

# Analysis of nursing home capital reimbursement systems

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*An increasing number of States are using a fair-rental approach for reimbursement of nursing home capital costs. In this study, two variants of the fair-rental capital-reimbursement approach are compared with the traditional cost-based approach in terms of after-tax cash flow to the investor, cost to the State, and rate of return to investor. Simulation models were developed to examine*

*the effects of each capital-reimbursement approach both at specific points in time and over various periods of time. Results indicate that although long-term costs were similar for the three systems, both fair-rental approaches may be superior to the traditional cost-based approach in promoting and controlling industry stability and, at the same time, in providing an adequate return to investors.*

## Introduction

Although capital costs represent a small portion of overall nursing home costs (around 10 percent) (Cohen and Holahan, 1986), the way in which such costs are reimbursed by State Medicaid programs can significantly affect the longrun financial viability of existing nursing homes as well as the perceived attractiveness of new investments (Baldwin, 1984). This, in turn, can affect the overall supply of nursing home beds and the access to care for Medicaid recipients. A major concern of policymakers is that more favorable capital reimbursement is likely to increase the cost of nursing home care to already strained State budgets. Nevertheless, with an aging population, decreasing acute care lengths of stay, occupancy rates in excess of 90 percent, and relatively old facilities, policies that promote an adequate supply of acceptable quality facilities within State budget constraints are essential to meet the increasing demand for nursing home care. Capital-reimbursement policies are one important part of this overall situation.

States vary considerably in their approach to capital reimbursement. These variations can be broadly categorized into traditional and nontraditional methods. The major traditional approaches base reimbursement for capital costs on the historical cost of long-term assets. They typically reimburse for depreciation, interest expense, and lease payments; and they sometimes include the payment of a return on equity. Various limits are often applied to these reimbursement elements. Another traditional approach used by some States is a flat rate methodology, in which capital costs are not treated separately but instead are included as part of an overall facility reimbursement rate that is the same for all or for a group of nursing homes.

In contrast to the traditional approaches, an increasing number of States are using an innovative approach to payment for capital costs called "fair rental." Although fair-rental systems vary considerably among themselves,

all estimate the current value of capital assets as the basis for payment of a fee for capital, that is, an imputed fair-rental amount. States currently utilizing a fair-rental approach include Maryland, West Virginia, Minnesota, Colorado, and Florida (Boerstler, Carlough, and Schlenker, 1988).

Several drawbacks are inherent in the traditional cost-based systems. In particular, such systems usually reimburse for interest costs on mortgages and for estimated depreciation. Typically, depreciation-reimbursement amounts exceed principal payments on mortgages in the early loan years, so owners experience a positive cash flow. However, over time, principal payments increase to eventually exceed depreciation reimbursement. The resulting negative cash flows create incentives for nursing home owners to refinance, sell, or sell-leaseback; and most such actions increase reimbursement amounts and costs to the State. Such actions also create considerable instability in nursing home ownership, and they can have adverse effects on the quality of care (Baldwin and Bishop, 1984; Bishop, 1980; Cohen and Holahan, 1986; Spitz, 1982).

The fair-rental approaches are often advocated as eliminating the disadvantages of the traditional payment method, by paying amounts that are more in line with the current value of the nursing home. Such a payment strategy, it is argued, is fairer to nursing home owners; and it reduces incentives for destabilizing financial actions (such as frequent resale or refinancing). However, fair-rental systems are also assumed to cost more in State funds (Baldwin and Bishop, 1984; Bishop, 1980; Cohen and Holahan, 1986; Spitz, 1982).

To examine these and related issues, three representative nursing home capital-reimbursement systems are analyzed herein in terms of after-tax cash flow to the investor, cost to the State, and rate of return to the investor.

Specifically, the objective of this analysis was to contrast the traditional cost-based, capital-reimbursement approach with the fair-rental approach in terms of facilitating adequate access to care for Medicaid recipients by encouraging investors to provide an adequate supply of nursing home beds while, at the same time, constraining State Medicaid costs. The focus of the analysis was on differences in outcomes between representative cost-based and fair-rental approaches, not on specific State systems. A limited number of situations were examined, and results are therefore not intended to

This work was conducted as part of a larger study financed under Cooperative Agreement Number 18-C-98306/8 between the Health Care Financing Administration and the Center for Health Services Research, University of Colorado Health Sciences Center.

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provide a comprehensive assessment of each capital-reimbursement approach or its affect on all types of facilities.

The focus of this study was on owner-operator, proprietary facilities. The intent was to analyze some of the financial differences between cost-based and fair-rental, capital-reimbursement systems from the points of view of the owner-investor and of the State. Thus, the variables included in the model were primarily financial rather than ownership related. Although a significant number of nursing homes are nonprofit organizations, most are proprietary. Also, most are owned rather than leased. Capital reimbursement of leased facilities and of nonprofit facilities are issues suggested for investigation in future studies.<sup>1</sup>

A number of investigators have examined capital-reimbursement methodologies. Some have focused on differences in rates of return and cost to the State between traditional and fair-rental systems (Cohen and Holahan, 1986). Other have examined cash flows (e.g., year in which cash flow becomes negative) across systems (Bartlett, 1984). In determining an appropriate rental rate for the Minnesota fair-rental system, Baldwin (1984) employed a methodology for selecting a rental rate using a comparable risk methodology and examined cash flows using a net present-value approach. Baldwin and Bishop (1984) developed theoretical models in order to analyze the incentives for investors of varying tax brackets to enter into the nursing home market. Finally, in designing the Maryland capital-reimbursement system, Skinner et al. (1981) developed a rental rate designed to yield a target rate of return to nursing homes in order to attract investors while at the same time increasing the States' ability to budget for nursing home capital-reimbursement expenditures. The analysis presented herein extends previous work by comparing periodic cash flows, cost to the State, and rate of return in response to changes in variables both across and within capital-reimbursement systems; and by the use of present value techniques to project and compare cost to the State.

## Analysis approach

Simulation models were developed to analyze individually and to compare a typical traditional system with two fair-rental systems.<sup>2</sup> The simulation models allowed examination of the effects of each capital-reimbursement system, both at specified points in time and over various time periods. The simulation models also allowed a comparison of several variables by

<sup>1</sup>The Institute of Medicine, citing 1981 Health Care Financing Administration data, indicates that, nationally, 70 percent of Medicare-Medicaid certified nursing homes were proprietary as compared with 22 percent that were nongovernment, nonprofit facilities. Cost reports collected from seven primary States in this study indicate that 60 percent of facilities were owned and 40 percent were leased. This ratio is somewhat skewed by the disproportionate representation of flat-rate States (two were included in the study whereas they are a fairly small minority nationally.) In the two flat-rate States, leased outnumbered owned facilities 1.3 to 1; in the five other study States, ownership occurred 2.5 times as often as leasing.

<sup>2</sup>The model is described in detail in an appendix which is available from the authors.

isolating the effects of key variables (such as the percent of debt, interest rate on debt, and rate of return paid on equity). In addition, simulation modeling facilitated a cash-flow analysis by incorporating all costs and revenues (including tax benefits) in the model at the times they occur, thus enabling a detailed analysis of the investment over time. Future inflation rates cannot be precisely predicted, and this analysis forecasted cash flows using a reasonable set of assumptions about inflation, interest rates, taxes, and, in the case of the fair-rental systems, property appreciation.

## Dependent variables

There were three key dependent variables in this examination:

- After-tax cash flow to the investor, measured per bed.
- Cost to the State, measured both as the total capital reimbursement over time per bed and as the discounted net present value of the total capital reimbursement per bed.
- Rate of return to the investor, also measured per bed.

For purposes of this analysis, after-tax cash flow was defined as after-tax income plus tax depreciation minus principal payment.

In calculating cost to the State, the total capital reimbursement is the sum of the annual reimbursement per bed over the period being examined. Because the total reimbursement reflects a series of payments to be made in the future, the discounted net present value of the payments was also calculated. This amount, the present value of the total reimbursement, enhances comparability of cost between systems by, in effect, condensing future reimbursement costs into the equivalent of a single amount at a certain point in time. The present value reflects an amount which, if invested today at a specific interest rate, would be adequate to fund the future reimbursement obligations. A 10-percent discount rate was used in the present value calculations. Other rates were also explored, but the overall results of relative comparisons among systems were similar.

The internal rate of return to the investor (IRR) "... is an expression for the annual average rate of return that is generated within an investment. For a given investment, starting at point  $t$ , the IRR is the rate of return that discounts all the cash flows of the investment to the point  $t$ , so that the sum of the discounted values equals the original cost of the investment" (Soderberg, 1985). The investment decision rule associated with the IRR is that, if the IRR is greater than the cost of capital, the investment is profitable.

## Basic reimbursement models

Although they were modified and simplified for the simulation process, three State systems served as prototypes for the systems modeled. A modified version of the Ohio systems was used to represent the traditional cost-based system; fair-rental gross (FRG) was patterned after West Virginia; and fair-rental net (FRN) was

modeled from the Maryland system. The three are described as follows:

*Traditional system*—Reimbursement consists of:

- Passthrough of interest on capital-related debt.
- Depreciation expenses of the historical cost of the building, calculated on a straight-line basis over a 40-year estimated life.
- Payment on equity of 10 percent applied to equity, defined as down payment plus cumulative principal.

The analysis also included an examination of the traditional system with ceilings on the interest rate and depreciation-reimbursement components.

*FRG system*—reimbursement is comprised of:

- 75 percent of current total appraised value is assumed to be debt financed and is paid at the original rate of mortgage debt.
- 25 percent of the current total appraised value is assumed to be equity financed and is paid at the stated rental rate.

The 75-percent and 25-percent assumptions remain constant, regardless of changes in the actual percent of debt.

*FRN system*—Reimbursement consists of:

- Interest is passed through and is fully reimbursed at the interest rate in effect on the mortgage.
- An equity rental payment is paid based on the net appraised value (total appraised value less current loan balance) at the stated rental rate.

## Method

The following are the key assumptions underlying the application of the capital-reimbursement systems modeled in this analysis. The assumptions were based on information obtained from various States with reimbursement systems similar to those being modeled.

- The facility was newly constructed and was wholly filled (100-percent occupancy rate) with Medicaid patients.<sup>3</sup>
- The facility was 85-percent debt financed and 15-percent equity financed (other debt and equity assumptions also were explored).
- All transactions were made once a year at the end of the year.
- The cost of one nursing home bed was \$35,000 (land \$3,500 and building \$31,500). Appraised values (for the fair-rental systems) increased 3 percent on a yearly basis.
- The mortgage runs for 30 years, with a fixed rate of interest. A 12-percent interest rate on mortgage debt was assumed (other rates were also explored).

<sup>3</sup>The assumption of 100-percent Medicaid occupancy produces somewhat misleading simulation results. A typical nursing home might, on average, be about two-thirds filled with Medicaid patients, with the remaining portion filled with Medicare and private-day patients whose per diem charges tend to be higher than those of Medicaid patients. Thus, the 100-percent Medicaid occupancy assumption somewhat underestimates a nursing home's total revenues and overestimates cost to the State. However, this does not affect the validity of the system comparisons of relative differences performed in the study.

- Depreciation, used for reimbursement in the traditional system, used a 40-year life (similar to requirements for Medicare and most States), over which historical building cost was amortized on a straight-line basis.
- A 10-percent rental rate was used for the fair-rental systems. This is similar to rates currently in effect in the West Virginia and Maryland capital-reimbursement systems. For comparability purposes, a 10-percent payment on equity was modeled for the traditional system. (Other rates were also explored.)
- Income and expenses from operations were not considered in this analysis. However, the dollars of tax shelter provided during years of negative taxable income from capital investment were assumed to be applicable to operating income and were used to reduce the capital investment tax loss.
- Cash flow was on an after-tax basis. A 25-percent tax rate was used. This rate was selected from marginal rates in effect for taxable income as of July 1, 1987, per the Tax Reform Act of 1986, for corporations with taxable income between \$50,000 and \$70,000, the range indicated as relevant by the cost reports of most of the 135 facilities participating in the overall study. States differ in the amount of State tax burden; therefore, for comparability purposes, only Federal tax was included. The simulations were not intended to depict actual after-tax cash flows, but rather to show the relative differences between general reimbursement systems.
- After-tax rate of return to investors was examined at 5-year periods through year 30 and at the end of 5 and 10 years, assuming a sale occurred at the appreciated value at the time of land and building.

Interest rate and debt-to-equity ratios were considered to be key financial variables, and the simulation model was used to systematically vary these variables. The primary analysis, for which tables are presented and to which the following findings refer (unless otherwise stated), modeled a facility that was 85 percent debt financed at a mortgage loan interest rate of 12 percent. Other analyses reported were based on interest rates of 5 percent and 15 percent and debt of 50 percent and 95 percent. These ranges were simulated to make the effect of variation more explicit, rather than to represent likely real-world financing scenarios. This is especially true in the case of debt financing, where Federal tax laws make high-equity financing unlikely (as is demonstrated by the model results).

Sensitivity analysis was performed on other model variables. Results of varying the cost of assets, the appreciation rate, and the equity payment rate are discussed later.

## Results

Results are presented in three sections: cash flow, cost to the State, and rate of return to investors. Because this study was concerned with relative differences both across and within systems, actual dollar amounts and rates of return should not be taken literally. Although the simulation models were based on reasonable assumptions,

actual dollar amounts and rates of return for a specific nursing home under a specific State system may differ quite dramatically from the simulation results.

### Cash flow

Table 1 presents results of the cash-flow analysis. Over 30 years, the fair-rental systems provided more years of higher cash flow than the traditional system. Highest cash flow in the traditional systems (\$1,120) occurred in year 1, with cash flows decreasing each year thereafter. By contrast, lowest cash flows occurred in year 1 in both fair-rental approaches (\$559 for FRG, \$608 for FRN), with cash flows increasing each year. In year 1, cash flow in the traditional system is approximately double that of the fair-rental approaches. However, by year 7, cash flow in the traditional system is less than both the FRG and the FRN; and by year 30, it is approximately 4 percent that of the fair-rental approaches.

Within the two fair-rental approaches, FRG had higher cash flows than FRN after year 4 (over 30 years, FRG ranged from \$559 to \$3,983, whereas FRN ranged from \$608 to \$3,324).

In supplemental analyses, FRG, the fair-rental system with fixed debt-to-equity assumptions, was found to be more sensitive to change in interest rate than FRN. This is a function of the constant 75-percent debt assumption and the relationship of the interest and rental rates (that is, interest rate is typically greater than rental rate). FRN,

in a manner similar to the traditional model, will provide greater cash flow in later years if the rental rate is greater than the interest rate. FRG, however, provides less cash flow when the rental rate is greater than the interest rate, because a larger portion of the appraised value is assumed to be debt.

*Ceiling*—Although the traditional systems modeled in this study assume that interest and depreciation are passed through and fully reimbursed, a number of States utilize ceilings on reimbursement for such costs of ownership. Cash flows in the traditional system were therefore examined assuming a per patient day ceiling for cost of ownership of \$7.50 (similar to ceilings actually in use, such as in Ohio); the 12-percent rate of interest on debt, the 85:15 debt-to-equity ratio and the 10-percent payment on equity were held constant. Traditional system cash flows utilizing a \$7.50 ceiling were considerably lower than when ownership costs were fully reimbursed. Cash flow was -\$95 in year 1 and remained negative for 9 years, although increasing for the first 24 years, after which it equalled the version without ceiling (full pass through) and, correspondingly, decreased thereafter. Within a \$10 ceiling, cash flow was positive from year 1 and increased for 18 years until equalling cash flow without ceiling and then declined through year 30.

*Cash flow summary*—All three modeled capital-reimbursement systems are capable of providing positive cash flows. It is important to note, however, that under the systems examined, only the fair-rental systems

**Table 1**  
**Cash flow over 30 years using a fair-rental versus traditional approach for reimbursement of nursing home capital costs, by type of approach and year<sup>1</sup>**

| Year | Traditional | Fair-rental gross | Fair-rental net |
|------|-------------|-------------------|-----------------|
| 1    | 1,120       | 559               | 608             |
| 2    | 1,116       | 648               | 685             |
| 3    | 1,111       | 740               | 764             |
| 4    | 1,105       | 834               | 844             |
| 5    | 1,099       | 931               | 927             |
| 6    | 1,092       | 1,030             | 1,011           |
| 7    | 1,084       | 1,132             | 1,097           |
| 8    | 1,076       | 1,236             | 1,185           |
| 9    | 1,066       | 1,343             | 1,275           |
| 10   | 1,055       | 1,452             | 1,367           |
| 11   | 1,042       | 1,563             | 1,460           |
| 12   | 1,029       | 1,677             | 1,556           |
| 13   | 1,013       | 1,793             | 1,653           |
| 14   | 996         | 1,912             | 1,751           |
| 15   | 977         | 2,033             | 1,851           |
| 16   | 955         | 2,156             | 1,952           |
| 17   | 931         | 2,281             | 2,054           |
| 18   | 903         | 2,408             | 2,157           |
| 19   | 873         | 2,536             | 2,260           |
| 20   | 839         | 2,667             | 2,364           |
| 21   | 801         | 2,799             | 2,468           |
| 22   | 758         | 2,931             | 2,572           |
| 23   | 710         | 3,065             | 2,675           |
| 24   | 656         | 3,199             | 2,777           |
| 25   | 596         | 3,333             | 2,877           |
| 26   | 529         | 3,466             | 2,974           |
| 27   | 453         | 3,599             | 3,068           |
| 28   | 369         | 3,730             | 3,159           |
| 29   | 274         | 3,858             | 3,244           |
| 30   | 168         | 3,983             | 3,324           |

<sup>1</sup>Cash flow for the representative systems, assuming a 12-percent interest rate on mortgage debt, 85:15 debt-to-equity ratio, and a 10-percent rental payment on equity. Amounts presented are after-tax figures.

SOURCE: (Boerstler, H., Carlough, T., and Schlenker, R.E., 1988.)

provide annually increasing cash flows that both recognize the generally appreciating value of real property and match the probable increased need for funds as the property ages and requires repair, renovation, etc.

The traditional system can be made to produce an increasing cash flow by recognizing the inverse relationship of debt and equity. As outstanding debt is reduced, equity in the facility increases; therefore, if the payment on equity is greater than the reimbursed interest rate, after-tax cash flow may increase over time. Our model produced this result when an 8-percent interest rate was accompanied by a 10-percent equity rate. The traditional system thus can recognize and reward increased equity and long-term ownership, even though it does not recognize any ongoing increase in facility value.

### Cost to the State

"Cost to the State" was defined in this study as the total amount of reimbursement paid by the State to the nursing home (per bed) for capital costs, examined in the following two ways:

- As the total amount of reimbursement per bed through the end of various time periods (sum of the State's total cash outlays per year).
- As the discounted net present value of the total reimbursement per bed paid over time (present value of the sum of total reimbursement paid per year). A 10-percent discount rate was used. (Other rates were also explored.)

Consistent with findings regarding cash flows, cost to the State (Table 2) was slightly higher in the traditional system than in the fair-rental approaches in the early years, but for periods beginning after about 12 or 13 years, the total amount of reimbursement paid by the traditional system was less.

Discounting these reimbursement cost cash-flow streams to the present, such as would be done in long-term budget projections, indicates that the fair-rental systems may be less costly than the traditional system, assuming the same rates and debt-to-equity ratio, throughout an intermediate time horizon. This occurs because fair-rental reimbursement tends to increase gradually, primarily with facility appreciation, whereas the traditional system pays the highest reimbursement in the early years. Only after about 20 years do the present

values of the fair-rental system costs exceed those of the traditional system.

Within the fair-rental systems, FRG was of slightly higher cost to the State than FRN, although the costs, especially present values, were similar for all time periods.

In supplemental analyses, changes in the interest rate were found to have a significant impact on cost for all systems. This was most striking for the FRG approach. For example, an increase in interest rate from 5 to 15 percent resulted in a 120-percent increase in the present value of total cost for FRG, whereas the FRN and traditional systems increased 72 percent and 82 percent, respectively. However, even at a high interest rate, it was more than 15 years before the present value of cost for the FRG exceeded cost under the traditional system.

*Cost to the State summary*—The simulations performed in this study suggest that fair rental, capital reimbursement can both provide positive after-tax cash flows and be less costly to the State (in discounted present value form) than traditional capital reimbursement.

### Rate of return to investors

Rate of return to investors was examined over two 5-year periods assuming no sale had occurred (Table 3). The traditional system had the highest rates of return over all time periods, particularly in the early years. The traditional system provided a slightly higher yield over 30 years even though, beginning in years 7 or 8, the fair-rental systems provided an increasingly greater after-tax cash flow. The internal rate-of-return calculations consider the timing of cash flows, thus dollars received in the earlier years of an investment are of greater value than those received later. However, although the traditional system provides a greater return over the longer holding periods modeled, the rate of increase in return over time is much greater from the fair-rental systems.

At 5 years, rate of return under the traditional approach was 1.9 percent, but the rates of return under the fair-rental systems were considerably lower, actually negative (-9.8 percent for FRG, -9.1 percent for FRN). In years 10 through 30, all three systems had positive (and increasing) rates of return, with the traditional system

Table 2

Cost to the State<sup>1</sup> of using a fair-rental versus traditional approach for reimbursement of nursing home capital costs, by type of approach and years

| Year | Type of approach         |                          |                                |                          |                              |                          |
|------|--------------------------|--------------------------|--------------------------------|--------------------------|------------------------------|--------------------------|
|      | Traditional <sup>2</sup> |                          | Fair-rental gross <sup>2</sup> |                          | Fair-rental net <sup>2</sup> |                          |
|      | Current dollars          | Discounted present value | Current dollars                | Discounted present value | Current dollars              | Discounted present value |
| 5    | \$24,463                 | \$18,548                 | \$22,010                       | \$16,594                 | \$22,165                     | \$16,724                 |
| 10   | 48,886                   | 30,046                   | 47,526                         | 28,538                   | 47,339                       | 28,517                   |
| 30   | 145,106                  | 45,926                   | 197,236                        | 50,967                   | 187,992                      | 49,844                   |

<sup>1</sup>Cost to the State for the representative systems, assuming a 12-percent interest rate on mortgage debt, 85:15 debt-to-equity ratio, and a 10-percent rental payment on equity.

<sup>2</sup>The table presents both the total reimbursement costs through the end of each period and the present value of these cumulative costs, discounted at 10 percent.

SOURCE: (Boerstler, H., Carlough, T., and Schlenker, R.E., 1988.)

**Table 3**  
**Rate of return (without sale)<sup>1</sup> to investors using a fair-rental versus traditional approach, by type of approach and years**

| Year | Type of approach |                                |                 |
|------|------------------|--------------------------------|-----------------|
|      | Traditional      | Fair-rental gross <sup>2</sup> | Fair-rental net |
|      |                  | Percent                        |                 |
| 5    | 1.9              | -9.8                           | -9.1            |
| 10   | 16.4             | 11.3                           | 11.3            |
| 30   | 20.5             | 19.9                           | 19.6            |

<sup>1</sup>Rate of return (after tax) for the representative systems, assuming a 12-percent interest rate on mortgage debt, 85:15 debt-to-equity ratio, and a 10-percent rental payment on equity. Rates presented are after-tax figures.

SOURCE: (Boerstler, H., Carlough, T., and Schlenker, R.E., 1988.)

having a higher rate of return in year 10 (16.4 percent), as compared with FRG (11.3 percent) and FRN (11.3 percent). At 30 years, all three systems had high (and approximately equal) rates of return: Rate of return under the traditional system was 20.5 percent, as compared with 19.9 percent and 19.6 percent under FRG and FRN, respectively.

The sale-of-facility assumption was modeled to demonstrate the magnitude of potential returns available to owners and investors treating nursing home ownership primarily as a vehicle for real estate speculation. Under the assumption that a sale had occurred in either year 5 or year 10, the relative rates of return were the same as the results from the model assuming no sale had occurred. Because the rate of return was higher under the traditional system, this suggests a greater likelihood of an earlier sale under this approach.

*Rate of return summary*—Assuming no sale had occurred, rates of return in all three systems increased over time and were greater both at higher interest rates and with greater debt financing. With higher debt financing, there is little equity in the facility, and payments on a small amount of equity yield a relatively larger return.<sup>4</sup> In addition, the financial leverage provided by debt financing is amplified by Federal tax code provisions related to mortgage debt.

## Summary and discussion

### Cash flow

Although all three systems are capable of producing positive after-tax cash flows, the most striking difference between the traditional and fair-rental systems is the ability of the fair-rental system to provide an annually increasing cash flow. Similar to findings from other studies (Barlett, 1984), cash flows in the traditional model were higher than those of the fair-rentals in the early years (often highest in year 1), but cash flows generally decreased over time in the traditional system. This is because in the traditional system, although interest is passed through and fully reimbursed, interest payments decline over time and principal payments (not reimbursed) increase over time. After about year 7, cash

flows in the fair-rental systems (which are increasing each year) surpassed those of the traditional system. Cash flows from the traditional system are reduced even more with the use of ceilings or a more stringent definition of equity (such as subtracting accumulated depreciation from physical plant values).

The annual increase in cash flow generated by the fair-rental systems is due primarily to the appraisal (asset revaluation) process. By systematically recognizing facility appreciation, which was estimated in the simulations by a modest 3 percent per year, the fair-rental systems provide an increasing cash flow to facility owners that parallels the increased value of their nursing home investment.

For all systems, cash flow was greater with greater equity financing. Again, this is similar to findings from other studies (Barlett, 1984). The financial leverage produced by debt financing results in higher rates of return on invested equity, but the accompanying debt service requirements result in substantially smaller after-tax cash flows.

### Cost to State

The cost to the State of reimbursement payments, being essentially the complement to cash flow, followed a similar pattern. In the early years, total cost to the State was higher in the traditional system than in the fair-rental systems. By year 30, however, it was lower under all financing assumptions tested.

As was the case for the cash flow results, cost to the State varied directly and significantly with changes in interest rate. Of the three systems, FRG (fixed debt-to-equity assumption) was most cost sensitive to interest rate changes. On the other hand, changes in debt-to-equity ratios resulted in little change in cost to the State. Notably, it requires several years before the costs of the fair-rental systems exceed those of the traditional system.

### Rate of return to investors

Rates of return were generally higher in the traditional system compared with the fair-rental systems, particularly in the early years. Again, this is similar to findings from

<sup>4</sup>Financial data available from 122 of the nursing homes participating in the overall study indicated that 88 percent of nursing home plant, property, and equipment was financed by debt.

Baldwin (1984), Cohen and Holahan (1986) and Bartlett (1984). Although rates of return increased with increased debt financing in all three systems, the traditional system appeared most prone to promote highly leveraged investment. At 95 percent debt, returns on investment for the traditional system were substantially higher throughout the 30-year simulation; at 50 percent debt, those for the fair-rental systems surpassed returns for the traditional system after about 15 years.

Between the two fair-rental systems, the most notable difference was the sensitivity of FRG (fixed debt-to-equity assumption) to changes in the interest rate. At a lower rate of interest on mortgage debt (5 percent), FRG had lower cash flows over 30 years, lower cost to the State, and lower rates of return over time than did FRN. At a higher rate of interest (15 percent), however, the opposite results occurred. Changes in debt-to-equity ratio impacted the systems fairly equally. At both a 50:50 and 95:5 debt-to-equity ratio, FRG had slightly lower cash flows, total cost to the State, and rate of return than did FRN.

### Policy implications

Although the simulations conducted for this study revealed some differences between the two fair-rental approaches, both fair-rental systems appear superior to the traditional cost-based system in generating a positive and reasonably stable cash flow over time for nursing home owners and also in providing reasonable rates of return to investors. Such a reimbursement environment can encourage investment in nursing homes (depending, of course, on the structure and level of the total reimbursement methodology). This, in turn, can contribute to the objective of providing adequate access to care for Medicaid recipients.

At the same time, although actual cash outlays by the States are greater over time under the fair-rental approaches than under the traditional approaches, they are similar in present value terms. This reflects the likelihood that the higher cash outlays by the State in the later years of a fair-rental system are likely to be largely financed by the overall expected growth of the economy and therefore of tax revenues. The discount rate used in the present-value analysis is a reasonable estimation of future economic growth and inflation. In addition, a fair-rental approach is likely to discourage the frequent and destabilizing ownership and financing changes that have occurred under the traditional, with possible adverse consequences for patient care.

Although the analysis presented here suggests that the fair-rental approach has significant advantages over the traditional cost-based method, further research is needed in a number of areas. For example, additional investment analysis models should be utilized and compared. To illustrate, the net present-value approach could be used to examine the returns to the investor, rather than the internal rate-of-return approach presented here. (Some preliminary analyses along these lines were carried out, and the results tended to support the relative differences between systems presented earlier. Hence, the internal rate-of-return approach was presented in order to

highlight the differences between systems more clearly.) In addition, the model could be expanded to include, for example, abandonment options and various measures of efficiency of public expenditure. In addition, the same cash-flow streams may be viewed differently by the State and the private investor, based on their different discount rates, and such differences could be incorporated into the analysis.

An important additional research approach is to study the experiences of States that have implemented fair rental methodologies. Unfortunately, the long-time horizons associated with investment decisions and their consequences hamper such analyses. The ideal approach, therefore, should probably include both empirical examinations of actual operational systems and simulation modeling of the type used here.

Finally, it is important to note that the analysis presented in this article was designed to examine differences between broadly defined payment methodologies. In order to carry out the analyses, many simplifying assumptions were necessary. Thus, although the results favor the fair-rental methodology, detailed analysis is required in the consideration of any system for actual implementation. The entire reimbursement methodology, including the overall generosity or stringency of the total payment system, must be examined, as must general nursing home market conditions and State policy objectives and constraints. Careful analysis and debate, involving all parties (the State, providers, and consumers), are necessary before implementing major reimbursement system changes.

### Acknowledgment

We greatly appreciate the suggestions from an anonymous reviewer.

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