Participants:** Medicaid recipients with dementia who lived in the community 6 months before receiving long-term care through nursing homes (N = 1534) or HCBS waivers (N = 174).

**Measurements:** Monthly inpatient and emergency department rates and total expenditures adjusted for prior use, demographics, insurance status, and comorbidities.

**Results:** Adjusted rates of inpatient use were stable for nursing home patients (0.06) but significantly increased over 12 months for HCBS recipients (0.07–0.12;  $P = 0.048$ ). Adjusted total expenditures increased over 12 months from \$1419 to \$2002 for HCBS recipients ( $P < 0.001$ ), but remained stable for those in nursing homes (\$3413–\$3336). Long-term care expenditures were on average \$1688 per month higher for those in nursing homes.

**Conclusions:** The escalation in inpatient use for HCBS waiver recipients suggests that future development of HCBS programs should consider the unique needs of persons with dementia so as to

optimize their health outcomes. Despite increasing inpatient use among HCBS recipients, their overall expenditures remained significantly lower than those of nursing home patients.

**Key Words:** long-term care, dementia, Medicaid

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States are under increasing pressure to cap Medicaid spending, which has increased 63% in the past 5 years.<sup>1,2</sup> Efforts to curb spending have focused on reducing expenditures for long-term care, which consume nearly one-third of states' Medicaid budgets.<sup>3</sup> The Medicaid Home and Community Based Services (HCBS) program may provide a partial solution to the high costs of providing long-term care because it shifts the delivery of long-term care from expensive institutional settings to recipients' homes.

The Medicaid HCBS 1915(c) waiver program was established in 1981 to allow states to provide long-term care services in the community to individuals who would otherwise be cared for in institutional settings. Medicaid recipients who are eligible for long-term care benefits may apply to receive waiver HCBS if services are available in the applicant's area and the array of services is appropriate for the applicant's medical needs.<sup>4</sup> Across states there are limited numbers of waiver slots available; consequently, the average waiting time to begin receipt of waiver HCBS is 9.6 months.<sup>4</sup>

States vary in the type and amount of waiver HCBS services offered to eligible older adults. Examples of waiver services include Adult Day Care, respite, personal care, chore services, a personal emergency response system, environmental adaptations, home delivered meals through their waiver program, nursing care, transportation, and medical equipment. Sixty-five percent of state waiver programs, including Indiana, offer at least 7 services to eligible older adults.<sup>5</sup> The type and amounts of services that an individual receives (eg, hours of personal care) are determined by the patient's medical and personal care needs, the availability of an unpaid caregiver, and the patient's other Medicaid expenditures. Although half of states do not impose limits on the amount of HCBS provided, federal guidelines require that average expenditures for waiver HCBS recipients do not exceed those of nursing home patients. Among the states that

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do have hourly limits, the average daily limit for personal care services is 4.8 hours.<sup>6</sup>

Nearly half of long-term care recipients have some form of dementia.<sup>7,8</sup> Many persons with dementia become eligible for long-term care because of disabilities in activities of daily living (eg, dressing, bathing, toileting), rather than a need for 24-hour skilled medical care.<sup>9,10</sup> Consequently, nursing homes may provide a level of care that is greater than what is needed by some persons with dementia. Conversely, the amount and type of waiver HCBS received may not be adequate for the complex and constant caregiving that many patients with dementia need. The purpose of this study is to compare health care utilization and Medicaid expenditures for Indiana Medicaid recipients with dementia who receive long-term care through HCBS waivers versus nursing homes.

## Methods

### Subjects

Subjects were Indiana Medicaid recipients who were eligible for benefits between July 1, 2001 and December 31, 2004. Of 71,873 recipients aged 40 and above who received long-term care services during this interval, 7002 lived in the community for at least 6 months before beginning long-term care services and remained in the same long-term care service for at least 3 months. Of these, 1708 had at least 2 claims with validated International Classification of Diseases Ninth Revision (ICD-9) codes for dementia within 1 year of the subject's study period.<sup>11</sup>

### Study Outcomes

Outcomes were measured monthly beginning with the first full month of receiving long-term care and included rates of inpatient services, emergency department (ED) services, and total Medicaid expenditures that includes inpatient, outpatient, pharmacy, long-term care, and other expenditures.

### Covariates

Covariates included baseline values of the outcome in the 6 months before admission to long-term care, age, gender, race, marital status, and geographic region of Indiana. Monthly, it was determined whether the subject had concurrent Medicare coverage and whether the subject had to pay some of their medical expenses out of their pocket (spend-down) because their income was above Medicaid's income standards. ICD-9 codes from the 6 months before the start of each subject's study interval were reviewed to compute a modified Charlson index.<sup>12</sup> Higher Charlson scores reflect greater number and severity of comorbid conditions.

### Statistical Analyses

Baseline characteristics of waiver HCBS and nursing home patients were compared using  $\chi^2$  tests. Differences between groups in the timing of dropping out of the study due to disenrollment or death were assessed using the log-rank test.

To assess differences in temporal trends in utilization between waiver and nursing home subjects, longitudinal multivariate logistic regression models were used. The repeated dependent variables in each model were probabilities

of admissions for each month. The time variable indicated the month the outcome was measured. The independent variable reflected the type of long-term care the patient received (waiver HCBS or nursing home), and the time by long-term care interaction assessed for group differences in utilization trajectories. The correlation structure between the repeated observations for the same subject was assumed to be autoregressive (1); consistent results were obtained when using unstructured, independent, and exchangeable correlation structures. Probabilities were adjusted for utilization in the 6 months before long-term care and baseline and time-varying covariates that reached a significance level of 0.05 or less.  $\chi^2$  tests assessed whether utilization significantly differed between waiver and nursing home patients at each month. A Bonferroni correction ( $P = 0.004$ ) was applied a priori.

Longitudinal generalized linear models were computed to assess temporal patterns in expenditures. Expenditures were assumed to have a negative binomial distribution and covariates included in this model were the same as described above except that it also included expenditures in the 6 months before beginning receipt of long-term care.

All analyses were rerun using an intention-to-treat paradigm. These analyses addressed whether outcomes were affected by a patient terminating 1 form of care (eg, waiver HCBS) and beginning another form of care (eg, nursing home care) in the 4th through 12th months of the study interval.

## Results

Long-term care occurred in nursing homes for 1534 (90%) and through waivers for 174 (10%). HCBS waiver patients were more likely to be female, white, have one or more comorbidities, and have to meet spend-down criteria (Table 1). Nursing home subjects were more likely to be admitted to a hospital in the 6 months before receiving long-term care with expenditures for inpatient use averaging \$166 more per month for nursing home than waiver HCBS patients. The 2 groups were similar in rates of ED use 6 months before starting long-term care with ED expenditures averaging \$3 per month less for waiver HCBS recipients. Attrition from the study due to death or disenrollment was similar ( $P = 0.99$ ) for waiver and nursing home patients.

Figure 1, Panel A shows adjusted monthly expenditures significantly diverged for the 2 groups ( $P < 0.001$ ). In the first month the adjusted total expenditures were \$3412 for nursing home subjects and \$1419 for waiver HCBS subjects ( $P < 0.001$ ). During the twelfth month of service, adjusted expenditures were \$3336 for nursing home patients and \$2002 for waiver HCBS ( $P < 0.001$ ) recipients. Differences in total expenditures primarily can be attributed to long-term care expenditures which averaged \$1688 per month higher for nursing home patients. The intention-to-treat analysis yielded similar results.

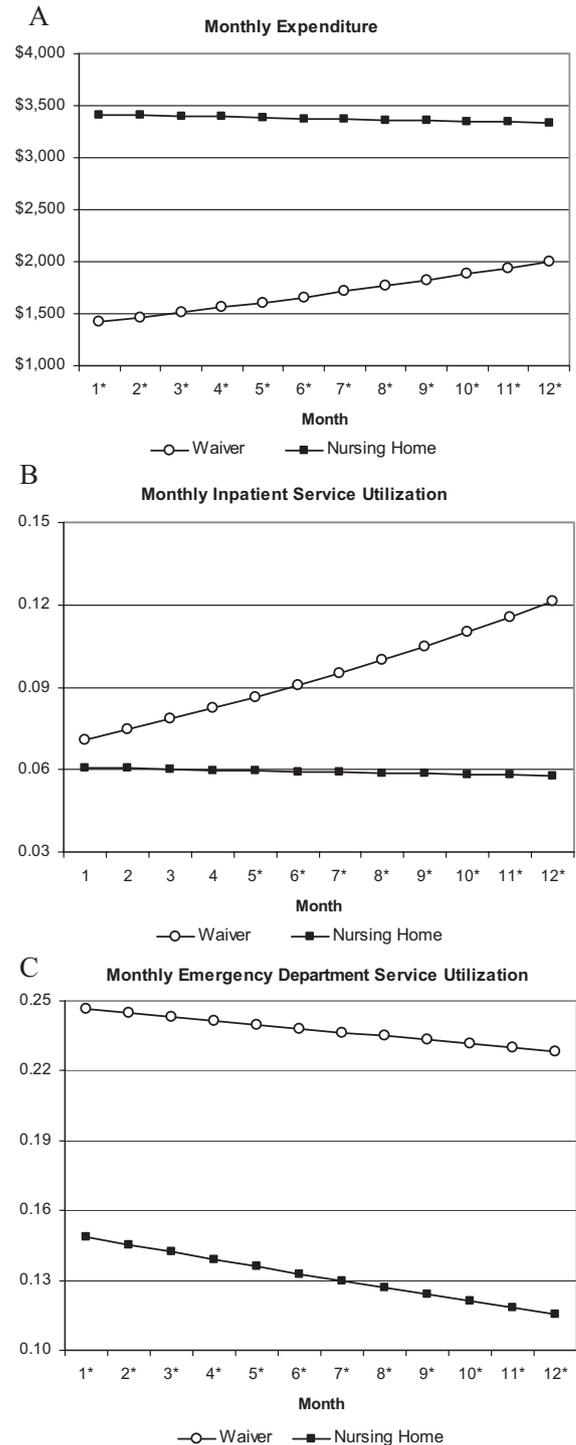
Figure 1, Panel B shows that the adjusted probabilities of inpatient admission were significantly higher for waiver HCBS subjects beginning with month 5. By month 12, the adjusted probability of an inpatient admission was 0.12 for waiver HCBS subjects compared with 0.06 for nursing home subjects ( $P < 0.001$ ). The time by type of long-term care interaction ( $P = 0.047$ ; Table 2) indicates that the rate of

**TABLE 1.** Sample Characteristics

	Nursing Home N = 1534 (%)	Waiver N = 174 (%)	P
Age (yr)			0.99
40–79	785 (51)	89 (51)	
≥80	749 (49)	85 (49)	
Gender			0.03
Female	1164 (76)	145 (83)	
Male	370 (24)	29 (17)	
Race			<0.01
White	1275 (84)	122 (70)	
Other	245 (16)	52 (30)	
Marital status			0.44
Married	168 (11)	22 (13)	
Divorced	279 (19)	33 (19)	
Widowed	687 (45)	85 (48)	
Other	379 (25)	34 (20)	
Region			0.01
Central	612 (40)	86 (50)	
North	424 (28)	32 (18)	
South	498 (33)	56 (32)	
Medicare eligibility			0.41
Yes	1390 (91)	161 (93)	
No	144 (9)	13 (7)	
Spend-down			<0.01
Yes	506 (33)	85 (48)	
No	1028 (67)	89 (51)	
Charlson comorbidity score			<0.01
0	368 (24)	63 (36)	
1	383 (25)	33 (19)	
2+	782 (51)	78 (45)	
Congestive heart failure			0.12
Yes	485 (32)	45 (26)	
No	1049 (68)	128 (74)	
Chronic obstructive pulmonary disease			<0.01
Yes	433 (28)	31 (18)	
No	1101 (72)	143 (82)	
Hospitalization in prior 6 mo			<0.01
Yes	664 (43)	57 (33)	
No	870 (57)	117 (67)	
Emergency department visit in prior 6 mo			0.97
Yes	808 (53)	92 (53)	
No	726 (47)	82 (47)	
Average monthly expenditures in prior 6 mo, mean (SD)	692.22 (1793.73)	732.73 (1227.9)	0.70

inpatient admissions increased significantly more for waiver HCBS subjects than for nursing home subjects. Results from the intention-to-treat analysis provided similar estimates.

Figure 1, Panel C shows waiver subjects were significantly more likely to use ED services, but the 2 groups were similar in their temporal trends. By the twelfth month of



**FIGURE 1.** Change in expenditures, inpatient and emergency department admissions in the 12 months after beginning receipt of long-term care. Waiver refers to receipt of home and community based long-term care through Medicaid’s Aged and Disabled waiver. Nursing home refers to receipt of long-term care in a skilled nursing facility. Expenditures refer to total expenditures. The vertical axis for plots (B) and (C) refer to the probability of admission to that facility. \*Significant difference between the nursing home and waiver subjects at that month.

**TABLE 2.** Regression Analysis of Monthly Expenditures, Inpatient and Emergency Department Associated With Waiver HCBS and Nursing Homes Care

	Monthly Expenditures		Inpatient Use		Emergency Department Use	
	Estimate	P	Estimate	P	Estimate	P
Time	0.00	0.16	-0.01	0.66	-0.03	<0.01
Care						
Waiver	-0.91	<0.01	0.11	0.61	0.61	<0.01
Nursing home	0				0	
Care*Time						
Waiver	0.03	<0.01	0.06	0.05	0.02	0.45
Nursing home	0		0		0	
Race						
White	—	—	0		0	
Other			0.23	0.03	0.43	<0.01
Marital status						
Married	0				0	
Divorced	-0.07	0.04	—	—	-0.20	0.09
Widowed	-0.08	<0.01			-0.33	<0.01
Other	-0.01	0.67			-0.33	<0.01
Medicare eligibility						
No	0		0		0	
Yes	-0.30	<0.01	-0.61	<0.01	-0.43	<0.01
Spend-down status						
No	0		—	—	—	—
Yes	-0.07	0.03				
Charlson index						
0	0		0		0	
1	0.02	0.33	0.29	0.03	0.15	0.15
2+	0.04	0.03	0.53	<0.01	0.34	<0.01
Congestive heart failure						
Yes	—	—	0.25	<0.01	0.24	<0.01
No			0		0	
Average monthly expenditures in prior 6 mo (in thousands)	0.06	<0.01	—	—	—	—
Inpatient admissions in prior 6 mo						
Yes	—	—	0.30	<0.01	—	—
No			0			
Emergency department visits in prior 6 mo						
Yes	—	—	—	—	0.35	<0.01
No					0	

— indicates that the covariate did not contribute significantly to the prediction of the outcome (ie,  $P > 0.05$ ).

service the adjusted probabilities were 0.12 for nursing home subjects and 0.23 for waiver HCBS subjects ( $P < 0.001$ ). The intention-to-treat analysis yielded similar results.

## Discussion

This study revealed that among persons with dementia, rates of inpatient admissions rise as length of time of receiving waiver HCBS increases. Although rates of inpatient admissions were similar when the 2 groups began long-term care, by month 12, the probability of an inpatient admission was 2 times higher for those using waiver HCBS than for those in nursing homes. Prior studies have provided evidence that lower amounts of long-term care services are associated with higher rates of inpatient admissions and mortality,<sup>13,14</sup>

suggesting that inadequate provision of long-term care can affect patients' health.<sup>15</sup> Data used for this study did not include information about the type or volume of services that waiver HCBS subjects received, so it was not possible to determine whether higher rates of admissions were seen for subjects who received fewer services.

Waiver HCBS play an important role in long-term care delivery. Compared with meeting long-term care needs through nursing homes or family members (20% of whom quit work to care for their elder<sup>16</sup>), waiver HCBS allow nursing home eligible older adults to receive paid long-term care services in their home. Rather than interpreting the results of this study to suggest that use of waiver HCBS

results in undesirable outcomes for recipients with dementia, we propose that greater monitoring and coordination of waiver HCBS recipients' primary and long-term care services are needed to optimize health related outcomes for waiver HCBS recipients. The analysis of total expenditures provides additional support for this conclusion. Despite increasing inpatient use among HCBS recipients, their overall expenditures remained significantly lower than those of nursing home patients, suggesting that HCBS waivers may provide a partial solution to the escalating costs of long-term care.

Prior publications evaluating waiver HCBS services have not focused on persons with dementia whose complex long-term caregiving needs may differ from HCBS recipients without dementia. The long-term care needs of persons with dementia are influenced by patients' cognitive and social functioning<sup>17,18</sup> and caregivers' level of burden.<sup>18,19</sup> The need for HCBS programs that are designed for the unique needs of persons with dementia is evident from a study that found that older adults at greatest risk of transition from waiver HCBS to a nursing home were those with a diagnosis of dementia.<sup>20</sup> The development of HCBS programs should integrate components that simultaneously consider the patients' disabilities as well as their primary care needs because most persons with dementia receiving HCBS have significant comorbidity.<sup>21–23</sup>

There are several limitations to this study. Although recipients enrolled in the waiver HCBS program met the same eligibility criteria as the nursing home patients,<sup>24</sup> there may have been unmeasured differences in the patients' clinical status that may have explained the results. To reduce this possibility, we experimentally controlled for prior long-term care use by including only recipients who lived in the community for 6 months before admission to long-term care, and we statistically controlled for the patients' insurance status, comorbidities, marital status, and health care utilization before beginning long-term care. For example, when modeling differences in hospital admission rates, we controlled for prior rates of hospitalization. However, we recognize that statistical adjustment does not provide the same control over potentially confounding variables as a randomized control trial. It is also important to note that some acute illnesses could have been successfully treated in-house for nursing home patients. If this occurred, it would explain why inpatient admissions rates were lower for nursing home patients. However, it would not explain why inpatient admissions steadily increased for recipients of waiver HCBS. This trend was surprising given that nursing home patients had significantly higher rates of inpatient admissions in the 6 months before beginning long-term care. Another limitation of the study was that it was not possible to quantify the amount of formal or informal caregiving that subjects received and the extent to which it may have influenced increasing inpatient use and expenditures for patients receiving waiver HCBS.

In conclusion, further research is needed to evaluate methods of allocating limited public dollars to fund long-term care for persons with dementia. Specifically, research should be directed towards determining how to deliver waiver HCBS so that they optimally meet patients' complex medical and caregiving needs.

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## REFERENCES

1. Inglehart J. The dilemma of Medicaid. *N Engl J Med*. 2003;348:2140–2148.
2. Weil A. There's something about Medicaid. *Health Aff*. 2003;22:13–30.
3. O'Brien E, Elias R. *Medicaid and Long-term Care: The Henry J. Kaiser Family Foundation*; May 2004. Available at: www.kff.org.
4. Kitchener M, Ng T, Harrington C. Medicaid 1915(c) Home and Community-Based Services Waivers: a national survey of eligibility criteria, caps, and waiting lists. *Home Health Care Serv Q*. 2004;23:55–69.
5. Centers for Medicare and Medicaid Services. U.S. Department of Health and Human Services. Available at: www.cms.hhs.gov/MedicaidStWaivProgDemoPGL/.
6. LeBlanc A, Tonner C, Harrington C. State Medicaid programs offering personal care services. *Health Care Financ Rev*. 2001;22:155–173.
7. Mechanic D, McAlpine D. Use of nursing homes in the care of persons with severe mental illness: 1985–1995. *Psychiatr Serv*. 2000;51:354–358.
8. Miller S, Intrator O, Bozalo P, et al. Government expenditures at the end of life for short-and long-stay nursing home residents: differences by hospice enrollment status. *J Am Geriatr Soc*. 2004;52:1284–1292.
9. Fox P, Maslow K, Zhang X. Long-term care eligibility for people with Alzheimer's disease. *Health Care Financ Rev*. 1999;20:67–85.
10. Tonner M, Harrington C. Nursing facility and home and community based service need criteria in the United States. *Home Health Care Serv Q*. 2003;22:65–83.
11. Bharmal M, Weiner M, Sands L, et al. Relationship between dementia-defining criteria and the prevalence of dementia among 2003 Indiana Medicaid recipients. *Alzheimer Dis Assoc Disord*. 2007;21:92–100.
12. Deyo R, Cherkin D, Ciol M. Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. *J Clin Epidemiol*. 1992; 45:613–619.
13. Sands L, Wang Y, McCabe G, et al. Rates of acute care admissions for frail elders living with met versus unmet activity of daily living needs. *J Am Geriatr Soc*. 2006;54:339–344.
14. Albert S, Simone B, Brassard A, et al. Medicaid home care services and survival in New York City. *Gerontologist*. 2005;45:609–616.
15. Komisar H, Feder J, Kasper J. Unmet long-term care needs: an analysis of Medicare-Medicaid dual eligibles. *Inquiry*. 2005;42:171–182.
16. Covinsky K, Eng C, Lui L, et al. Reduced employment in caregivers of frail elders: impact of ethnicity, patient clinical characteristics and caregiver characteristics. *J Gerontol: Med Sci*. 2001;56A:M707–M713.
17. Gaugler JE, Kane RL, Kane RA, et al. The longitudinal effects of early behavior problems in the dementia caregiving career. *Psychol Aging*. 2005;20:100–116.
18. Gaugler J, Leach C, Clay T, et al. Predictors of nursing home placement in African Americans with dementia. *J Am Geriatr Soc*. 2004;52:445–452.
19. Yaffe K, Fox P, Newcomer R, et al. Patient and caregiver characteristics and nursing home placement in patients with dementia. *J Am Med Assoc*. 2002;287:2090–2097.
20. Bauer E. Transitions from home to nursing home in a capitated long-term care program: the role of individual support systems. *Health Serv Res*. 1996;31:309–326.
21. Fortinsky R, Fenster J, Judge J. Medicare and Medicaid home health and Medicaid waiver services for dually eligible older adults: risk factors for use and correlates of expenditures. *Gerontologist*. 2004;44:739–749.
22. O'Keefe J, Long S, Liu K, et al. How do they manage? Disabled elderly persons in the community who are not receiving Medicaid long-term care services. *Home Health Care Serv Q*. 2001;20:73–90.
23. Long S, Liu K, Black K, et al. Getting by in the community: lessons from frail elders. *J Aging Soc Policy*. 2005;17:19–44.
24. Weiner J, Tilly J, Alecxih L. Home and community-based services in seven states. *Health Care Financ Rev*. 2002;23:89–114.