January 2000

Variation in Nursing Facility Rates

Background Paper

This publication provides an overview of Minnesota's nursing facility reimbursement systems and describes the sources and extent of variation in nursing facility rates.

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Introduction

Nursing facility reimbursement rates under the Medical Assistance (MA) program vary considerably across facilities, due to historical, geographic, and other factors. There has been increasing concern that reimbursement rates for some facilities are lower, relative to their costs, than for other facilities. Concerns have also been raised as to whether a reimbursement system that is based in part upon the geographic location of the facility unfairly limits reimbursement for facilities located in rural areas of the state. This paper provides information on variation in nursing facility rates that is relevant to discussing these issues.

Part I of this paper provides an overview of the two reimbursement systems under which Minnesota nursing facilities are reimbursed and describes the main sources of variation in nursing facility payment rates. Particular attention is paid to the impact of reimbursement limits that vary with geographic location. Part II provides descriptive information on nursing facilities, examines the extent of variation in nursing facility rates, and portrays this variation in different ways. Part III summarizes findings and suggests questions for further study.

The scope of this paper is limited to a description of the extent of rate variation between nursing facilities. The paper describes rate variation associated with certain variables but does not attempt to determine the relative importance of each variable in contributing to rate differences. The paper also does not examine whether differences in rates reflect actual differences in the underlying costs of providing nursing facility services, or whether lower reimbursement rates affect quality of care, staff compensation and retention, or the financial viability of facilities.

Executive Summary

Part I – Sources of Variation in Rates

1. Nursing facilities under MA are reimbursed under two different systems—a cost-based system (sometimes referred to as "Rule 50") and an alternative payment system (sometimes referred to as the "contract" system).

2. Factors contributing to rate variation in the cost-based system include: (a) historical spending patterns of facilities; (b) the impact of reimbursement limits, some of which vary with the geographic location of the facility; (c) different reimbursement rates for freestanding and non-freestanding facilities; (d) differences in occupancy levels; and (e) the effect of special statutory provisions on reimbursement.

3. Reimbursement rates in the alternative payment system are set based upon the facility's cost-based payment rate in effect at the time a contract is signed. This has the effect of carrying existing rate disparities under the cost-based system over to the alternative payment system.

4. The Commissioner of Human Services is required to present recommendations to the legislature by February 15, 2000, for a performance-based contracting system. Areas for recommendations include criteria and a process that would allow facilities to request rate adjustments for low base rates, geographic disparities, and other reasons, and the development of a property payment system to address the capital needs of nursing facilities that will be funded with additional appropriations.

Part II – The Extent of Rate Variation

1. Nursing facility rate data and descriptive information applying to the rate year that began July 1, 1999, was obtained from the Department of Human Services (DHS) for all 434 nursing facilities participating in MA.

2. An examination of nursing facility characteristics found that:

   - A plurality of nursing facilities (42 percent) had 75 or fewer beds.

   - Most of the 434 facilities participating in MA (81 percent) are located in geographic groups 1 ("deep" rural) and 2 (rural).

   - About two-thirds of facilities are nonprofit, with almost one-third of facilities for-profit.

- Two-thirds of facilities are reimbursed under the alternative payment system, with the remainder reimbursed under the cost-based system.

- About three-fourths of facilities are freestanding, and the remainder non-freestanding (hospital-attached, short length of stay, or classified as Rule 80 facilities because they care for residents with severe physical impairments).

3. The weighted average rate, calculated by DHS, is a summary measure of a nursing facility's average reimbursement rate that reflects the care needs of residents, as measured by their case mix scores. An examination of mean weighted average nursing facility rates found that:

   - Facilities with 100 or fewer beds have average rates below the statewide average, while facilities with over 100 beds have average rates above the statewide average.

   - The average rate for facilities in geographic group 3 (metro) is 25 percent higher than the average rate for facilities in group 1 and 17 percent higher than the average rate for facilities in group 2.

   - The average rate for non-freestanding facilities is 13 percent higher than the average rate for freestanding facilities.

   - There is little difference, on average, in the weighted average rate for facilities classified by type of ownership (government, private sector nonprofit, or private sector for-profit).

   - The weighted average rate for facilities in the alternative payment system is, on average, 11 percent higher than the average rate for facilities in the cost-based system.

4. A regression analysis found geographic group, type of facility (freestanding or non-freestanding), size of facility, and average facility case mix score to each be associated with differences in the weighted average rate, when the other variables are held constant. The type of ownership did not have a statistically significant effect on the weighted average rate.

5. Geographic group and facility type are together associated with large differences in average rates. Overall, non-freestanding facilities in group 3 have the highest average rates and freestanding facilities in group 1 have the lowest average rates.

6. An examination of the variation in average rates within geographic groups for freestanding nursing facilities found that:

   - There is wide variation in maximum and minimum rates within each geographic group, and a resulting overlap in rates between geographic groups.

- The middle 50 percent of rates within each geographic group are clustered closely around the median.

- There is a considerable difference in average rates across the three geographic groups. For instance, over three-quarters of facilities in groups 1 and 2 had average rates that were below the first quartile of group 3 rates.

Part III – Summary and Discussion

This paper has identified some of the reasons for differences in nursing facility rates and has described the extent of this rate variation though a preliminary analysis of rate differences. Questions for further study include:

- What additional factors related to rate variation should be examined?

- Are existing rate variations justified?

- Does rate variation adversely affect the quality of care in nursing facilities with lower than average rates?

- Does rate variation threaten the financial viability of nursing facilities with lower than average rates?

Part I – Sources of Variation in Rates

Nursing facilities are reimbursed by MA under either a cost-based reimbursement system (also referred to as "Rule 50" or the "case mix" system) or an alternative payment system (also referred to as the "contract" system). Under both systems, nursing facilities are reimbursed on a resident per day basis.

The per diem reimbursement for a resident under both systems varies with the resident's care needs, as measured by a case mix classification. All nursing facility residents are screened and assigned one of 11 case mix classifications, based on the severity of their disabilities and the complexity of their nursing care needs. The classifications are designated "A" through "K," with "A" representing the lowest level of care and "K" the highest. Each case mix classification is assigned a case mix weight, ranging from 1.00 for case mix classification A to 4.12 for case mix classification K. Reimbursement for nursing costs is proportional to this classification.

Reimbursement rates under both systems are facility specific and based on a facility's historical costs of providing care. These historical costs reflect, in part, the impact of reimbursement limits that vary with the geographic location of the facility.

A. Reimbursement Under the Cost-Based System

1. Overview of the Cost-Based System

Under the cost-based system, facilities file annual cost reports with the Department of Human Services (DHS) that document their spending during the past reporting year. The per diem reimbursement for a resident for the coming rate year is based upon these reported costs, subject to any DHS cost disallowances, the application of reimbursement limits, and any inflation adjustment authorized by the legislature. (Reporting years run from October 1 to September 30, and rate years from the following July 1 to June 30).

For each rate year, facilities receive a total per diem payment for each resident that is the sum of separately calculated per diems for:

- care-related costs (nursing costs plus other care-related costs)
- other operating costs
- any efficiency incentive[1] earned
- pass-through costs
- property costs

[1] The efficiency incentive is a supplemental payment that can be earned by facilities with other operating cost per diems that are below specified limits.

The per diem payment for nursing costs varies with the case mix classification of the resident. The per diems for all other cost categories are identical for all residents in the same facility. Each facility therefore has 11 different total per diem reimbursement rates, one for each case mix classification.

These components of the cost-based reimbursement system are described in more detail in Table 1.[2]

Table 1

Components of the Cost-Based Nursing Facility Reimbursement System

Care-related and other operating costs are adjusted annually for expected inflation, subject to available appropriations. Total per diem reimbursement is the sum of separate per diems for the four cost categories.

COST CATEGORY	VARIES WITH CASE MIX?	SUBJECT TO SPEND-UP AND HIGH-COST LIMITS?
1. CARE-RELATED COSTS		
A. Nursing Costs • Nursing equipment and supplies • Nursing salaries • Related fringe benefits and payroll taxes	Yes	Yes Spend-up limit: CPI + 1% (if facility's case mix A per diem is above median) or CPI + 2% (if per diem is at or below median)
B. Other Care-Related Costs • Social services, activities, and therapies • Raw food • Dietary consultant fees	No	High-cost limit: 3% (if facility's case mix A per diem is > 1.0 std. deviation above median) or 2% reduction (if per diem is > 0.5 but ≤ 1.0 std. deviation above median)
2. OTHER OPERATING COSTS • Dietary services, other than raw food and dietary consultant costs • Laundry and linen • Housekeeping • Plant operations and maintenance • General and administrative costs, including relevant payroll taxes and fringe benefits	No	These limits are indexed annually for inflation.
3. ANY EFFICIENCY INCENTIVE EARNED	No	No
4. PASS-THROUGH COSTS Includes property taxes, special assessments, licensing fees, PERA contributions, and preadmission screening fees	No	No

5. PROPERTY COSTS

Based upon the following formula:

Total Property Reimbursement Per Diem = Base property rate + Incremental increase or decrease under modified rental formula + Capital repair and replacement payment + Equity incentive + Refinancing incentive

[2] See also "Nursing Facility Reimbursement," House Research information brief, July 1998. This publication includes an appendix that describes the property reimbursement formula in more detail.

2. Sources of Variation Under the Cost-Based System

The per diem reimbursement rate a facility receives for a resident varies with the care needs of that resident, as measured by the resident's case mix classification. However, reimbursement rates for the same case mix classification also vary widely across facilities. This section outlines some of the factors that contribute to this variation.

a. Reimbursement rates reflect a facility's historical spending patterns.

Under the cost-based system, facilities are reimbursed on the basis of expenditures reported in annual cost reports filed with DHS. If a facility's average per person spending decreases for a reporting year, this reduces the reimbursement made available during the next rate year, all other things being equal. Similarly, if a facility's average per person spending increases for a reporting year, this increases the reimbursement made available to the home during the next rate year, subject to reimbursement limits.

Two facilities can therefore have similar per diem rates at one point in time but significantly different rates at a subsequent point in time. This would occur if one facility, over a period of several years, had a relatively high level of spending per resident, while the other facility over those years had a relatively low level of spending.

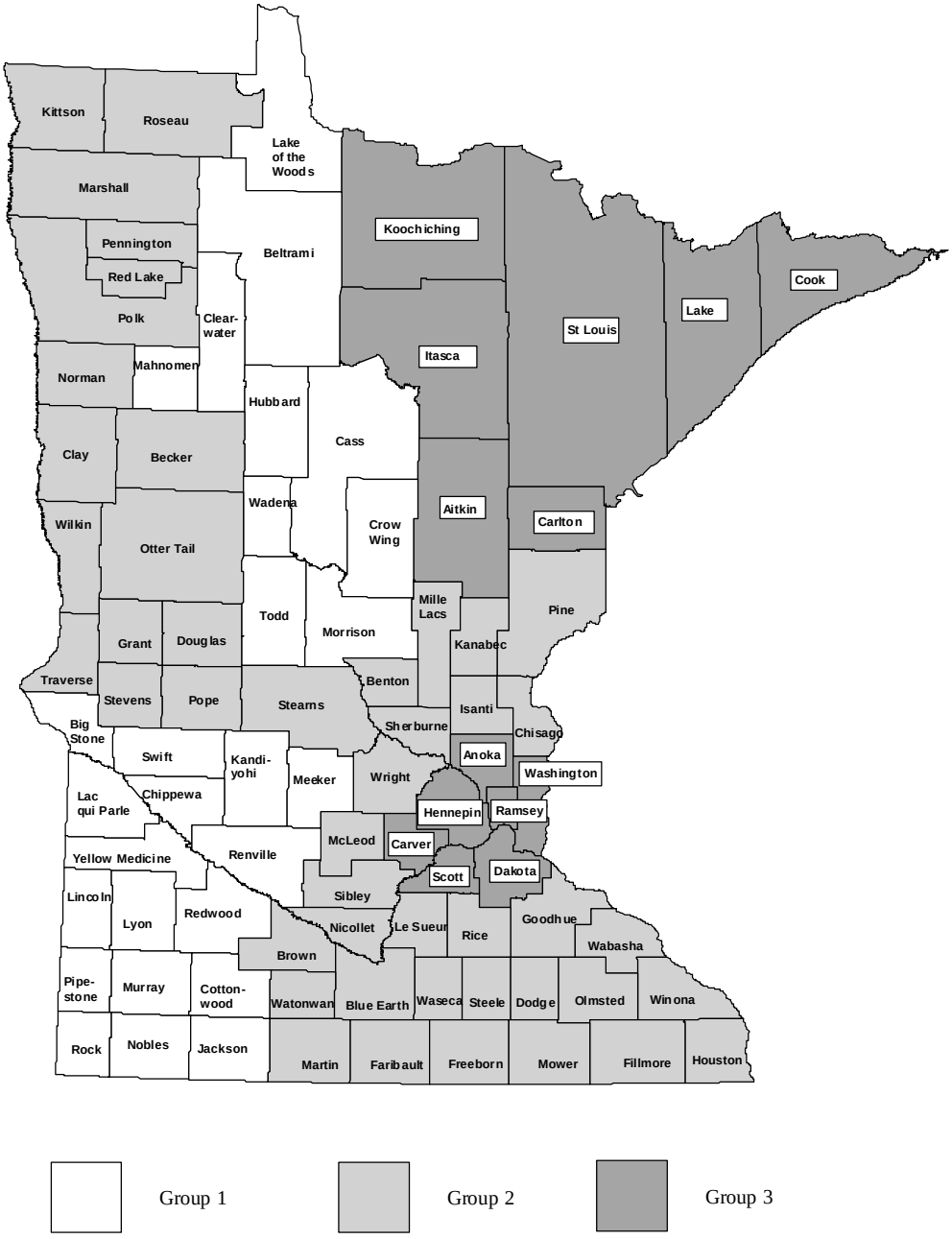
b. Reimbursement rates reflect the impact of reimbursement limits, some of which vary with the geographic location of the facility.

Geographic groups. For purposes of applying certain reimbursement limits and calculating the efficiency incentive, nursing facilities are placed in one of three geographic groups depending upon the county in which they are located—group 1 ("deep" rural), group 2 (rural), or group 3 (metro). A map of the geographic groups appears on the following page, and a list of the counties in each geographic group is provided in Appendix I.

The nursing home geographic groups, along with the case mix classification system, were part of the cost-based system implemented in 1985. The three geographic groups were developed by Lewin and Associates, a consulting firm, after comparing hourly nursing salaries across Minnesota's 11 economic development regions (EDRs).[3] Nursing salaries were obtained from audited nursing facility cost reports and used as a proxy measure for nursing facility labor costs. Labor costs were in turn used as a proxy measure for input prices in a geographic area.

[3] For more information on the establishment of the three geographic groups, see Minnesota State Planning Agency, *Appropriateness Study: Minnesota's Geographic Groups for Nursing Home Reimbursement*, January 1987. From 1972 until implementation of the cost-based system, the state had been divided into two geographic regions for purposes of nursing facility reimbursement.

Nursing Facility Geographic Groups



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Spend-up and high-cost limits. Under the cost-based system, facilities are subject to limits on the rate of increase in operating costs from one rate year to another (spend-up limits) and reimbursement reductions for high-cost facilities (high-cost limits).[4] These limits vary depending upon which one of three geographic groups the facility is located in, and also upon whether a facility is freestanding or non-freestanding (these terms are defined later in this section).

Spend-up limits are intended to limit the rate of growth in facility spending for operating costs from one rate year to another to a specified percentage, called the "spend-up limit." The spend-up limits are the Consumer Price Index, all urban consumers (CPI-U) plus two percentage points for facilities with case mix A per diems that are at or below the median for facilities of the same type in their geographic groups, and CPI-U plus one percentage point for facilities with case mix A per diems at or above the median for facilities of the same type in the geographic group.

High-cost limits reduce the per diem reimbursement rate for facilities determined to be "high cost" based on a comparison of case mix A operating cost per diems for each type of nursing facility in its geographic group, after application of the spend-up limit. The allowable operating cost per diem is reduced by 3 percent for facilities with case mix A operating cost per diems that are greater than 1.0 standard deviation above the median, and reduced by 2 percent for facilities in each geographic group with case mix A operating cost per diems that are greater than 0.5 but less than 1.0 standard deviation above the median.

Category specific limits. Prior to July 1, 1998, facilities were subject to reimbursement limits for certain cost categories. These limits, referred to as category specific limits, were calculated separately for different facility types within the three geographic groups. The reimbursement limits for freestanding facilities were 125 percent of the median of the geographic group for care-related costs, and 110 percent of the median of the geographic group for other operating costs (category specific limits for non-freestanding facilities are discussed in the next section). Facilities in geographic group 1 were allowed to use the group 2 limits effective July 1, 1989, but the group 1 limit was still used for purposes of calculating the efficiency incentive. There were also separate limits for general and administrative costs and plant and maintenance costs that were not tied to geographic location.

Since July 1, 1998, these category specific limits have not been applied when determining nursing facility reimbursement rates. Category specific limits are now used only for calculating the efficiency incentive.[5]

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[4] The spend-up and high-cost limits were not calculated for the rate year beginning July 1, 1999, because the nursing facility salary adjustment was based on the rates in effect on June 30, 1999. This had the effect of carrying over any spend-up and high-cost limits in effect for the rate year beginning July 1, 1998, to the next rate year.

[5] The efficiency incentive is calculated after application of the spend-up and high-cost limits. Calculation of the efficiency incentive varies with the type of facility and the geographic group in which the facility is located.

c. Reimbursement rates vary with the type of facility.

Under the current cost-based system, spend-up and high-cost limits are calculated separately for freestanding and non-freestanding facilities within each geographic group. This is done because non-freestanding facilities tend to have higher average costs than freestanding facilities.

Non-freestanding homes are those that are hospital-attached, have short length of stays (an average stay of less than 180 days), or care for residents from a range of age groups with severe physical impairments (Rule 80 facilities). All other facilities are considered freestanding facilities.

Non-freestanding facilities also had higher category specific limits, during those rate years when these limits were in place (the higher other operating cost limits are still used to calculate the efficiency incentive). The care-related limit for short length of stay facilities was 125 percent of the limit that applied to freestanding facilities. Rule 80 facilities were exempt from the care-related limit altogether. Hospital-attached facilities were subject to the same care-related limit as freestanding facilities. The other operating cost limit was calculated separately for hospital-attached, short length of stay, and Rule 80 facilities. The limit for hospital-attached facilities was 110 percent of the median for non-freestanding facilities grouped together and the limit for short length of stay and Rule 80 facilities was 105 percent of the limit for hospital-attached facilities. These limits were calculated separately for facilities in each geographic group.

d. Reimbursement rates can vary with the occupancy level of a facility.

Nursing facilities are reimbursed on a per-resident, per-day basis. Since some nursing facility costs are fixed and not dependent upon the number of residents, a decrease in the level of occupancy means that the same amount of fixed costs must be spread among a smaller number of residents. Over time, and all other things being equal, this can result in facilities with lower average occupancy rates having higher reimbursement rates than other facilities of the same size with higher average occupancy rates.

e. Rates for some facilities are set under special statutory provisions.

Over the years, certain facilities have had legislation passed to increase their reimbursement rates to account for facility-specific circumstances. Other facilities receive higher reimbursement rates as a result of the approval of a nursing facility moratorium exception by the Commissioner of Health through the competitive moratorium exception process (see Minn. Stat. § 144A.073)[6] or by the legislature through passage of a statutory exception (see Minn. Stat. § 144A.071).

If these facilities entered the alternative payment system, these special reimbursement provisions were incorporated into their base rates.

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[6] Minnesota law prohibits the licensure and certification of new nursing facility beds, but provides a process by which exceptions to this moratorium can be approved by the Commissioner of Health. All construction projects, whether or not they involve nursing facility beds, whose cost exceeds $787,199 (for the rate year beginning July 1, 1999; this amount is adjusted annually for inflation), must also be approved by the Commissioner of Health through the moratorium exception approval process.

B. Reimbursement Under the Alternative Payment System

1. Overview of the Alternative Payment System

The alternative payment system (APS) was authorized by the legislature in 1995. The goal of APS is to determine whether a reimbursement system based upon contracts between facilities and DHS can reduce regulation, provide facilities with more flexibility, and also promote consumer satisfaction and good health care outcomes.

Under the APS, facilities sign contracts with DHS to provide nursing facility care, and are no longer required to file cost reports. Unlike the case with the cost-based system, a facility's reimbursement rate is no longer dependent upon the level of spending during a prior reporting year. Instead, a facility's initial reimbursement rate under APS for each of the 11 case mix classifications is the total per diem payment rate the facility was receiving under the cost-based system for that case-mix classification, at the time the contract with DHS is signed. This initial rate incorporates reimbursement for care-related, other operating, pass-through, and property costs. The rate is adjusted annually for inflation each July 1 by the CPI-U.[7]

Other differences from the cost-based system include:

- The spend-up and high-cost limits and efficiency incentive are not recalculated each year. Instead, the facility receives whatever payment it received under the cost-based system at the time the contract was signed.

- Facilities receive the property payment rate they received under the cost-based system at the time the contract was signed. The rental formula, used to calculate the property payment rate under the cost-based system, no longer applies.

2. Sources of Variation Under the Alternative Payment System

Under the APS, rate disparities between facilities still exist. This is because a facility's initial reimbursement rate under APS is the facility's cost-based payment rate at the time the contract was signed. This has the effect of transferring any existing rate disparities under the cost-based system to the APS.

Relative to the cost-based system, however, there is less opportunity for a facility's reimbursement rate to change relative to other APS facilities. This is because all facilities receive identical percentage rate adjustments each July 1, based on the CPI-U. Unlike the cost-based system, facilities' rates will no longer vary based on how much they spend in a particular rate year, and will not be subject to spend-up and high-cost limits that vary with geographic group. While this does have the effect of limiting the development of further rate disparities, it also has

[7] For the rate years beginning July 1, 1999, and July 1, 2000, this CPI-U adjustment applies only to the property rate. Facilities in the APS receive an increase in operating costs for those rate years as part of a broader adjustment that also includes facilities reimbursed under the cost-based system (see Minn. Stat. § 256B.431, subd. 28).

the effect of limiting the ability of individual facilities to increase their rates relative to other facilities.

The one exception relates to reimbursement for property costs. Under APS, the property component of the total rate is adjusted to reflect the cost of construction projects authorized as exceptions to the moratorium, either by the legislature or through the competitive moratorium exception process.

C. Reimbursement Under Performance-Based Contracting

The 1998 Legislature directed DHS to implement, effective July 1, 2000, a performance-based contracting system to replace the current methods of establishing nursing facility rates under the cost-based and alternative payment systems. The 1999 Legislature delayed implementation of this system until July 1, 2001, and required the Commissioner of Human Services to present to the legislature, by February 15, 2000, additional recommendations for performance-based contracting in a number of areas. One of the areas for recommendations is the "development of criteria and a process under which nursing facilities can request rate adjustments for low base rates, geographic disparities, or other reasons." Another area for recommendations is the "development of a property payment system to address the capital needs of nursing facilities that will be funded with additional appropriations." (See Minn. Stat. § 256B.435, subd. 1)

Part II – The Extent of Rate Variation

Nursing facility reimbursement rates vary considerably across the state. For the rate year beginning July 1, 1999, facility-specific per-resident per-day rates ranged from a low of $56.80 (for a case mix A resident in a freestanding facility in geographic group 2) to a high of $283.71 (for a case mix K resident in a non-freestanding facility in geographic group 3).

As noted in Part I, this rate variation reflects a range of factors, including historical spending patterns, type of facility, geographic location, and resident care needs as measured by the case mix system.

The next several sections provide information on nursing facility characteristics, average rates for different categories of nursing facilities, and rate variation across the three nursing facility geographic groups.

A. Source of Data and Method of Comparison

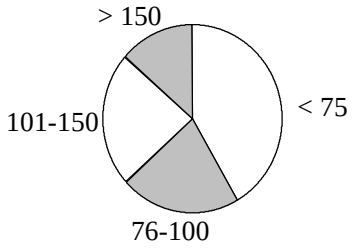
This analysis is based on nursing facility rate data and descriptive information provided by staff at DHS. Rate data for the rate year beginning July 1, 1999, was provided for all 434 nursing facilities participating in MA, both cost-based and those participating in the alternative payment system. The rate information is the total per diem reimbursement rate received by each home, including property costs. The rate data includes projections of the rate adjustments for staff compensation and the actual rate adjustments for facility operating costs provided by the 1999 Legislature.

B. Nursing Facility Characteristics

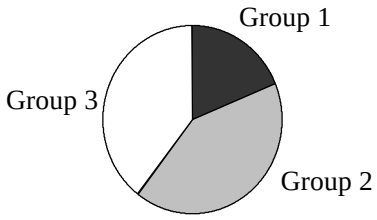
Nursing facilities participating in MA ranged in size from 15 to 559 licensed beds, with a statewide average of 99 beds. The average facility resident case mix score ranged from 1.04 to 3.36, with a statewide average facility case mix score of 2.45. This case mix score falls between the scores for case mix classifications F and G.

The following pie charts and Table 2 provide information on the distribution of nursing facilities by number of licensed beds, geographic group, type of ownership (government, nonprofit, or for-profit), reimbursement system (alternative payment system v. cost-based), and facility type (freestanding v. non-freestanding).

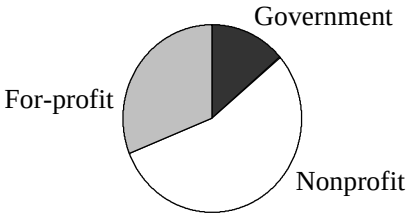
- A plurality of facilities (42 percent) have 75 or fewer licensed beds.



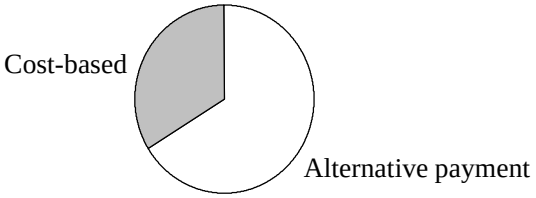
- Most facilities (81 percent) are in geographic groups 2 or 3; facilities are nearly evenly divided between these two geographic groups.



- About two-thirds of facilities are nonprofit (either private sector nonprofit or government owned), with about one-third of facilities for-profit.



- Two-thirds of facilities are reimbursed under the alternative payment system for the rate year beginning July 1, 1999, with the remaining one-third reimbursed under the cost-based system.



- About three-quarters of facilities are freestanding, and the remainder non-freestanding. Non-freestanding facilities are those that are hospital-attached or classified as Rule 80 or short length of stay.

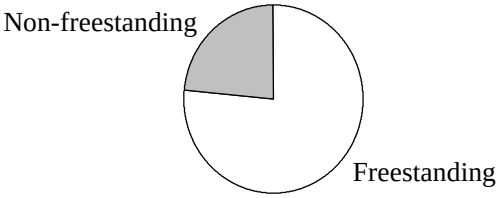


Table 2
Characteristics of Minnesota Nursing Facilities

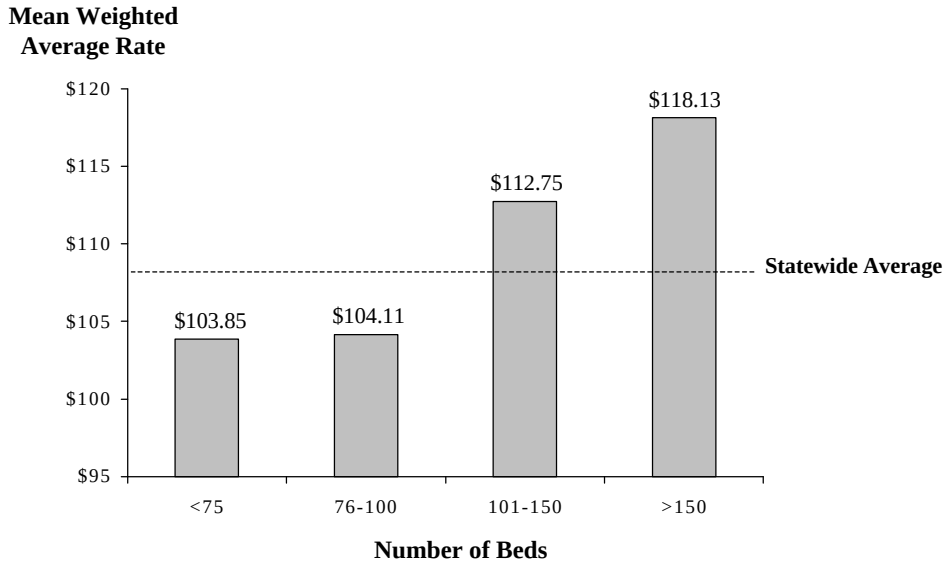
	Number of facilities	**Percentage of all facilities**
Number of Beds		
≤ 75	181	42%
76-100	92	21%
101-150	102	23%
>150	59	14%
Geographic group		
Group 1	83	19%
Group 2	178	41%
Group 3	173	40%
Ownership		
Government	61	14%
Nonprofit	238	55%
For-profit	135	31%
Reimbursement System		
APS	286	66%
Cost-based	148	34%
Facility Type		
Freestanding	333	77%
Non-freestanding	101	23%

C. Comparison of Overall Means

The **weighted average rate** is a summary measure of a nursing facility's average rate that takes into account the case mix of the residents in the facility. Differences in the weighted average rate therefore reflect differences in average resident case mix classification across facilities. The weighted average rate is calculated by multiplying the number of resident days for each of the 11 case mix classifications by the facility per diem rate for that classification, summing all 11 of these products, and dividing this sum by total resident days.

The bar graphs below compare different groups of nursing facilities by their mean "weighted average rate." Facilities are divided into groups based upon bed size, geographic group, type of ownership, reimbursement system, and facility type. The means presented for the weighted average rate are overall means, i.e., facilities are divided into groups based only on one variable, such as facility type, and in this example the resulting groups would include facilities from all geographic regions, types of ownership, facility size, etc.

- The mean weighted average rate for facilities with 100 or fewer beds is below the mean weighted average rate for all facilities statewide of $107.94. The mean weighted average rate for facilities with 100 or more beds is above this statewide average. The average rate for facilities with over 150 beds is 14 percent higher than the average rate for facilities with 75 or fewer beds.



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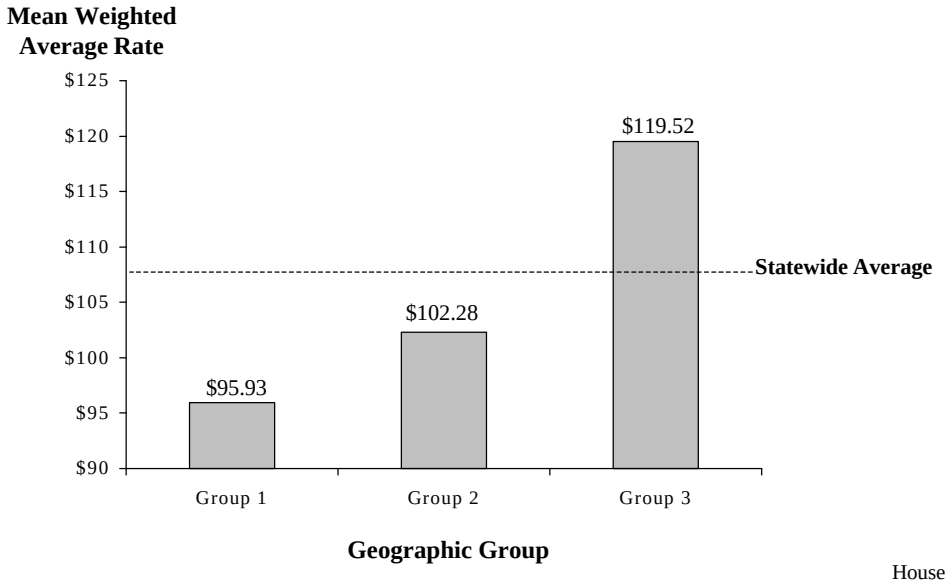
- The mean weighted average rate is highest for facilities in geographic group 3 (metro) and lowest for facilities in geographic group 1 ("deep" rural). The average group 3 rate is 25 percent higher than the group 1 average, and 17 percent higher than the group 2 average.



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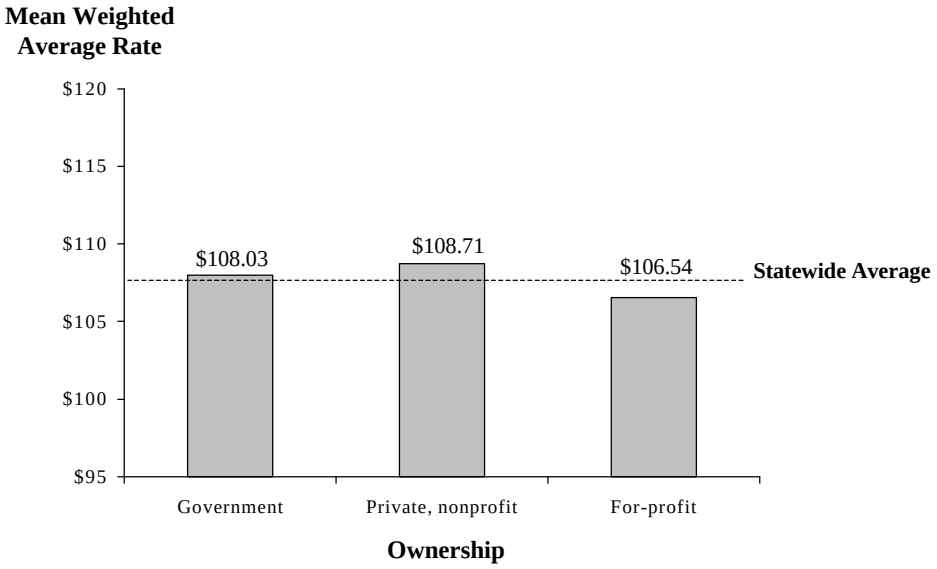
- There is little difference in the mean weighted average rate for facilities grouped by type of ownership. The average rate for for-profit facilities is slightly lower than the rates for private nonprofit and government-owned facilities.



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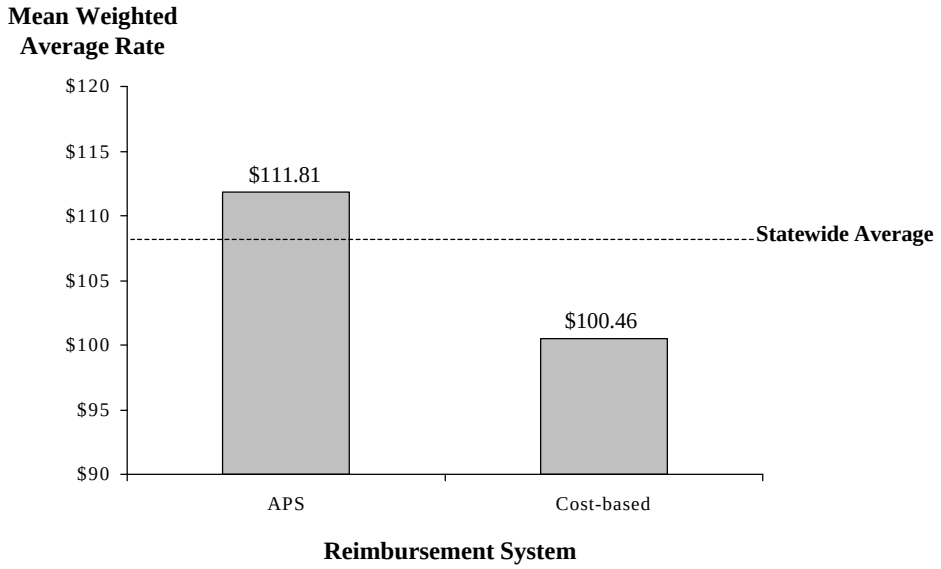
- The mean weighted average rate for facilities in the APS system is 11 percent higher than the average rate for facilities in the cost-based system.



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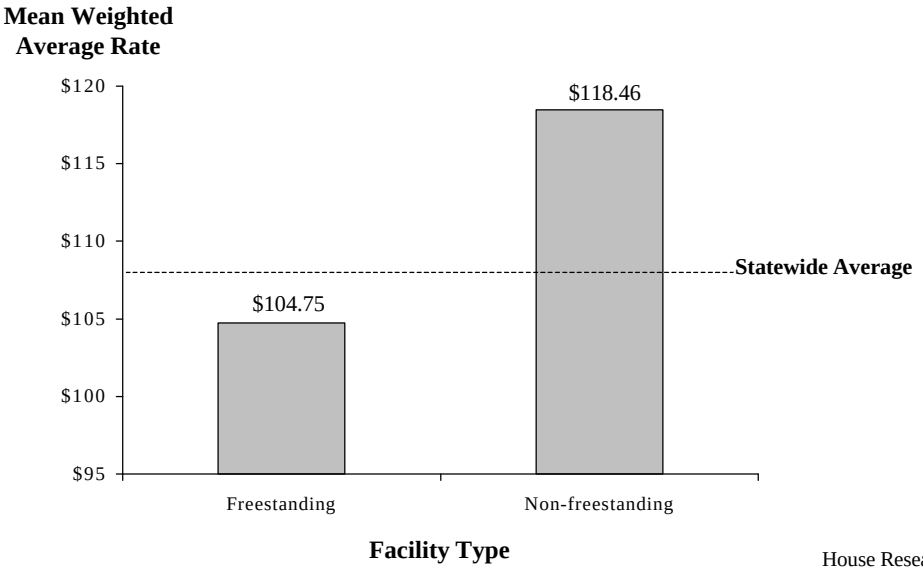
- The mean weighted average rate for non-freestanding facilities is 13 percent higher than the rate for freestanding facilities.



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Appendix II provides, for purposes of comparison, rate averages for the case mix A, G, and K classifications, along with the mean weighted average rate. These averages are provided for all nursing facilities statewide and for groups of nursing facilities. Generally, an examination of the average case mix A, G, and K rates across different groups of facilities shows similar patterns to those described above for the mean weighted average rate.

D. Evaluation of the Independent Effect of Variables

The comparisons of overall means in section C showed a number of variables to be associated with differences in average reimbursement rates. However, it is difficult to determine from that comparison whether these differences were actually due to the independent effects of the variable being measured, or were instead due to some other associated variable. For example, average reimbursement rates increased as the number of facility beds increased. Is this result due to variables directly related to bed size or is the result instead a reflection of the fact that large facilities are more likely to be concentrated in geographic group 3 (which has the highest rates on average of the geographic groups)?[8]

This section uses a statistical technique called multiple linear regression to determine whether certain variables have an independent effect on average reimbursement rates.[9] An independent variable has an "independent effect" if it leads to a statistically significant change in a dependent variable, while all other independent variables are held constant.

The regression analysis found that:[10]

- Differences in geographic group, type of facility, number of beds, and average case mix score are each associated with differences in the weighted average rate, when the other variables are held constant.

- Differences in type of ownership are not associated with statistically significant differences in the weighted average rate.

These results suggest that generally, a nursing facility's average reimbursement rate will be higher, relative to other facilities, to the extent a facility is located in a county classified as "metro" (i.e., is

[8] Just 19 percent of the facilities in geographic group 1 had over 100 beds, compared to 28 percent of facilities in group 2 and 55 percent of facilities in group 3.

[9] This regression analysis is exploratory. While a test for multicollinearity was run (see Appendix III), no tests were run for heteroscedasticity (unequal variances of the error terms) or linearity.

[10] While an analysis of the relative importance of each of the independent variables in contributing to rate differences is of obvious interest, it is not appropriate to interpret the results of the multiple regression (i.e., the regression coefficients) as an indicator of this. The size of regression coefficients reflects the units of measurement used. In this case, different units of measurement were used for the independent variables.

located in geographic group 3), is a non-freestanding facility rather than freestanding, has a large number of beds, and has a high average resident case-mix score.

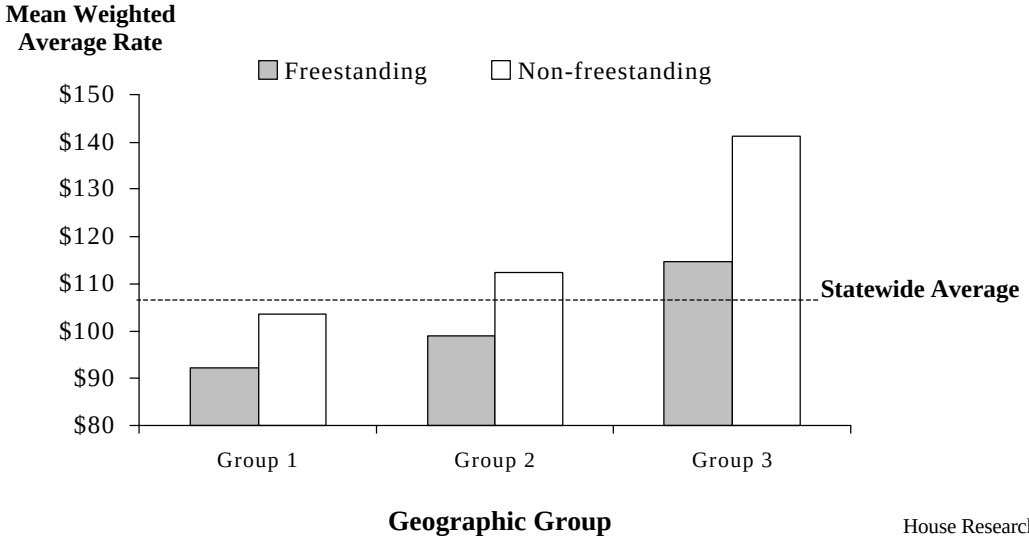
More information on the results of this analysis can be found in Appendix III.

E. Means for Facilities Classified by Geographic Group and Facility Type

Comparing overall means for individual variables, as done in section C, does not provide information on how average reimbursement rates differ when facilities are classified on the basis more than one variable. In Part I, it was noted that the cost-based nursing home reimbursement system treats homes differently based on both geographic group and facility type. These differences in turn are carried over into the contract system. This section examines the combined effect of these two variables on average reimbursement rates.

The bar graphs in Figure 1 present the mean weighted average rate for freestanding and non-freestanding facilities within each geographic group. This figure shows that geographic group and facility type together are associated with even greater differences in average rates than each of these characteristics examined separately. Overall, non-freestanding facilities in geographic group 3 have the highest average rates and freestanding facilities in geographic group 1 the lowest average rates. The rate differential between these two classifications of nursing facilities is 53 percent.

Figure 1
Mean Weighted Average Rate for Facilities Divided by Geographic Group and Facility Type



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Appendix IV presents rate averages for the case mix A, G, and K classifications, along with the mean weighted average rate. Generally, an examination of the average case mix A, G, and K rates shows a similar pattern to that described above for the mean weighted average rate.

F. Rate Variance within Geographic Groups

A focus on average reimbursement rates may conceal wide variation in rates within groups of nursing facilities. Figure 2 shows the spread of rates for freestanding facilities in each geographic group. The bar graph for each geographic group shows the minimum and maximum weighted average rate for freestanding facilities in the group, and also the first quartile, median, and third quartile.[11]

Limiting this analysis to freestanding facilities, rather than including all nursing facilities, excludes rate variations that are due to facility type.[12] This gives a clearer picture of the extent of rate variation within a geographic group that is due to historical spending patterns and other factors.

Figure 2 shows that:

- There is a wide variation in maximum and minimum rates for freestanding facilities within each geographic group, resulting in overlap in rates between different geographic groups. For example, facilities with high reimbursement rates for group 2 are reimbursed at rates comparable to the median reimbursement rate for facilities in group 3. Also, the minimum group 3 rate ($65.09) is lower than the minimum group 2 rate ($71.24). These are indications of the importance of historical spending patterns for individual facilities.

- In contrast to the wide range of minimum and maximum rates, the range of rates for the middle 50 percent of freestanding facilities in each geographic group (facilities between the first and third quartile) is narrow (i.e., the first and third quartile rates fall close to the median rates).

- A majority of freestanding facilities in groups 1 and 2 have rates below the first quartile of group 3 ($109.67). For example, 75 percent of group 1 facilities have rates at or below $96.85, and 75 percent of group 2 facilities have rates below $104.57. Both of these amounts are below the first quartile of group 3. This suggests that proposals to raise group 1 and 2 facility rates to a specified percentage of the group 3 median or average may be costly, since it is likely that a large number of facilities in groups 1 and 2 would be affected.

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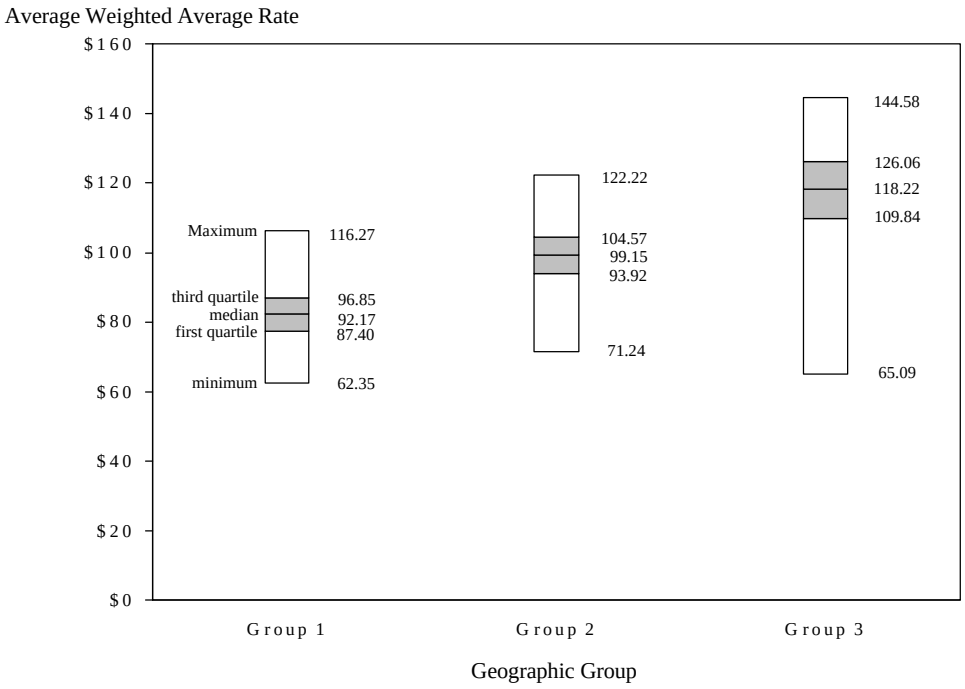
[11] The first quartile is the reimbursement rate that 25 percent of facilities do not exceed (with 75 percent of facilities having higher rates). The median is the reimbursement rate that 50 percent of facilities do not exceed (with 50 percent of facilities having higher rates). The third quartile is the reimbursement rate that 75 percent of facilities do not exceed (with 25 percent of facilities having higher rates).

[12] An analysis of rate variation for all facilities within each geographic group found similar patterns to those described in the text for freestanding facilities. There was wide variation in maximum and minimum rates, overlap in rates between geographic groups, and clustering of facility rates around the median. The maximum rate for each geographic group was higher, since non-freestanding facilities have higher reimbursement rates on average than freestanding facilities (most of the highest cost facilities within each geographic group were non-freestanding).

Figure 2
Rate Variance for Freestanding Facilities in Each Geographic Group



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Part III – Summary and Discussion

A. Summary

Part I of this paper has identified a number of factors in the cost-based reimbursement system that contribute to variation in rates between nursing facilities. These factors are: (1) historical spending patterns of facilities; (2) the impact of reimbursement limits, some of which vary with the geographic location of the facility; (3) different reimbursement rates for freestanding and non-freestanding facilities; (4) differences in occupancy levels; and (5) the effect of special statutory provisions on reimbursement. Rate variations in the cost-based system are in turn carried over to the alternative payment system, since reimbursement rates in the alternative payment system are based upon the facility's cost-based payment rate in effect when the alternative payment system contract is signed.

Part II has examined the extent of rate variation, using DHS rate data for the 434 nursing facilities participating in MA. This analysis found that geographic group, type of facility, size of facility, and average facility case mix score make independent contributions to differences in the weighted average rate. Generally, a nursing facility's average reimbursement rate will be higher, relative to other facilities, to the extent a facility is located in a county classified as "metro" (i.e., is located in geographic group 3), is a non-freestanding facility rather than freestanding, has a large number of beds, and has a high average resident case-mix score. The type of ownership did not have a statistically significant effect on the weighted average rate.

Part II also examined the variation in rates for freestanding facilities across geographic groups. This analysis found that there was wide variation in the maximum and minimum rates for facilities in each geographic group, and a resulting overlap in facility rates between groups. At the same time, there was a considerable difference in average rates for the three groups, and also a clustering of facilities around the median.

B. Discussion – Issues for Further Research

The intent of this paper was to provide background information that would be useful in discussing nursing facility rate variation. The paper has identified some of the reasons for differences in nursing facility rates and, through a preliminary analysis of rate differences, described the extent of this rate variation. The final section of the paper suggests issues and questions that may be usefully explored in future analyses.

1. What additional factors related to rate variation should be examined?

This paper has identified some factors associated with rate differences, but has not examined all relevant variables. For example, part I identified five factors related to variation in facility rates (see summary section above). Three of these factors—historical spending patterns of facilities, occupancy levels, and special statutory provisions were not examined in Part II, due in part to

data limitations. Other factors not analyzed that are probably related to rate variations include differences in wage and employee benefit levels, employee longevity, staffing levels, and property costs.

2. Are existing rate variations justified?

The paper has also not addressed the question of whether existing rate variations are justified or "fair"—whether they accurately reflect differences in the cost of operating the nursing facility and providing care. Answering this question would be very difficult, since it would require estimates to be made of the "true" costs of operating nursing facilities in different areas of the state, taking into account factors such as the average care needs of a facility's residents, facility staffing levels, prevailing wages and the ease or difficulty of hiring staff in an area, the average years of experience of employees, the cost of supplies, and property costs.

While it is difficult to obtain the information needed to precisely estimate regional differences in the costs of operating a nursing facility, some individuals may argue that enough information is available, and current variation in rates is large enough, to warrant corrective action. If this view is adopted, there is a wide range of possible approaches. These include, in order of increasing scope, the following: (1) establishing a process that would allow individual facilities to request rate increases (DHS is required to present recommendations on this topic to the legislature by February 15, 2000); (2) providing facilities with low rates of reimbursement with higher inflation adjustments than provided to facilities with higher rates; (3) increasing rates for facilities with low rates of reimbursement under both the cost-based and alternative payment systems, and any new reimbursement system; and (4) completely restructuring the reimbursement system, basing rates either on new geographic groups or perhaps separating rates from geographic location. The appropriateness of any of these approaches would of course depend on one's perception of the seriousness of the problem, the level of funding available, and the time period over which changes are to be made.

3. Does rate variation adversely affect quality of care in nursing facilities with lower than average rates?

While industry representatives and others have raised the issue of whether reimbursement for the industry as a whole is adequate, in the context of rate variation the question is whether facilities with lower than average reimbursement rates pay lower than average salaries to direct care and other staff, and whether this in turn leads to recruitment and retention problems, and lower quality of care. In addition to salary data, other information relevant to addressing this question includes staffing ratios, the average number of vacant positions, the number of beds not operated due to staffing problems, the degree to which nursing pool staff are used, and facility results on resident outcome and satisfaction measures.

4. Does rate variation threaten the financial viability of nursing facilities with lower than average rates?

While industry representatives and others have raised this as an issue for the industry as a whole, the specific question as it relates to rate variation is whether facilities with lower than average rates of reimbursement have lower operating margins and score poorer on other measures of financial health than facilities with higher reimbursement rates. In some areas of the state, the potential closure of a nursing facility may be viewed as an access or economic development issue.

Appendices

Appendix I
Nursing Facility Geographic Groups

Group 1			
Beltrami	Hubbard	Mahnomen	Renville
Big Stone	Jackson	Meeker	Rock
Cass	Kandiyohi	Morrison	Swift
Chippewa	Lac qui Parle	Murray	Todd
Clearwater	Lake of the Woods	Nobles	Wadena
Cottonwood	Lincoln	Pipestone	Yellow Medicine
Crow Wing	Lyon	Redwood	
Group 2			
Becker	Grant	Norman	Sibley
Benton	Houston	Olmsted	Stearns
Blue Earth	Isanti	Otter Tail	Steele
Brown	Kanabec	Pennington	Stevens
Chisago	Kittson	Pine	Traverse
Clay	LeSueur	Polk	Wabasha
Dodge	Marshall	Pope	Waseca
Douglas	Martin	Red Lake	Watonwan
Faribault	McLeod	Rice	Wilkin
Fillmore	Mille Lacs	Roseau	Winona
Freeborn	Mower	Sherburne	Wright
Goodhue	Nicollet		
Group 3			
Aitkin	Cook	Koochiching	St. Louis
Anoka	Dakota	Lake	Scott
Carlton	Hennepin	Ramsey	Washington
Carver	Itasca		

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Appendix II
Nursing Facility Average Rates

	Mean Weighted Average Rate	Case Mix A Average Rate	Case Mix G Average Rate	Case Mix K Average Rate
All Facilities	$107.94	$76.53	$109.97	$143.34
Number of Beds				
<75	103.85	74.90	106.79	138.63
76-100	104.11	74.47	106.74	138.96
101-150	112.75	78.61	113.60	148.49
>150	118.13	81.12	118.46	155.76
Geographic Group				
Group 1	95.93	69.97	99.26	128.46
Group 2	102.28	72.68	103.54	134.38
Group 3	119.52	83.62	121.71	159.70
Ownership				
Government	108.03	76.95	108.72	140.45
Private, nonprofit	108.71	76.59	110.26	143.86
For-profit	106.54	76.22	110.02	143.75
Reimbursement System				
APS	111.81	78.52	112.96	137.35
Cost-based	100.46	72.68	104.17	135.60
Facility Type				
Freestanding	104.75	74.45	107.42	140.30
Non-freestanding	118.46	83.37	118.38	153.38

The **case mix A rate** is the per diem payment a facility receives for caring for a resident who, based on an assessment, is dependent in three or fewer activities of daily living,[13] does not have a behavioral condition, and does not need special nursing care. Case mix A is the case mix category with the highest percentage of resident days (15 percent of total resident days as of March 1999). It is also the case mix rate that DHS uses in computing the high-cost and spend-up limits.

The **case mix G rate** is the per diem payment a facility receives for caring for a resident who, based on an assessment, is dependent in seven or eight activities of daily living but does not have the highest level of dependence for eating, does not have a behavioral condition, and does not need special nursing care. Case mix G is the case mix category with the second highest percentage of resident days (14 percent of total resident days as of March 1999).

The **case mix K rate** is the per diem payment a facility receives for caring for a resident who, based on an assessment, is dependent in seven or eight activities of daily living and needs special nursing care. Case mix K is the case mix category requiring the highest level of care on average.

[13] Nursing facility applicants and residents are assessed in the following activities of daily living: dressing, grooming, bathing, eating, bed mobility, transferring, walking, and toileting.

Appendix III
Results of Regression Analysis

The following table presents the results of the regression of geographic group, facility type, ownership, facility size, and average case mix score on the weighted average rate for each facility. Prior to running the regression, a calculation of Eigen values found some evidence of moderate multicollinearity. Multicollinearity means that there is correlation between some of the independent variables. The effect of severe multicollinearity is increased difficulty in separating out independent effects. However, if multicollinearity is not severe, linear regression may still be appropriate.

The first column lists the independent variables thought to affect the weighted average rate. The second column lists the regression (beta) coefficients. The beta coefficient for each independent variable is the effect of a one unit change in that variable on the dependent variable, holding other independent variables constant. The dependent variable, measured in dollars, is the weighted average rate. The independent variables are measured in different units, making it difficult to compare the relative effect of the independent variables. The third column is the standard error of the beta coefficient. The standard error is a measure of the spread of the coefficients about their mean. The fourth column measures the statistical significance of the beta coefficient. The figure in that column is the probability that the beta coefficient could have been obtained by chance.

Reg1 represents the effect of geographic region 1 relative to geographic group 3 (measured by the constant). Similarly, Reg 2 represents the effect of geographic region 2 relative to geographic group 3 (again measured by the constant). The results suggest that facilities in group 1 have, on average, per diem reimbursement rates that are $21.99 lower than facilities in group 3, and facilities in group 2 have, on average, per diem reimbursement rates that are $18.39 lower than facilities in group 3.

Type 1 represents the effect of a non-freestanding facility relative to a freestanding facility (measured by the constant). The results suggest that non-freestanding facilities have, on average, per diem reimbursement rates that are $13.78 higher than freestanding facilities.

Owner1 represents the effect of nonprofit ownership relative to for-profit ownership (measured by the constant). Owner2 represents the effect of government ownership relative to for-profit ownership (measured by the constant). The coefficients for these two variables were not statistically significant.

Number of beds represents the effect of a one unit change in the number of beds on the weighted average rate. The results suggest that an increase in one bed is associated with a three cent increase in the weighted average rate.

Average case mix score represents the effect of a one unit change in the average case mix score on the weighed average rate. The results suggest that an increase of 1.0 case mix units (on a scale of 1.0 to 4.12) is associated with a $29.33 increase in the weighted average rate.

Results of Regression Equation

Independent Variable	Beta coefficient	Standard error of beta coefficient	Significance (using t-test)
Reg1	-21.991	1.455	.0000
Reg2	-18.389	1.151	.0000
Type1	13.784	1.251	.0000
Owner1	.319	1.142	.7805
Owner2	-.229	1.713	.8937
Number of beds	.032	.009	.0003
Average case mix score	29.334	1.525	.0000
Constant (y-intercept)	41.145	3.761	.0000

Appendix IV

Average Rates for Nursing Facilities, Classified by Geographic Group and Facility Type

	Mean Weighted Average Rate	Case Mix A Average Rate	Case Mix G Average Rate	Case Mix K Average Rate
Group 1				
Freestanding	$92.22	$67.44	$96.25	$124.93
Non-freestanding	103.63	75.23	105.51	135.79
Group 2				
Freestanding	99.09	70.39	100.66	130.90
Non-freestanding	112.00	79.76	112.31	144.98
Group 3				
Freestanding	114.96	81.00	118.11	155.12
Non-freestanding	141.27	96.13	138.88	181.52