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Design of Evaluation Options of the System Change Grants

Final Report

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DRAFT FINAL REPORT

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EXECUTIVE SUMMARY

The goal of the project was to identify and pilot analyses useful for monitoring and evaluating state's progress in reforming their long-term care systems, in part to evaluate the impact of the Systems Change grant program. The Centers for Medicare & Medicaid Services has awarded about $240 million since 2001 in approximately 300 separate grants to states and Independent Living Centers to foster long-term care reform. Because of the diversity of the grant goals, activities and scope, staggered implementation and a lack of quantitative data, it is not feasible to develop direct measures of the grant program as a whole or even of specific grant types. In addition, many projects lay the groundwork for future changes, such as establishing new waivers, but could not be expected to have a measurable impact in the short run. However, virtually every state is engaged in long-term care reforms consistent with the objectives of the Systems Change grant program that should ultimately prevent or delay institutionalization and facilitate return to the community for beneficiaries who have institutional stays. The challenge was to identify a quantitative approach to evaluate the impact of these activities and reforms that could provide information about how the nation as a whole and individual states are doing in reforming their long-term care systems as well as shedding light on the impact of specific features of state long-term care policy.

The common objective across grants and other long-term care reforms (to support community alternatives to institutionalization), combined with the availability of detailed information about nursing home residents collected through the Nursing Home Minimum Data Set (MDS), support the use of MDS data to analyze patterns related to facility admission and discharges and to use the results to make inferences about state long-term care reform. We hypothesized that well-developed home and community-based service systems could sustain people at higher levels of impairment in the community and that well integrated long-term care systems would support facility residents to return to community living. The first would be observable in the level of impairment of facility residents on admission, the second in the proportion of facility residents who are discharged back to the community. To test these hypotheses, we constructed a database combining over 2 years of MDS data, facility characteristics from the OSCAR data, state level supply variables, and state long-term care policy variables to monitor and evaluate the profile of new facility entrants and of discharge destinations. The analyses focus on long-stay residents, not those admitted to nursing facilities for short term rehabilitation or post-acute care.

This report details the use of admission and discharge assessment data from the Nursing Home Minimum Data Set (MDS) to observe state variation and changes over time in the profile of new entrants to nursing facilities and in discharge destinations. The results are used to make inferences about the strength of the home and community based system and states' progress in moving towards long-term care reform. With some refinements the approach piloted in this study could be used as a monitoring tool, evaluating patterns of facility admissions and discharges nationally and on the state level. There are also several ways this pilot approach could be extended as a research project to further understand state variation and factors associated with facility admissions and discharges.

The pilot analyses show gradually increasing functional impairment levels of newly admitted long-stay nursing facility residents, and gradual increases in the proportion of long-stay

residents returning to the community, both potential indicators of the effects of state rebalancing efforts. There is state variation on these measures and on the rate of change. Furthermore, the ratio of Medicaid home and community-based long-term care expenditures to total Medicaid long-term care expenditures is a significant predictor of these outcomes, and has the greatest impact of the state policy variables included in multivariate models. As the proportion of long-term care dollars spent on home and community-based services increases, so does the likelihood of discharge back to the community.

SECTION 1

1.1 Introduction

The goal of the project was to identify and pilot analyses useful for monitoring and evaluating state's progress in reforming their long-term care systems. Under the Systems Change grant program, the Centers for Medicare & Medicaid Services (CMS) has awarded about $240 million since 2001 in approximately 300 separate grants to states and Independent Living Centers. A review of the 2001 awards indicates that there are no direct measures readily available to evaluate the Systems Change grant program as a whole or specific types of grant activities due to the diversity of grants in goals and scope and timing and a lack of quantitative data about grant activities. In addition, many grants lay the groundwork for change that will not affect the service system in the short run- for example, developing new waivers or creating new service delivery options (Walsh, Greene and Brown, 2000). However, virtually every state is engaged in long-term care reforms and systems change activities that should ultimately prevent or delay institutionalization and facilitate return to the community for beneficiaries who have institutional stays.

Various types of activities fall under the rubric of long-term care reform. "Rebalancing" is generally used to refer to shifting the balance of funding from institutional care to spending more on home and community-based services (HCBS). This funding shift is accomplished through developing HCBS waivers, adding personal care services to the Medicaid state plan, and programs such as Money Follows the Person (MFP), which allows states to directly shift funds from facility to community care for individuals as they leave nursing facilities. Improving coordination across settings is another aspect of long-term care reform. Activities focused in this area include creating single entry points to the long-term care service system, enhanced case management activities, and projects like nursing facility transition programs that assist individuals to leave nursing facilities by linking them to community services. Other activities include efforts to increase the capacity of the home and community-based system, for example, through initiatives to recruit and train direct service workers and develop consumer directed personal care options.

1.2 Overall Approach

We used admission and discharge assessments from the Nursing Home Minimum Data Set, linked to facility characteristics from the OSCAR data, state supply variables, and several state-level LTC policy variables, to make inferences about the impact of HCBS on who is admitted and discharged from nursing homes. We hypothesized that in states with well-developed HCBS systems new entrants to nursing facilities would be more impaired, a higher proportion of long-stay residents would return to the community, and that these findings would be related to state LTC policies.

Across all rebalancing initiatives, the goal is to bolster the home and community service system, thus providing viable alternatives to nursing facility placement, and to help link people

to these alternatives. If effective, such activities ultimately would have an impact on nursing facility use, observable through analysis of the Nursing Home Minimum Data Set (MDS). This concept is based on a past qualitative research finding. Interviews with nursing facility administrators in Oregon, a state with an extensive and well organized HCBS system reported several changes they attributed to the state's long-term care reforms. Facility length of stay had decreased substantially as consumers had alternative long-term care options both prior to facility care and through active efforts to assist consumers to return to the community. Facility discharge destinations included community settings as well as hospitals, facility transfers or death. Overall, new entrants had become substantially more impaired over time, as consumers were able to age in place longer and less impaired candidates for facility admission were diverted to other settings (Walsh, Kulas, and Khatutsky, 2000). In the same study, quantitative analysis of Oregon's long-term care assessment data confirmed that facility residents in that state were substantially more impaired on average than other nursing home certifiable Medicaid beneficiaries.

Thus, aspects of nursing facility use and the characteristics of nursing facility residents might serve as measurable outcomes related to the effectiveness of the Systems Change projects, or more globally of state long-term care reform or rebalancing activities—regardless of the specific activity. Analyzing characteristics of facility residents on admission and discharge patterns could provide CMS and the states with important information about directions for future grant procurements and assessments. As a pilot, this project was designed to test the feasibility of using the MDS to compare the characteristics of new facility entrants and return to the community, across states and across time, and to relate these differences to long-term care reform measures.

SECTION 2
RESEARCH DESIGN

2.1 Hypotheses

The research hypotheses relate to the effects that the home and community service system, including waivers, service delivery models, service options, nursing facility transition and diversion activities and overall HCBS expenditures may have on the use of nursing facilities.

We have three hypotheses[1]:

H1: Well-developed HCBS systems can support people at high levels of impairment in the community.

The functional status of nursing facility entrants will be higher in states with strong HCBS systems and will increase over time as states engage in systems change. For example, this would occur as more alternatives to facility care become available, as states develop systems to link people to needed services are improved, and as the HCBS workforce is strengthened.

H2: Successful rebalancing or reform efforts would result in an increasing proportion of nursing facility discharges to the community, and an increasing proportion of facility discharges will be linked to HCBS

Nursing facility discharge destinations include return to the community, hospitalization, transfers across facilities, and death. As home and community service options and the systems to link people to community care increase, we would expect to see a higher proportion of discharges to the community.

H3: Any observed changes over time would be the result of ongoing reforms.

Changes in admission profiles or in discharge destinations could result from implemented reforms or from underlying changes in case mix due to factors like population aging or the compression of morbidity. While both may occur, if LTC reforms are effective, their impact would remain holding changes in case mix constant.

2.2 Analytic Approach

In summary, the analytic approach we piloted in this study includes the following:

- Use of **admission assessments** in the Nursing Home Minimum Data Set (MDS) to analyze and compare resident characteristics across states and over time.
- Use of MDS **discharge assessments** to analyze and compare discharge destinations across states and over time.

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[1] We also hypothesized that length of stay would be shorter in states with LTC reforms, but we could not test this hypothesis. While the discharge assessments have a field for admission date it is frequently missing.

- Inclusion of state LTC policy measures in multivariate analyses to observe their relationship to resident characteristics on admission and discharge destinations.
- Inclusion of facility characteristics and state supply variables as controls in multivariate analyses.

2.3 Methods

2.3.1 Data Sources

The data sources are summarized in ***Table 1***. The Nursing Home Minimum Data Set (MDS) provides detailed information about every facility resident. Assessments are conducted on admission, at discharge and at varying intervals including quarterly and annually. The data from the MDS is available quickly. Facilities submit data to their states monthly; states then forward the information to CMS, where it is quickly available for analysis. There is almost no lag in this process. Admission assessments include detailed information about demographics, insurance coverage, health, and functional status and can be used to generate various scores and Resource Utilization Groups (RUGS). The RUGS are measures of staffing intensity and are used to categorize residents for Medicare post-acute care payments, and in many states, as part of the Medicaid nursing facility payment formula. The discharge assessments have limited information, primarily discharge destination, demographics and insurance coverage. Although there is a field for admission date, this information is frequently missing and cannot be used to reliably to calculate length of stay.

We used MDS data from January 1, 2003–June 30, 2005 to create two samples: one to analyze characteristics of facility residents on admission, the second to analyze discharge destination patterns. We limited the samples to Medicaid beneficiaries, as these individuals would be eligible for Medicaid HCBS, and, as detailed in later sections, we eliminated individuals with stays of less than 30 days to avoid including people who were in a facility for rehabilitation or post acute care. For the admission sample, we dropped people with a second admission assessment or a discharge assessment within 30 days of admission. For the discharge sample, we dropped individuals who had another discharge or admission assessment in the previous thirty days.

We selected this time period for several reasons. First, we wanted to have the most recently available data at the time we constructed the files. Second, we wanted to allow time for the 2001 Systems Change grants to be operational and potentially having a measurable impact. We also wanted to have multiple years of data to observe time trends, and further divided the data into 10 quarters (3-month periods) to provide additional data points for trend analyses. The later sections describing each analysis will discuss details of the Admission and Discharge sample files.

For the admission analysis, our dependent variable is the ADL Score on admission, a measure of functional impairment. For the discharge analysis, we have two dependent variables: discharge to the community and a subset of this variable, discharge to the community with services. We provide additional detail about these variables in later sections.

Table 1
Variable construction and sources

Characteristic	Variable construction	Source
Dependent Variables		
ADL scores on admission	4-18 possible points based on level of dependence (1–5) in bed mobility, transferring, toileting and (1–3) eating	Admission assessment data from the Nursing Home Minimum Data Set, January 2003–March 2005
Discharge to community	Dichotomous variable based on Discharge destination = 1 if discharged to private home, or private home with home health, or assisted living.; =0 for all others including death, acute care hospital, psychiatric hospital, rehabilitation hospital, transfer to another nursing facility	Discharge assessment data from the Nursing Home Minimum Data Set, April 2003–June 2005
Discharge to community with services	Dichotomous variable based on Discharge destination = 1 if discharged to private home with home health, or assisted living; 0 for all other destinations.	Discharge assessment data from the Nursing Home Minimum Data Set, April 2003–June 2005
Independent Variables		
Demographic variables	Age in years, dummy variables for gender, black-non-Hispanic, white-non-Hispanic, Hispanic, Asian, and other	Admission analysis: MDS admission assessment Discharge analysis: MDS discharge assessments
Medicare/Medicaid dual eligibility	Dichotomous variable =1 based on having both Medicare and Medicaid numbers entered in the MDS assessment data.	Admission analysis: MDS admission assessment Discharge analysis: MDS discharge assessments
Cognitive Performance Score (used in Admission analysis only)	0-6 with 0 indicated cognitively intact and 6 indicating severe cognitive impairment	Admission assessment data from the Nursing Home Minimum Data Set, January 2003–March 2005
Diagnosis count (used in Admission analysis only)	Count of individual conditions	Admission assessment data
Diagnostic categories (used in descriptive analysis of admission data only)	Categorical variable based on MDS categorization of the individual conditions into 8 categories	Admission assessment data
RUGS-III categories (used in descriptive analysis of admission data only)	Categorical variable of 7 mutually exclusive categories	Application of RUGS-III algorithms to the Admission assessment data
Facility Characteristics		
Number of Medicare or Medicaid certified beds	Continuous variable	OSCAR data in 2003,2004, 2005

(continued)

Table 1 (continued)
Variable construction and sources

Characteristic	Variable construction	Source
Facility ownership	Categorical variable including nonprofit, for profit and government (usually county) ownership	OSCAR data in 2003,2004, 2005
Occupancy rate	Percent of beds occupied	OSCAR data in 2003,2004, 2005
Urban- need definition	Dummy variable =1 if facility is in urban area	OSCAR or something else?
Chain	Dummy variable =1 if facility is part of a chain, = 0 if independently owned	OSCAR data in 2003,2004, 2005
State Policy Characteristics		
Medicaid HCBS/LTC expenditure ratio	Ratio of Medicaid expenditures on HCBS waivers, home health, personal care, and hospice as a proportion of total LTC spending on community and facility LTC Calculated separately for beneficiaries under age 65 and over age 65. Includes ICF-MR expenditures for the under 65 age group.	RTI International calculations based on Urban Institute analysis of 2002 MSIS data.[2]
Money Follows the Person grant-FY2003 or Nursing Facility Transition Grant FY2001-FY2004	Dummy variable =1 if state has an MFP or NFT Systems Change grant	Real Choices System Change Grants Compendium Fifth Addition
Nursing Home Certifiability (NHC) criteria	1-5 from least restrictive to most restrictive functional eligibility requirements for Medicaid nursing facility care	Testimony of Robert L. Mollica Before Senate Special Committee on Aging. April 29, 2003.[1]
State supply characteristics		
Heating Degree Days 2003/365	Continuous variable	National Weather Service Climate Prediction Center
Physicians per 1,000 elderly in 2003	Continuous variable	American Medical Association
Hospital Beds per 1,000 elderly in 2003	Continuous variable	2004 AHA Annual Survey Copyright 2005 by Health Forum LLC.
Nursing facility beds per 1000 elderly in 2003	Continuous variable	

NOTES:

1 Provided data for 45 states. Data for KY, NY, WV, SD, NV, and Washington DC were calculated based on RTI International interviews of State Units on Aging, Nursing Home Association, Medicaid officials, and other sources.

2 Expenditure data was incomplete for Hawaii, Washington and Arizona. To impute values for these states rather than drop them from the analysis, we ran regressions for the total and for the community spending using the following state level variables : presence of an MFP or NFT grant, NHC criteria, and the state supply variables. We then set the ratio equal to the ratio of the predicted community expenses to the predicted total expenses for these states.

We used the OSCAR data for 2003, 2004, and 2005 to identify characteristics of the facilities in which the sample members reside and used these in both the Admission and Discharge Analyses. We appended the individual level observations with the facility characteristics associated with the year in which the admission or discharge occurred. We included the number of certified beds as a measure of facility size, facility ownership (nonprofit, for profit and government), whether the facility was located in an urban area, and whether it was part of a chain.

2.3.2 Variable Construction: State Policy Measures

We created several state long-term care policy variables and included standard supply variables from various sources as detailed in ***Table 1***. State level data are presented in the appendix, ***Table A-1***. The state long-term care policy variables are the following:

LTC expenditure ratio—Medicaid home and community-based services as a proportion of total Medicaid LTC expenditures. We calculated this ratio using estimates developed by Urban Institute based on analysis of 2002 MSIS data. These estimates were derived separately for LTC expenditures for beneficiaries under age 65 and those age 65 and over. Thus, in our analyses we were able to use age group-specific expenditure ratios.

In keeping with our analytic approach, we hypothesize that states where community LTC expenditures are a higher proportion of total LTC expenditures would be able to delay facility admission and support discharges back to the community. Specifically, we expect the ADL scores on admission to be higher in states that spend a greater proportion of their LTC dollars on HCBS. We also expect to see a higher proportion of residents discharged to the community overall and discharged to the community with services in states with that spend a higher proportion of their LTC dollars on HCBS.

Nursing Home Certifiability (NHC) criteria—Each state has its own level of care criteria used to determine functional eligibility for nursing facility care. These vary greatly in how restrictive they are and in the types of requirements to qualify for Medicaid reimbursement of facility care. Mollica (2003) categorized these criteria into a five-point scale ranging from least to most restrictive for 45 states. To have complete information for our sample, we called the remaining five states and the District of Columbia to ascertain their NHC criteria and to sort them into the appropriate categories. We expect that more restrictive NHC criteria would be associated with higher ADL scores on admission.

Presence of a Money Follows the Person (MFP) or Nursing Facility Transition (NFT) grant—MFP and NFT Systems Change grants are specifically designed to identify facility residents who wish to return to the community and to assist them by linking them to HCBS, housing and other needed resources. To the extent the programs are operational, we expect a higher proportion of facility residents in states with MFP or NFT programs to be discharged to the community and that a higher proportion will be discharged to the community with services.

2.3.3 State Level Supply Variables

We included several standard supply variables including standardized measures of hospital bed supply, physician supply, and nursing home bed supply. The supply of hospital and physicians provide additional controls for the demand for nursing home care. The supply of nursing home beds was included to examine how nursing homes would respond to tighter bed supplies, a strategy commonly proposed as part of rebalancing. Given that nursing homes may have a financial incentive to admit light care over heavy care residents, tighter nursing home bed supplies may result in nursing homes triaging by accepting less disabled residents first, reducing average ADL scores and reducing discharges to the community.

We also included heating degree days (divided by 365 for ease of presentation). Heating degree days is a measure of how cold the climate is in a state. This measure has been associated in past research with the risk of institutionalization. In general, people living in colder states are more likely to become institutional residents than those in warmer states.

2.4 Analytic Methods

We used descriptive methods to determine means and distributions for national and state level characteristics for both the Admission and Discharge analyses. We used multivariate regression techniques with cluster adjustments (at the facility level) to examine longitudinal changes in ADL scores (Poisson regression) and longitudinal changes in prevalence rates of discharge destinations (logistic regression). All analyses are done separately for residents under age 65 and those age 65 and older as these populations and their associated LTC utilization are known to be different.

In Section 3 of this report, we provide details about the Admission Analyses. Section 4 provides a detailed description of the Discharge Destination Analyses.

SECTION 3
ADMISSION ANALYSIS

Institutionalization is generally considered the least desirable option for beneficiaries in need of LTC. From the individual perspective, it entails loss of autonomy, privacy and home. From government's point of view it is costly. Thus, a major goal of LTC reform is to delay or prevent institutionalization through targeting and through effective provision of home and community-based supports. Because LTC reform is essentially about increasing the capacity of the home and community-based system to assist people with functional limitations, as reform progresses, the HCBS system should be able to care for people at increasing levels of impairment. This would be reflected in the facility population—the average level of impairment should be increasing among new entrants to nursing facilities as the HCBS system improves.

ADL score (a functional status measure) on admission, is the dependent variable in these analyses because of its usefulness as a summary measure of need for long-term care. For the descriptive analyses, we included a wide range of health and functional status measures to observe time trends in the facility population and identify appropriate control variables for multivariate analyses.

To see how individual states and the nation are doing in moving towards this aspect of LTC reform, we framed the following research questions:

- How do characteristics on admission for long-stay residents vary across states and over time?
- What factors are associated with variation in resident characteristics on admission?
- How do selected state LTC characteristics relate to observed differences?

3.1 Admission Sample Selection

We created the sample from the Minimum Data Set, starting with all Medicaid admission assessments between January of 2003 and March of 2005, for a total of nine quarters, including all 50 states, Puerto Rico, the Virgin Islands, and the District of Columbia. Medicaid status was based on the presence of a Medicaid number in the admission assessment. Our goal was to create a sample of Medicaid beneficiaries who were long-stay facility residents—those at most risk of sustained institutionalization. We defined long-stay as 30 days or longer, based on the advice of experts familiar with the MDS, as most post-acute stays last less than 30 days. As there is no way to directly identify length of stay from the MDS, we inferred length of stay greater than 30 days based on the absence of a discharge assessment or a second admission assessment within that time period. We eliminated any resident who had another admission assessment or a discharge assessment within 30 days.

The sample is further limited to those for whom the standard initial assessments were completed on admission. For some new admissions, a 7- or 14-day Medicare assessment is accepted as a substitute. Facility staff complete very brief reentry assessments for residents who have a short acute hospitalization. We did not include any of these types of assessments as they

provide substantially less information about the beneficiaries. We also postulated that the Medicare 7- and 14-day assessments are most often used for short term, rehabilitation-oriented facility stays and the reentry assessments do not actually represent a new admission. We further limited the sample to Medicaid beneficiaries (including those with and without Medicare in addition to their Medicaid benefits) as these beneficiaries would both be the targets of Systems Change activities and would be eligible for Medicaid HCBS.

3.2 Admission Analysis Variable Construction

Figure 1 provides definitions of the health and functional status measures we derived from the MDS. In addition, we include demographic characteristics such as age, race, gender, dual eligibility for Medicare and Medicaid, and previous living arrangement. In the descriptive analyses, we also tabulated responses on the state level to three questions related to the desire or potential to return to the community: the resident wishes to return to the community, the resident has the support of another person to return to the community and a measure of the facility staff's assessment of the potential of the resident to return home.

Figure 1
Health status measures derived from the MDS

Activity of Daily Living score (ADL Score)

4–18 points

Based on summing the level of dependence for each of four ADLs: (1–5) bed mobility, transferring, toileting, and (1–3) eating.

Used in calculating RUGS-III categories based on the association between resident characteristics and facility resource utilization and costs.

Selected as it is commonly used in MDS analyses and to maximize potential variation in scores.

Cognitive Performance Score (CPS)

0–6 from intact to very severe impairment

Diagnosis count

Count based on the number of medical conditions and diagnoses indicated in the admission assessment.

Diagnostic categories

The individual medical conditions included on the MDS are organized in to 8 categories: endocrine, cardiac, pulmonary, neurological, psychiatric, musculoskeletal, sensory impairments and infections.

Resource utilization group categories

These categories are based on evaluating residents' care needs from the MDS, taking into account the need for rehabilitation therapies, nursing treatments, medical monitoring, as well as functional, cognitive and behavioral status. The full RUGS-III 44 item hierarchy further differentiates care needs within these eight groups.

ADL score on admission is the dependent variable we selected for multivariate analyses because of its usefulness as a summary measure of need for long-term care. This ADL score is different from the common 0–6 ADL impairment count often used in determining nursing facility and HCBS eligibility. Bathing and dressing are not included in this score, presumably because all or most facility residents receive help with these ADLs and so they do not differentiate among residents with greater and lesser needs for assistance. Bed mobility, the ability to reposition oneself in bed, is not part of the standard ADL counts, but is an important aspect of the MDS ADL score. Residents who need assistance or are totally dependent on others for repositioning are at the far end of the functional status spectrum. For the descriptive analyses, we also included a wide range of health and functional status measures to observe other aspects of case mix trends in the facility population and to identify appropriate control variables for multivariate analyses. From the array of available health status variables, we selected the Cognitive Performance Scale (CPS) and a count of health conditions and diagnoses to include in the multivariate analyses.

3.3 Admission Analysis Descriptive Findings

Key descriptive findings in this analysis include:

- *The mean ADL scores across states varies substantially, ranging from 6.6 – 13.5*
- *Facility residents age 65 and over are more impaired, on average than younger facility residents*
- *Facility residents are becoming sicker over time (as measured by the condition count and the percent of residents with various types of diagnoses) and more impaired--as measured by ADL scores and the proportion of residents in higher Resource Utilization Groups (RUGS-III).*

The descriptive analysis includes detailed information about ADL scores on admission and to a lesser extent, information about the CPS, diagnostic and RUGS categories. We include summary tables and graphs in this section and detailed state-by-state data in the appendix.

Sample characteristics: National means—*Table 2* shows the means for the sample characteristics (ADL score, CPS, diagnosis count, demographics), the facility characteristics associated with each sample member, state policy, and state supply variable characteristics. The sample includes 247,714 long-stay Medicaid residents under age 65 and 687,192 age 65 and over. The 65 and over sample is more impaired in terms of ADL scores and CPS and has more chronic conditions. Blacks are a higher proportion of the residents under age 65 group, compared to those age 65 and over. About a quarter of each sample lived alone prior to admission. While most (92%) of the over 65 group is dually eligible for Medicare, less than half of residents under age 65 are Medicare/Medicaid dually eligible.

The sample members were admitted to facilities with about 150 beds and with occupancy rates of about 86%. About one quarter of the facility residents are in non-profit facilities, three quarters in metropolitan areas, and about half in facilities that belong to a chain.

Table 2
Admissions sample characteristics
(January 2003–March 2005)

	Under 65					65 and Over				
	Obs	Mean	Std Dev	Min	Max	Obs	Mean	Std Dev	Min	Max
Age	247714	50.97%	11.12	0	64	687192	80.70%	8.16	65	117
Male	247639	53.7	0.50	0	1	687078	30.4	0.46	0	1
Black	246848	26.8	0.44	0	1	685381	16.9	0.37	0	1
Hispanic	246848	8.2	0.27	0	1	685381	7.5	0.26	0	1
Asian	246848	1.6	0.127127	0	1	685381	2.8	0.164878	0	1
White	246848	62.1	0.485133	0	1	685381	72.1	0.448587	0	1
Dual Eligible	247714	45.1	0.50	0	1	687192	92.2	0.27	0	1
Number of Beds	228642	154.91	115.38	2	1389	638391	143.37	95.45	2	1389
Non-Profit	247714	14.3	0.349583	0	1	687192	19.1	0.392913	0	1
For Profit	247714	73.6	0.44	0	1	687192	68.8	0.46	0	1
Government	247714	4.4	0.21	0	1	687192	5.0	0.22	0	1
Occupancy Rate	228642	83.6	0.14	0.0	1	638391	85.6	0.14	0.0	1
Urban	247714	76.3	0.43	0	1	687192	69.9	0.46	0	1
Chain	247714	51.6	0.50	0	1	687192	50.2	0.50	0	1
NHC Criteria (1-5)	247695	2.17	1.15	1	5	687147	2.31	1.19	1	5
Expenditure Ratio (0-1.0)	245774	0.57	0.13	0.28	0.97	677898	0.22	0.11	0.05	0.51
MFP or NFT Grant	247714	62.0	0.49	0	1	687192	63.4	0.48	0	1
Hospital Beds/1000 65+	247695	2.83	0.64	1.8	6.1	687147	2.88	0.66	1.8	6.1
Physicians/1000 65+	247695	21.94	5.32	12.8	64.4	687147	21.59	5.24	12.8	64.4
NF bed/1000 65+	247695	45.09	12.43	17.2	71.0	687147	44.20	11.93	17.2	71.0
Heating Degree Days/365	247695	12.39	5.62	0	27.8	687147	11.86	5.72	0	27.8

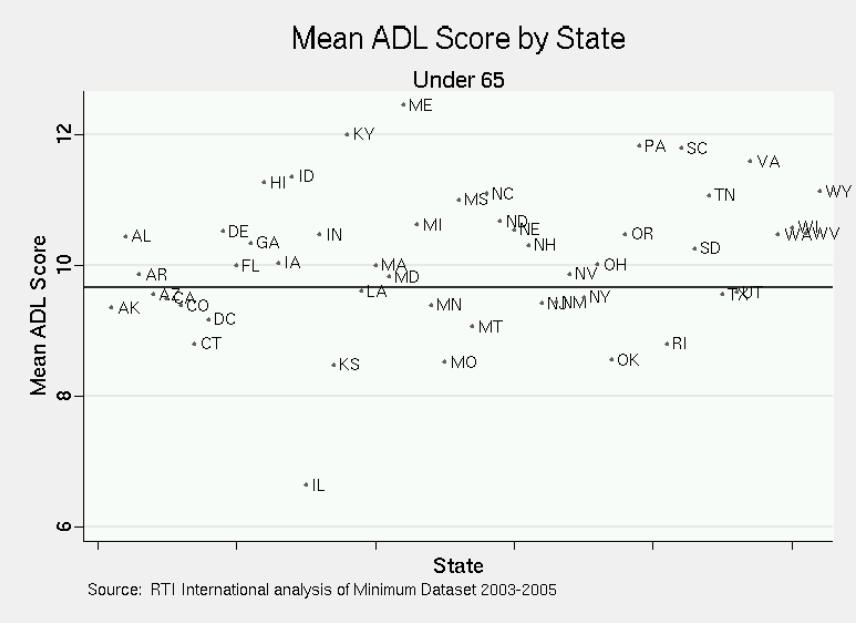
SOURCE: RTI International analysis of MDS and OSCAR data, January 2003–March 2005.

The mean Medicaid HCBS/LTC expenditure ratios differ markedly between the two age groups. On average, states are spending 57% of their long-term care dollars on community services for people under age 65, while for older people, only 21% of total long-term care dollars are spent on community services. About 60% of both groups reside in states that had received a Systems Change grant for an MFP or NFT project by 2003.

Mean ADL Scores by State

Figures 2 and 3 are scatter plots showing the mean ADL scores on admission by state, with a line indicating the national mean in each figure. Detailed state by state mean ADL scores on admission are presented in the appendix, ***Table A-2***. In ***Table 3***, we provide several examples of individual state data. Maine has the highest ADL scores on admission for both sample groups of residents under and over age 65; Illinois has the lowest ADL scores for the under age 65 sample; and Oklahoma has the lowest mean ADL scores for the age 65 and over sample.

Figure 2
Mean ADL score by state—Under age 65



Time trends in mean ADL scores by state

We also examined time trends for the mean ADLS on admission nationally and for each state, looking at the means for each 3-month period to create a series of data points for analysis. The time trend analysis controls for CPS, demographics and the number of chronic conditions, to take into account potential changes in other case mix factors that would affect ADL scores. In other words, our goal was to look at changes in ADL scores above and beyond any changes in other health status or demographic characteristics. As seen in ***Figures 4 and 5,*** nationally the level of ADL impairment increased steadily by about one half a point over the study period for

residents in both age groups. Individual state detail is provided in ***Table A-3*** in the appendix. In ***Table 4***, we summarize some of these findings- ADL scores increased significantly in 22 states for residents under age 65, and in 39 states for residents over age 65, while only decreasing significantly in two states (under age 65 only). If this trend continues, ADL scores on admission will increase by one full point about every 4–5 years.

Figure 3
Mean ADL score by state—Age 65 and over

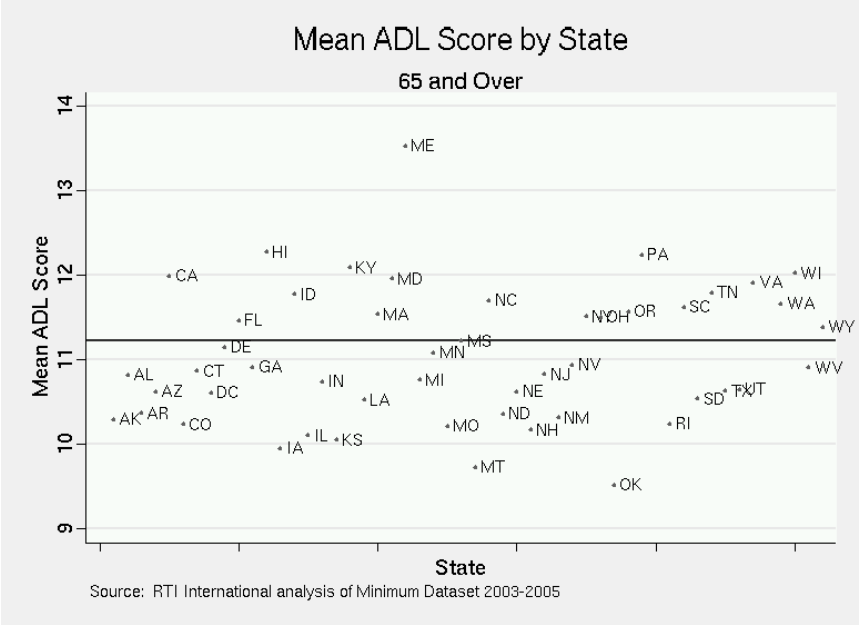


Table 3
Examples of mean ADL scores on admission

	<65	**65+**
United States	9.7	11.2
Maine	12.5	13.5
Illinois	6.7	10.1
Oklahoma	8.6	9.5

SOURCE: RTI International analysis of Minimum Data Set, 2003–March 2005.

Figure 4
Mean ADL score on admission by quarter—Under age 65

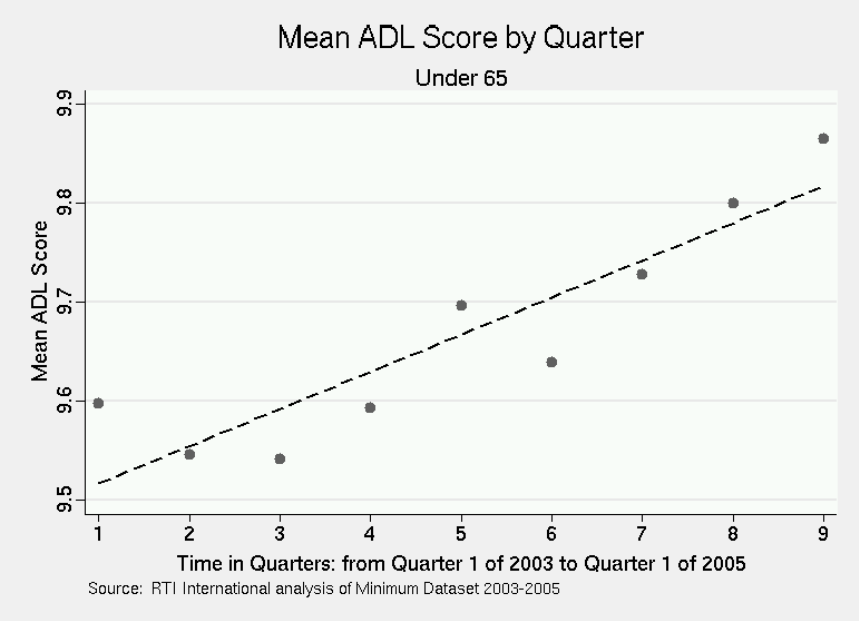


Figure 5
Mean ADL score on admission by quarter—Age 65 and over

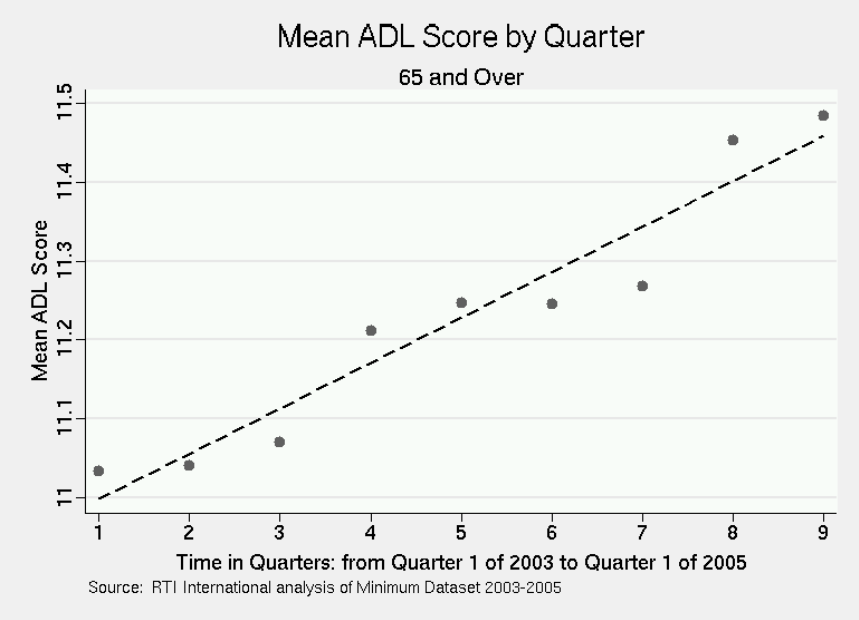


Table 4
ADL scores on admission

	<65	65+
Increasing (p<0.05)	22	39
Decreasing (p<0.05)	2	0

SOURCE: RTI International analysis of Minimum Data Set, 2003–2005.

Cognitive performance score on admission—CPS values decreased over the study period for the admission cohort, though very slightly (***Figure 6 and 7***). While there is a definite downward trend, it is so small that it is probably not clinically meaningful (from 1.69 to 1.63 for those under 65 and from 2.41 to 2.32 for those age 65 and over). CPS for residents under 65 decreased significantly in 15 states, and for the over 65 in 28 states. CPS increased significantly only in Colorado for the under 65 population, and in no states for residents over 65. We include the CPS scores as control variables in multivariate analyses.

Figure 6
Mean CPS score on admission by quarter—Under age 65

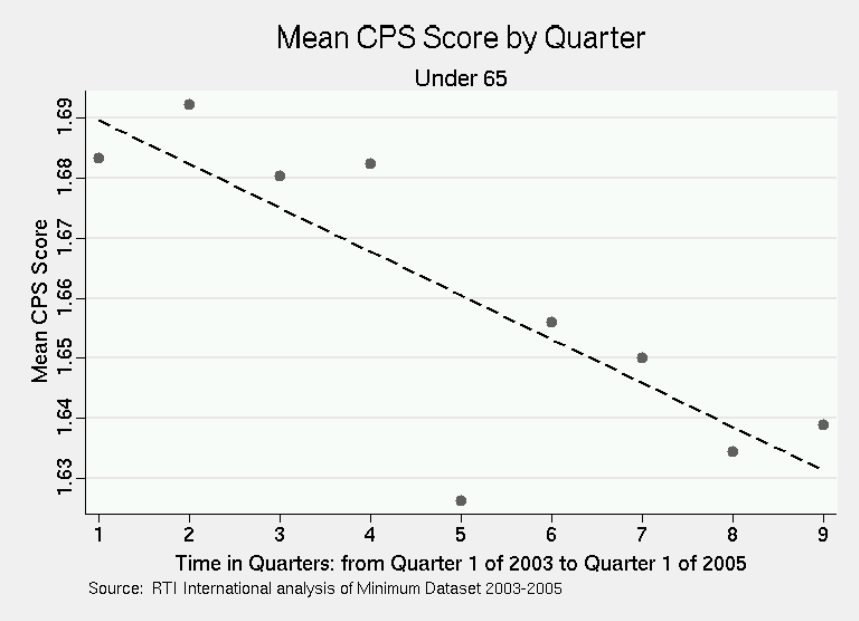
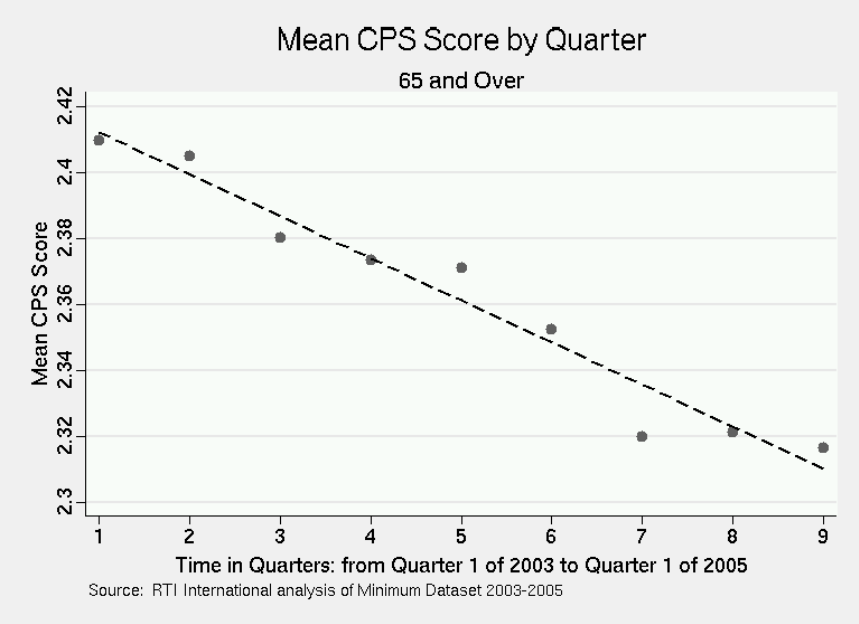


Figure 7
Mean CPS score on admission by quarter—Age 65 and over



Diagnostic characteristics—The MDS initial assessment includes detailed information about medical conditions, which are categorized into endocrine, cardiac, musculoskeletal, neurological, psychiatric, pulmonary, and sensory conditions, and infections. We used the individual diagnoses within these categories to create a condition count used as a control variable in multivariate analyses.

Table 5 shows the percent of sample members with conditions in each diagnostic category for the total study period and for each quarter. The findings are shown separately for people under and over age 65. In both age groups we see that an increasing percentage of sample members have endocrine, cardiac, psychiatric, pulmonary conditions, and sensory disorders. The percentage with neurological conditions and infectious diseases is decreasing, and there is no change in the percentage with musculoskeletal conditions. Taken together these patterns suggest that the facility population is getting sicker over time. This information is presented graphically in ***Figures 8 and 9*** (note: the sales vary across these graphs).

RUGS-III categories—Under Medicare and many Medicaid state reimbursement systems, nursing facility resident characteristics are sorted by a hierarchical method that takes into consideration health and functional status and rehabilitation potential. The full Resource Utilization Group (RUG-III) hierarchy, used for Medicare reimbursement of skilled nursing facility care, has 44 cells. A slightly more parsimonious version is used for Medicaid payments in about 30 states. Individual characteristics and treatments are entered into a hierarchical grouping so that facilities are paid based on the most intensive resource needs a person has. This hierarchy can be rolled up into seven mutually exclusive general categories. Within each of the seven general categories are multiple subgroupings that reflect additional characteristics like the

Table 5
Distribution of MDS diagnostic categories by quarter

Under 65	1	2	3	4	5	6	7	8	9	Total
Endocrine	41.2%	41.1%	40.7%	41.8%	42.9%	42.8%	42.6%	43.3%	43.9%	42.3%
Cardiac	56.8	56.0	56.3	57.1	58.7	59.4	58.9	59.7	60.2	58.1
Musculoskeletal	20.9	20.5	20.1	20.7	21.1	21.5	21.2	21.4	21.3	21.0
Neurological	41.3	41.4	40.8	39.9	40.2	40.2	40.3	40.1	39.1	40.4
Psychiatric	49.8	51.0	50.7	51.4	51.8	53.0	53.4	53.2	53.2	52.0
Pulmonary	21.0	20.9	20.0	21.0	21.9	21.6	21.1	21.6	23.3	21.4
Sensory	52.1	51.1	50.8	51.4	51.9	52.2	53.0	52.8	53.4	52.1
Infections	72.8	72.5	72.5	72.1	72.9	72.8	72.0	67.9	68.3	71.5
Over 65	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
Endocrine	49.6%	50.2%	50.2%	50.3%	50.8%	51.4%	51.5%	51.8%	51.9%	50.8%
Cardiac	79.9	80.0	80.4	80.8	81.5	82.0	82.0	82.4	82.9	81.3
Musculoskeletal	41.5	42.0	41.8	41.8	41.6	42.7	42.5	42.7	41.6	42.0
Neurological	57.0	57.0	56.8	56.3	56.1	56.5	56.6	55.8	55.3	56.4
Psychiatric	38.2	39.3	39.5	39.6	39.6	40.4	41.0	40.8	39.9	39.8
Pulmonary	23.5	22.8	22.7	23.3	24.1	23.8	23.5	23.8	25.0	23.6
Sensory	55.5	55.5	56.0	56.2	56.6	57.4	57.0	57.6	57.0	56.5
Infections	77.3	76.9	77.5	76.2	76.4	76.7	76.0	70.8	71.0	75.5

SOURCE: RTI International analysis of Minimum Data Set, 2003–2005.

Figure 8
Chronic diseases trends: Under age 65

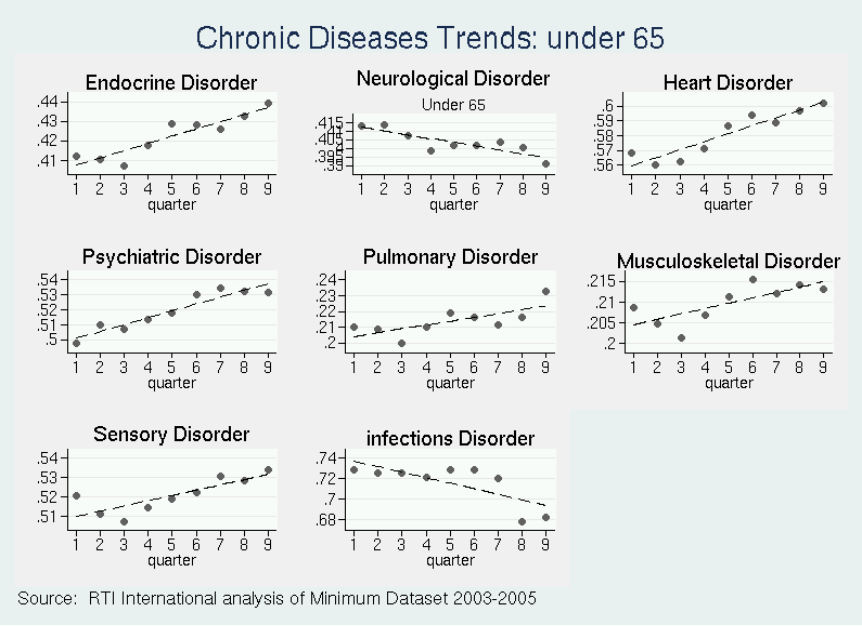
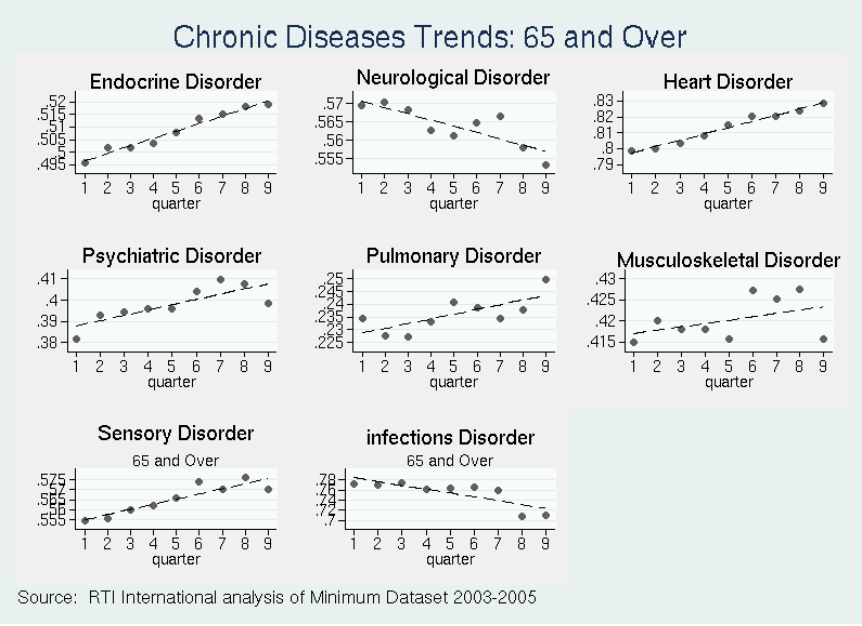


Figure 9
Chronic diseases trends: Age 65 and Over

mus



degree of ADL dependency. Thus, all groups except "Behavior problems only" may have some degree of ADL dependency, while "Physical functioning reduced" is limited to people who have no rehabilitation, extensive care, special care needs. ***Table 6*** shows the RUGS-III category distribution over the nine quarters of the time period. ***Figures 10 and 11*** show this information graphically (note: the scales vary across these graphs).

There are interesting differences between the two populations and changes over time. For both the younger and older groups, new admissions falling into the Rehabilitation category is both the most common category and increasing over time. About a third of residents under age 65 fall into this category; close to half of residents over age 65 do. In contrast, there is a higher prevalence rate in the under age 65 group for extensive care and special care, with about twice as many under age 65 admissions (14%) falling into the special care group as for the over 65 (7.5%). In both age groups, the percentage of new admissions categorized as Special Care is decreasing over time, while Extensive Care is increasing in residents under age 65 and staying essentially stable in residents over age 65. The rehabilitation category is increasing for both age groups, while there are fewer admissions as a proportion of the total whose only needs relate to impaired cognition or reduced physical function. In sum, over the study period, from January 2003 to March 2005, long stay facility admissions appear to be increasingly medically complex with smaller proportion admitted only because of cognitive or functional deficits.

Desire and potential to return to the community in the admission sample—The MDS initial assessment includes questions about whether the beneficiary wishes to return to the community, whether the resident has the support of another person to return home, and when—if ever—facility staff expect the resident to return home. Nationally, 55% of the sample residents under age 65 and 41% of those over age 65 expressed the desire to go home when they were admitted to the nursing facility. Thirty-eight percent of the younger group and 29% of the older group both wish to go home and had the support of another person for returning to the community. Facility staff evaluated 60% of the younger group and 44% of the older group as potentially able to return to the community. Our coding of potential to return to the community may overstate the facility staff's evaluation as it includes those about whom the staff are uncertain.

The means for these variables are correlated within each state and to some extent across age groups (not shown). Thus, the lowest means for each of these variables is found in Louisiana and Mississippi and the highest in Puerto Rico. However, in the Virgin Islands, while 100% of those under age 65 wish to go home, have support and are assessed as capable of returning home, the high ADL and CPS scores of the elderly may explain the lack of residents expressing a wish to return to the community or a support person available and that 50% are assessed as having the potential to return home.

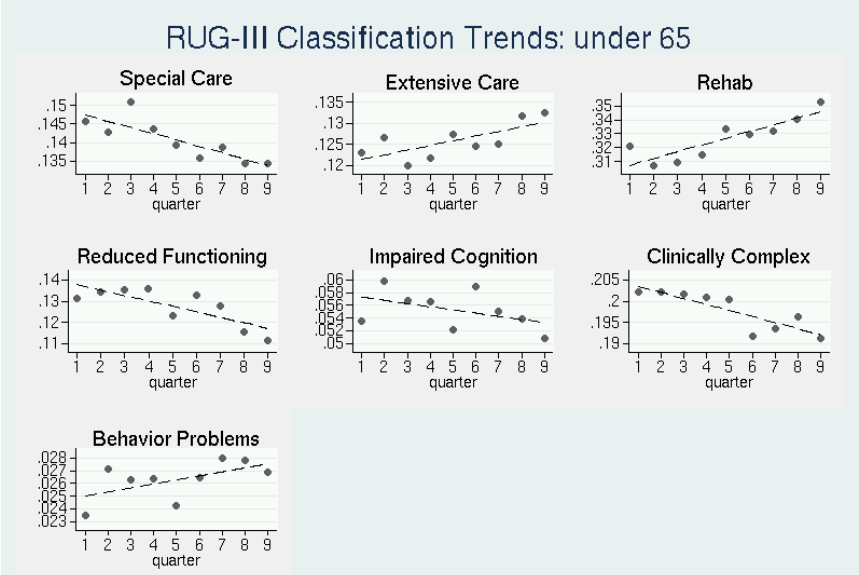
Summary changes over the study period: ADL, CPS, desire/support/ potential to return home—*Table 7* summarizes the changes over time for the samples of residents under and over age 65, regarding ADL scores on admission, CPS on admission, and the percent wishing to return to the community, with support to return, and evaluated as having the potential to return to the community. In summary we see that even as ADL impairment levels are increasing in the facility sample, there is an increase in the desire, support and perceived potential to return to the community.

Table 6
Distribution of RUGS-III categories over the study period (January 2003–March 2005)

Under age 65	1	2	3	4	5	6	7	8	9	Total
Behavior problems only	2.3%	2.7%	2.6%	2.6%	2.4%	2.6%	2.8%	2.8%	2.7%	2.6%
Clinically complex	20.2	20.2	20.2	20.1	20.0	19.2	19.4	19.6	19.1	19.8
Impaired cognition	5.4	6.0	5.7	5.7	5.2	5.9	5.5	5.4	5.1	5.5
Physical functioning reduced	13.1	13.5	13.5	13.6	12.3	13.3	12.8	11.6	11.1	12.8
Rehabilitation	32.1	30.7	30.9	31.5	33.4	33.0	33.2	34.1	35.3	32.7
Extensive care	12.3	12.7	12.0	12.2	12.7	12.5	12.5	13.2	13.3	12.6
Special care	14.6	14.3	15.1	14.4	13.9	13.6	13.9	13.4	13.4	14.1
Behavior problems only	2.3	2.7	2.6	2.6	2.4	2.6	2.8	2.8	2.7	2.6
Over age 65	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
Behavior problems only	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Clinically complex	15.8	15.9	15.9	15.4	15.2	15.1	14.9	14.4	13.9	15.2
Impaired cognition	7.4	7.6	7.6	7.0	6.8	7.0	6.9	6.3	6.0	7.0
Physical functioning reduced	13.1	13.9	13.6	13.2	11.9	12.6	12.9	12.4	11.1	12.8
Rehabilitation	44.5	43.4	44.0	45.2	47.4	47.0	47.6	48.7	50.6	46.4
Extensive care	10.9	10.7	10.6	10.9	11.0	10.5	10.2	10.5	10.9	10.7
Special care	7.8	7.9	7.9	7.8	7.3	7.3	7.1	7.1	7.0	7.5
Behavior problems only	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

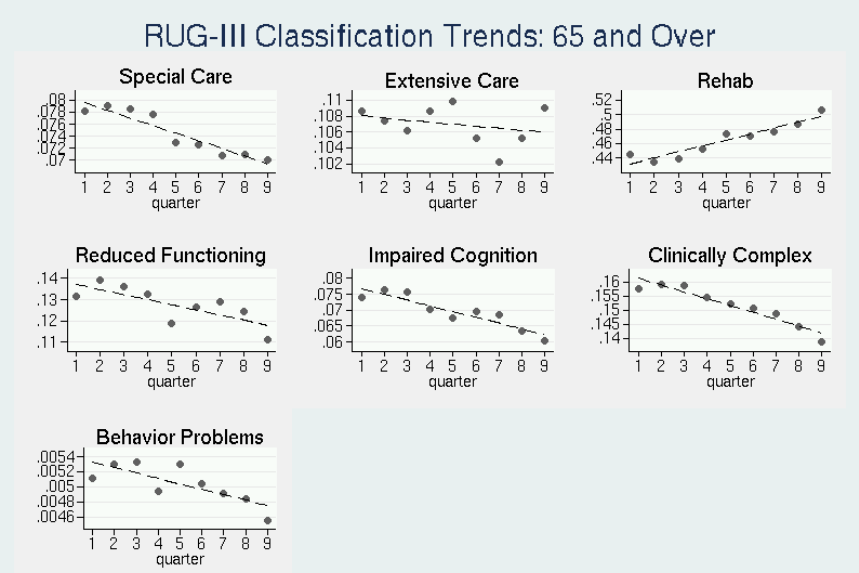
SOURCE: RTI International analysis of Minimum Data Set, 2003–2005.

Figure 10
RUG-III classification trends: Under age 65



Source: RTI International analysis of Minimum Dataset 2003-2005

Figure 11
RUG-III classification trends: Age 65 and over



Source: RTI International analysis of Minimum Dataset 2003-2005

Table 7
Summary changes over the study period by quarter (January 2003–March 2005)

	Characteristics of admissions in the first quarter	Change from January 2003 – March 2005
Residents under age 65		
# points on ADL scale (4-18)	9.60	Increasing
# points on CPS (0-6)	1.68	Decreasing
% wishing to return home	53%	Increasing
% wishing to return home and has support of another person	37%	Increasing
% predicted to return home (includes those about whom staff are uncertain)	59%	Increasing
Residents over age 65		
# points on ADL scale (4-18)	11.03	Increasing
# points on CPS (0-6)	2.41	Decreasing
% wishing to return home	38%	Increasing
% wishing to return home and has support of another person	27%	Increasing
% predicted to return home (includes those about whom staff are uncertain)	41%	Increasing

SOURCE: RTI International analysis of Minimum Data Set, 2003–2005.

3.4 Admission Analysis Multivariate Models

We used Poisson regression to model ADL score on admission as a function of selected individual characteristics, facility characteristics, state level policy variables, and state level supply variables. Poisson regression is appropriate for a count variable such as ADL scores. Although ADL scores are essentially qualitative in nature (i.e., not pure interval data) they are consistently treated as such throughout the LTC literature. In addition, these ADL scores are related to facility resource utilization.[2,3] We modeled the residents under and over age 65 separately since the services available to them are different, because we include age-specific LTC expenditure ratio data, and because the two groups of residents clearly differ in ADL

[2] We also tried models using ADL cut-offs as the dependent variable (e.g., 1= ADL score > 4,8, 10, 12 or 14), acknowledging the categorical nature of this variable. However, the results were similar regardless of the cut-off.

[3] Because the NHC criteria is an ordinal, but not internal scale, we also ran a model using a set of dummy variables (i.e., as a categorical variable). The results are shown in ***Appendix Table A-5***. We retained the ordinal variable in the main analysis for two reasons: (1) it allows us to see the effect of increasingly restrictive criteria and (2) we can model marginal effects with an ordinal, but not a categorical, variable.

scores, and most other health and functional status measures in the data. ***Table 8*** displays the results for these models.

Impact of the state policy variables—The state policy characteristics are the key variables of interest, holding all other factors constant. Thus, even controlling for time trends, health status and other demographic characteristics, facility characteristics and state supply variables, the Medicaid HCBS/LTC expenditure ratio has a significant and positive effect on the ADL scores on admission for people over age 65, while it is not significant in predicting ADL scores on admission for residents under age 65. In other words, the higher the percentage of long-term care expenditures for home and community-based services, the higher the ADL levels in nursing homes. In contrast, stricter nursing home certifiability criteria have a positive effect on ADLs on admission for residents under age 65 (i.e., result in higher ADL levels on admission), but not for the over 65, and presence of an MFP or NFT grant increases the ADL scores on admission for both groups. These findings are less easily interpreted. As the impairment level is higher on average for the older group, it may be that state NHC thresholds have less impact for the older than younger beneficiaries. Theoretically, we would not expect the presence of an MFP or NFT program to directly effect facility admissions—they aimed at impacting discharge destinations. Perhaps it is an indicator of states with more extensive LTC reform efforts in general.

Impact of the health status and demographic characteristics—In these models, we see that the ADL score on admission increases with increasing cognitive impairment and an increasing number of chronic conditions for both the younger and older groups. This is what we would expect and controls for other case mix differences that might exist across states and facilities. The ADL levels also increase with age for those age 65 and older, but is not significant for younger people with disabilities. Men are admitted to facilities at lower ADL impairment levels for both groups. Younger black facility entrants have lower ADLs on admission, but older black beneficiaries are being admitted with higher ADL scores compared to other groups. Being Asian or Hispanic is also associated with higher ADL score on admission. Living alone prior to admission is associated with lower levels of ADL impairment on admission, while dual eligibility, which provides access to increased services such as the Medicare home health benefit, is associated with higher impairment levels at the time of facility admission.

Impact of facility characteristics—While most facility characteristics are significant predictors of ADL scores on admission, the size of the facility is not, for residents under age 65, the occupancy rate is not significant, and urban location is not for residents over age 65. For profit ownership decreases the ADL scores on admission for residents under age 65, while increasing it for residents over 65. For the older group this may indicate that for profit facilities target groups of beneficiaries for whom payment rates are best, which would be the more intense RUGS groups.

Government ownership is associated with lower levels of impairment on admission for both age groups. Residents of facilities that are part of a chain have higher ADL scores on admission.

Table 8
Predicting ADL score on admission

Variable	Under age 65 odds ratio	Age 65 and over odds ratio
Time trend (quarter)	1.004***	1.005***
Expenditure ratio	0.974	1.079***
NHC criteria	1.016***	1.001
MFP or NFT grant	1.095***	1.016***
Cognitive performance scale	1.084***	1.066***
Diagnosis count	1.034***	1.024***
Age	1.000	1.001***
Male	0.920***	0.968***
Black	0.984**	1.052***
Asian	1.044***	1.059***
Hispanic	1.021**	1.052***
Dual eligible	1.055***	1.055***
Lived alone prior to admission	0.966***	0.973**
Number of certified beds	1.000	1.000
For profit	0.928***	1.008
Government	0.954**	0.963***
Occupancy rate	0.992	1.074***
Urban	0.970***	1.001
Chain	1.043***	1.020***
Heating degree days/365	1.005***	1.004***
Hospital bed supply/1000 elderly	1.088***	1.019***
Physician supply/1000 elderly	0.999	1.002***
Nursing facility bed supply/1000 elderly	0.9934***	0.997***
Constant	7.455***	6.437***

NOTES: * p<0.05, ** p<0.01, *** p<0.001

SOURCE: RTI International analysis of MDS and OSCAR data, January 2003–March 2005.

Impact of state supply variables—Hospital bed supply and heating degree days are associated with higher levels of ADL impairment on admission for both groups, and physician supply significantly increases the ADL scores on admission for residents over age 65, but is not a significant predictor for residents under age 65. The greater the supply of facility beds in a state, the lower the level of ADL impairment of new admissions. This is a key research finding important to developing strategies for rebalancing. Policy makers sometimes consider constraining bed supply to target facility care to the most impaired, either directly through certificate of need regulations or indirectly by providing little financial incentive to increase bed supply. These results show that on average, facilities are behaving as one would hope: i.e., taking

more impaired residents when bed supply is tighter instead of choosing lighter care patients when bed supply is tight. However, interpreting this finding is complicated in light of the fairly low average occupancy rates (about 86%) observed in the data.

Comparison to non-Medicaid (Medicare-only) long-stay residents—As a sort of sensitivity analysis, we also modeled ADLs on admission for another sample: long-stay residents without Medicaid (not shown). We did this to see if the time trend variable showed a background trend of increasing ADL scores over time (it did) and also to see the impact of the state policy variables. We hypothesized that the Medicaid HCBS/LTC expenditure ratio would not affect ADL scores on admission for Medicare-only beneficiaries as they are not eligible for Medicaid HCBS. In other words, we expect Medicaid HCBS to help Medicaid beneficiaries remain in the community, but not beneficiaries who only have Medicare.

Over the 2.5 year study period, there were 1,568,606 long-stay nursing home entrants with Medicare but not Medicaid. The total included in this regression analysis, i.e., those without any missing data for variables in the model, was 1,456,676: 58,156 under age 65 and 1,398,520 over age 65. Thus while the under age 65 non-Medicaid residents are a small group, there were many non-Medicaid long-stay residents. We did not try to determine whether these reflect extended post-acute stays or long-term facility residents paying privately or with private LTC insurance.

For this population, the Medicaid HCBS/LTC expenditure ratio variable had a significant negative effect on number of ADLs at admission, while it had a significant positive effect for the Medicaid population. We see this result in both multivariate and univariate models. Since Medicaid service availability should not have a direct effect on Medicare beneficiaries' facility use, we considered other possibilities. Our explanation is the following, hypothetically dividing candidates for nursing facility admission into two groups—"very sick" and "not very sick." The "very sick" Medicaid and Medicare groups go to a nursing facility without choice, but if the "not very sick" Medicaid group is kept in the community by represented by the Medicaid HCBS/LTC expenditure ratio, the nursing facility vacuum is filled in by the remaining Medicare "not very sick" group. This way the average ADL score would increase for the Medicaid population and decrease for the Medicare population when the Medicaid HCBS/LTC expenditure ratio increases. If this is the case, then as Medicaid rebalances, Medicare beneficiaries may fill the resulting gap in nursing facility admissions. One test of this would be to evaluate occupancy rates over time.

3.5 Effect Decomposition Analysis

Changes in an outcome over time, such as we see in the ADL scores, can result from various sources. First, the case mix of the nursing facility population may change over time. For example, if the age distribution of new entrants changes or the diagnostic profile changes then the resulting proportion of residents with certain characteristics changes. This component of change is referred to as the characteristics effect or observed effect. Outcomes may also change over time if the value associated with various characteristics changes, for example, if the impact of Medicaid HCBS/LTC expenditure ratio becomes greater. This type of effect is often referred to as the unexplained or coefficients effects. The classic example of effect decomposition is analysis of changes in earnings by gender. A change in the proportion of women: men in the

workforce would be an explained or characteristics effect, while changes in the earnings values associated with being either female or male would be an unexplained or coefficient effect.

Using regression based decomposition analyses we decomposed the average change in ADL scores between the first and last quarters of the admission sample to the part due to case mix changes versus the contribution resulting from changes in the coefficient values associated with the variables.

For residents under age 65, this decomposition showed that the increase in mean ADL scores is almost all due to changes in the coefficients over time (95% of the effect), not to change in the underlying case mix over time (only 6% of the effect). In other words, any observed increases in ADL scores over time reflect the impact of the individual variables rather than shifts in the composition of the sample. The results are similar for residents age 65 and over with 87% of the increase related to changes in the coefficients over time, and only 13% due to changes in case mix.

Effect decomposition is also useful to rank the relative impact of independent variables. We grouped the variables by type into individual characteristics, facility characteristics and state policy variables and then ranked the effects of each variable within its type. Of the state policy variables, the Medicaid HCBS/LTC expenditure ratio makes the biggest contribution; age makes the biggest contribution of the individual level variables; and facility size has the greatest impact of the facility level variables.

SECTION 4
DISCHARGE DESTINATION ANALYSIS

4.1 Discharge Destination Analysis

As states increase their investment in HCBS and in coordinating systems of care, facility residents should have more support available to return to the community. First, if they were receiving services prior to admission, even if the admission were prolonged, they may be able to return to those. Second, even if they were not receiving services prior to admission, an enriched service system would provide more options for returning to the community- either back to their own homes or to less restrictive settings such as assisted living. Third, states might have programs specifically designed to identify people who wish to return to the community and link them to needed services. Finally, there are programs and policies designed to address obstacles to return after a long facility stay. These include assistance finding and paying for housing, purchasing appliances and basic furniture, as well as providing ongoing support services.

CMS has invested substantial resources in grant programs aimed specifically to accomplish these goals. Money Follows the Person (MFP) grants are intended to support states in their efforts to create a system of flexible financing for long term services and supports that allows funds to move with the individual to the most appropriate and preferred setting for that individual. Nursing Facility Transition grants provide states with funding to assist state efforts to develop a nursing facility transition and diversion program that identifies consumers in institutions wishing to transition to the community and supports them to do so. An NFT program is also a component of MFP. In addition, states have access to other funding sources to support these types of activities or have developed projects independently.

The MDS discharge assessment includes information about discharge destinations, in other words, the type of setting to which the beneficiary is being discharged. This allows us to address the following research questions:

- How does the proportion of long-stay Medicaid residents who are discharged back to the community (all community settings) vary across states and over time?
- How does the proportion of long-stay Medicaid residents who are discharged back to the community to a setting with support services vary across states and over time?
- What factors are associated with variation in discharge destinations?
- How do selected state LTC characteristics and facility characteristics relate to observed differences in discharge destinations?

4.2 Discharge Destination Sample Selection

The discharge sample includes all Medicaid residents with discharge assessments in the MDS and with stays of 30 days or longer between April 2003 and June 2005. We inferred length of stay longer than 30 days by eliminating individuals with a previous discharge assessment or initial assessment within a 30 day period. The initial sample includes 193,649 long-stay residents under age 65, and 828,449 over age 65. After eliminating observations with missing data on the

variables of interest (discharge destination, demographics and insurance) the data files we used in multivariate analysis include 192,248 discharges for residents under age 65 and 818,904 discharges of residents over age 65.

4.3 Discharge Destination Variable Construction

We used the same facility characteristics, state long-term care policy variables and state supply variables as used in the admission sample. The demographic variables available were limited to age, gender, race, and dual eligibility for Medicare and Medicaid. Although date of admission is an available field on the discharge assessment, it was missing too often to include it in the analysis. Thus we were neither able to study length of stay nor the relationship between length of stay and discharge destinations.

The discharge destinations available in these assessments are the following:

- Private home
- Private home with home health
- Assisted living
- Acute care hospital
- Psychiatric hospital
- Rehabilitation hospital
- Another LTC facility
- Death

We created two variables from these discharge destinations for use as dependent variables in the multivariate analysis. We created one dummy variable indicating if the whether the resident was discharged to the community, which we defined to include private home, private home with home health, and assisted living, and we set all other discharge destinations set to 0. We created a second dummy variable indicating if the resident was discharged to the community with services, identified on the discharge assessment as discharged with home health, or discharged to an assisted living facility, setting all other discharge destinations to 0. Some of those who are coded as returning to private homes without home health services may be receiving other HCBS, but this information is not available in the MDS discharge assessments.

4.4 Discharge Destination Analysis Descriptive Findings

- *A higher proportion of people under age 65 are discharged from nursing facilities to the community compared to those 65 (both to the community and to the community with services)*
- *Discharge destinations vary across states*
- *Nationally and in several states, discharges to the community are increasing over time—even controlling for case mix changes and against the backdrop we observed in the admission analysis, that the facility admissions are increasingly impaired over time.*

Table 9 displays the characteristics of the discharge sample, including basic individual demographics, characteristics of the facilities from which the residents were discharged and basic state level characteristics for states in which the resident discharges occurred, for both age groups: residents under age 65 and those age 65 and older. The mean age of residents under age 65 population is 51, and 83 in the residents over age 65. A little over half of those under age 65 are men, compared to less than a third of the older group. Facility residents in both groups are predominantly white, though blacks are a substantially higher proportion of the residents under age 65 sample (26%) compared to the residents over age 65 sample (13%). Not quite half of the younger group are Medicare/Medicaid dually eligible beneficiaries, compared to 93% of the residents over age 65.

As in the admission analysis, we used OSCAR data to examine the characteristics of the nursing facilities from which the sample is being discharged. The results are similar to those for the admissions analysis in terms of the average facility size, facility ownership, occupancy rates and chain versus independent ownership for both age groups. Residents under age 65, resided in- and were discharged from—somewhat larger facilities. Most were discharged from for profit facilities (77% of residents under age 65 and 69% of those over age 65), with similar occupancy rates (84% and 86%). Most individuals were discharged from nursing facilities in urban areas (83% of those under age 65 and 75% of those over age 65). Almost 60% of those under 65 years of age were discharged from facilities that were part of a chain during the study period, compared to a little more than half of the elderly.

We included the same state policy and supply variables as in the admission analysis. We hypothesize that the presence of an MFP or NFT program and higher Medicaid community LTC expenditures as a proportion of total Medicaid LTC expenditures would support community discharges, especially to settings with services. In other words, we expect residents in states with MFP or NFT programs to have a higher likelihood of being discharged to the community, especially to settings with services, compared to residents in states without these programs. We also expect that as the Medicaid HCBS/LTC expenditure ratio increases, the likelihood of being discharged to the community, especially to the community with services, also increases.

Because the literature has shown people who live in colder states are at higher risk for nursing home admission (Weissert, Elston, and Koch, 1990), we also wanted to examine heating degree days as a factor discharges to the community. One might hypothesize that in areas with a higher risk of institutionalization there would also be a lower likelihood of community discharge because both might be a function of limited HCBS. Further, we anticipated that nursing home admission criteria might have an affect on the percent of discharges to the community since those states with stricter nursing home admission criteria are more likely to admit individuals who are more frail than those with less stringent criteria, in this case potentially decreasing the likelihood of community discharge. Alternatively, states with stringent facility entrance criteria might also be states engaged in a wider array of LTC reforms and might be places where the likelihood of community discharge, or discharge with services would increase.

Table 9
Discharge sample characteristics
(April 2003–June 2005)

	Residents under age 65					Residents age 65 and over				
	Obs	Mean	Std Dev	Min	Max	Obs	Mean	Std Dev	Min	Max
Community discharge	212229	49.9%	0.500	0	1	899254	20.7%	0.405	0	1
Community with services	212229	28.8	0.453	0	1	899254	14.5	0.352	0	1
Age	212359	51.07	10.986	0	64	899525	83.18	8.639	65	123
Male	212319	53.8	0.499	0	1	899438	29.0	0.454	0	1
Black	211582	26.0	0.438	0	1	897177	13.5	0.341	0	1
Hispanic	211582	7.5	0.264	0	1	897177	5.2	0.221	0	1
Asian	211582	1.5	0.122	0	1	897177	1.8	0.134	0	1
White	211582	63.7	0.480824	0	1	897177	79.0	0.407419	0	1
Dual Eligible	212359	48.0	0.500	0	1	899525	93.8	0.241	0	1
Number of Beds	194507	154.7	122.715	2	1389	830918	143.7	97.581	2	1389
Non-Profit	212359	16.4	0.370354	0	1	899525	22.9	0.420149	0	1
For Profit	212359	70.2	0.458	0	1	899525	63.8	0.481	0	1
Government	212359	5.0	0.218	0	1	899525	5.7	0.232	0	1
Occupancy Rate	194507	83.5	0.147	0.010	1	830918	86.1	0.137	0.010	1
Urban	212359	75.7	0.429	0	1	899525	69.1	0.462	0	1
Chain	212359	52.1	0.500	0	1	899525	49.9	0.500	0	1
NHC Criteria (1-5)	212343	2.19	1.165	1	5	899492	2.34	1.173	1	5
Expenditure Ratio (0-1.0)	210775	0.57	0.131	0.28	0.97	889107	0.20	0.109	0.05	0.51
MFP or NFT Grant	212359	62.6	0.484	0	1	899525	63.9	0.480	0	1
Hospital Beds/1000 65+	212343	2.8	0.633	1.8	6.1	899492	2.9	0.648	1.8	6.1
Physicians/1000 65+	212343	21.9	5.340	12.8	64.4	899492	21.5	5.299	12.8	64.4
NF bed/1000 65+	212343	45.1	12.494	16.5	71.0	899492	45.1	11.978	16.5	71.0
Heating Degree Days/365	212343	12.6	5.661	0	27.8	899492	12.7	5.748	0	27.8

SOURCE: RTI International analysis of MDS and OSCAR data, April 2003–June 2005.

Community Discharges

Figures 12 and 13 are pie charts showing the proportion of the under and over age 65 samples associated with each discharge destination. We examined the percentage of discharges by type of discharge and by state for the under age 65 and the 65 and older resident population to identify differences across states. The scatter plots in ***Figures 14 and 15*** show how individual states are dispersed relative to the national average, represented by the dark line through the center of the scatter plot. A detailed state-by-state table showing the number and percent of discharges to each potential discharge destination in ***Tables A-6a*** and ***A6b***, found in the appendix.

Nationally, half of residents under age 65 were discharged from a nursing facility to the community during the study period (April 2003–June 2005), compared to about a fifth of residents over age 65. Of those under age 65, 29% were either discharged home with home health services or to an assisted living facility. Of those over age 65, only 15% were discharged to the community with services.

The analysis shows that several states are close to the national average for discharges to the community for residents under age 65. A few, including Oregon, Washington and New Hampshire, are more than 10 percentage points above the national average.

It is also noteworthy that a few states are more than 10 percentage points below the national average, including Iowa (39%), Louisiana (39%), and Mississippi (36%) with Mississippi being the farthest below the national average for discharges the community for the under age 65 population.

With regard to community discharges for older facility residents, a few states are doing substantially better than the national average of 21% (Figure 15). These include Alaska (37%), California (31%), and Oregon (31%) among others.[4] A few states also fell below the national average by almost 10 percentage points, including New Hampshire (13%), Iowa (11%), and North Dakota (10%).

Discharged to the Community with Services

The proportion of individuals discharged to the community with services (a subset of those discharged to any community setting) nationally is shown visually in the earlier pie charts, ***Figures 12 and 13***. The following scatter plots, ***Figures 16*** and ***17***, show the dispersement of individual state discharges to the community with services around the national means.

[4] Alaska only had 572 total discharges in the 65 and older sample during the study period, while California had 74,158; Florida had 13,858; and Oregon had 6,940.

Figure 12
Nursing facility discharge destinations in U.S.—Under age 65

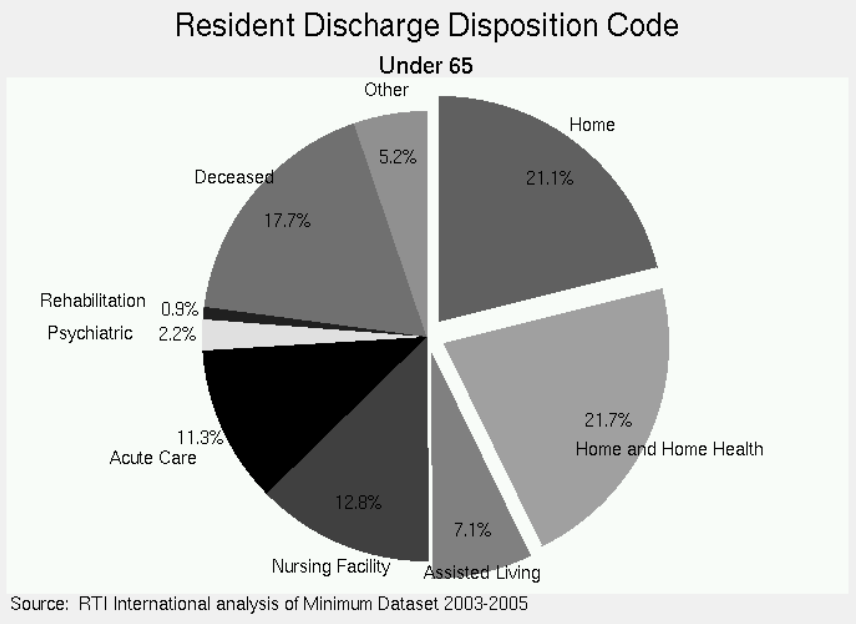


Figure 13
Nursing facility discharge destinations in U.S—Age 65 and over

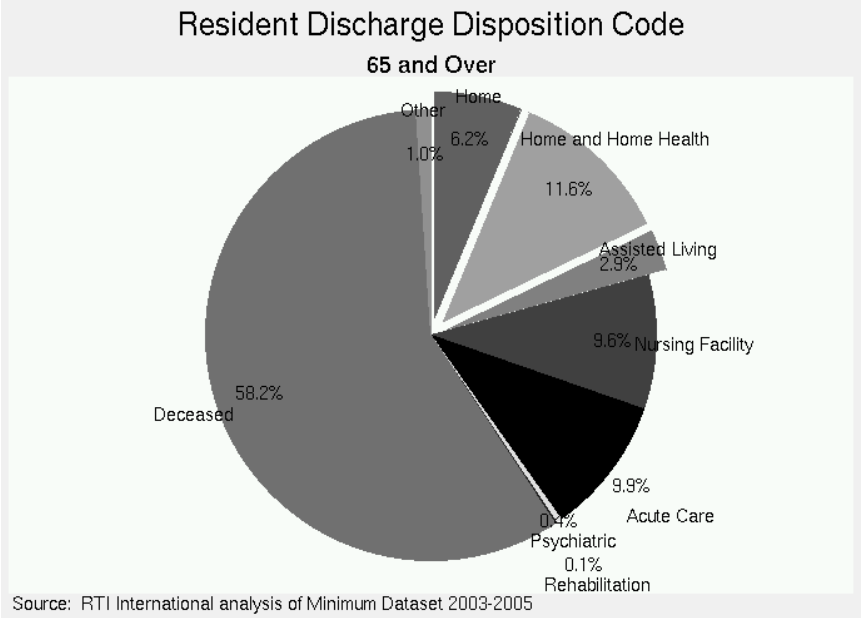


Figure 14
Community discharge by state—Under age 65

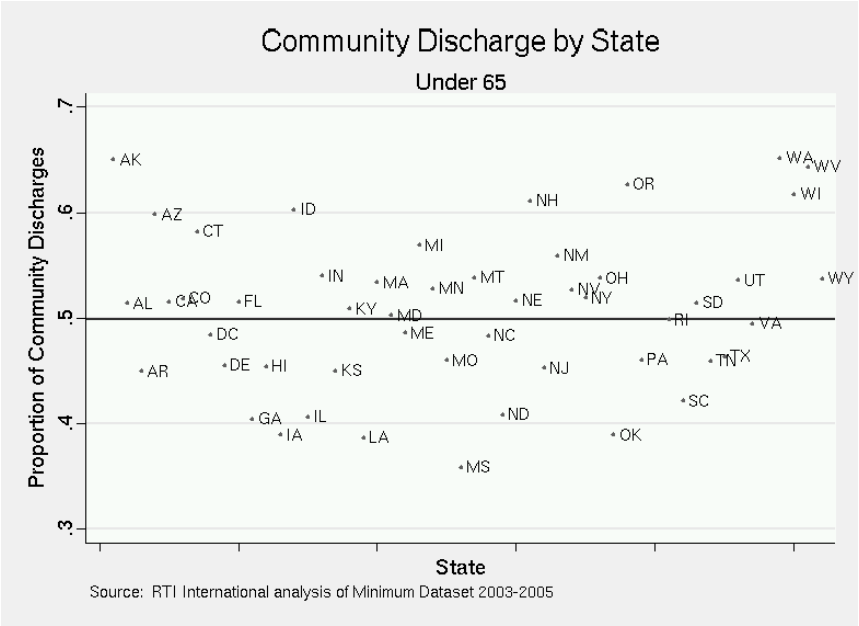


Figure 15
Community discharge by state—Age 65 and over

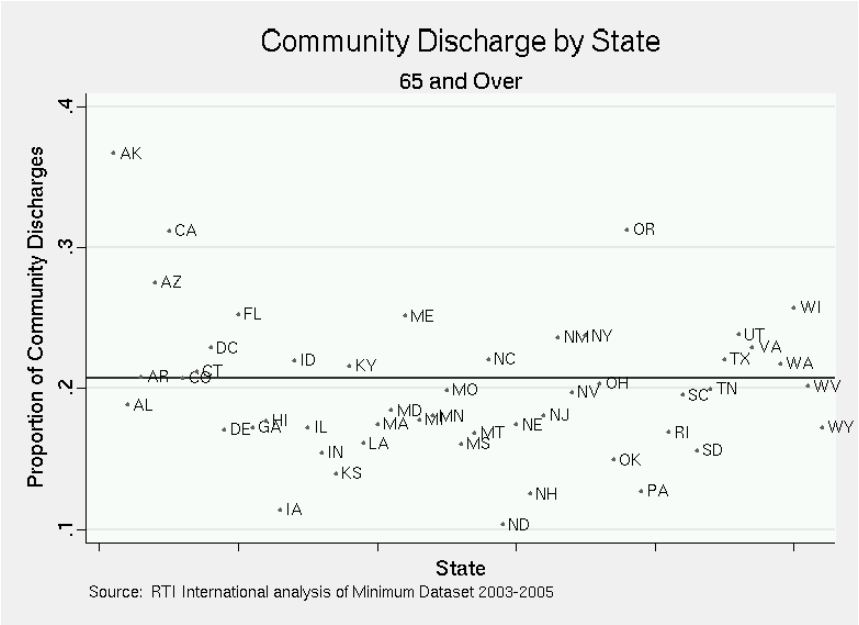


Figure 16
Community discharge with services by state: Under age 65

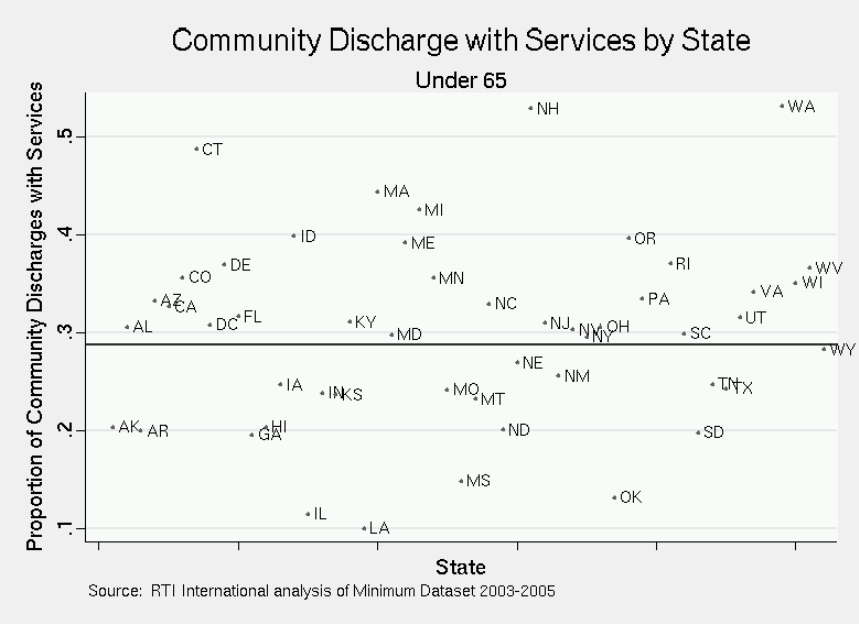
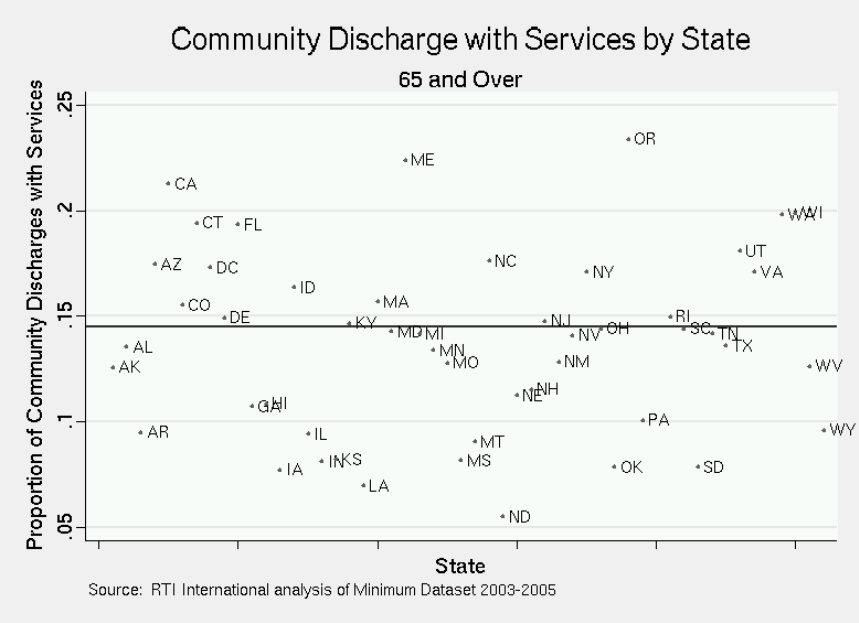


Figure 17
Community discharge with services by state: Age 65 and over



Comparing individual states to the national average for those discharged to the community with services, we found that nursing homes in a several states discharged a significantly larger percentage of individuals under age 65 to the community with services than the national average (29%). Facilities in Connecticut (49%), Massachusetts (45%) and Michigan (45%) each discharged almost twice the national percentage of residents under age 65 to the community with services and New Hampshire discharged more than twice of the national average (53%). In addition, nursing homes in a few states, such as Illinois (11%), Louisiana (10%), and Oklahoma (13%) discharged substantially fewer residents under age 65 to the community with services than the nation as a whole (see ***Figure 17 and Appendix Table A-6a).***

The state standouts for discharges to the community with services for the elderly are California and Oregon. Nursing facilities in both states discharged more than twenty percent of elderly residents to the community with services compared to the national average of 15%. At the other end of the spectrum, other states are also noteworthy, but because the percentage of elderly discharged to the community with services is almost 10 percentage points below the national average. Iowa (8%), North Dakota (6%), Oklahoma (8%), and South Dakota (8%) are among those states where facilities are discharging a lower percentage of elderly persons to the community with support.

For illustrative purposes, ***Table 10***provides several state examples of discharge destinations for residents under age 65. Washington State has one of the highest proportions of community discharges total (62%) and to assisted living specifically (14%). Maryland is as an example of state similar to the national average for these variables, and Louisiana is one of the states with the lowest proportion of discharges to the community total, especially with services.

Table 10
Selected discharge destinations in three states: Residents under age 65
(April 2003–June 2005)

	Community–All			
		Community with services		
	Home w/o paid help (%)	Home w/ home health (%)	Assisted living (%)	Death (%)
United States	21	22	7	18
Washington	27	21	14	15
Maryland	20	23	7	18
Louisiana	29	9	1	29

SOURCE: RTI International analysis of Minimum Data Set, April 2003–June 2005.

Table 11 shows the same information for the over 65 sample. Again we see substantial differences in the proportion discharged with services, especially to assisted living.

Table 11
Selected discharge destinations in three states: Residents over age 65 (April 2003–June 2005)

	Community–All			
		Community with services		
	Home w/o paid help (%)	Home w/ home health (%)	Assisted living (%)	Death (%)
United States	6	12	3	58
Washington	6	10	10	58
Maryland	4	11	3	63
Louisiana	9	7	0.3	61

SOURCE: RTI International analysis of Minimum Data Set, April 2003–June 2005.

In ***Table 12***, we separate the national samples by dual eligibility for Medicare and Medicaid. Theoretically, we might expect that a higher proportion of Medicare/Medicaid dually eligible beneficiaries would return to the community with services compared to Medicaid-only beneficiaries as they have access to additional, Medicare funded, home health benefits. This appears to be the case for residents under age 65, for whom 24% are discharged to a private home with home health compared to only 19% of those with Medicaid only. However, for residents over age 65, the proportion going home with home health is similar for the two groups (12%).

Table 12
Community discharge destinations by Medicare/Medicaid dual eligibility status

	Under Age 65		Over age 65	
	Medicaid-only	Dual Eligible	Medicaid-Only	Medicare-only
	(n=110,442)	(n=101,912)	(55,480)	(844,045)
Home	25%	17%	9%	6%
Home with home health	19	24	12	12
Assisted Living	7	8	3	3
Total Community discharges	51	49	24	21

SOURCE: RTI International analysis of Minimum Data Set, 2003–2005.

4.5 Discharge Destination Time Trends

Looking at descriptive data (not shown), it appears that nationally, and in many states, the proportion of facility residents being discharged back to the community, and to the community with services, increased between April 2003 and June 2005. However we wanted to examine these trends taking into underlying case mix changes that might effect these trends. While there is no health or functional status information available on the discharge assessments, there is demographic information.

Using logistic regression analysis we examined time trends for the likelihood of discharge to the community- nationally and for each state, controlling for demographic characteristics. Detailed national and state by state results are shown in the appendix, ***Table A-7***, presenting odds ratios that show annualized trends. The trend analysis shows that most states are increasing in the proportion of nursing home residents being discharged to the community, controlling for resident case mix, but the finding is only statistically significant for five states—Florida, Indiana, Michigan, New York, and North Carolina—for residents under age 65, and 11 states—Arizona, California, Florida, Indiana, Missouri, New Jersey, North Carolina, Pennsylvania, South Carolina, Texas, and Washington—for residents over age 65 and older sample. One state—Illinois—shows a statistically significant decrease in the proportion of discharges to the community for both resident sample populations under age 65 and 65 and older.

4.6 Discharge Destination Multivariate Analyses

- *State policy variables are significant predictors of the likelihood of community discharge, with the exception of the nursing facility admission criteria for residents over age 65*

- *The Medicaid HCBS/LTC expenditure ratio is an important policy variable – the higher the portion of spending for community LTC the higher the likelihood of individuals going home*

Multivariate Findings

We estimated separate logistic regression models predicting the probability of being discharged to the community and to the community with services (separately for under and over age 65). ***Table 13*** presents the results of these models. We also repeated these analyses splitting the residents into three age groups, under age 65, 65–74, and 75 and over (see ***Table A-8*** in the appendix). The results are similar, though more marked for residents age 75 and over compared to the results shown here where all residents age 65 are included together.[5]

[5] Because the NHC criteria is an ordinal, but not internal scale, we also ran a model using a set of dummy variables (i.e., as a categorical variable). The results are shown in ***Appendix Table A-9***. We retained the ordinal variable in the main analysis for two reasons: (1) it allows us to see the effect of increasingly restrictive criteria and (2) we can model marginal effects with an ordinal, but not a categorical, variable.

Table 13
Probability of discharge to the community

Variable	Under 65 Discharge to community odds ratio (n=192,248)		65 and Over Discharge to community odds ratio (n=818,904)		Under 65 Discharge to community with services odds ratio (n=192,248)		65 and Over Discharge to community with services odds ratio (n=818,904)	
Time trend (quarter)	1.008	*	1.008	***	1.015	***	1.018	***
Expenditure ratio	1.579	***	2.714	***	1.805	***	2.056	***
NHC criteria	0.961	***	0.977	**	0.997		1.008	
MFP or NFT grant	1.094	**	0.912	***	1.302	***	0.921	***
Age	0.991	***	0.920	***	0.998		0.929	***
Male	0.819	***	0.721	***	0.716	***	0.684	***
Black	0.983		1.378	***	0.852	***	1.266	***
Asian	0.844	***	1.948	***	0.818	***	1.443	***
Hispanic	1.055		2.105	***	0.921	**	1.645	***
Dual eligible	0.928	***	1.122	***	1.323	***	1.281	***
Number of certified beds	1.000		1.000	*	0.999	**	0.999	***
For profit	0.894	***	0.950	*	0.870	***	0.903	***
Government	0.856	*	0.740	***	0.777	**	0.720	***
Occupancy rate	0.786	**	0.651	***	1.155		0.784	**
Urban	0.988		0.978		1.170	***	1.140	***
Chain	1.090	***	1.062	***	1.162	***	1.090	***
Heating degree days	1.025	***	1.008	***	1.037	***	1.019	***
Hospital beds/1000 elderly	0.989		0.963	*	1.061	*	0.943	**
Physicians/1000 elderly	0.998		1.005	**	1.010	***	1.013	***
Facility beds/1000 elderly	0.988	***	0.990	***	0.977	***	0.983	***
Constant	2.494	***	408.3	***	0.291	***	92.29	***

NOTES: * p<0.05; ** p<0.01; *** p<0.001

SOURCE: RTI International analysis of MDS and OSCAR data, April 2003–June 2005.

Time Trend—We looked previously at the time trends for each state using only demographics as control variables. Controlling now for all case mix, facility and state characteristics, more individuals are being discharged to the community over time, indicating states are making progress towards moving individuals out of nursing homes. The analysis shows that every quarter, the probability of being discharged to the community increases by a factor of 1.008 for nursing home residents in both age groups, all other variables in the model being held constant. In other words, every quarter the likelihood of being discharged to community is increasing almost 1%, an annual rate of over 3%. When the dependent variable is defined as community discharge with services, i.e., home with home health or to an assisted living facility, change is increasing at a faster rate. Every quarter, the likelihood of being discharged to the community with services increases for both those under age 65 and for the elderly by a factor close to 1.02, all else constant (p<.001). In other words, the likelihood of being discharged to the

community with services increases almost 2% every quarter, or 6% annually for those under age 65 and over 7% annually for those over age 65.

Impact of the State Policy Variables—The Medicaid HCBS/LTC expenditure ratio is positively associated with the odds of being discharged to the community in all four models and is statistically significant. As the proportion of spending for community long term care within a state goes up, the odds of nursing home residents being discharged to the community and to the community with services increase for residents in both age groups. It is not easy to directly interpret the size of the effect from the odds ratio in this case, as a one unit increase in this variable is not meaningful. To understand the impact of this variable in the models, we calculated an increase of 10 percentage points in the HCBS expenditures. For example, raising the ratio by 0.1 from 0.57 to 0.67 in the model estimating community discharge for residents under age 65 the odds increase by a factor 1.105 (odds ratio 2.714 raised to the 1/10th power). To place this finding in terms of dollars, for every additional ten out of one hundred dollars spent for community long-term care, the likelihood of going home to the community increases by 4.7% for residents under age 65, and by 10.5% for residents over age 65. It also increases the likelihood of going home to the community with services by 6.1% for the younger group and 7.5% the elderly, controlling for all other factors.

States' nursing facility admission level of care criteria also has a statistically significant effect on the probability of being discharged to all community locations for residents in both age groups. The more stringent a state's nursing facility level of care criteria, the lower the likelihood of nursing home residents being discharged to the community for both those under age 65 and those age 65 and older. This finding supports the hypothesis that stringent admission criteria might be associated with a more frail facility population with less ability to return to the community. However, when the sample is subset to discharges to the community with support, nursing home level of care criteria is no longer a statistically significant predictor.

Nursing facility residents under age 65 who live in states with an MFP or NFT grant have a significantly higher probability of being discharged to the community and to the community with supportive services than those in states without one of these grants. The opposite is true for elderly nursing home residents in states with one these grants. The likelihood of being discharged to the community and to the community with services decreases for the elderly if they are in one of the states with these grants. It is difficult to interpret this finding or to be assured that this variable actually measures MFP or NFT activity in light of the small amount of progress states had made in implementing their MFP or NFT grant programs during the study period. Theoretically this finding could indicate that MFP and NFT programs are targeting residents under age 65. Alternatively, this variable may be a marker for some other state characteristic, or perhaps states with low rates of community discharge with services for older residents applied for MFP or NFT funding to address this problem.

Impact of Demographic Characteristics—Overall, demographic variables function in these models the way one would expect. As age increases, the odds of being discharged from a nursing facility to the community decreases by 1% for residents under age 65 and by 8% for residents over age 65. In contrast, age is not a statistically significant predictor of the likelihood of being discharged to the community with services for residents under age 65, but is a

significant predictor for the elderly. Being male significantly decreases the likelihood of being discharged to the community, and to the community with services in all models.

Of the racial categories, being black is a statistically significant predictor of outcomes, except of discharge to the community for residents under age 65, while being Asian is a statistically significant predictor in all four models. Being black or Asian decreases the likelihood of being discharged to the community and to the community with services for residents under age 65; however, the opposite is true for residents age 65 and over where being black or Asian increase the likelihood of being discharged to the community with services. Being Hispanic also operates differently in the models depending upon whether the individuals are under or over age 65, but is not statistically significant in predicting community discharge for residents under age 65. Being Hispanic compared to non-Hispanic increases the odds of being discharged to the community and to the community with services for those 65 and older by a factor of 2.1 and 1.6 respectively ($p < .001$).

Dual eligibility status is also a statistically significant predictor. Having dual eligibility status increases the odds of transitioning from a nursing facility to the community and to the community with services for the elderly and to the community with services for residents under age 65. The opposite is true for the dually eligible under age 65 being discharged to the community.

Impact of Facility Characteristics—The size of the facility is only slightly significant in predicting community discharge for residents over age 65, and has only a small effect on the likelihood of individuals 65 and older being discharged to the community. The analyses show that as the size of the facility increases, the likelihood of individuals in both age groups being discharged to the community with services decreases by a factor of 0.999. In other words, for each additional bed, the likelihood of being discharged with services decreases very slightly. Residents of all ages in for profit and government operated (usually county) facilities are much less likely to be discharged to the community or to the community with services than those in not-for-profit nursing facilities. Residents in facilities that are part of a chain compared to those in an independent facility have a significantly higher probability of being discharged to the community, whether in general or with supportive services.

Theoretically the occupancy rate of a nursing facility should be related to discharge patterns. Lower occupancy rates might reflect shorter stays or conversely, facilities with lower occupancy rates have less incentive to discharge their residents. Results of this analysis show that indeed the occupancy rate significantly affects the probability of transitioning to the community for residents in both age groups. The higher a facility's occupancy rate, the less likely nursing home residents in either age group are to be discharged to the community. On the other hand, when the sample is restricted to discharges with services, the effect is only significant for the older age group.

Living in an urban area also significantly increases the probability of both sample populations being transitioned to the community with supportive services, all else constant, but is not significant for being discharged to the community.

Impact of State Supply Variables—Our finding regarding the number of heating degree days is significant in all the models. The colder the state in which nursing facility residents reside, the more likely they are to transition to the community, whether in general or with supportive services- despite the increased likelihood of admission reported in the literature. Thus, heating degree days may be a regional marker, separating northern and southern states, and the difference observed in these models may relate to regional differences in the availability of HCBS or other unobserved characteristics.

Of the state supply variables included in the models, only the number of nursing facility beds per 1000 elderly in a state has a significant effect in all models. The more nursing facility beds available in a state, the less likely nursing facility residents are to be discharged to the community and to the community with services.

Examining the remaining supply variables, increasing hospital bed supply is associated with a lower likelihood of discharged to the community or to the community with services for residents over age 65, but an increased likelihood of discharged to the community with services for residents under age 65. The more physicians per 1000 elderly in a state the greater the likelihood of nursing facility residents being discharged to the community with services regardless of age, and the greater the probability of the nursing facility residents under age 65 going home to the community in general. Neither of these variables is significant in predicting discharges to the community for the under age 65 sample population.

4.7 Effect Decomposition Analysis

Using the same methodology explained in section 3.5 of the admission analysis, we decomposed the changes over time in the proportion of residents discharged back to the community, and to the community with services. For residents under age 65, only 4% of the increase in the proportion discharged to the community was due to changes in the demographic characteristics of the sample over time, while 96% was due to the coefficients effects. For residents over age 65, 33% of the change is due to changing demographics (primarily age) while 67% is due to changes in the values associated with each variable.

Decomposing the change in the proportion discharged to the community with services is more consistent across age groups: the characteristics effects is only 4% for the residents under age 65 and only 2% for residents over age 65. In other words, almost all of the change is associated with the changing value of the coefficients—94% and 98% respectively.

4.8 Marginal Effects Analysis

We predicted the marginal effect of increasing the state Medicaid HCBS/LTC expenditure ratio on the probability of being discharged to the community. The marginal effect was calculated as the difference in the mean predicted value of the outcome using the raised vs. actual ratio. We used the calculation to show examples of the ratio increases, which will significantly increase the proportion of community discharges.

We found that the marginal effect of increasing the Medicaid HCBS/LTC ratio to a balanced (50/50) one for the elderly, (Oregon’s Medicaid HCBS/LTC expenditure ratio is 51%) would result in an increase of the average proportion of community discharges: the proportion

will increase by 4.7% for the community discharges nationally and by 3.0% for the community discharges with help, and both changes are 95% statistically significant. This finding confirms the earlier finding in the regression (Section 4.5) as the magnitude of the effects are in agreement.

SECTION 5
CONCLUSIONS AND RECOMMENDATIONS

Our goals in this pilot project were both methodological and substantive. Methodologically, we wanted to see if MDS analyses could be used to provide useful information about state long-term care reform efforts on a routine basis and to pilot the approach, identifying potential future refinements to the approach we piloted. Substantively, we wanted to analyze differences in long-term care users experience across states and across time taking state policy differences into account. This section has three parts. First, we summarize the substantive findings and discuss them in light of the original hypotheses. Second, we discuss the effectiveness and limitations of the pilot as a monitoring tool for seeing how the nation as a whole and individual states are doing in reforming their long-term care systems. Finally, we present recommendations for extending and refining this approach.

5.1 Results of Hypothesis Testing

H1: The original idea of this hypothesis was to examine how the community service system is developing by looking at the nursing home case mix. If the community service system and other long-term care reforms are maturing, then it would be possible to keep people with cognitive impairments at home and those at lower levels of ADL impairment. Nursing home will be filled with more functionally or clinically impaired people, and less with people with fewer care needs. In addition, over time, the community service system would be able to care for people at increasing levels of impairment.

This hypothesis was confirmed by the descriptive results:

- Over time nursing homes are admitting patients with higher on average ADL score and slightly lower on average CPS score (part 1 of Table 7),
- The structure of the nursing home case mix is changing, as well as the means for various health and functional status measures—over time the proportion of higher intensity residents (identified as Rehab groups under RUGS-III) is growing and the proportion of lower intensity residents is decreasing (Table 6).
- In terms of diagnoses, nursing homes residents are progressively sicker on admission (Table 5, and the average number of diagnosis goes up).

It is also interesting that although the resident population is getting sicker, the proportion of persons wishing and judged as having potential to go home is increasing; this might also be evidence of the development of good community supports or of facility staff's growing awareness of community supports (part 2 of Table 7).

We then wanted to see if the observed time trends would still be significant controlling for the available demographic, facility, and state characteristics. The multivariate models confirmed these findings (Table 8). We also saw that the same time trends are significant for the majority of states, despite substantial state variation at the outset (Table 4).

H2: We evaluated community changes by looking at a discharge cohort: if the proportion of persons discharged to the community, particularly with services to the extent the MDS data

provides this information, is increasing over time then it would appear that long-term care reforms are having the desired effects. The analysis confirms this hypothesis.

- The proportion of discharges to the community, and especially with services, is increasing with time. The absolute increase is relatively small, but given the fact the admission case mix keeps getting sicker, one would expect to see a decrease in proportion of patients discharged to the community. The fact that we still see an increase suggests improvement in available community services or the linkages between facilities and the community.
- The multivariate analysis confirms that the positive time trend of community discharges is significant controlling for demographic, facility and state level variables. Time trend analysis on the individual state level also shows that this trend is significant in the majority of individual states despite all state variation.
- The other key finding of the discharge sample analysis was that the Medicaid HCBS/LTC expenditure ratio has a positive significant effect on the probability of being discharged to the community. This finding was strengthened by checking the impact of this variable in the non-Medicaid (Medicare-only) population where the Medicaid HCBS/LTC expenditure ratio did not increase the probability of being discharged to the community. This suggests that the effect associated with the Medicaid HCBS/LTC expenditure ratio was not due to other unknown state confounders in the discharge analysis.

H3: We hypothesized that the changes that we observe are mainly due to the implemented reforms, not due to differences in the case mix which occur with time.

Using effect decomposition techniques, we learned that the main part of the effects is attributed to the changes in the way the same variables work with time *(coefficients* effect), not to the changes in the variables (*characteristics* effect). These results show that the observed changes are mostly due to the changes in how the variables affect the outcomes, and supports this hypothesis.

5.2 Summary of Substantive Findings

The increasing functional impairment levels, the increased number of chronic conditions of newly admitted long-stay nursing facility residents, and the proportion of long-stay residents returning to the community are potential indicators of the effects of state rebalancing efforts. The time trends were significant in all models, indicating that even holding all other factors constant, the LTC system is moving gradually in the desired direction. Specifically, nationally and in many states, ADL scores on admission are increasing over time for beneficiaries under and over age 65. The likelihood of community discharge also increased over the study period, including the likelihood of being discharged with services. We also see that there is state variation on these measures and on the rate of change. These patterns are occurring against a backdrop of other changes in the health status of facility admissions that suggest facility residents are generally increasing in their acuity levels.

Financial rebalancing, indicated in this study by increasing Medicaid long-term care expenditures on community services as a proportion of a total Medicaid long-term care expenditures, is associated with the likelihood of discharge to the community for Medicaid beneficiaries. The effect is strongest in relation to discharge to the community with services. Simulations showed that increasing Medicaid home and community-based long-term care expenditure ratios could be expected to increase the likelihood of this outcome. In addition, effect decomposition analyses indicate that this variable has the greatest effect on outcomes of the state characteristics. The likelihood of community discharge for another population—long-stay residents with Medicare only—was not positively effected by the Medicaid community long-term care variable. This is inconsistent with a counter hypothesis that all observed changes might be due to background trends unrelated to state Medicaid long-term care policies.

In addition, we saw that the presence of an MFP or NFT grant in the states was associated with an increase in ADL scores on admission for both residents under and over age 65, and an increase in the likelihood of community discharges for residents under age 65. These results are harder to interpret, particularly because the impact of the MFP or NFT programs were unlikely to be large because of their slow start up. Indeed, in some states, the decision to request funding for an MFP or NFP program might reflect an awareness of the need to address unmet needs for community discharge (e.g. Louisiana). In other states, this may be a proxy for strength in their community LTC system as MFP initiatives in particular are complex "late stage" investments in LTC reform. For example, because the presence of an MFP or NFT grant was associated with higher ADL scores on admission, a measure we would not expect them to directly effect, it may indicate that states with MFP or NFT grants have already pursued utilizing more restrictive facility admission requirements.

The findings regarding state nursing home certifiability criteria as a predictor variable are more mixed. As a predictor of ADL scores on admission, state NHC criteria were significantly associated with higher levels of impairment only for the residents under age 65. This could reflect the weak association between the state NHC criteria and the level of ADL impairment measured by the ADL score, and differences between residents under and over age 65. However, the state NHC criteria do not have an effect on the likelihood of community discharges. The lack of a direct effect is logical, however, only if more impaired individuals are accessing facility care to begin with; then we would expect fewer residents to be able to return to the community.

5.3 Methodological Findings

First and foremost, this pilot study shows that it is feasible to use the MDS to monitor important aspects associated with long-term care reform of nursing home admissions and discharge for the long-stay Medicaid facility population. The differences across states are meaningful, and the fact that we could observe modest trends over time, even in such short time span (2 years and 3 months) suggests this is a dynamic and changing picture worthy of ongoing monitoring. The results of the multivariate analyses indicate that these are real changes associated with state policy variables and holding up after controlling for underlying changes and variation in case mix.

Within states, the information about differential likelihood of community discharge for types of residents and for residents of different types of facilities is important. These data could

be used to identify facility types and resident types to target for MFP or NFT activities. For example, a state might wish to target for-profit, government owned, and independent facilities for outreach or further investigate differences in discharge patterns by race if state specific analysis shows the same patterns as the national analysis reported here. Although states have shown interest in using the MDS data for case finding, much of that effort has focused on identifying people who have indicated that they wish to go home. Our analysis is not able to look at the relationship between that desire and future discharge, but it does show that the number and proportion of residents who have this desire, who have someone in the community who is supportive of this desire, and who are evaluated as having the potential to go home are all increasing. With some refinements and use of additional policy measures, states may also find this type of analysis useful in determining the impact of specific state policy measures. For example, a state might explore the relationship between personal care expenditures and nursing facility outcomes, or use the information from these analyses to communicate the value of HCBS expenditures to the state legislature.

State specific results and analyses could also be valuable to CMS in targeting future grant funding to states. CMS could use these data to identify the states with low community discharge rates, or low discharges to the community with services for future Systems Change grants. CMS could also use the state specific data to guide states in targeting their case finding efforts..

5.4 Limitations

There are several limitations to this study, often related to the MDS. We were unable to test our hypothesis related to length of stay since the field was often missing on the discharge assessments. If we had created a sample for which we had both admission and discharge assessments, we could have calculated length of stay and examined the relationships among length of stay, health and functional status on admission, and discharge destinations. We chose not to do this because it would have defined a smaller sample in the study period and truncated the observations available. It is difficult to define episodes of nursing facility care using MDS data alone.

Using the MDS alone means that we relied on the facility staff to have correctly identified Medicare and Medicaid status on the admission and discharge assessments. It is possible that facility staff may have only entered Medicare numbers on the initial assessments for dually eligible beneficiaries if the resident was initially receiving Medicare-reimbursed post acute care. Thus, it is possible that we undercounted beneficiaries with Medicaid in our samples. Correctly identifying Medicaid beneficiaries would require merging the MDS with Medicaid enrollment files.[6] Similarly, we do not know how accurate the discharge assessment data are regarding discharge destination. Our definition of long-stay was not as conservative as if we had limited the analyses to residents with quarterly assessments, implying a stay of at least 90 days. However, this approach would also drop people whose stays exceeded any concept of post acute care. We also chose to keep individuals who may have had repeated admissions in our admission sample, as long as there was no evidence of leaving the facility less than 30 days after the first

[6] CMS analyses indicate about one third of Medicare beneficiaries do not have a Medicare number included on an MDS assessment so it is likely possible that time is also a substantial undercount of residents with Medicaid (personal communication with Edward Mortimore).

observed assessment during the study period (as measured by presence of a discharge assessment of a new admission assessment).We controlled for correlations between observations at the facility level, assuming that most beneficiaries who have repeat admissions would be entering the same facility.

As a pilot, we selected and tested a limited number of state program characteristics that could be associated with our dependent variables. There are not many state policy variables on which reliable information is available on a 50-state basis. The expenditure ratio proved to be an excellent choice. However, our MFP or NFT variable may not have been an optimal choice and the results related to this variable are hard to interpret. As we indicated, the Systems Change grants were slow to start and included varied levels of effort across states and even within a state where the effort may have been less than statewide. We selected states with MFP or NFT grants funded by the Systems Change grant program, yet we had no information about their level of implementation. Conversely, we did not incorporate information about MFP or NFT programs funded separately or implemented on a state level without external funding. This may have left out states with active programs or whose Systems Change MFP or NFT funding was used to further an existing program rather than start one from scratch.

There are other options that could be considered. States with a single point of entry model for accessing information and services could be expected to support delaying or preventing nursing facility entrance or assist facility residents to return to the community. Inclusion of personal care as a state plan benefit could also affect facility use, as would Medicaid coverage of assisted living or use of consumer directed options. Specific aspects of state policies and procedures might also be useful to incorporate, such as whether a state mandates frequent redetermination of nursing facility level of care for facility residents.

5.5 Recommendations

With some refinements, the approach piloted in this study could be used as a monitoring tool, evaluating patterns of facility admissions and discharges nationally and on the state level. There are also several ways this pilot approach could be extended as a research project to further understand state variation and factors associated with facility admissions and discharges.

Extensions of the data:

- Extend into additional years, and create annual statistics.
- Create an admission cohort and follow until discharge, to observe length of stay and to incorporate characteristics on admission as predictors of discharge destinations. This could include both health and functional status measures and the items about desire, support and potential to return to the community.
- Develop measures of disability types (psychiatric, physical, and intellectual) for inclusion in the analyses or as strata for separate analyses. This could be done based on diagnostic information within the MDS. It could also be enhanced by linking to the SSA data reason for disability information.
- Conduct additional simulations of policy changes using marginal effects techniques.

- Link to claims data to know more about where people have been prior to facility admission, what services they receive after admission and about costs. This would be a very rich analysis and provide CMS with useful information, though the time lag associated with claims data availability would have a negative effect on its usefulness as an ongoing monitoring tool.

Refinements of the approach:

- Model other potential measures of Systems Change of LTC reform. For example, it is possible to analyze the impact of the presence of personal care as a state plan benefit, or of consumer directed options, on ADL scores on admission and on discharge destinations.
- We selected the MDS ADL score as our measure of status on admission, however there are other options that could be considered. These could include constructing a different ADL scale that relates more closely to the types of ADL scales used in NHC criteria, looking at individual ADLs that might be especially challenging or easy to address in the community, summarizing ADL data into a hierarchical approach related to independence, support or dependence, or creating a typology that integrates level of cognitive function with ADL status.

- Consider other definitions of long-stay residents. Using MDS data alone, we could restrict the sample to residents with a quarterly assessment. Although there are many challenges and imperfections associated with this approach, it would ensure that the sample did not include residents admitted for short-term post-acute stays.

- Link the data to Medicare and Medicaid enrollment files to more accurately identify beneficiary status.

- Use a linked data set incorporating hospitalization and death data sources to more accurately evaluate discharge destinations. Data sets that would support this type of analysis, including the opportunity to assess length of stay, are under development at CMS.

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APPENDIX
SUPPLEMENTARY TABLES

Table A-1
State policy and supply characteristics

State ID	Medicaid HCBS/LTC Expenditure Ratio (under 65)	Medicaid HCBS/LTC Expenditure Ratio (65 and over)	MFP Grant	NFT Grant	MFP or NFT Grant	NHC Criteria (1-5)	Total heating degrees/ 365	Hospital beds/ 1000 elderly, 2003	# Physicians/1000 elderly	# Facility beds/ 1000 elderly
AK	0.88	0.41	0	1	1	3	27.8	2.2	34.4	16.9
AL	0.61	0.10	0	1	1	5	7.7	3.5	16.0	37.5
AR	0.53	0.26	0	1	1	2	9.2	3.6	14.5	59.5
AZ	0.74	0.26	0	0	0	4	4.7	1.9	16.0	16.2
CA	0.67	0.40	1	1	1	1	6.4	2.1	24.2	30.5
CO	0.84	0.26	0	1	1	3	18.7	2.1	25.7	40.7
CT	0.63	0.16	0	1	1	3	17.4	2.1	26.6	57.3
DC	0.35	0.14	0	0	0	1	11.9	6.1	64.4	43.6
DE	0.64	0.12	0	1	1	1	13.2	2.5	19.0	34.0
FL	0.64	0.14	0	0	0	3	1.9	3	14.4	25.7
GA	0.62	0.13	0	1	1	3	7.8	2.8	22.7	42.7
HI	0.79	0.31	0	0	0	5	0.0	2.5	22.7	16.2
IA	0.47	0.15	0	0	0	2	18.6	3.7	12.8	71.0
ID	0.65	0.27	1	0	1	3	16.5	2.5	14.6	35.0
IL	0.42	0.11	0	0	0	2	17.0	2.8	22.7	59.8
IN	0.40	0.06	0	1	1	2	16.2	3.1	17.3	58.7
KS	0.76	0.25	0	0	0	1	13.3	3.9	16.8	63.0
KY	0.71	0.16	0	0	0	2	12.3	3.6	18.0	47.1
LA	0.38	0.07	0	1	1	2	5.0	4	22.6	66.3
MA	0.71	0.13	0	1	1	3	18.6	2.5	33.3	55.4
MD	0.66	0.13	0	1	1	5	14.0	2.1	35.9	41.0
ME	0.91	0.29	1	0	1	5	22.0	2.8	18.4	38.1
MI	0.42	0.11	1	1	1	2	18.6	2.6	19.3	36.4
MN	0.79	0.16	0	1	1	2	22.8	3.2	22.9	55.3
MO	0.73	0.25	0	0	0	3	13.8	3.4	17.9	60.4
MS	0.28	0.14	0	0	0	2	7.3	4.5	14.8	43.5
MT	0.74	0.20	0	0	0	3	20.7	4.7	16.4	56.7
NC	0.59	0.33	0	1	1	4	9.3	2.8	20.6	39.5
ND	0.54	0.07	0	0	0	3	25.2	5.7	16.4	69.9
NE	0.63	0.13	0	1	1	2	16.8	4.3	18.2	65.1
NH	0.90	0.13	0	1	1	1	20.9	2.2	21.7	46.1
NJ	0.46	0.23	0	1	1	3	15.3	2.6	23.8	41.2
NM	0.71	0.41	0	0	0	3	11.5	2	19.5	28.2
NV	0.59	0.17	1	0	1	1	8.4	1.9	15.8	18.6
NY	0.53	0.32	0	0	0	1	17.1	3.4	30.1	46.2
OH	0.43	0.12	0	1	1	1	16.3	2.9	19.1	53.8
OK	0.65	0.16	0	0	0	2	9.7	3.1	13.0	58.1
OR	0.84	0.51	0	0	0	1	12.2	1.9	20.3	25.3
PA	0.38	0.05	1	0	1	3	16.5	3.3	19.2	44.7
RI	0.40	0.05	0	1	1	1	16.6	2.2	25.0	54.6
SC	0.55	0.16	0	1	1	3	7.8	2.7	18.3	29.4
SD	0.68	0.08	0	0	0	1	20.3	5.8	15.0	60.1
TN	0.47	0.06	0	0	0	5	10.9	3.5	20.6	48.7
TX	0.51	0.30	1	1	1	2	5.3	2.6	21.1	48.4
UT	0.65	0.12	0	1	1	4	16.2	1.9	24.0	33.9
VA	0.62	0.18	0	0	0	5	12.3	2.3	23.9	33.2
VT	0.97	0.28	0	0	0	2	22.5	2.4	27.9	40.2
WA	0.62	0.27	1	1	1	1	13.9	1.8	23.2	32.1
WI	0.67	0.16	1	1	1	2	20.7	2.7	19.2	53.2
WV	0.67	0.17	0	1	1	2	14.5	4.3	15.0	35.3
WY	0.81	0.12	0	1	1	1	21.2	3.5	15.8	43.9

Table A-2
Mean ADL scores on admission by state: Under & over age 65

	Under 65		Over 65	
State	**Number**	**ADL score (4-18)**	**Number**	**ADL score (4-18)**
US	247,504	9.67	686,591	11.22
AK	225	9.35	441	10.30
AL	2,816	10.45	10,937	10.83
AR	1,920	9.86	9,234	10.37
AZ	4,288	9.56	7,826	10.63
CA	32,912	9.50	82,794	12.00
CO	2,546	9.39	6,896	10.24
CT	3,746	8.80	10,616	10.87
DC	589	9.17	1,273	10.61
DE	394	10.53	1,241	11.15
FL	12,632	10.00	40,824	11.47
GA	5,218	10.34	21,042	10.91
HI	426	11.26	1,990	12.28
IA	1,928	10.04	6,975	9.96
ID	835	11.36	2,359	11.78
IL	21,929	6.65	26,893	10.11
IN	6,257	10.47	14,693	10.75
KS	1,975	8.48	5,435	10.05
KY	3,428	12.01	13,449	12.09
LA	5,035	9.61	14,760	10.53
MA	6,424	10.01	16,239	11.54
MD	3,891	9.83	7,240	11.96
ME	1,142	12.45	5,847	13.53
MI	5,628	10.62	17,691	10.76
MN	4,584	9.40	12,177	11.08
MO	7,257	8.53	19,533	10.22
MS	2,629	11.00	11,534	11.23
MT	727	9.06	2,145	9.73
NC	6,293	11.09	26,079	11.70
ND	376	10.68	1,609	10.37
NE	1,496	10.55	4,156	10.63
NH	426	10.31	1,950	10.17
NJ	5,240	9.42	15,324	10.83

(continued)

Table A-2 (continued)
Mean ADL scores on admission by state: Under & over age 65

State	Under 65		Over 65	
	Number	ADL score (4-18)	Number	ADL score (4-18)
NM	974	9.44	3,390	10.32
NV	970	9.87	2,568	10.94
NY	20,046	9.51	57,683	11.51
OH	18,443	10.01	29,911	11.51
OK	3,588	8.56	10,181	9.52
OR	2,100	10.48	5,247	11.58
PA	5,803	11.83	21,020	12.25
PR	17	8.18	37	9.57
RI	995	8.80	4,636	10.25
SC	1,555	11.80	9,467	11.63
SD	622	10.26	2,341	10.54
TN	4,528	11.07	17,344	11.80
TX	15,791	9.56	53,853	10.63
UT	1,721	9.59	2,652	10.66
VA	3,825	11.59	14,401	11.92
VI	2	10.00	8	15.50
VT	285	10.47	1,400	11.67
WA	5,305	10.58	11,485	12.03
WI	4,003	10.49	12,592	10.91
WV	1,413	11.13	4,311	11.39
WY	306	9.14	862	10.20

SOURCE: RTI International analysis of MDS data, January 2003–March 2005.

Table A-3
ADL scores on admissions:
Annualized state trends, January 2003–March 2005

	Under age 65				Age 65 and over			
State	Factor	p-value	+/-	Significant	Factor	p-value	+/-	Significant
US	1.015	0.0000	**+**	*****	1.022	0.0000	**+**	*****
AL	1.034	0.0003	+	*	1.035	0.0000	+	*
AK	0.958	0.2131	-		0.956	0.0642	-	
AZ	1.037	0.0000	+	*	1.043	0.0000	+	*
AK	0.958	0.2131	-		0.956	0.0642	-	
CA	1.020	0.0000	+	*	1.022	0.0000	+	*
CO	1.009	0.3682	+		1.038	0.0000	+	*
CT	1.046	0.0000	+	*	1.034	0.0000	+	*
DE	1.006	0.8099	+		1.014	0.2793	+	
DC	1.012	0.5907	+		1.001	0.9290	+	
FL	1.020	0.0000	+	*	1.031	0.0000	+	*
GA	0.986	0.0371	-	*	1.023	0.0000	+	*
HI	0.960	0.0825	-		1.029	0.0043	+	*
ID	1.018	0.2829	+		1.035	0.0002	+	*
IL	1.006	0.1371	+		1.019	0.0000	+	*
IN	1.036	0.0000	+	*	1.046	0.0000	+	*
IA	1.014	0.2178	+		1.020	0.0006	+	*
KS	1.053	0.0000	+	*	1.028	0.0000	+	*
KY	0.993	0.3627	-		0.995	0.2019	-	
LA	1.013	0.0616	+		1.017	0.0000	+	*
ME	1.024	0.0706	+		1.020	0.0002	+	*
MD	1.001	0.9128	+		1.021	0.0001	+	*
MA	1.016	0.0082	+	*	1.022	0.0000	+	*
MI	1.025	0.0001	+	*	1.017	0.0000	+	*
MN	1.010	0.2134	+		1.029	0.0000	+	*
MS	1.021	0.0207	+	*	1.026	0.0000	+	*
MO	0.994	0.3780	-		1.016	0.0000	+	*
MT	0.982	0.3402	-		1.009	0.3955	+	
NE	1.036	0.0044	+	*	1.021	0.0043	+	*
NV	0.988	0.4490	-		1.032	0.0008	+	*
NH	1.046	0.0550	+		0.996	0.7097	-	
NJ	0.992	0.2427	-		1.007	0.0570	+	
NM	1.078	0.0000	+	*	1.021	0.0140	+	*
NY	1.022	0.0000	+	*	1.022	0.0000	+	*
NC	1.018	0.0024	+	*	1.023	0.0000	+	*
ND	1.055	0.0267	+	*	1.042	0.0007	+	*
OH	1.019	0.0000	+	*	1.027	0.0000	+	*
OK	1.003	0.7431	+		1.008	0.1311	+	
OR	1.043	0.0001	+	*	1.041	0.0000	+	*
PA	1.006	0.2939	+		1.015	0.0000	+	*
RI	0.955	0.0059	-	*	1.027	0.0002	+	*

(continued)

Table A-3 (continued)
ADL scores on admissions:
Annualized state trends, January 2003–March 2005

	Under age 65				Age 65 and over			
State	Factor	p-value	+/-	Significant	Factor	p-value	+/-	Significant
SC	1.028	0.0148	+	*	1.008	0.0851	+	
SD	1.053	0.0075	+	*	1.057	0.0000	+	*
TN	1.009	0.2273	+		1.020	0.0000	+	*
TX	1.023	0.0000	+	*	1.020	0.0000	+	*
UT	1.005	0.6505	+		1.027	0.0039	+	*
VT	1.016	0.5884	+		0.993	0.5500	-	
VA	1.001	0.8414	+		1.022	0.0000	+	*
WA	1.044	0.0000	+	*	1.023	0.0000	+	*
WV	0.980	0.1033	-		1.020	0.0060	+	*
WI	1.030	0.0001	+	*	1.030	0.0000	+	*
WY	1.032	0.2910	+		0.992	0.6513	-	

NOTES:

Control variables: CPS, diagnosis count, age, male, Black, Asian, Hispanic, dual eligible, lived alone prior to admission

* $p<0.05$

SOURCE: RTI analysis of MDS 2003-2005

Table A-4
Predicting ADL scores on admission (3 age groups)

Variable	Under 65 odds ratio	65-74 odds ratio	75 and over odds ratio
Time trend (quarter)	1.004***	1.005***	1.006***
Expenditure ratio	0.974	1.024	1.095***
NHC criteria	1.016***	1.000	1.002
MFP or NFT grant	1.095***	1.023***	1.014***
Cognitive performance scale	1.084***	1.059***	1.068***
Diagnosis count	1.034***	1.027***	1.023***
Age	1.000	1.001**	1.002***
Male	0.920***	0.946***	0.977***
Black	0.984**	1.049***	1.053***
Asian	1.044***	1.082***	1.052***
Hispanic	1.021**	1.041***	1.057***
Dual eligible	1.055***	1.069***	1.049***
Lived alone prior to admission	0.966***	0.970***	0.973***
Number of certified beds	1.000	1.000	1.000
For profit	0.928***	0.982***	1.016***
Government	0.954**	0.945***	0.968***
Occupancy rate	0.992	1.106***	1.065***
Urban	0.970***	0.996	1.002
Chain	1.043***	1.020***	1.020***
Heating degree days/365	1.005***	1.003***	1.004***
Hospital bed supply/1000 elderly	1.088***	1.013**	1.021***
Physician supply/1000 elderly	0.999	1.001**	1.002***
Nursing facility bed supply/1000 elderly	0.993***	0.997***	0.997***
Constant	7.455***	6.711***	6.013***

NOTES: * $p<0.05$; ** $p<0.01$; *** $p<0.001$

SOURCE: RTI International analysis of MDS and OSCAR data, January 2003–March 2005.

Table A-5
Predicting ADL scores on admission (3 age groups)

Variable	Under age 65 odds ratio	Age 65 and over odds ratio
Time Trend (quarter)	1.004***	1.005***
Expenditure ratio	0.963	1.066***
NHC criteria 2	0.975*	0.967***
NHC criteria 3	1.012	0.981***
NHC criteria 4	1.032*	0.971***
NHC criteria 5	1.082***	1.015**
MFP or NFT grant	1.097***	1.021***
Cognitive performance scale	1.084***	1.065***
Diagnosis count	1.033***	1.023***
Age	1.000	1.001***
Male	0.919***	0.968***
Black	0.985**	1.052***
Asian	1.041***	1.054***
Hispanic	1.023***	1.054***
Dual eligible	1.056***	1.057***
Lived alone prior to admission	0.965***	0.971***
Number of certified beds	1.000	1.000
For profit	0.927***	1.007*
Government	0.953**	0.962***
Occupancy rate	0.983	1.068***
Urban	0.970***	1.000
Chain	1.043***	1.020***
Heating degree days/365	1.005***	1.003***
Hospital bed supply/1000 elderly	1.086***	1.018***
Physician supply/1000 elderly	0.998**	1.001
Nursing facility bed supply/1000 elderly	0.994***	0.998***
Constant	7.827***	6.617***

NOTES: * p<0.05, ** p<0.01, *** p<0.001

SOURCE: RTI International analysis of MDS and OSCAR data, January 2003–March 2005.

Table A-6a
Discharge distribution by state: Under age 65

State	Private home	Private home with home health	Assisted living	Another nursing facility	Hospital	Psychiatric hospital	Rehabilitation hospital	Deceased	Other	Total
US	44,751	46,100	15,086	27,102	24,007	4,761	1,812	37,492	11,118	212,229
	21.09	21.72	7.11	12.77	11.31	2.24	0.85	17.67	5.24	100
AK	110	19	31	5	15	1	2	61	2	246
	44.72	7.72	12.6	2.03	6.1	0.41	0.81	24.8	0.81	100
AL	408	566	32	255	154	37	17	468	19	1,956
	20.86	28.94	1.64	13.04	7.87	1.89	0.87	23.93	0.97	100
AR	392	270	43	260	140	39	23	384	17	1,568
	25	17.22	2.74	16.58	8.93	2.49	1.47	24.49	1.08	100
AZ	1,073	910	434	508	379	48	25	410	251	4,038
	26.57	22.54	10.75	12.58	9.39	1.19	0.62	10.15	6.22	100
CA	4,646	3,849	4,169	2,228	3,736	1,138	399	2,775	1,616	24,556
	18.92	15.67	16.98	9.07	15.21	4.63	1.62	11.3	6.58	100
CO	369	591	218	306	158	36	14	480	98	2,270
	16.26	26.04	9.6	13.48	6.96	1.59	0.62	21.15	4.32	100
CT	283	1,287	173	359	240	36	11	464	141	2,994
	9.45	42.99	5.78	11.99	8.02	1.2	0.37	15.5	4.71	100
DC	79	129	9	33	51	5	0	115	27	448
	17.63	28.79	2.01	7.37	11.38	1.12	0	25.67	6.03	100
DE	35	143	7	21	82	4	2	89	23	406
	8.62	35.22	1.72	5.17	20.2	0.99	0.49	21.92	5.67	100
FL	2,339	2,857	868	1,392	1,550	138	54	1,944	621	11,763
	19.88	24.29	7.38	11.83	13.18	1.17	0.46	16.53	5.28	100
GA	904	688	157	572	532	79	30	1,246	113	4,321
	20.92	15.92	3.63	13.24	12.31	1.83	0.69	28.84	2.62	100
HI	96	50	28	27	70	3	3	91	15	383
	25.07	13.05	7.31	7.05	18.28	0.78	0.78	23.76	3.92	100
IA	230	350	47	280	145	40	9	429	79	1,609
	14.29	21.75	2.92	17.4	9.01	2.49	0.56	26.66	4.91	100
ID	146	201	84	71	43	13	10	136	11	715
	20.42	28.11	11.75	9.93	6.01	1.82	1.4	19.02	1.54	100
IL	5,189	1,687	343	3,383	1,692	720	89	2,094	2,559	17,756
	29.22	9.5	1.93	19.05	9.53	4.05	0.5	11.79	14.41	100
IN	1,535	1,055	158	872	268	61	40	995	105	5,089
	30.16	20.73	3.1	17.13	5.27	1.2	0.79	19.55	2.06	100
KS	365	302	103	323	107	97	19	326	67	1,709
	21.36	17.67	6.03	18.9	6.26	5.68	1.11	19.08	3.92	100

(continued)

Table A-6a (continued)
Discharge distribution by state: Under age 65

State	Private home	Private home with home health	Assisted living	Another nursing facility	Hospital	Psychiatric hospital	Rehabilitation hospital	Deceased	Other	Total
KY	561	759	122	383	305	45	46	556	57	2,834
	19.8	26.78	4.3	13.51	10.76	1.59	1.62	19.62	2.01	100
LA	1,244	390	44	895	248	101	64	1,254	97	4,337
	28.68	8.99	1.01	20.64	5.72	2.33	1.48	28.91	2.24	100
MA	546	2,263	448	915	610	134	23	907	252	6,098
	8.95	37.11	7.35	15	10	2.2	0.38	14.87	4.13	100
MD	766	858	261	313	661	20	12	673	187	3,751
	20.42	22.87	6.96	8.34	17.62	0.53	0.32	17.94	4.99	100
ME	113	342	130	92	256	3	6	230	31	1,203
	9.39	28.43	10.81	7.65	21.28	0.25	0.5	19.12	2.58	100
MI	602	1,397	391	411	337	24	29	914	95	4,200
	14.33	33.26	9.31	9.79	8.02	0.57	0.69	21.76	2.26	100
MN	837	1,074	656	627	590	79	32	701	264	4,860
	17.22	22.1	13.5	12.9	12.14	1.63	0.66	14.42	5.43	100
MO	1,126	881	365	854	468	263	54	938	208	5,157
	21.83	17.08	7.08	16.56	9.08	5.1	1.05	18.19	4.03	100
MS	475	316	18	287	505	100	27	483	44	2,255
	21.06	14.01	0.8	12.73	22.39	4.43	1.2	21.42	1.95	100
MT	211	114	46	80	69	15	13	113	28	689
	30.62	16.55	6.68	11.61	10.01	2.18	1.89	16.4	4.06	100
NC	782	1,200	478	492	845	60	39	1,086	105	5,087
	15.37	23.59	9.4	9.67	16.61	1.18	0.77	21.35	2.06	100
ND	81	52	26	41	45	14	8	109	13	389
	20.82	13.37	6.68	10.54	11.57	3.6	2.06	28.02	3.34	100
NE	304	207	124	200	87	16	13	250	28	1,229
	24.74	16.84	10.09	16.27	7.08	1.3	1.06	20.34	2.28	100
NH	33	178	36	33	22	7	3	90	2	404
	8.17	44.06	8.91	8.17	5.45	1.73	0.74	22.28	0.5	100
NJ	671	1,177	280	646	446	74	28	1,224	153	4,699
	14.28	25.05	5.96	13.75	9.49	1.57	0.6	26.05	3.26	100
NM	261	183	37	91	67	20	10	160	31	860
	30.35	21.28	4.3	10.58	7.79	2.33	1.16	18.6	3.6	100
NV	184	203	46	83	100	5	6	153	41	821
	22.41	24.73	5.6	10.11	12.18	0.61	0.73	18.64	4.99	100
NY	3,678	4,003	868	1,149	2,437	160	34	2,703	1,426	16,458
	22.35	24.32	5.27	6.98	14.81	0.97	0.21	16.42	8.66	100

(continued)

Table A-6a (continued)
Discharge distribution by state: Under age 65

State	Private home	Private home with home health	Assisted living	Another nursing facility	Hospital	Psychiatric hospital	Rehabilitation hospital	Deceased	Other	Total
OH	4,645	5,526	611	2,783	2,037	337	120	3,170	816	20,045
	23.17	27.57	3.05	13.88	10.16	1.68	0.6	15.81	4.07	100
OK	735	333	40	700	202	99	35	630	69	2,843
	25.85	11.71	1.41	24.62	7.11	3.48	1.23	22.16	2.43	100
OR	454	453	330	116	162	16	47	318	77	1,973
	23.01	22.96	16.73	5.88	8.21	0.81	2.38	16.12	3.9	100
PA	877	1,910	410	547	684	79	124	1,969	338	6,938
	12.64	27.53	5.91	7.88	9.86	1.14	1.79	28.38	4.87	100
PR	4	6	0	2	2	0	0	0	1	15
	26.67	40	0	13.33	13.33	0	0	0	6.67	100
RI	94	224	48	95	85	8	3	93	84	734
	12.81	30.52	6.54	12.94	11.58	1.09	0.41	12.67	11.44	100
SC	167	321	88	110	226	16	4	421	13	1,366
	12.23	23.5	6.44	8.05	16.54	1.17	0.29	30.82	0.95	100
SD	159	75	24	52	26	27	3	107	28	501
	31.74	14.97	4.79	10.38	5.19	5.39	0.6	21.36	5.59	100
TN	861	908	97	590	405	86	47	950	117	4,061
	21.2	22.36	2.39	14.53	9.97	2.12	1.16	23.39	2.88	100
TX	2,663	2,192	734	2,294	1,307	260	97	2,161	344	12,052
	22.1	18.19	6.09	19.03	10.84	2.16	0.8	17.93	2.85	100
UT	309	322	120	229	134	29	14	201	43	1,401
	22.06	22.98	8.57	16.35	9.56	2.07	1	14.35	3.07	100
VA	522	952	212	289	521	49	13	770	77	3,405
	15.33	27.96	6.23	8.49	15.3	1.44	0.38	22.61	2.26	100
VI	0	0	0	0	1	0	0	0	0	1
	0	0	0	0	100	0	0	0	0	100
VT	32	119	23	13	14	0	3	56	7	267
	11.99	44.57	8.61	4.87	5.24	0	1.12	20.97	2.62	100
WA	1,149	903	608	385	324	36	75	637	189	4,306
	26.68	20.97	14.12	8.94	7.52	0.84	1.74	14.79	4.39	100
WI	1,006	923	404	263	256	51	17	648	58	3,626
	27.74	25.46	11.14	7.25	7.06	1.41	0.47	17.87	1.6	100
WV	319	316	39	128	137	26	9	264	16	1,254
	25.44	25.2	3.11	10.21	10.93	2.07	0.72	21.05	1.28	100
WY	81	66	18	19	24	7	7	46	15	283
	28.62	23.32	6.36	6.71	8.48	2.47	2.47	16.25	5.3	100

SOURCE: RTI International analysis of MDS, April 2003–June 2005

Table A-6b
Discharge distributions by state: Age 65 and over

State	Private home	Private home with home health	Assisted living	Another nursing facility	Hospital	Psychiatric hospital	Rehabilitation hospital	Deceased	Other	Total
US	55,923	104,393	26,112	86,176	88,580	3,708	1,337	523,687	9,338	899,254
	6.22	11.61	2.9	9.58	9.85	0.41	0.15	58.24	1.04	100
AK	138	35	37	27	18	0	0	316	1	572
	24.13	6.12	6.47	4.72	3.15	0	0	55.24	0.17	100
AL	679	1,651	79	1,240	897	84	16	8,065	71	12,782
	5.31	12.92	0.62	9.7	7.02	0.66	0.13	63.1	0.56	100
AR	1,178	919	67	1,263	683	88	64	6,057	63	10,382
	11.35	8.85	0.65	12.17	6.58	0.85	0.62	58.34	0.61	100
AZ	950	1,017	628	1,169	817	47	7	4,681	110	9,426
	10.08	10.79	6.66	12.4	8.67	0.5	0.07	49.66	1.17	100
CA	7,363	12,204	3,577	7,326	11,704	380	192	30,593	819	74,158
	9.93	16.46	4.82	9.88	15.78	0.51	0.26	41.25	1.1	100
CO	509	1,076	434	1,006	502	33	3	6,108	53	9,724
	5.23	11.07	4.46	10.35	5.16	0.34	0.03	62.81	0.55	100
CT	263	2,621	214	1,608	1,303	43	4	8,460	89	14,605
	1.8	17.95	1.47	11.01	8.92	0.29	0.03	57.93	0.61	100
DC	69	200	13	128	103	1	0	700	17	1,231
	5.61	16.25	1.06	10.4	8.37	0.08	0	56.86	1.38	100
DE	46	293	26	105	356	9	2	1,241	58	2,136
	2.15	13.72	1.22	4.92	16.67	0.42	0.09	58.1	2.72	100
FL	3,244	8,112	2,500	5,898	6,719	151	41	27,247	920	54,832
	5.92	14.79	4.56	10.76	12.25	0.28	0.07	49.69	1.68	100
GA	1,626	2,234	445	2,059	2,789	84	19	15,397	304	24,957
	6.52	8.95	1.78	8.25	11.18	0.34	0.08	61.69	1.22	100
HI	167	165	100	146	231	2	1	1,604	25	2,441
	6.84	6.76	4.1	5.98	9.46	0.08	0.04	65.71	1.02	100
IA	413	769	101	941	647	39	3	8,153	215	11,281
	3.66	6.82	0.9	8.34	5.74	0.35	0.03	72.27	1.91	100
ID	183	295	237	275	152	39	2	2,058	9	3,250
	5.63	9.08	7.29	8.46	4.68	1.2	0.06	63.32	0.28	100
IL	2,918	3,021	487	4,460	3,113	149	45	22,476	596	37,265
	7.83	8.11	1.31	11.97	8.35	0.4	0.12	60.31	1.6	100
IN	1,646	1,605	217	2,773	1,106	89	15	14,923	72	22,446
	7.33	7.15	0.97	12.35	4.93	0.4	0.07	66.48	0.32	100

(continued)

Table A-6b (continued)
Discharge distributions by state: Age 65 and over

State	Private home	Private home with home health	Assisted living	Another nursing facility	Hospital	Psychiatric hospital	Rehabilitation hospital	Deceased	Other	Total
KS	522	464	281	1,078	474	48	12	6,123	62	9,064
	5.76	5.12	3.1	11.89	5.23	0.53	0.13	67.55	0.68	100
KY	1,142	2,004	408	1,601	1,693	69	33	9,235	255	16,440
	6.95	12.19	2.48	9.74	10.3	0.42	0.2	56.17	1.55	100
LA	1,627	1,186	53	2,645	1,034	95	134	10,878	135	17,787
	9.15	6.67	0.3	14.87	5.81	0.53	0.75	61.16	0.76	100
MA	503	3,778	611	2,457	2,146	244	26	18,120	88	27,973
	1.8	13.51	2.18	8.78	7.67	0.87	0.09	64.78	0.31	100
MD	505	1,359	374	804	1,352	28	5	7,614	96	12,137
	4.16	11.2	3.08	6.62	11.14	0.23	0.04	62.73	0.79	100
ME	216	883	857	494	1,061	9	5	4,215	32	7,772
	2.78	11.36	11.03	6.36	13.65	0.12	0.06	54.23	0.41	100
MI	898	2,993	529	1,808	1,699	68	17	16,728	105	24,845
	3.61	12.05	2.13	7.28	6.84	0.27	0.07	67.33	0.42	100
MN	1,028	1,789	1,159	2,072	1,226	78	20	14,525	106	22,003
	4.67	8.13	5.27	9.42	5.57	0.35	0.09	66.01	0.48	100
MO	1,517	2,294	431	2,648	1,509	134	27	12,589	157	21,306
	7.12	10.77	2.02	12.43	7.08	0.63	0.13	59.09	0.74	100
MS	1,077	1,050	61	1,334	2,650	146	44	7,121	117	13,600
	7.92	7.72	0.45	9.81	19.49	1.07	0.32	52.36	0.86	100
MT	246	173	112	260	278	13	2	2,031	33	3,148
	7.81	5.5	3.56	8.26	8.83	0.41	0.06	64.52	1.05	100
NC	1,259	3,354	1,605	2,153	4,423	123	18	15,016	204	28,155
	4.47	11.91	5.7	7.65	15.71	0.44	0.06	53.33	0.72	100
ND	150	119	52	203	185	16	7	2,325	50	3,107
	4.83	3.83	1.67	6.53	5.95	0.51	0.23	74.83	1.61	100
NE	388	369	336	529	315	17	7	4,254	47	6,262
	6.2	5.89	5.37	8.45	5.03	0.27	0.11	67.93	0.75	100
NH	36	352	73	238	148	10	0	2,809	16	3,682
	0.98	9.56	1.98	6.46	4.02	0.27	0	76.29	0.43	100
NJ	786	2,938	533	1,902	2,096	84	24	14,968	167	23,498
	3.34	12.5	2.27	8.09	8.92	0.36	0.1	63.7	0.71	100
NM	454	480	61	517	361	24	5	2,276	32	4,210
	10.78	11.4	1.45	12.28	8.57	0.57	0.12	54.06	0.76	100

(continued)

Table A-6b (continued)
Discharge distributions by state: Age 65 and over

State	Private home	Private home with home health	Assisted living	Another nursing facility	Hospital	Psychiatric hospital	Rehabilitation hospital	Deceased	Other	Total
NV	178	333	110	325	389	19	2	1,741	46	3,143
	5.66	10.59	3.5	10.34	12.38	0.6	0.06	55.39	1.46	100
NY	4,846	10,717	1,719	5,303	9,792	234	41	39,343	723	72,718
	6.66	14.74	2.36	7.29	13.47	0.32	0.06	54.1	0.99	100
OH	3,187	7,354	389	5,451	4,510	137	70	32,254	351	53,703
	5.93	13.69	0.72	10.15	8.4	0.26	0.13	60.06	0.65	100
OK	842	872	61	2,083	680	78	51	7,087	115	11,869
	7.09	7.35	0.51	17.55	5.73	0.66	0.43	59.71	0.97	100
OR	549	687	937	414	510	28	9	3,760	46	6,940
	7.91	9.9	13.5	5.97	7.35	0.4	0.13	54.18	0.66	100
PA	1,317	3,971	1,061	2,395	3,317	107	70	36,317	1,457	50,012
	2.63	7.94	2.12	4.79	6.63	0.21	0.14	72.62	2.91	100
PR	5	12	1	2	4	0	0	0	1	25
	20	48	4	8	16	0	0	0	4	100
RI	99	694	88	586	469	50	1	3,213	18	5,218
	1.9	13.3	1.69	11.23	8.99	0.96	0.02	61.58	0.34	100
SC	591	1,321	340	704	1,348	25	12	7,087	91	11,519
	5.13	11.47	2.95	6.11	11.7	0.22	0.1	61.52	0.79	100
SD	254	140	117	272	105	14	0	2,356	18	3,276
	7.75	4.27	3.57	8.3	3.21	0.43	0	71.92	0.55	100
TN	1,272	2,838	258	1,885	1,944	96	43	13,218	294	21,848
	5.82	12.99	1.18	8.63	8.9	0.44	0.2	60.5	1.35	100
TX	4,680	6,288	1,218	8,679	5,817	250	171	27,477	633	55,213
	8.48	11.39	2.21	15.72	10.54	0.45	0.31	49.77	1.15	100
UT	200	364	263	346	318	7	2	1,947	21	3,468
	5.77	10.5	7.58	9.98	9.17	0.2	0.06	56.14	0.61	100
VA	1,067	2,699	422	1,255	2,635	61	10	9,921	181	18,251
	5.85	14.79	2.31	6.88	14.44	0.33	0.05	54.36	0.99	100
VI	1	2	0	0	0	0	0	5	0	8
	12.5	25	0	0	0	0	0	62.5	0	100
VT	41	355	60	137	49	2	0	1,446	4	2,094
	1.96	16.95	2.87	6.54	2.34	0.1	0	69.05	0.19	100
WA	841	1,465	1,386	1,191	907	69	20	8,346	100	14,325
	5.87	10.23	9.68	8.31	6.33	0.48	0.14	58.26	0.7	100

(continued)

Table A-6b (continued)
Discharge distributions by state: Age 65 and over

State	Private home	Private home with home health	Assisted living	Another nursing facility	Hospital	Psychiatric hospital	Rehabilitation hospital	Deceased	Other	Total
WI	1,599	1,769	900	1,283	1,087	50	16	14,396	52	21,152
	7.56	8.36	4.25	6.07	5.14	0.24	0.08	68.06	0.25	100
WV	505	585	49	622	766	30	15	3,984	51	6,607
	7.64	8.85	0.74	9.41	11.59	0.45	0.23	60.3	0.77	100
WY	103	125	35	76	143	7	4	883	12	1,388
	7.42	9.01	2.52	5.48	10.3	0.5	0.29	63.62	0.86	100

SOURCE: RTI International analysis of MDS, April 2003-June 2005

Table A-7
Community discharge: Annualized state trends, April 2003–June 2005

	Under age 65				Age 65 and over			
State	Factor	p-value	+/-	Significant	Factor	p-value	+/-	Significant
US	1.034	0.0000	**+**	*****	1.034	0.0000	**+**	*****
AL	1.072	0.3325	+		1.045	0.2356	+	
AK	0.819	0.3663	-		1.111	0.4571	+	
AZ	0.976	0.6285	-		1.138	0.0005	+	*
AK	0.819	0.3663	-		1.111	0.4571	+	
CA	1.034	0.0933	+		1.042	0.0018	+	*
CO	0.980	0.7538	-		1.025	0.5521	+	
CT	1.083	0.1731	+		1.006	0.8568	+	
DE	0.788	0.1330	-		0.936	0.4804	-	
DC	0.906	0.5193	-		0.954	0.6822	-	
FL	1.064	0.0346	+	*	1.043	0.0103	+	*
GA	1.015	0.7618	+		1.035	0.2093	+	
HI	1.179	0.3214	+		1.113	0.2264	+	
ID	0.989	0.9286	-		1.028	0.6966	+	
IL	0.874	0.0000	-	*	0.956	0.0465	-	*
IN	1.184	0.0001	+	*	1.151	0.0000	+	*
IA	0.951	0.5406	-		1.031	0.5250	+	
KS	0.967	0.6517	-		0.957	0.3700	-	
KY	1.106	0.0862	+		1.040	0.1910	+	
LA	0.975	0.6142	-		0.944	0.0741	-	
ME	0.904	0.2682	-		0.960	0.3394	-	
MD	1.100	0.0701	+		1.044	0.2605	+	
MA	1.033	0.4087	+		1.051	0.0613	+	
MI	1.158	0.0029	+	*	1.012	0.6777	+	
MN	1.047	0.3270	+		1.034	0.2559	+	
MS	1.115	0.1185	+		1.023	0.5382	+	
MO	1.082	0.0796	+		1.059	0.0430	+	*
MT	1.035	0.7728	+		0.985	0.8509	-	
NE	1.042	0.6476	+		1.010	0.8607	+	
NV	0.844	0.1342	-		1.031	0.6682	+	
NH	1.140	0.4114	+		1.040	0.6424	+	
NJ	1.056	0.2452	+		1.110	0.0002	+	*
NM	1.101	0.3817	+		0.955	0.4331	-	
NY	1.165	0.0000	+	*	1.029	0.0501	+	
NC	1.163	0.0007	+	*	1.054	0.0254	+	*
ND	0.828	0.2441	-		1.101	0.3280	+	
OH	0.982	0.4120	-		1.012	0.5090	+	
OK	0.990	0.8682	-		0.958	0.3012	-	
OR	1.101	0.1952	+		1.059	0.1754	+	
PA	1.036	0.3524	+		1.059	0.0096	+	*
RI	0.885	0.3076	-		0.977	0.7007	-	

(continued)

Table A-7 (continued)
Community discharge: Annualized state trends, April 2003–June 2005

	Under age 65				Age 65 and over			
State	Factor	p-value	+/-	Significant	Factor	p-value	+/-	Significant
SC	1.102	0.2661	+		1.112	0.0055	+	*
SD	0.945	0.6906	-		0.989	0.8927	-	
TN	1.090	0.0847	+		1.028	0.3105	+	
TX	0.996	0.8798	-		1.053	0.0019	+	*
UT	1.083	0.3462	+		1.071	0.2938	+	
VT	0.948	0.8001	-		1.187	0.0552	+	
VA	1.066	0.2441	+		1.043	0.1481	+	
WA	1.080	0.1158	+		1.115	0.0005	+	*
WV	1.019	0.8339	+		1.074	0.1813	+	
WI	0.982	0.7466	-		1.017	0.5482	+	
WY	1.073	0.7144	+		1.071	0.5581	+	

NOTES:

Control variables: Age, male, Black, Asian, Hispanic, dual eligible

* $p<0.05$

SOURCE: RTI International analysis of MDS 2003–2005

Table A-8
Probability of discharge to the community (3 age groups)

Variables	Discharge to community			Discharge to community with help		
	Under 65 odds ratio	65-74 odds ratio	75 and over odds ratio	Under 65 odds ratio	65-74 odds ratio	75 and over odds ratio
Time trend (quarter)	1.0076*	1.0078**	1.008***	1.0154***	1.0168***	1.0183***
Expenditure ratio	1.5791***	1.6166***	3.2717***	1.8054***	1.0979	2.6144***
NHC criteria	0.96066***	0.96371***	0.98033*	0.9971	0.99954	1.0098
MFP or NFT grant	1.0935**	0.88861***	0.9224***	1.3021***	0.92804**	0.92067***
Age	0.99146***	0.94125***	0.90957***	0.9979	0.95603***	0.9158***
Male	0.81914***	0.69419***	0.73627***	0.71608***	0.64754***	0.70572***
Black	0.98272	1.1516***	1.5018***	0.85223***	1.0701**	1.3776***
Asian	0.84429***	1.4032***	2.114***	0.81835***	1.1163	1.5425***
Hispanic	1.0545	1.6202***	2.328***	0.92072**	1.2737***	1.8465***
Dual eligible	0.92753***	1.2344***	1.0242	1.3229***	1.4144***	1.1545***
Number of certified beds	0.99991	0.99948*	0.99965*	0.99938**	0.99904***	0.99912***
For profit	0.89364***	0.85478***	0.97674	0.86997***	0.81244***	0.92993*
Government	0.85574*	0.70712***	0.74508***	0.77736**	0.68327***	0.72457***
Occupancy rate	0.78647**	0.78978**	0.60659***	1.1549	0.98484	0.71458***
Urban	0.98826	1.0152	0.96375	1.17***	1.2271***	1.1088***
Chain	1.0895***	1.0678**	1.0542**	1.1621***	1.0953***	1.0806***
Heating degree days	1.025***	1.0157***	1.0059***	1.0372***	1.0256***	1.0171***
Hospital bed supply	0.98916	0.92548***	0.9767	1.0605*	0.91754***	0.95191*
Physician supply	0.99777	1.0054*	1.0048**	1.0098***	1.0131***	1.0125***
Facility bed supply	0.98787***	0.98913***	0.99001***	0.97723***	0.98248***	0.98364***
Constant	2.4935***	85.289***	0.1133***	0.29076***	11.24***	328.45***

NOTES: * p<0.05; ** p<0.01; *** p<0.001

SOURCE: RTI International, MDS & Oscar data, April 2003–June 2005

Table A-9
Probability of discharge to the community
(nursing home certifiability modeled as a categorical variable))

Variable	Under 65		65 and over		Under 65		65 and over	
	Discharge to community odds ratio (n=192,248)		Discharge to community odds ratio (n=818,904)		Discharge to community with services odds ratio (n=192,248)		Discharge to community with services odds ratio (n=818,904)	
Time trend (quarter)	1.008	*	1.016	***	1.015	***	1.018	***
Expenditure ratio	1.581	***	2.59	***	1.665	***	1.946	***
NHC criteria 2	0.897	**	0.901	***	0.786	***	0.821	***
NHC criteria 3	0.877	***	0.910	***	1.057		1.004	
NHC criteria 4	0.930		0.897	**	0.980		1.004	
NHC criteria 5	0.865	**	0.920	*	0.902	*	0.966	
MFP or NFT grant	1.092	**	0.917	***	1.281	***	0.922	***
Age	0.992	***	0.920	***	0.998		0.929	***
Male	0.819	***	0.721	***	0.716	***	0.684	***
Black	0.982		1.376	***	0.857	***	1.270	***
Asian	0.843	***	1.933	***	0.835	**	1.452	***
Hispanic	1.059	*	2.122	***	0.928	*	1.669	***
Dual eligible	0.929	***	1.127	***	1.328	***	1.300	***
Number of certified beds	1.000		1.000	*	0.999	**	0.999	***
For profit	0.894	***	0.949	*	0.877	***	0.905	***
Government	0.858	*	0.740	***	0.782	**	0.725	***
Occupancy rate	0.782	**	0.646	***	1.103		0.761	***
Urban	0.991		0.975		1.144	***	1.119	***
Chain	1.088	***	1.062	***	1.162	***	1.093	***
Heating degree days	1.024	***	1.008	***	1.036	***	1.018	***
Hospital beds/1000 elderly	0.989		0.959	**	1.038		0.931	***
Physicians/1000 elderly	0.996		1.003		1.006	*	1.009	***
Facility beds/1000 elderly	0.989	***	0.991	***	0.982	***	0.987	***
Constant	2.400	***	420.19	***	0.327	***	100.5	***

NOTES: * $p<0.05$; ** $p<0.01$; *** $p<0.001$

SOURCE: RTI International analysis of MDS and OSCAR data, April 2003–June 2005.