Continuing Care Retirement Communities

An Empirical, Financial, and Legal Analysis

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To our children:
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Chapter Eight

Actuarial Valuations: Methodology for Determining Fee Adjustments

■ In the preceding chapter, actuarially adequate fees were derived from a set of underlying assumptions, including future mortality, morbidity, inflation, and interest. If the community's experience were to follow these assumptions exactly and if fees were increased according to the inflation assumption, then the community would maintain its actuarially adequate position. Since this is an unlikely scenario, management needs a tool to assess the financial consequences of annual experience "deviations" so that fees can be adjusted accordingly. The actuarial valuation methodology, which is traditionally applied to pension plans for setting annual contributions to keep the plans actuarially sound, is the approach the authors recommend for generating the needed information for making CCRC fee adjustments.

The authors believe that the age of a community can have an impact on the frequency with which actuarial valuations should be undertaken and the manner in which the results are used. For a *maturing* CCRC, where expenses for continuing care contractholders are increasing faster than their corresponding revenues because of the adoption of inflation-constrained monthly fees, management will need to examine the relationship between its long-term assets and liabilities annually. In this case, the community's demographic profile is changing rapidly, generating significant and frequent shifts in the asset/liability relationship. By closely monitoring this relationship, management may be able to make relatively minor annual fee adjustments for eliminating any imbalance, whereas, if such adjustments are not made, more severe changes might be required in the future.

For a *mature* CCRC, where the rate of increase in expenses and revenues has stabilized and is approximately equal to the rate of increase in revenues, there is less of a need for annual valuations since the asset/liability relationship is less likely to change as quickly or as much as is the case for a maturing CCRC. Moreover, if an actuarial imbalance exists between assets and liabilities, the long-term financial position for a mature community may not be seriously threatened, provided the community's cash flow is projected to be adequate and management intends to offer continuing care contracts throughout the indefinite future. Therefore, in the authors' judgment, it is reasonable to make a different use of the valuation results for each CCRC, depending on its age and other financial characteristics, and possibly even to apply a different type of valuation philosophy regarding the definition of future liabilities to communities that differ in age.

One by-product of an actuarial valuation is the determination of the actuarial reserves that should be held by a CCRC. Conceptually, actuarial reserves are the amount a community should hold to offset the difference between its future expenses and its future revenues. The assets backing up an actuarial reserve may be both liquid, such as cash, and nonliquid, such as land and physical plant. One financial issue not addressed by actuarial valuations is the desired level of liquid assets. The liquid asset issue is often raised by legislators who wish to establish funding requirements for actuarial reserves. The "correct" amount of liquid assets, which depends on the community's debt load and the proportion of revenues generated from monthly fees versus entry fees, can be determined through accounting and/or cash management techniques. Nevertheless, it is generally true that an actuarially priced CCRC will generate liquid assets far in excess of those deemed necessary from an accounting viewpoint. Thus, there will be little concern over liquid asset requirements for a CCRC in actuarial balance under the closed-group approach.

THEORY OF ACTUARIAL VALUATIONS

Actuarial valuations compare a CCRC's aggregate assets with its aggregate liabilities. Aggregate assets are the community's tangible assets (liquid assets and physical plant) plus the present value of future monthly revenues, which can be considered an intangible or prospective asset. Aggregate liabilities, on the other hand, are the community's current and long-term liabilities plus the present value of future expenses associated with the services promised to continuing care contractholders. If aggregate assets equal aggregate liabilities, the community's pricing structure is in actuarial balance and monthly fees need be increased only by the community's inflation rate (i.e., the community's

internal inflation rate) in order to maintain this balance. If aggregate assets are less than aggregate liabilities, then monthly fees would have to be increased by more than the assumed inflation rate to bring the community into actuarial balance, and vice versa.

It was pointed out previously that there is more than one way to define a community's future liabilities, resulting in two types of valuations: (1) closed-group and (2) open-group. The liability calculation under the closed-group method takes into account *current* residents only. This means that the present value of future expenses is derived from an expense projection that may extend for 30 years or more to reflect the probability that some residents may live for that length of time. The liabilities and corresponding assets associated with new entrants are ignored. Valuations using the closed-group approach test whether the community's tangible and prospective assets on behalf of *current* residents equal their existing and future liabilities. This method is consistent with a management policy to minimize intergenerational subsidies, implying a self-supporting fee structure. Moreover, a pricing policy meeting this test will generate sufficient resources for management to liquidate the continuing care obligations for existing residents without having to increase future fees by more than inflation.

The open-group method differs from the closed-group method in two respects. First, the financial impact of new entrants is taken into consideration. Under the closed-group method, new entrants are assumed to be priced on a break-even basis and, thus, are assumed to have no financial consequence.[1] New entrants can generate either a positive or negative financial impact under the open-group method. Second, the CCRC's liability is based on both current and future residents *over a fixed time period*. The authors recommend that this time period be at least 15 years to ensure that decisions are based on a stabilized pattern of revenues and expenses. An actuarially balanced position using this method could be achieved with lower fees than those required under the closed-group method because the highest expenses for a group of residents (toward the end of their life span when they are likely to require health care) are deferred to future generations. Therefore, this method is consistent with the management philosophy of accepting intergenerational transfers of funds and the assumption that management will always offer continuing care contracts.

The appropriateness of either method depends on management's goals and the community's age. Achieving actuarial adequacy under the closed-group method for a mature community might be difficult if

[1] If the combination of entry fees and monthly fees is not adequate, the new entrant pricing methodology (see Chapter 7) would be applied to derive adequate entry fees.

previous fees were not set with this goal in mind. For such cases, an open-group valuation may be appropriate, provided that projected cash flows are adequate. Also, the open-group method may be appropriate for a maturing CCRC provided that management agrees with the above-mentioned constraints. The closed-group methodology is described in this book because it represents the highest standard for the financial evaluation of a CCRC.

Actuarial Valuation Statement

The primary question that an actuarial valuation answers is whether the community's assets are equal to its liabilities, as summarized below:

Actuarial Valuation Statement

Aggregate assets		**Aggregate liabilities**
1. Short-term assets + **2.** Actuarial value of fixed assets + **3.** Prospective assets	$\stackrel{?}{=}$	**1.** Short-term liabilities + **2.** Long-term liabilities + **3.** Prospective liabilities

If these two components of a CCRC are not equal, the balancing item is termed the unfunded liability (a negative unfunded liability represents a surplus).

If the relationship does not hold for a given CCRC, the results of an actuarial valuation provide guidelines on how to adjust fees to eliminate the imbalance. If an imbalance exists (particularly if aggregate assets fall short of aggregate liabilities) and management does not change its fees to eliminate that imbalance, the actuarial deficit may grow over a period of years to the point where a severe adjustment in fees would be necessary in order to prevent a financial crisis.

In this sense, an actuarial valuation serves as an early warning device, allowing management to uncover deficiencies in its pricing policies far in advance of a financial crisis. Using this tool may allow management to make relatively modest fee adjustments currently to avoid future financial problems that would require more dramatic changes. The information generated by an actuarial valuation is extremely important during the maturation period of a CCRC when a robust cash flow position, which will deteriorate in a few years, could lead management to mistakenly believe that the community is financially sound (e.g., see the cash flows associated with Case 2 in Chapter 4).

For an initial move-in population, an actuarial valuation would show that the community is in actuarial balance (i.e., the unfunded liability would be zero) if fees were based on the actuarial pricing methodology described in the preceding chapter. Moreover, if experience matches the underlying assumptions and the fees for new entrants are also actuarially determined, then future valuations would show a zero unfunded liability. To demonstrate this point, a simplified example of projected valuations on a closed group of residents follows.

Projected Closed-Group Valuation

In this example, it is assumed that the community has 100 females at age 75 entering its one-bedroom apartment units and that fees are actuarially balanced at entry. The fees for these residents involve an entry fee of $53,846 and a monthly fee of $686 (values that were derived in Chapter 7). Monthly fees are assumed to increase 10 percent annually. The actuarial liability, or PVFE, associated with these residents is $15,195,100. Table 8–1 contains projected actuarial valuations and cash flows associated with the surviving members from the original 100 residents over their potential lifetimes (to age 110) in the community.

The first three columns of Table 8–1 contain the year of operation, the age of surviving residents, and the number of surviving residents. The next three columns contain items from the cash flow projection based on the surviving residents: total revenues, total expenses, and net cash flow. The last four columns contain items included in an actuarial valuation statement: aggregate assets, which consist of liquid assets and the present value of future revenues (PVFR); aggregate liabilities which in this example include only the present value of future expenses (PVFE); and the unfunded liability.

The flow through this table is explained as follows. Liquid assets are initially $5,385,000, a value equal to the sum of all entry fees paid by the 100 entrants. Liquid asset values in future years are calculated by adding the net cash flow, equal to the difference between revenues and expenses, to the prior year's liquid asset balance. The present value of future revenues (PVFR) is the discounted value (discounted for both interest and mortality) of future monthly fees to be collected from current residents. The present value of future expenses is the discounted value of the costs of providing shelter and health care to surviving residents. During the first year, this value equals the sum of liquid assets and PVFR, or $15,195,000, since the fee structure was established to be in actuarial balance. The unfunded liability for each year is determined by subtracting aggregate assets from aggregate liabilities.

Several observations can be made from this table. First, a long-term projection is mandatory for financial analysis of continuing care con-

TABLE 8–1
Projected Cash Flow and Actuarial Valuation Statements for 100 Age-75 Female Entrants *($000)*

Year (t)	Age (x)	Number of survivors	Cash flow: Total revenues	Cash flow: Total expenses	Cash flow: Net income
0	75	100.0	—	—	—
1	76	98.7	$1,413	$1,290	$ 123
2	77	97.1	1,497	1,376	121
3	78	95.3	1,582	1,471	111
4	79	93.1	1,669	1,574	95
5	80	90.6	1,755	1,686	69
6	81	87.6	1,837	1,803	34
7	82	84.1	1,911	1,924	(13)
8	83	80.0	1,975	2,045	(70)
9	84	75.5	2,025	2,162	(137)
10	85	70.3	2,055	2,267	(212)
11	86	64.6	2,066	2,299	(233)
12	87	58.5	2,050	2,356	(306)
13	88	51.9	2,003	2,376	(373)
14	89	45.1	1,920	2,353	(433)
15	90	38.2	1,803	2,278	(475)
16	91	31.5	1,655	2,152	(497)
17	92	25.3	1,480	1,978	(498)
18	93	19.8	1,291	1,767	(476)
19	94	15.0	1,096	1,533	(437)
20	95	11.1	906	1,292	(386)
21	96	8.1	731	1,059	(328)
22	97	5.7	443	846	(270)
23	98	3.9	443	659	(216)
24	99	2.6	332	501	(169)
25	100	1.7	244	372	(128)
26	101	1.1	174	268	(94)
27	102	0.7	121	188	(67)
28	103	0.4	80	127	(47)
29	104	0.2	53	83	(30)
30	105	0.1	31	51	(20)
31	106	0.1	19	30	(11)
32	107	0.0*	11	17	(6)
33	108	0.0*	5	9	(4)
34	109	0.0*	3	4	(1)
35	110	0.0*	0.8	1.7	(0.9)

* Less than 0.1, but greater than 0.

tracts since a significant portion of residents will survive 10 years or more. In this example, more than 10 percent of the original group survives for at least 20 years. Second, the actuarial liability for a group of residents increases for the first few years after entry even though not all the residents survive. Third, and perhaps most important, the un-

Aggregate assets			
Liquid assets	PVFR	Aggregate liabilities PVFE	Unfunded liability
$5,385	$ 9,810	$15,195	$0
5,508	10,066	15,574	0
5,629	10,273	15,902	0
5,740	10,422	16,162	0
5,835	10,503	16,338	0
5,904	10,507	16,411	0
5,938	10,423	16,361	0
5,925	10,244	16,169	0
5,855	9,963	15,818	0
5,718	9,577	15,295	0
5,506	9,086	14,592	0
5,273	8,495	13,768	0
4,967	7,815	12,782	0
4,594	7,060	11,654	0
4,161	6,257	10,418	0
3,686	5,430	9,116	0
3,189	4,611	7,800	0
2,691	3,829	6,520	0
2,215	3,109	5,324	0
1,778	2,468	4,246	0
1,392	1,916	3,308	0
1,064	1,455	2,519	0
794	1,080	1,874	0
578	782	1,360	0
409	553	962	0
281	380	661	0
187	253	440	0
120	162	282	0
73	100	173	0
43	58	101	0
23	33	56	0
12	17	29	0
6	8	14	0
2	4	6	0
1	1	2	0
0.1	0.3	0.4	0

funded liability is zero for every year during the projection. In other words, an actuarial valuation of current residents who enter at different years is expected to have a zero unfunded liability, provided fees are in actuarial balance and experience follows the underlying assumptions.

ACTUARIAL VALUATION: NUMERICAL EXAMPLE

The preceding example was based on the simplistic assumption that all residents were of the same sex and age at entry and that all assets and expenses were expressed in terms of cash. In reality, a community will consist of both males and females whose ages may range from 65 to 100. Also, some of the community's assets will be held in nonliquid items such as buildings and equipment. Values for these assets must be expressed in terms of their actuarial equivalents.[2] Table 8–2 contains a more realistic actuarial valuation based on a hypothetical community serving 350 residents.

Assets are given on the left-hand side and liabilities on the right-hand side of the valuation statement. In this example, aggregate assets and liabilities are separated into three components, as described below.[3] The unfunded liability, equal to the difference between aggregate liabilities and assets, is recorded on the liability side of the valuation statement.

Aggregate Assets

Short-Term Assets. Short-term assets typically include cash, marketable securities, inventory, and accounts receivable. These items are recorded at their market value to reflect their current economic worth to the community. This example has two short-term assets, cash (component 1*a*) and trusteed funds (component 1*b*). Cash, which equals the portion of entry fees not used for plant financing plus working capital and contingency funds, is slightly less than $5 million. The trusteed funds are approximately $6 million and are equal to the debt service reserve required by the financing agreement. Total short-term assets equal $10,629,917, or 17.2 percent of aggregate assets.

Actuarial Value of Fixed Assets. The actuarial value of fixed assets (AVFA) represents the present value of services provided by fixed assets for investments in land, buildings, equipment, and furnishings and amortization of start-up costs. In future years, the actuarial values for additions or improvements to fixed assets are added to this component and deductions are made according to an actuarial amortization schedule. Initially, the building value (component 2*b*), which includes construction plus start-up costs, is the largest portion of the AVFA. The building value in this example is almost $19 million, or 91.7 percent

[2] The actuarial equivalent value for a fixed asset is based on the method used to expense that asset. The actuarial value for a fixed asset is defined to be the present value of expenses associated with that asset over its remaining useful lifetime.

[3] In some cases, an additional liability is recorded for fund balances. This component would include liabilities for future asset replacement and for contingencies.

TABLE 8–2

Actuarial Valuation Statement
XYZ RETIREMENT COMMUNITY
As of December 31, 1982

Assets

1. Short-term assets:		
a. Cash	$ 4,679,917	7.6%
b. Reserved funds	5,950,000	9.6
Total liquid assets	10,629,917	17.2
2. Actuarial value of fixed assets:		
a. Land	500,000	0.8
b. Buildings	18,750,000	30.4
c. Equipment and furnishings	1,200,000	2.0
Total fixed assets	20,450,000	33.2
3. Prospective assets:		
a. Present value of future revenues (PVFR)	30,571,322	49.6
b. Present value of supplemental fees	0	0.0
Total prospective assets	30,571,322	49.6
Aggregate assets	$61,651,239	100.0%

Liabilities

1. Short-term liabilities:		
a. Current portion of debt	$ 62,155	0.1%
Total short-term liabilities	62,155	0.1
2. Long-term liabilities:		
a. Debt	14,937,845	24.2
Total long-term liabilities	14,937,845	24.2
3. Prospective liabilities:		
a. Present value of future expenses (PVFE)	46,651,239	75.7
b. Unamortized actuarial losses (gains)	0	0.0
Total prospective liabilities	46,651,239	75.7
Aggregate liabilities	$61,651,239	100.0%
Unfunded liabilities	0	

of the combined fixed asset values. The total AVFA is $20,450,000, or 33.2 percent of aggregate assets.

Prospective Assets. Prospective assets represent the actuarial value of future revenues to be received from current residents. This component includes the present value of future monthly fees or revenues (PVFR) and the present value of supplemental monthly fees, if any, that are required to fund experience deviations (see later discussion).[4] The PVFR is equal to $30.6 million in this example, while the value for supplemental fees is zero since the initial pricing structure was designed to be in actuarial balance. Total prospective assets are 49.6% of the aggregate assets.

Aggregate Liabilities

Short-Term Liabilities. Short-term liabilities represent those amounts that will become due in the current year. Examples are the current portion of debt, accounts payable, and accrued wages. The value recorded for the current portion of debt (component 1*a*) is $62,155. The value of other short-term liabilities is assumed to be zero and is not recorded on this statement. Typically, short-term liabilities in this example will be an insignificant portion of aggregate liabilities, and in this case amount to less than 0.1 percent.

Long-Term Liabilities. Long-term liabilities are liabilities payable over a period of years but are not contingent on the survival of current residents (the value for the latter liability is recorded under prospective liabilities). The primary component of long-term liabilities is debt (component 2*a*). Debt, which is about $15 million, is the only long-term liability in this illustrative example, representing 24.2 percent of aggregate liabilities.

Prospective Liabilities. Prospective liabilities consist of the present value of future expenses (PVFE, component 3*a*) and, if any, unamortized actuarial gains or losses (component 3*b*). The PVFE, which totals $46.7 million, is the major element of prospective liabilities. Table 8–3 shows a breakdown of the PVFE by cost center and type of expense. Future health care expenses in this example represent 37.5 percent of the total expenses, while future apartment expenses represent 62.5 percent. Note that the total present value of future *operating* expenses in Table 8–3 ($13,930,463 + $16,640,869 = $30,571,322) is equal to the present value of future revenues (i.e., monthly fees) in Table 8–2, by definition of the pricing philosophy.

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[4] Other revenue sources that might be included with this component include the present value of future reimbursement from outside agencies and the present value of any voluntary contributions from residents.

TABLE 8–3
Present Value of Future Expenses by Cost Center and Type

Type of expense	Amount	Percentage of total PVFE
Health care cost center:*		
Operating	$13,930,463	29.9%
Building	1,988,920	4.3
Building replacement	4	0.0
Land	52,468	0.0
Original equipment and furnishings	296,273	0.6
Equipment replacement	595,095	1.3
Refurbishment/modernization	646,659	1.4
Subtotal	17,509,882	37.5%
Apartment cost center:		
Operating	16,640,859	35.7
Building	10,415,211	22.3
Building replacement	3	0.0
Land	274,754	0.6
Original equipment and furnishings	651,584	1.4
Equipment replacement	572,670	1.2
Refurbishment/modernization	586,276	1.3
Subtotal	29,141,357	62.5%
Total PVFE	$46,651,239	100.0%

* These costs include all liabilities under the contract offered by the community. This liability includes only future nursing care in some communities, while in others it may include some acute or physician's care. This example is based on the assumption that the contract covers nursing care only.

No actuarial gains or losses are shown on the illustrative actuarial valuation statement in Table 8–2. Values for this component will be determined in future years by comparing the following year's *expected* actuarial position with the *realized* actuarial position. The total prospective liabilities are 75.7 percent of the aggregate liabilities.

Actuarial Reserves and Unfunded Liabilities

Actuarial reserves are equal to the difference between prospective assets and prospective liabilities.[5] Actuarial reserves represent the present value of future obligations to current contractholders that are not covered by their anticipated monthly fees. In this example, where monthly fees are assumed to be inflation-constrained, the actuarial reserve is $16,079,917 ($46,651,239 − $30,571,322).

The net assets of a community are equal to the difference between (1) short-term assets plus the actuarial value of fixed assets

[5] If the community explicitly calculates a liability for contingencies, this value would also be added to actuarial reserves.

($10,629,917 + $20,450,000) and (2) short- and long-term liabilities ($62,155 + $14,937,845). In this case, the community's net assets are equal to its reserves (i.e., $16,079,917). If net assets are equal to actuarial reserves, the community is in "actuarial balance" and has a zero unfunded liability. An actuarial imbalance exists if net assets are not equal to actuarial reserves, and the community will then have a positive or negative unfunded liability. An equivalent and easier way to determine the unfunded liability is simply to subtract aggregate assets from aggregate liabilities.

The size of a community's unfunded liability provides a barometer for assessing its long-term financial position. A small unfunded liability (less than 10 percent of aggregate assets) does not usually imply a near-term cash flow problem. However, if the liability is not funded, it will grow with the interest rate assumed in the valuation and may result in a cash flow problem in later years.

TABLE 8–4
Experimental Design for Valuation Sensitivity Analysis

Experiment	Assumption changes
1	Baseline; no changes
2	1% increase in inflation (from 10% to 11%)
3	2% increase in inflation (from 10% to 12%)
4	1% decrease in inflation (from 10% to 9%)
5	2% decrease in inflation (from 10% to 8%)
6	1% increase in interest (from 12% to 13%)
7	2% increase in interest (from 12% to 14%)
8	1% decrease in interest (from 12% to 11%)
9	2% decrease in interest (from 12% to 10%)
10	25% increase in mortality rates
11	25% decrease in mortality rates
12	25% increase in morbidity rates
13	25% decrease in morbidity rates
14	25% increase in mortality rates and 25% decrease in morbidity rates
15	25% decrease in mortality rates and 25% increase in morbidity rates
16	2% decrease in inflation (from 10% to 8%), 25% increase in mortality rates, and 25% decrease in morbidity rates
17	2% increase in inflation (from 10% to 12%), 25% decrease in mortality rates, and 25% increase in morbidity rates
18	2% increase in interest (from 12% to 14%), 25% increase in mortality rates, and 25% decrease in morbidity rates
19	2% decrease in interest (from 12% to 10%), 25% decrease in mortality rates, and 25% increase in morbidity rates

Even though a community may have a modest unfunded liability under a given set of assumptions, management may be concerned with the relative importance of specific assumptions on the unfunded liability. In performing an actuarial valuation for CCRCs, it is a reasonable and sensible practice to generate alternative valuations under different sets of assumptions because the data base used to develop these assumptions is often not as credible as one would like to have them. This practice is referred to as a sensitivity analysis. Table 8–4 contains an experimental design for performing a sensitivity analysis that includes favorable and unfavorable changes in mortality, morbidity, inflation, and interest assumptions.

Table 8–5, which contains the results of the sensitivity analysis, shows the actuarial reserve, the unfunded liability, and the ratio of the unfunded liability to the aggregate assets. The actuarial reserve

TABLE 8–5
Sensitivity Analysis *($000)*

	Experiment	Actuarial reserves*	Unfunded liability	Ratio of unfunded liability to aggregate assets
1	Baseline	$16,080	$ 0	0.0%
2	+1% inflation	16,904	834	1.3
3	+2% inflation	17,930	1,850	2.8
4	−1% inflation	15,393	(687)	(2.0)
5	−2% inflation	14,824	(1,256)	(3.6)
6	+1% interest	15,952	(1,046)	(1.7)
7	+2% interest	15,855	(1,952)	(3.4)
8	−1% interest	16,249	1,213	1.9
9	−2% interest	16,469	2,630	4.0
10	+25% mortality	14,070	(2,010)	(3.4)
11	−25% mortality	19,099	3,019	4.0
12	+25% morbidity	17,001	921	1.5
13	−25% morbidity	15,009	(1,071)	(1.7)
14	+25% mortality −25% morbidity	13,165	(2,915)	(4.8)
15	−25% mortality +25% morbidity	20,195	4,115	6.5
16	−2% inflation +25% mortality −25% morbidity	12,417	(3,663)	(6.3)
17	+2% inflation −25% mortality +25% morbidity	23,115	7,035	10.5
18	+2% interest +25% mortality −25% morbidity	13,403	(4,404)	(7.7)
19	−2% interest −25% mortality +25% morbidity	21,525	7,686	11.3

* Actuarial reserves = PVFE − PVFR.

(column 2) is the difference between the PVFE and the PVFR, representing the amount of unencumbered assets that the community should hold to be in actuarial balance. The reserve under the baseline assumptions is $16 million and ranges from $13 to $23 million under alternative assumptions. Experiments 5 through 9 show that the prospective assets and liabilities are approximately equal for the interest sensitivities since the actuarial reserve is relatively constant for these experiments.

Like the variance in actuarial reserves, the absolute value of the unfunded liability associated with unfavorable assumptions is greater than the value associated with favorable assumptions. The unfunded liability as a percentage of aggregate assets ranges from a positive 11 percent (implying an actuarial deficit) to a negative 8 percent (implying an actuarial surplus). This relatively modest range for rather significant assumption changes suggests that the continuing care concept is financially viable for small groups.

Methods for Funding Unfunded Liabilities

If a community is not in actuarial balance (i.e., there is an actuarial deficit or surplus), management can select several funding methods to eliminate the imbalance. The discussion of funding methods is based on the assumption that the community has a deficit; hence, the methods are described in terms of fee increases. If a surplus exists, similar decreases in fees are applicable. Three issues associated with the selection of the funding method are:

1. Should the deficit be eliminated (fully funded) or frozen (funding interest on deficit only)?
2. Over what time period should the funding last?
3. Should the funding come from the fees of current residents only, from the fees of prospective residents only, or from some combination of both current and prospective residents?

The decision for each of these three questions must be based on management's assessment of the impact that an additional fee increase will have on the community's marketability and the resident's morale. With regard to the elimination or freezing issue, it is clearly more desirable to eliminate the deficit whenever possible. Similarly, shorter funding periods are preferable to longer ones. As mentioned previously, there are three sources of fees for funding the deficit: current residents only, prospective residents only, or some combination of the two groups. Methods using current residents are complicated by the fact that the current residents did not create the entire deficit. Past residents may have contributed to the deficit. Thus, it is difficult to argue that only the current group should bear the additional fee increase. Moreover, from a practical viewpoint, adjusting fees for the

current group to eliminate the deficit while keeping new entrant fees in line may distort the overall fee structure (e.g., the actuarially adequate entry fees associated with the higher monthly fees may be much smaller than those currently offered). Thus, it is often advisable to fund such deficits from both current and prospective entrants.

An unlimited number of methods could be devised to fund an unfunded liability. Descriptions of the four alternative actuarial funding methods illustrated in Table 8–6 are given below:

One-time percentage increase. The one-time percentage increase required to eliminate a deficit is determined by dividing the unfunded liability by the present value of monthly fees. This method eliminates the deficit on the current valuation statement.

Additional percentage increase. The additional percentage increase in monthly fees required to eliminate a deficit is determined by estimating the increase in monthly fees (over and above the assumed inflation rate) required to raise the PVFR to cover the deficit. This amount will be greater than the amount required under the one-time percentage increase divided by the length of the funding period since future revenues are lost due to mortality of current residents. This method also eliminates the deficit on the valuation statement.

Flat dollar monthly surcharge. The flat dollar monthly surcharge required to eliminate a deficit is determined by dividing the deficit by the product of an n-year level dollar annuity times the expected number of surviving residents (closed-group) or total residents (open-group). The length of the annuity is the funding period. The closed-group approach will eliminate the deficit on the valuation statement. The open-group approach (which is used in Table 8–6) will show a deficit; however, the amount of the surcharge is smaller than that for the closed-group approach.

Deficit freezing. Deficit freezing can be achieved by applying the nonincreasing surcharge method over an infinite time period. The amount of the surcharge is determined by dividing the interest rate charge on the unfunded liability by the average population. This method is applied only on an open-group basis. The size of the unfunded liability is expected to remain constant in future years; however, it poses less of a financial problem since it becomes a relatively smaller portion of the aggregate assets as the latter increase for inflation.

Table 8–6 shows four methods of funding the deficits (and surpluses) that were estimated under the sensitivity analysis. The one-time percentage increase method shows that under the best case monthly fees could be reduced by 17 percent and that under the worst case they

TABLE 8–6
Percentage Increase in Fees under Alternative Funding Options to Eliminate (or Freeze) Unfunded Liabilities Derived from Sensitivity Analysis

		Methods that eliminate unfunded liability			Method that freezes unfunded liability
Experiment		One-time percentage increase	Additional percentage over inflation for five years	Flat dollar monthly surcharge for 10 years	Flat dollar monthly surcharge
1	Baseline	0.0%	0.0%	$ 0	$ 0
2	+1% inflation	2.6	0.7	31	21
3	+2% inflation	5.4	1.3	70	47
4	−1% inflation	(2.4)	(0.5)	(26)	(18)
5	−2% inflation	(4.6)	(1.1)	(47)	(33)
6	+1% interest	(3.6)	(0.9)	(41)	(29)
7	+2% interest	(7.2)	(1.8)	(78)	(58)
8	−1% interest	3.7	0.9	44	28
9	−2% interest	7.5	1.8	93	57
10	+25% mortality	(7.0)	(1.7)	(176)	(52)
11	−25% mortality	9.2	2.2	114	77
12	+25% morbidity	3.1	0.8	35	23
13	−25% morbidity	(3.4)	(0.8)	(40)	(28)
14	+25% mortality −25% morbidity	(9.8)	(2.4)	(110)	(75)
15	−25% mortality +25% morbidity −2% inflation	12.8	3.0	155	105
16	+25% mortality −25% morbidity +2% inflation	(13.7)	(3.6)	(138)	(94)
17	−25% mortality +25% morbidity +2% interest	19.6	4.3	265	179
18	+25% mortality −25% morbidity −2% interest	(16.6)	(4.4)	(176)	(129)
19	−25% mortality +25% morbidity	20.9	4.6	271	167

would have to be increased by 21 percent. The increase under the additional percentage increase method, calculated to eliminate the deficit over five-year period, is slightly more than one fifth of the one-time percentage increase. The flat dollar monthly surcharge method was calculated to eliminate the deficit in 10 years. The deficit freezing method adds a surcharge that lasts in perpetuity and is 27 to 38 percent less than the 10-year flat dollar surcharge.

In summary, the appropriate method for funding a CCRC's deficit must consider the equity to current and prospective residents, the impact on residents' morale, and the effects on the CCRC's market-

ability. In some cases, it may not be possible or desirable to implement a closed-group funding approach, since an open-group method can permit all persons to pay the same monthly fees regardless of the year they entered the community. The authors' view is that any funding method should strive to eliminate the deficit within five years and that the burden should probably be shared between existing residents and new entrants.

TREATMENT OF EXPERIENCE DEVIATIONS

In the preceding analysis, inflation-related increases in monthly fees were sufficient to keep the community in actuarial balance. This section describes the methodology that can be used to determine the financial effects of variations in the underlying assumptions and the adjustments required to monthly fees to account for such variations. Experience deviations considered in this paper arise from variations in: (1) mortality rates, (2) morbidity rates, (3) inflation, and (4) interest earnings.

Experience deviations are referred to as actuarial gains or losses. An actuarial gain indicates that the expected experience for the current residents was more favorable, financially, than expected and fees can be increased at a lower rate than expected. An actuarial loss indicates that experience was worse than expected and fees must be increased more than expected to maintain actuarial balance.

Fee adjustments that eliminate experience deviations may require that the group equity concept (as described in Chapter 7) be violated, at least temporarily. It is not usually feasible or desirable to fund experience deviations from the fees of current residents only. Thus, new entrants' fees can be altered to help fund financial gains and losses. The examples presented in this section are based on open-group adjustments to fees (i.e., changes to current and prospective residents' fees). The first step in calculating the amount of the adjustment is to determine the financial (or actuarial) gain or loss.

Determination of Financial Gains or Losses

Financial gains or losses are determined by comparing the actual unfunded liability for a given year with the *expected* unfunded liability, as estimated from the previous year. The actual unfunded liability is determined by performing an actuarial valuation in the current year. The *expected* unfunded liability is determined by performing an actuarial valuation on the projected survivors from the prior year plus expected new entrants. If the actual unfunded liability exceeds the expected unfunded liability, the community experienced a financial loss. If the

reverse is true, the community experienced a financial gain. This calculation is expressed algebraically by:

$$FG/L_t = AUL_t - EUL_t$$

where

FG/L_t = Financial gain/loss in year t
AUL_t = Actual unfunded liability for year t
EUL_t = Expected unfunded liability for year t

Table 8–7 shows a five-year projection of unfunded liabilities and actuarial gains/losses based on one cash flow iteration generated by the

TABLE 8–7
Expected and Actual Net Aggregate Assets and Liabilities from Projected Actuarial Valuations and Calculation of Financial Gains and Losses *($000)*

	Actual values			Expected values			
Fiscal year January 1,	**Aggregate liabilities**	**Aggregate assets**	**Unfunded liability**	**Aggregate liabilities**	**Aggregate assets**	**Unfunded liability**	**Financial losses (gains)**
1983	—	—	—	—	—	—	—
1984	$62,572	$62,875	$(303)	$65,087	$65,075	$12	$(315)
1985	65,815	66,068	(253)	66,049	66,355	(306)	53
1986	70,370	70,156	214	69,597	69,835	(238)	452
1987	74,790	74,742	48	74,337	74,031	306	(258)
1988	79,187	79,196	(9)	78,926	78,851	75	(84)

stochastic population methodology described in Chapter 6. The unfunded liability in each year is determined by deducting aggregate assets from aggregate liabilities (column 2 minus column 3). The *expected* unfunded liability is calculated in a similar manner using the values in columns 5 and 6. No values are given for the community's first fiscal year, since at least one year's experience is needed to calculate experience deviations. In the second year, the actuarial valuation shows a negative unfunded liability, or actuarial surplus, of $303,000 (column 4). The expected unfunded liability is $12,000 (column 7).[6] Consequently, the year's experience generated a $315,000 financial gain (financial gains on this table are represented by negative values). The following two years generated financial losses of $53,000 and $452,000, while the last two years generated financial gains of $258,000 and $84,000. These results illustrate that, for a small group, there can be considerable variation in annual experience.

[6] The reason the expected unfunded liability is not zero is that, for this iteration, the actual distribution of new entrants (i.e., single, couple, and age mix) did not equal the expected distribution.

Methods for Amortizing Financial Gains and Losses

There are two methodologies for dealing with experience deviations: (1) the supplemental fee method and (2) the buffer fund method. The supplemental fee method spreads over a period of years the monthly fee adjustments required to fund deviations. Each year the experience deviation is calculated, and adjustments to amortize that year's gain or loss are then added to the sum of the remaining adjustments from prior years. The monthly fee in the current year is last year's monthly fee increased for assumed inflation plus (or minus) the supplemental monthly fees. Under the buffer fund method, fees for the current group of residents are increased by a factor to build up a contingency reserve that is statistically expected to cover potential variation over a fixed time period. Annual deviations are applied against the contingency reserve. Periodically, the reserves are recalculated and the fees adjusted to fund any shortfall between actual and required reserves.

Supplemental Fee Method. The supplemental fee method amortizes the actuarial gain and loss over a period of years. Implementing this method requires that management decide whether supplemental fees should be level (nonincreasing) or inflation-adjusted, and the time period over which the gain or loss is to be amortized. This method implicitly applies the amortization to the fees of both current and future residents.

The first-year results from Table 8–7 show an actuarial gain of \$315,000. The level dollar decrease in monthly fees would be \$19 (\$315,000 ÷ 4.03735 × 12 × 350 residents). If the average monthly fee in the first year was \$664, the appropriate monthly fee in the second year would be \$711. This amount equals the initial fees increased for an assumed inflation rate of 10 percent (\$730) and reduced by the amortization amount (\$19).

The same procedure is used to determine the amortization amount in future years. Although Table 8–7 did not reflect changes in the unfunded liability due to any fee changes made to amortize prior years' gains and losses, the actuarial deviations given in column 8 would have been the same if annual fee adjustments had been applied. Table 8–8 compares average monthly fees under baseline assumptions with those required to eliminate the actuarial deviations shown in Table 8–7. Columns 2 and 3 present, respectively, the average monthly fees for the baseline assumptions and the percentage increase in fees. Columns 4 through 8 show fee changes (supplemental fees) for amortizing each year's actuarial gain or loss. The average monthly fees incorporating the amortization of experience deviations, which are the sum of baseline fees plus supplemental fees, are presented in column 9. For example, the average monthly fees in 1986 are \$883 − \$19 + \$3 + \$27, for a total of \$894.

TABLE 8–8

Average Monthly Fees under Baseline Assumptions and Supplemental Monthly Fees to Amortize Financial Gains and Losses

Fiscal year January 1,	Baseline monthly fee	Percent change	Supplemental fees adjustments beginning in fiscal year: 1984	1985	1986	1987	1988	Baseline monthly fee plus supplemental fees	Percent change
1983	$ 664	—	—	—	—	—	—	$ 664	—
1984	730	10.0%	$(19)	—	—	—	—	711	7.1%
1985	803	10.0	(19)	$3	—	—	—	787	10.7
1986	883	10.0	(19)	3	$27	—	—	894	13.6
1987	972	10.0	(19)	3	27	$(15)	—	968	8.3
1988	1,069	10.0	(19)	3	27	(15)	($5)	1,060	9.5

This approach may seem somewhat cumbersome at first, due to the need to continually track remaining adjustments to amortize prior years' gains and losses; however, monthly fees should be combined as one fee when presented to residents. The separation is merely for management purposes, enabling it to set fees in a consistent and equitable fashion.

Buffer Fund Method. This approach actuarially estimates the potential variation in actuarial reserves (PVFE − PVFR) and the corresponding fee increases required to cover the variation associated with unfavorable experience. The buffer fund should cover risks associated with the misestimation of assumptions and with random deviations from the underlying assumptions. The liability values are selected so that the expectation of cumulative deviations exceeding this amount is relatively small (e.g., less than 10 percent). This amount, referred to as the liability for contingencies, would be recorded in the fund balance component of a valuation statement (in our example, this component was omitted). Monthly fees are typically used to fund this additional liability.

Calculating the buffer fund (liability for contingencies) requires two separate tasks. The first task is to generate the liability for estimation risk. Its value is determined from the results of the sensitivity analysis. The difference between the actuarial reserves from the sensitivity analysis and the baseline actuarial reserves are weighted by a set of subjective probabilities representing the actuary's relative belief in their occurrence. The liability is set equal to the sum of the weighted differences. In the example given in Table 8–9, the weights are 10

TABLE 8–9
Liability for Contingencies

Estimation risk liability		$515,000		
Percentage increase in baseline PVFR		1.7%		
	Confidence level			
	75%	**90%**	**95%**	**99%**
Stochastic risk liability	$170,000	$260,000	$334,000	$506,000
Percentage increase in baseline PVFR	0.6%	0.9%	1.1%	1.7%

percent for the baseline valuation and 5 percent for the other experiments. The liability for estimation risk is $515,000. Monthly fees would have to be increased 1.7 percent ($515,000 ÷ $30,571,000) to fund this liability.

Calculating the stochastic liability requires that the potential variation in mortality, morbidity, inflation, and interest be analyzed. The stochastic risk liability presented in this chapter does not include inflation and interest variations. The risk associated with variations in inflation is minimal if both monthly fees and expenses are assumed to increase with inflation. This results in offsetting effects on the actuarial reserve and creates a sort of immunization of the community against inflation rate changes.[7] With regard to interest rate variation, the sensitivity analysis indicated that the actuarial reserves were relatively insensitive to interest rate changes. This fact, coupled with the difficulty of modeling future interest rates, indicates that a calculation of interest rate variation would be of minimal value.

The approach for determining the liability for stochastic risk requires that the distribution of the actuarial reserve for *current* residents be generated for the period over which the liability will be recalculated (five years in this case). The variation in this amount is compared to the expected difference between the PVFR and the PVFE for the same period. The value recorded on the valuation statement would be based on a specific probability that unfavorable experience will exceed that amount. The lower section of Table 8–9 contains stochastic buffer funds for the 75th, 90th, 95th, and 99th percentiles. The necessary increase in monthly fees to cover this liability is determined by dividing the liability by the PVFR. For example, the 99th percentile value would also be covered by a 1.7 percent ($506,000 ÷ $30,571,000) increase in monthly fees. New entrants' fees would also fund their respective liability for stochastic risk, an amount that would be added to the buffer fund in future years.

Fees would be increased for inflation under this approach, and periodically (i.e., every three to five years) the value of the buffer fund would be recalculated, with fees being adjusted to reflect the cumulative change. An alternative method for determining the recalculation of the buffer fund is to set a corridor such that if the buffer fund falls below a specific level, it would be recalculated at that time and fees increased to bring it up to the appropriate level. This approach (as opposed to predetermined periodic evaluations) allows management to react more rapidly to trends away from the underlying assumptions.[8]

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[7] There is a risk that annual projections for inflation may be inaccurate and, therefore, that the immunization concept would not hold. The fee adjustments for this possibility should be covered by the estimation risk liability.

[8] The above description is based on a closed-group concept that strives to maintain entrant group equity. The stochastic risk liability calculated on an open-group basis will generate smaller values for this liability. By pooling the risk among several communities on an open-group basis, it may be possible to minimize the potential liability and effect a type of reinsurance scheme. The development of such a procedure is beyond the scope of this chapter.

Whenever the size of the buffer fund is reevaluated, the community's past experience with regard to mortality, morbidity, interest, and inflation should also be examined and used to adjust prior assumptions.

Summary

Actuarial valuations are the key component of the pricing methodology for CCRCs. Even if management initially charged fees that were in actuarial balance, it is not likely that these fees would remain in actuarial balance in future years since experience would deviate from the underlying assumptions. In order to avoid financial difficulties due to unfavorable experience deviations, an actuarial valuation generates the information needed by management to make appropriate fee changes.

In the discussion of the actuarial valuation methodology, the authors analyzed the impact of changes in underlying assumptions. This sensitivity analysis provides management with an estimate of the relative importance of various assumptions and allows it to assess the potential shortfall between fees and expenses for assumptions that may not be credible and to factor that information into its financial decisions. The authors also developed several methods for determining the required fee adjustments if the community is not in actuarial balance (i.e., the community has an unfunded liability under current pricing policies). For the cases where the imbalance is associated with experience deviations, two approaches were discussed to amortize the resulting financial gain or loss.

The closed-group valuation methodology described in this chapter represents a logical extension of the new entrant pricing theory presented in Chapter 7. If management wishes to charge inflation-constrained monthly fees, then the actuarial theory presented in these two chapters provides the appropriate tools to accomplish this goal. It is desirable that all CCRCs be priced so that their long-term financial position is sound, and actuarial valuations, whether open- or closed-group, represent a tool that can help to achieve this objective. The choice between an open-group valuation and a closed-group valuation depends on the community's age, management's philosophy, and the opinion of the financial analyst. The authors' recommendation is that new or maturing CCRCs employ closed-group valuations, though the open-group method may be acceptable for mature communities. Moreover, an actuarial valuation should be performed at least once every three years, and preferably on an annual basis. ■