Continuing Care Retirement Communities
An Empirical, Financial, and Legal Analysis

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To our children:
Amanda, Cameron, & Tyler
and
Thandi & Sibongile

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University of Pennsylvania

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Appendix A

CCRC Universe (as of December 31, 1981)

Kirkwood by the River .................................................. Birmingham, Ala.
Mount Royal Towers, Inc. ................................................. Birmingham, Ala.
*Friendship Village ....................................................... Tempe, Ariz.
Orangewood Retirement Community ..................................... Phoenix, Ariz.
Aldersley, Inc. ................................................................. San Rafael, Calif.
The Alhambra ................................................................. Alhambra, Calif.
Brethren Hillcrest Homes, Inc. ........................................... La Verne, Calif.
Canterbury Woods ............................................................ Pacific Grove, Calif.
Carlsbad-by-the-Sea .......................................................... Carlsbad, Calif.
Carmel Valley Manor, Inc. .................................................. Carmel, Calif.
Casa Dorinda ................................................................. Montecito, Calif.
Channing House ............................................................... Palo Alto, Calif.
Covenant Village .............................................................. Turlock, Calif.
Forest Hill Manor .............................................................. Oakland, Calif.
Grand Lake Gardens .......................................................... Pacific Grove, Calif.
The Heritage ................................................................. San Francisco, Calif.
Lake Park Retirement Home ................................................ Oakland, Calif.
Los Gatos Meadows .............................................................. Los Gatos, Calif.
Mt. San Antonio Gardens ..................................................... Pomona, Calif.
Piedmont Gardens .............................................................. Oakland, Calif.
Pilgrim Haven ................................................................. Los Altos, Calif.
*Plymouth Village of Redlands ............................................. Redlands, Calif.
*Rosewood Retirement Community ....................................... Bakersfield, Calif.
Quaker Gardens ................................................................. Stanton, Calif.
Regents Point ................................................................. Irvine, Calif.
Royal Oaks Manor .............................................................. Duarte, Calif.
St. Paul’s Towers ............................................................... Oakland, Calif.
The Samarkand of Santa Barbara, Inc. .................................... Santa Barbara, Calif.
San Joaquin Gardens .......................................................... Fresno, Calif.
The Scripps Home ............................................................ Altadena, Calif.
The Sequoias—Portola Valley ............................................. Portola Valley, Calif.
The Sequoias—San Francisco ................................................ San Francisco, Calif.
*Solheim Lutheran Home .................................................... Los Angeles, Calif.
Sunny View Lutheran Home ................................................ Cupertino, Calif.
The Tamalpais ................................................................. Greenbrae, Calif.
The Valle Verde Retirement Center ....................................... Santa Barbara, Calif.
*White Sands of La Jolla ..................................................... La Jolla, Calif.
Windsor Manor ................................................................. Glendale, Calif.

Frasier Meadows Manor ..................................................... Boulder, Colo.
*Medalion Retirement Center .............................................. Colorado Springs, Colo.
*Medalion West ............................................................... Colorado Springs, Colo.

* = not included in data base for empirical analysis.
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Wesley Willows ........................................ Rockford, Ill.
*Westminster Place .................................... Evanston, Ill.

Altenheim Community ................................ Indianapolis, Ind.
Ashbury Towers .......................................... Greencastle, Ind.
The Four Seasons Retirement Center .................. Columbus, Ind.
*Franklin United Methodist Home ...................... Franklin, Ind.
*Friends’ Fellowship Community ....................... Richmond, Ind.
Hoosier Village Retirement Center ................... Indianapolis, Ind.
Topsheld Terrace Retirement Community ............. South Bend, Ind.
The Towne House ....................................... Fort Wayne, Ind.
United Methodist Memorial Home ..................... Warren, Ind.

Calvin Manor ............................................ Des Moines, Iowa
*Cedar Falls Lutheran Church ........................ Cedar Falls, Iowa
Heritage House ......................................... Atlantic, Iowa
Meth-Wick Manor ....................................... Cedar Rapids, Iowa
Northcrest Community ................................ Ames, Iowa
*Osknoll Retirement Residence ....................... Iowa City, Iowa
Ridgcrest Retirement Village .......................... Davenport, Iowa
United Presbyterian Home ............................. Washington, Iowa
Valley View Village .................................... Des Moines, Iowa

Wesley Acres .......................................... Des Moines, Iowa

*Aldersgate Village .................................... Topeka, Kans.
Arkansas City Presbyterian Manor .................... Arkansas City, Kans.
Brewster Place .......................................... Topeka, Kans.
Lakeview Village ....................................... Lenexa, Kans.
Lawrence Presbyterian Manor ......................... Lawrence, Kans.
Presbyterian Manor of Kansas City .................... Kansas City, Kans.
Salina Presbyterian Manor, Inc. ...................... Salina, Kans.
Sterling Presbyterian Manor .......................... Sterling, Kans.
Wesley Towers, Inc. .................................... Hutchinson, Kans.
Wichita Presbyterian Manor ........................... Wichita, Kans.

*St. James Place ...................................... Baton Rouge, La.

*Asbury Methodist Home ............................... Gaithersburg, Md.
*Augsburg Lutheran Home ............................ Baltimore, Md.
*Broadmead ........................................... Sykesville, Md.
Friendship Village Kalamazoo ......................... Kalamazoo, Mich.
Glacier Hills ........................................... Ann Arbor, Mich.
Inter-City Christian Manor ........................... Allen Park, Mich.

Covenant Manor Retirement Community ............. Minneapolis, Minn.
Friendship Village of Bloomington ................... Bloomington, Minn.
Madonna Towers ....................................... Rochester, Minn.
Thorne-Crest Retirement Center ...................... Albert Lea, Minn.

The Charless Home .................................... St. Louis, Mo.
*Friendship Village of South County ................. St. Louis, Mo.
Friendship Village of West County .................. Chesterfield, Mo.
Fulton Presbyterian Manor ............................ Fulton, Mo.
John Knox Village ..................................... Lee’s Summit, Mo.
*John Knox Village East .......................................................... Higginsville, Mo.
*John Knox Village of the Ozarks ............................................. Waynesville, Mo.
*Presbyterian Manor at Farmington .......................................... Farmington, Mo.
Rolla Presbyterian Manor ....................................................... Rolla, Mo.
St. Louis Altenheim ................................................................ St. Louis, Mo.
Vista del Rio ............................................................................. Kansas City, Mo.

*Eastmont Towers ........................................................................... Lincoln, Neb.
Gateway Manor, Inc. ..................................................................... Lincoln, Neb.
Northfield Villa, Inc. ................................................................. Gering, Neb.
*Skyline Manor ........................................................................... Omaha, Neb.

Home for Aged Women .................................................................. Portsmouth, N.H.
Cadbury ......................................................................................... Cherry Hill, N.J.
Meadow Lakes ............................................................................ Princeton, N.J.
Medford Leas ................................................................................ Medford, N.J.
Navesink House ........................................................................... Red Bank, N.J.
Workmen’s Circle Home for the Aged ............................................. Elizabeth, N.J.

*El Castillo Retirement Residence ................................................ Santo Fe, N. Mex.
Landsun Homes, Inc. ..................................................................... Carlsbad, N. Mex.

J. W. Abernethy Center ............................................................... Newtown, N. C.
Carol Woods Retirement Community ............................................. Chapel Hill, N. C.
*Carolina Village ........................................................................... Hendersonville, N. C.
*Episcopal Home for the Aging ...................................................... Southern Pines, N. C.
The Methodist Home .................................................................... Charlotte, N. C.
*Moravian Home, Inc. ................................................................. Winston-Salem, N. C.
The Presbyterian Home, Inc. ......................................................... High Point, N. C.
*The Presbyterian Home at Charlotte ........................................... Charlotte, N. C.

Bethesda Scarlet Oaks Retirement Community ......................... Cincinnati, Ohio
Breckenridge Village ................................................................... Willoughby, Ohio
Copeland Oaks ............................................................................. Sebring, Ohio
Dorothy Love Retirement Community ......................................... Sidney, Ohio
*First Community Village ............................................................. Columbus, Ohio
*Friends Care Center of Yellow Springs ....................................... Yellow Springs, Ohio
Friendship Village of Columbus .................................................. Columbus, Ohio
*Friendship Village of Dayton ....................................................... Dayton, Ohio
Friendship Village of Dublin ........................................................ Dublin, Ohio
*Hill View Retirement Center ........................................................ Portsmouth, Ohio
Judson Park .................................................................................. Cleveland Heights, Ohio
Maple Knoll Village .................................................................... Springdale, Ohio
The Marjorie P. Lee Home ............................................................. Cincinnati, Ohio
Methodist Home on College Hill .................................................. Cincinnati, Ohio
Otterbein Home .......................................................................... Lebanon, Ohio
Mt. Pleasant Retirement Village .................................................. Monroe, Ohio
Park Vista Presbyterian Home ...................................................... Youngstown, Ohio
Portage Valley Retirement Village ............................................. Pemberville, Ohio
Rockynol ....................................................................................... Akron, Ohio
*Trinity Home ................................................................................. Dayton, Ohio
Wesley Glen, Inc. ........................................................................... Columbus, Ohio
Westminster Thurber Community ................................................ Columbus, Ohio

Oklahoma Christian Home/Apartments ........................................ Edmond, Okla.
Cascade Manor ............................................................................. Eugene, Ore.
Friendsview Manor ...................................................................... Newberg, Ore.
Holladay Park Plaza ................................................................. Portland, Ore.
Rogue Valley Manor, Inc. ............................................................ Medford, Ore.
*Rose Villa, Inc. ............................................................................ Portland, Ore.
*Willamette View Manor ............................................................. Portland, Ore.
Bayou Manor
Houston, Tex.

Masonic Home of Hermitage
Alexandria, Va.

Friendship Village of South Hill
Upper St. Clair, Pa.

Green Ridge Village
Dillsburg, Pa.

Gwynedd Estates
Springhouse, Pa.

*Heritage Towers
Doylestown, Pa.

Kendal at Longwood
Kennett Square, Pa.

*Lima Estates
Lima, Pa.

*Martin’s Run
Marple Township, Pa.

Messiah Village
Mechanicsburg, Pa.

Paul’s Run

Pennswood Village, Inc.
Newtown, Pa.

Philadelphia Protestant Home

Pine Run
Doylestown, Pa.

Rosemont Presbyterian Village
Rosemont, Pa.

Rydal Park
Rydal, Pa.

Sarah A. Reed Home—Retirement Center
Erie, Pa.

*Sherwood Oaks
Wexford, Pa.

*Simpson House

Southampton Estates
Southampton, Pa.

Spring House Estates
Springhouse, Pa.

*Springfield Retirement Residence
Wyndmoor, Pa.

The Village at St. Barnabas
Gibsonia, Pa.

*Wood River Village
Bensalem, Pa.

McKendree Manor, Inc.
Hermitage, Tenn.

*Shannondale
Knoxville, Tenn.

The Trezevant Episcopal Home
Memphis, Tenn.

*Bayou Manor
Houston, Tex.

*The Hallmark
Houston, Tex.

*John Knox Village of Metroplex
Denton, Tex.

John Knox Village of the Rio Grand Valley
Weslaco, Tex.

John Knox Village of West Texas
Lubbock, Tex.

Presbyterian Village North, Inc.
Dallas, Tex.

*Westminster Manor
Austin, Tex.

Goodwin House
Alexandria, Va.

Hermitage Home of Richmond
Richmond, Va.

*Hermitage in Northern Virginia
Alexandria, Va.

*Hermitage on the Eastern Shore
Onancock, Va.

Lakewood Manor
Richmond, Va.

*Masonic Home of Virginia
Richmond, Va.

United Methodist Home in Roanoke
Roanoke, Va.

Virginia Baptist Homes—Culpeper
Culpeper, Va.

Westminster Canterbury Corporation
Richmond, Va.

Westminster—Canterbury in Virginia Beach
Virginia Beach, Va.

Westminster—Canterbury of Lynchburg, Inc.
Lynchburg, Va.

Bayview Manor
Seattle, Wash.

Covenant Shores, Inc.
Mercer Island, Wash.

The Frank Tobey Jones Home
Tacoma, Wash.

The Hearthstone
Seattle, Wash.

Horizon House, Inc.
Seattle, Wash.
*Judson Park Retirement Residence .................. Seattle, Wash.
Riverview Terrace.................................. Spokane, Wash.
Alexian Village of Milwaukee ...................... Milwaukee, Wis.
Evergreen Manor, Inc. .............................. Oshkosh, Wis.
Fairhaven Corporation .............................. Whitewater, Wis.
*Friendship Village of Milwaukee .................. Milwaukee, Wis.
Methodist Manor, Inc. ............................... West Allis, Wis.
Milwaukee Catholic Home, Inc. .................... Milwaukee, Wis.
Milwaukee Protestant Home for the Aged ............ Milwaukee, Wis.
St. John’s Home of Milwaukee ...................... Milwaukee, Wis.
Tudor Oaks Retirement Community .................. Hales Corners, Wis.
Appendix B  
Actuarial Assumptions

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<td>—</td>
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<td>89.9</td>
<td>—</td>
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<td>34.7</td>
<td>97.5</td>
<td>—</td>
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<td>109</td>
<td>26.3</td>
<td>36.3</td>
<td>100.0</td>
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<tr>
<td>110</td>
<td>100.0</td>
<td>100.0</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
### TABLE B–IC

**Morbidity Rates for Illustrative Financial Analyses**  
*rates per 100 residents*

<table>
<thead>
<tr>
<th>Age</th>
<th>Female Permanent transfer morbidity rates</th>
<th>Male Permanent transfer morbidity rates</th>
<th>Female Temporary transfer morbidity rates</th>
<th>Male Temporary transfer morbidity rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>0.9 transfers</td>
<td>1.2 transfers</td>
<td>400 days</td>
<td>0 days</td>
</tr>
<tr>
<td>66</td>
<td>1.0</td>
<td>1.3</td>
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<td>67</td>
<td>1.1</td>
<td>1.4</td>
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<tr>
<td>68</td>
<td>1.2</td>
<td>1.6</td>
<td>700</td>
<td>0</td>
</tr>
<tr>
<td>69</td>
<td>1.3</td>
<td>1.7</td>
<td>800</td>
<td>100</td>
</tr>
<tr>
<td>70</td>
<td>1.4</td>
<td>1.8</td>
<td>900</td>
<td>200</td>
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<td>71</td>
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<td>1,000</td>
<td>300</td>
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<td>73</td>
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<td>1,200</td>
<td>500</td>
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<td>74</td>
<td>2.2</td>
<td>2.6</td>
<td>1,300</td>
<td>600</td>
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<td>75</td>
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<td>78</td>
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<td>3.7</td>
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<td>4.1</td>
<td>1,800</td>
<td>1,100</td>
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<tr>
<td>80</td>
<td>4.6</td>
<td>4.5</td>
<td>1,900</td>
<td>1,200</td>
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<td>81</td>
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<td>82</td>
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<td>1,400</td>
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<td>83</td>
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<td>5.9</td>
<td>2,200</td>
<td>1,500</td>
</tr>
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<td>84</td>
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<td>6.5</td>
<td>2,300</td>
<td>1,600</td>
</tr>
<tr>
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<td>8.6</td>
<td>7.1</td>
<td>2,400</td>
<td>1,700</td>
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<td>86</td>
<td>9.7</td>
<td>7.8</td>
<td>2,500</td>
<td>1,800</td>
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<td>8.6</td>
<td>2,600</td>
<td>1,900</td>
</tr>
<tr>
<td>88</td>
<td>12.3</td>
<td>9.5</td>
<td>2,700</td>
<td>2,000</td>
</tr>
<tr>
<td>89</td>
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<td>10.6</td>
<td>2,800</td>
<td>2,100</td>
</tr>
</tbody>
</table>
### Table B-1D
Morbidity Rates for Illustrative Financial Analyses
(rates per 100 residents)

<table>
<thead>
<tr>
<th>Age</th>
<th>Permanent transfer morbidity rates</th>
<th>Temporary transfer morbidity rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female transfers</td>
<td>Male transfers</td>
</tr>
<tr>
<td>90</td>
<td>15.2 transfers</td>
<td>11.8 transfers</td>
</tr>
<tr>
<td>91</td>
<td>16.7</td>
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<td>93</td>
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<td>16.2</td>
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### Table B-2
New Entrant Assumptions for Illustrative Financial Analyses

<table>
<thead>
<tr>
<th>Assumption</th>
<th>Female</th>
<th>Male</th>
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<tbody>
<tr>
<td>Entry age distribution:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64 and younger</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>65–74</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>75–84</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>85 and older</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Average</td>
<td>77 years</td>
<td>77 years</td>
</tr>
<tr>
<td>Gender distribution:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single entrants</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>Paired entrants (percent same sex)</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Double-occupancy percentage:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studio</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>One bedroom</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Two bedrooms</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

* These assumptions are applied to all entrants after the initial move-in of first generation.
### TABLE B-3

**Economic Assumptions for Illustrative Financial Analyses***

<table>
<thead>
<tr>
<th>Time period</th>
<th>Inflation rates</th>
<th>Interest rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term rates:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>1984</td>
<td>10%</td>
<td>12</td>
</tr>
<tr>
<td>1985</td>
<td>10%</td>
<td>12</td>
</tr>
<tr>
<td>1986</td>
<td>10%</td>
<td>12</td>
</tr>
<tr>
<td>1987</td>
<td>10%</td>
<td>12</td>
</tr>
<tr>
<td>Long-term rates:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1988 and thereafter</td>
<td>10%</td>
<td>12%</td>
</tr>
</tbody>
</table>

* Format of this table is used to illustrate that short-term assumptions could differ from long-term assumptions.
Expense and Valuation Assumptions

EXPENSE ASSUMPTIONS

The four steps required to develop expense assumptions are: (1) defining expense items and their aggregate values for the initial year; (2) projecting aggregate expenses for at least as many years as the difference between the age of the youngest resident and the assumed end of the human life span; (3) defining expense allocation factors that specify the portion of each aggregate expense allocated to the apartment center versus the health care center, the portion of each cost center expense allocated on a per capita (per person) basis versus a per unit (square footage) basis, and the number of residents over whom each expense is to be shared; and (4) specifying annual expenses by living status for an individual resident.

Table C–1 contains the base year assumptions for eight operating expense categories and six capital expense categories. These values were derived from projected expenses for three similar communities whose first full year of operation begins in 1983. This facility is assumed to contain 295 apartment units and 60 health care beds. The notes to Table C–1 describe the assumptions used to calculate actuarial expenses for fixed assets. These assumptions result in total actuarial expenses for the base year of approximately $5 million.

Tables C–2 and C–3 contain the expense allocation assumptions used to determine the proportion of each expense category allocated to individual residents. Table C–3 presents the allocation assumptions that define the amount of each expense category allocated between the apartment center and the health care center. For example, 85 percent of the $451,000 administrative expenses in the base year, or $383,350, is allocated to the apartment center, and 15 percent, or $67,650, is allocated to the health care center. Table C–3 presents the allocation assumptions that specify the portion of each expense estimated to vary as the number of residents changes (per capita allocation) and the
portion that does not vary as the number of residents changes (per unit allocation).\(^1\) Apartment center expenses that are allocated on a per unit basis are assumed to be shared among 280 units (95 percent occupancy) consisting of three types: studio, one-bedroom, and two-bedroom. The relative sizes of the units follow a ratio of 1 to 1.5 to 2, and the percentage mix of unit types is 20 percent studio, 60 percent one-bedroom, and 20 percent two-bedroom. By way of example, the per unit allocations imply that residents of studio apartments will be allocated 13 percent of the apartment per unit expenses, residents of one-bedroom apartments will be allocated 60 percent, and residents of two-bedroom apartments will be allocated 27 percent.

\(^1\) The apartment center per capita expenses are assumed to be shared among 350 residents (1.25 residents per occupied apartment). The health care center expenses are also allocated on a per capita basis over 57 residents (95 percent occupancy). Any portion of the health care center expenses that would be allocated on a per unit basis would be the same as per capita because all health care beds are assumed to occupy the same square footage.
### TABLE C-1

**Base Year Expense Assumptions for Actuarial Liability Calculation**

<table>
<thead>
<tr>
<th>Operating expenses:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>$451,000</td>
</tr>
<tr>
<td>Food service</td>
<td>568,000</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>196,000</td>
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<tr>
<td>Maintenance</td>
<td>249,000</td>
</tr>
<tr>
<td>Utilities</td>
<td>374,000</td>
</tr>
<tr>
<td>Nursing care</td>
<td>584,950</td>
</tr>
<tr>
<td>Resident services</td>
<td>125,000</td>
</tr>
<tr>
<td>Taxes and insurance</td>
<td>80,000</td>
</tr>
<tr>
<td><strong>Total operating expenses</strong></td>
<td>2,627,950</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capital expenses:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Building</td>
<td>1,624,602</td>
</tr>
<tr>
<td>Land</td>
<td>60,000</td>
</tr>
<tr>
<td>Original equipment and furnishings</td>
<td>189,626</td>
</tr>
<tr>
<td>Equipment and furnishings replacement</td>
<td>18,963</td>
</tr>
<tr>
<td>Refurbishments</td>
<td>17,930</td>
</tr>
<tr>
<td>Original start-up costs</td>
<td>406,151</td>
</tr>
<tr>
<td><strong>Total capital expenses</strong></td>
<td>2,317,272</td>
</tr>
</tbody>
</table>

| Total expenses                          | $4,945,222 |

**Notes:**

1. Interest rate used to expense all fixed assets is 12 percent.
2. Building cost is assumed to be $15 million: with an assumed useful lifetime equal to 40 years.
3. Cost of land was $500,000; actuarial methodology treats land expense as a perpetuity. (Since land is assumed to have an infinite useful lifetime, the actuarial expensing methodology implies that the proper expense for land should last forever.)
4. Cost of fully equipping and furnishing the facility is $1,200,000; these short-term assets are assumed to have an average useful lifetime equal to 10 years.
5. Equipment and furnishings replacement expenditures are assumed to be $120,000 ($1,200,000 / 10) initially and are increased by 10 percent annually. These expenditures are expensed over 10 years, and future expenses will be added to the initial value, generating a 10-year layer of expense for each calendar year.
6. The initial refurbishment expenditure is equal to 1 percent of the building cost, $150,000, and is assumed to increase 10 percent annually. The annual expenditures are expensed over 20 years, and future expenses will be added to the preceding year's expense, generating a 20-year layer of expense for each calendar year.
7. Original start-up costs include architects' fees, legal fees, marketing costs, development fees, sewer construction, and financing costs, which are assumed to be 25 percent of the construction cost, or $3,750,000; these costs are expensed over the assumed useful lifetime of the facility (40 years).
### TABLE C-2
Expense Allocation Factors for Apartment and Health Care Cost Centers

<table>
<thead>
<tr>
<th>Allocation percentage</th>
<th>Expense amount allocated to Apartment center</th>
<th>Expense amount allocated to Health care center</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating expenses:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative</td>
<td>85% 15%</td>
<td>$383,350</td>
</tr>
<tr>
<td>Food service</td>
<td>85 15</td>
<td>482,800</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>80 20</td>
<td>156,800</td>
</tr>
<tr>
<td>Maintenance</td>
<td>85 15</td>
<td>211,650</td>
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<tr>
<td>Utilities</td>
<td>85 15</td>
<td>317,900</td>
</tr>
<tr>
<td>Nursing care</td>
<td>0 100</td>
<td>0</td>
</tr>
<tr>
<td>Resident services</td>
<td>80 20</td>
<td>100,000</td>
</tr>
<tr>
<td>Taxes and insurance</td>
<td>85 15</td>
<td>68,000</td>
</tr>
<tr>
<td><strong>Total operating expenses</strong></td>
<td></td>
<td>1,720,500</td>
</tr>
</tbody>
</table>

| **Capital expenses:** |                                            |                                            |
| Building              | 85 15                                      | 1,380,912                                   | 243,690                                    |
| Land                  | 85 15                                      | 51,000                                      | 9,000                                      |
| Original equipment and furnishings | 65 35                                      | 123,257                                     | 66,369                                     |
| Equipment and furnishings replacement | 65 35                                      | 12,326                                      | 6,637                                      |
| Refurbishments        | 65 35                                      | 11,654                                      | 6,276                                      |
| Original start-up costs | 85 15                                      | 345,228                                     | 60,923                                     |
| **Total capital expenses** |                                        | 1,924,377                                   | 392,895                                    |
| **Total expenses**    |                                            | $3,644,877                                  | $1,300,345                                 |

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<table>
<thead>
<tr>
<th>Operating expenses:</th>
<th>Apartment center expense amount</th>
<th>Health care expense amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>60% 40% $230,010 $153,340 $67,650</td>
<td>67,650</td>
</tr>
<tr>
<td>Food service</td>
<td>100 0 482,800 0 85,200</td>
<td>85,200</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>40 60 62,720 94,080 37,350</td>
<td>37,350</td>
</tr>
<tr>
<td>Maintenance</td>
<td>20 80 42,330 169,320 37,350</td>
<td>37,350</td>
</tr>
<tr>
<td>Utilities</td>
<td>20 80 63,580 254,320</td>
<td>56,100</td>
</tr>
<tr>
<td>Nursing care</td>
<td>100 0 62,720 94,080 37,350</td>
<td>56,100</td>
</tr>
<tr>
<td>Resident services</td>
<td>100 0 100,000 0 25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Taxes and insurance</td>
<td>20 80 13,600 54,400 12,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Total operating expenses</td>
<td>995,040 725,460 907,450</td>
<td>907,450</td>
</tr>
</tbody>
</table>

| Capital expenses:                           |                                |                            |
|--------------------------------------------|                                |                            |
| Building                                   | 20 80 276,183 1,104,729 243,690|                            |
| Land                                       | 20 80 10,200 40,800 9,000       |                            |
| Original equipment and furnishings         | 20 80 24,651 98,606 66,369      |                            |
| Equipment and furnishings replacement      | 20 80 2,465 9,861 6,637         |                            |
| Refurbishments                             | 20 80 2,331 9,323 6,276         |                            |
| Original start-up costs                    | 20 80 69,046 276,182 60,923     |                            |
| Total capital expenses                     | 384,876 1,539,501 392,895       |                            |

Total expenses: $1,379,916 $2,264,961 $1,300,345
TABLE C-4
Valuation Assumptions

Occupancy distribution

<table>
<thead>
<tr>
<th></th>
<th>Occupied units</th>
<th>Residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td>One bedroom</td>
<td>168</td>
<td>210</td>
</tr>
<tr>
<td>Two bedrooms</td>
<td>56</td>
<td>84</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>280</strong></td>
<td><strong>350</strong></td>
</tr>
</tbody>
</table>

Fees as of January 1, 1983

<table>
<thead>
<tr>
<th></th>
<th>Entry fees</th>
<th>Monthly fees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One person</td>
<td>Two persons</td>
</tr>
<tr>
<td>Studio</td>
<td>$40,781</td>
<td>$659</td>
</tr>
<tr>
<td>One bedroom</td>
<td>52,129</td>
<td>$72,512</td>
</tr>
<tr>
<td>Two bedrooms</td>
<td>63,475</td>
<td>85,901</td>
</tr>
</tbody>
</table>

Average age of residents: 77.0 years
Percentage female: 75.7%
Revenue and expense inflation rate: 10%
Interest discount rate: 12%
Mortgage interest rate: 12%

TABLE C-5
Statement of Estimated Uses and Sources of Funds

Uses of funds:
- Construction: $15,000,000
- Land: 500,000
- Equipment: 1,200,000
- Contingency: 500,000
- Working capital: 700,000

Start-up:
- Architect: $750,000
- Sewer: 350,000
- Development: 300,000
- Marketing: 1,000,000
- Legal: 375,000
- Financing: 975,000
- Debt service reserve: 1,800,000
- Funded interest: 3,150,000

Total uses of funds: $26,600,000

Sources of funds:
- Debt: $15,000,000
- Entry fees*: $11,600,000

Total sources of funds: $26,600,000

* Total entry fees received are $16,079,917.
Appendix D

Technical Description of Actuarial Pricing Methodology

METHODOLOGY FOR DETERMINING ACTUARIAL LIABILITIES AND FEES

The purpose of this appendix is to present the technical details of the methodology used to determine actuarial liabilities and corresponding fees for funding those liabilities. This methodology was used to generate the numerical values presented in Chapters 7 and 8. The discussion begins with the basic pricing equation that equates monthly fee revenues and entry fee earnings with expenses. This equation is modified to incorporate the time value of money (present values), probability of survival, and health care cost differentials. The final result is a generalized pricing equation that can be used to develop actuarial liabilities for a specific set of demographic (age, sex, health status), contractual (limited or extensive health care guarantee and alternative refund provisions), accounting policy (per capita and per unit allocations and timing of capital expenses), and economic (inflation and interest) assumptions, as well as to determine various fee setting methods under alternative pricing philosophies that may or may not vary fees on some or all of the characteristics affecting costs.

Basic Pricing Equation

The fundamental pricing equation for any continuing care contract is that the revenues expected to be collected from a group of residents must equal their expected expenses. Not only must total revenues equal total expenses for the group, but annual revenues must also "match" annual expenses (in order to prevent intergroup subsidies). Algebraically, this equivalency can be represented by the following equation:

$$R_0 + R_1 + R_2 + \cdots = E_0 + E_1 + E_2 + \cdots$$
where

\[ R_t = \text{Expected revenues in year } t \]
\[ E_t = \text{Expected expenses in year } t \]

This formula, which will be referred to as the actuarial pricing equation, is the basis for developing a theoretically equitable and adequate pricing structure.

In order to introduce the “inflation-constrained increase in monthly fees” objective, the revenue (left-hand) side of the equation must be separated into two components. One is monthly fee revenues, and the other is the amortization of entry fees (or entry fee earnings).

\[
(MF_0 + EFE_0) + (MF_1 + EFE_1) + (MF_2 + EFE_2) + \cdots
= E_o + E_1 + E_2 + \cdots
\]

where

\[ MF_t = \text{Monthly fees during year } t \]
\[ EFE_t = \text{Entry fee earnings during year } t \]

Entry fee earnings represent the portion of the original entry fee plus interest on the unearned balance recognized as revenue each year. The inflation-constrained monthly fees increase objective implies that the maximum change in monthly fees in any one year is limited; hence, entry fee earnings must equal the difference between total expenses and monthly fee revenues for the cohort group of residents. This condition has an important impact both on the method by which entry fees are determined and on how they are earned on an income statement.

Figure D–1 presents the ideal relationship between expenses, monthly fees, and entry fee earnings. Expenses and monthly fees are assumed to increase by 10 percent annually for inflation, and all residents are assumed to live for 20 years.\(^1\) For purposes of this illustration, all values are given in terms of monthly fees that total to $1 annually, that is, monthly fees of $0.08 ($1 ÷ 12). In the first year, annual monthly fees are assumed to be $1 and expenses are assumed to be $1.20. By the end of 20 years, monthly fees (on an annual basis) are projected to increase to $6.73 and expenses to $8.07, reflecting 20 years of 10 percent inflation.

The amortization of entry fees, which are defined to be the difference between expenses and monthly fees, are also given in this graph. Initially, entry fee earnings are $0.20 ($1.20 − $1.00). By the end of 20 years, entry fee earnings are $1.34 ($8.07 − $6.73). In this example, these earnings increase at the same rate as expenses and monthly fees;

\(^1\) This unrealistic assumption is used at this point for pedagogic purposes. The assumption will be relaxed in further developments of the pricing structure.
Time Value of Money

Revenues and expenses for a group of continuing care contractholders are spread over a period of years. In order to equate the value of these future dollars, it is necessary to determine their value today. This requires that the "time value" of money be incorporated into the actuarial pricing equation. The time value of money reflects the fact that $1 today is worth more than $1 payable in the future since interest can be earned by investing today's dollar.

The actuarial pricing equation modified to reflect the time value of money is given below:

\[
(MF_0 v_0 + EFE_1 v_1) + (MF_1 v_1 + EFE_1 v_1) + \cdots = E_0 v_0 + E_1 v_1 + E_2 v_2 + \cdots
\]

where

\[v_t = \text{Present value of } \$1 \text{ promised in } t \text{ years}\]

\[E_{t}\] The correct method for earning entry fees is a major point of controversy for the financial statements used by CCRCs. The manner in which entry fees should be earned bears a direct relationship to the philosophy used to establish fees. Since there is no universally accepted philosophy for determining fees, there is no one entry fee earnings schedule that is correct for all communities.
By way of example, assume that money invested today earns 12 percent interest compounded annually. Column 2 of Table D-1 contains the present value of $1 payable in future years. The present value of $1 today is $1. The present value of $1 promised at year 1 is $0.89. In other words, if one invested $0.89 in a fund that yields 12 percent per year, the original investment would accumulate to $1 at the end of one year. Similarly, $1 promised at year 4 has a present value of $0.64; the present value of $1 at year 19 is $0.12; and so forth.

Table D-1 applies these present values to discount the projected annual expenses and revenues, both of which are assumed to increase by 10 percent inflation, as shown previously in Figure D-1. Column 3 shows the projected annual expense, and column 4 gives the present value of those expenses (i.e., column 2 times column 3). The present value of future expense is $1.12 at year 4, while at year 9 the present value is $1.02. The sum of the present value of future expenses over the 20 years is $20.33. The present value of future monthly fees and entry fee earnings is given in columns 6 and 8, respectively.

Entry fee earnings, equal to the difference between projected expenses and projected monthly fees, sum to $11.47. The present value of entry fee earnings is derived by subtracting the present value of monthly fees, $16.94, from the present value of future expenses, $20.33, and is equal to $3.39, one third of the sum of entry fee earnings.  

Probability of Survival

The preceding example was based on the assumption that all residents survived for 20 years. A more realistic scenario is that only a portion of the cohort will survive to each future year. In order to properly match expenses and revenues, these dollar payment streams must additionally be discounted for death. The survivors from a closed group of residents can be estimated by using an actuarial model, known as a life table, which specifies the probability of survival (or death) in each year.

In actuarial terminology, the probability of surviving to future years is specified by a 1 column, in which the "1" refers to the number of lives and the "x" refers to a specific age. By way of example, consider 100 females at age 75. Table D-2 shows the expected number of survivors from this group over the next 20 years. These probabilities were developed from the mortality assumptions presented in Appendix B.
### TABLE D-1
Calculation of Interest-Discounted Expenses and Revenues

<table>
<thead>
<tr>
<th>Year t</th>
<th>Present value of $1 promised in year t</th>
<th>Projected expenses</th>
<th>Interest-discounted expenses</th>
<th>Projected monthly fees</th>
<th>Interest-discounted monthly fees</th>
<th>Projected entry fee earnings</th>
<th>Interest-discounted entry fee earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.00000</td>
<td>$ 1.20</td>
<td>$ 1.20</td>
<td>$ 1.00</td>
<td>$ 1.00</td>
<td>$ 0.20</td>
<td>$ 0.20</td>
</tr>
<tr>
<td>1</td>
<td>0.89286</td>
<td>1.32</td>
<td>1.18</td>
<td>1.10</td>
<td>0.98</td>
<td>0.22</td>
<td>0.20</td>
</tr>
<tr>
<td>2</td>
<td>0.79719</td>
<td>1.45</td>
<td>1.16</td>
<td>1.21</td>
<td>0.96</td>
<td>0.24</td>
<td>0.19</td>
</tr>
<tr>
<td>3</td>
<td>0.71178</td>
<td>1.60</td>
<td>1.14</td>
<td>1.33</td>
<td>0.95</td>
<td>0.27</td>
<td>0.19</td>
</tr>
<tr>
<td>4</td>
<td>0.63552</td>
<td>1.76</td>
<td>1.12</td>
<td>1.46</td>
<td>0.93</td>
<td>0.30</td>
<td>0.19</td>
</tr>
<tr>
<td>5</td>
<td>0.56743</td>
<td>1.93</td>
<td>1.10</td>
<td>1.61</td>
<td>0.91</td>
<td>0.32</td>
<td>0.18</td>
</tr>
<tr>
<td>6</td>
<td>0.50663</td>
<td>2.13</td>
<td>1.08</td>
<td>1.77</td>
<td>0.90</td>
<td>0.36</td>
<td>0.18</td>
</tr>
<tr>
<td>7</td>
<td>0.45235</td>
<td>2.34</td>
<td>1.06</td>
<td>1.95</td>
<td>0.88</td>
<td>0.39</td>
<td>0.18</td>
</tr>
<tr>
<td>8</td>
<td>0.40388</td>
<td>2.57</td>
<td>1.04</td>
<td>2.14</td>
<td>0.87</td>
<td>0.43</td>
<td>0.17</td>
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<td>9</td>
<td>0.36061</td>
<td>2.83</td>
<td>1.02</td>
<td>2.36</td>
<td>0.85</td>
<td>0.47</td>
<td>0.17</td>
</tr>
<tr>
<td>10</td>
<td>0.32197</td>
<td>3.11</td>
<td>1.00</td>
<td>2.59</td>
<td>0.84</td>
<td>0.52</td>
<td>0.17</td>
</tr>
<tr>
<td>11</td>
<td>0.28748</td>
<td>3.42</td>
<td>0.98</td>
<td>2.85</td>
<td>0.82</td>
<td>0.57</td>
<td>0.16</td>
</tr>
<tr>
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<td>0.25668</td>
<td>3.77</td>
<td>0.97</td>
<td>3.14</td>
<td>0.81</td>
<td>0.63</td>
<td>0.16</td>
</tr>
<tr>
<td>13</td>
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<td>4.14</td>
<td>0.95</td>
<td>3.45</td>
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<td>0.69</td>
<td>0.16</td>
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<td>4.56</td>
<td>0.93</td>
<td>3.80</td>
<td>0.78</td>
<td>0.76</td>
<td>0.16</td>
</tr>
<tr>
<td>15</td>
<td>0.18270</td>
<td>5.01</td>
<td>0.92</td>
<td>4.18</td>
<td>0.76</td>
<td>0.84</td>
<td>0.15</td>
</tr>
<tr>
<td>16</td>
<td>0.16312</td>
<td>5.51</td>
<td>0.90</td>
<td>4.59</td>
<td>0.75</td>
<td>0.92</td>
<td>0.15</td>
</tr>
<tr>
<td>17</td>
<td>0.14564</td>
<td>6.07</td>
<td>0.88</td>
<td>5.05</td>
<td>0.74</td>
<td>1.01</td>
<td>0.15</td>
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<td>18</td>
<td>0.13004</td>
<td>6.67</td>
<td>0.87</td>
<td>5.56</td>
<td>0.72</td>
<td>1.11</td>
<td>0.14</td>
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<tr>
<td>19</td>
<td>0.11611</td>
<td>7.34</td>
<td>0.85</td>
<td>6.12</td>
<td>0.71</td>
<td>1.22</td>
<td>0.14</td>
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<tr>
<td>Sum*</td>
<td>8.36578</td>
<td>$68.73</td>
<td>$20.33</td>
<td>$57.26</td>
<td>$16.94</td>
<td>$11.47</td>
<td>$3.39</td>
</tr>
</tbody>
</table>

* Some columns may not sum exactly due to rounding errors.
**TABLE D-2**

Discounting Expenses and Revenues for the Probability of Survival

<table>
<thead>
<tr>
<th>Year</th>
<th>Age x</th>
<th>Number of survivors to age x</th>
<th>Probability of survival to age x</th>
<th>Survival-discounted expenses</th>
<th>Survival-discounted monthly fees</th>
<th>Survival-discounted entry fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>75</td>
<td>100.000</td>
<td>1.00000</td>
<td>$1.20</td>
<td>$1.00</td>
<td>$0.20</td>
</tr>
<tr>
<td>1</td>
<td>76</td>
<td>98.697</td>
<td>.98697</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>77</td>
<td>97.147</td>
<td>.97147</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>78</td>
<td>95.307</td>
<td>.95307</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>79</td>
<td>93.130</td>
<td>.93130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>80</td>
<td>90.563</td>
<td>.90563</td>
<td>1.75</td>
<td>1.46</td>
<td>0.29</td>
</tr>
<tr>
<td>6</td>
<td>81</td>
<td>87.551</td>
<td>.87551</td>
<td>1.86</td>
<td>1.55</td>
<td>0.31</td>
</tr>
<tr>
<td>7</td>
<td>82</td>
<td>84.053</td>
<td>.84053</td>
<td>1.97</td>
<td>1.64</td>
<td>0.33</td>
</tr>
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<td>8</td>
<td>83</td>
<td>80.028</td>
<td>.80028</td>
<td>2.06</td>
<td>1.72</td>
<td>0.34</td>
</tr>
<tr>
<td>9</td>
<td>84</td>
<td>75.453</td>
<td>.75453</td>
<td>2.13</td>
<td>1.78</td>
<td>0.36</td>
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<td>.70318</td>
<td>2.19</td>
<td>1.82</td>
<td>0.36</td>
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<td>12</td>
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<td>1.79</td>
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<td>1.71</td>
<td>0.34</td>
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<td>15</td>
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<td>38.188</td>
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<td>1.91</td>
<td>1.60</td>
<td>0.32</td>
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<tr>
<td>16</td>
<td>91</td>
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<td>.31526</td>
<td>1.74</td>
<td>1.45</td>
<td>0.29</td>
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<td>0.26</td>
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<td>1.32</td>
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<td>19</td>
<td>94</td>
<td>15.041</td>
<td>.15041</td>
<td>1.10</td>
<td>0.92</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Sum*  
1,357.948  
13.57948  
$38.82  
$32.35  
$6.47

* The sums are based on projections to age 110.

98.697% of the original 100 females are expected to survive to age 76. This indicates that the probability of survival for one year is 98.7 percent for a female age 75. The probability of surviving two years is 97.1 percent. Other probabilities are determined by dividing the number of survivors at a given time by the initial number of residents.

Taking the probability of survival into consideration, the basic pricing formula now becomes:

$$(MF_0v_0p_0 + EFE_0v_0p_0) + (MF_1v_1p_1 + EFE_1v_1p_1) + \cdots = E_0v_0p_0 + E_1p_1p_1 + E_2v_2p_2$$

5 Fractional deaths are used to make precise actuarial calculations, even though in real-life situations only whole numbers of persons survive.

6 The projected number of survivors extends past the 20 years presented in this table. In deriving fees, actuarial projections of survivors are extended to the assumed end of the human life span (in our example, this is age 110). The total number of years lived by the original group of residents is derived by summing the number of survivors over all future years and deducting one-half year per resident for the assumption that deaths occur midway through the year. This sum is 1,308 [1,358 (−½ × 100)]. The life expectancy is equal to the sum of years lived divided by the number of original residents, 13.1 (1,308 ÷ 100) years. Due to the characteristics of the mortality curve, the life expectancy, or mean of the death distribution, will approximately equal the median of that distribution. Hence, the life expectancy can be thought of as the maximum number of years that the survivors for a closed group will equal 50 percent of the original number.
where

\[ p_t = \text{Probability of surviving } t \text{ years} \]

Columns 5 through 7 of Table D–2 contain the survival-discounted value of expenses, monthly fees, and entry fees over the next 20 years, respectively. The sum of survival-discounted expenses to the end of the human life span (assumed to be 100) is $38.82. This amount represents, in today's dollars, the expenses for services provided to survivors from the current group of residents. The sum of the expected monthly fees and entry fees is $32.35 and $6.47, respectively. This table shows that even though the number of surviving residents decreases annually, their expenses increase for 11 years before declining.

**Health Care Cost Differential**

The preceding examples do not reflect the consequences of changes in the residents' living status during their stay in the community. Such changes have a significant impact on projecting future expenses. Typically, nursing care costs are 2 to 3 times greater than apartment costs. Therefore, in order to reflect properly the future costs of offering a continuing care contract, it is necessary to define the probability of survival by living status, and to adjust projected expenses to reflect changes in living status.

This projection can be made by using a multiple decrement model to estimate the future living status of survivors. This also means that the mortality assumptions used for pricing decisions must be differentiated by living status (i.e., apartment versus health care). In addition, morbidity (health care utilization) assumptions are required to estimate the probability of permanent transfer from the apartment center to the health care center and of temporary utilization of the health care center.

Figure D–2 shows the impact of higher health care costs. Health care center expenses are initially assumed to be twice apartment center expenses, and are assumed to increase 10 percent annually for inflation. The expected expense curve is weighted according to costs of living in the apartment center versus the health care center according to the relative probability of survival in each living status. For this example, however, neither the expense curve nor the revenue curve is discounted for survivorship. The monthly fee curve is the same as in Figure D–1 since monthly fees are not assumed to change with living status. However, both the expense curve and the entry fee earnings curve change substantially. The expense curve is found to increase faster than the underlying inflation assumption because of increasing expected health care utilization with its proportionately higher costs. The expense curve increases to $12.51 from $1.20 in 20 years—an
FIGURE D-2
Living Status Weighted Expense, Monthly Fee, and Entry Fee Earnings

average annual rate of 12 percent, or two percentage points more than the underlying inflation rate. (The example in Figure D–1 shows that total expenses increase to $8.07 in 20 years.)

Entry fee earnings also increase faster than inflation since they must equal the difference between expenses and monthly fees. Entry fee earnings start at $0.20 and increase to $5.78 in 20 years (compared to $1.35 in the Figure D–1 example), an average annual rate of 18 percent.

Table D–3 shows the results of a multiple decrement projection incorporating survival probabilities with living status cost differentials. Column 3 contains the number of surviving apartment residents; initially, this number is assumed to be 100. During the first year, 2,496 are expected to transfer permanently to the health care center (column 4), leaving 96,264 survivors in their apartments at the end of the year. The number of deaths in apartments, 1,240 residents, is equal to the original number of apartment residents minus the number of survivors at the end of the year plus the permanent transfers (this value is not given in the table). Of the 2,496 transfers to the health care center, 2,434 (column 5) are expected to live to the end of the year. In the first year, 1,337 residents are expected to die while residing in their apartments and 2,712 residents are expected to transfer permanently to the health care center. Hence, there are 92,215 apartment survivors at year 2 and 4,932 in the health care center. This sequence is continued for each successive year. At year 10 there are 70,318 surviving residents, 29.7
<table>
<thead>
<tr>
<th>Year t</th>
<th>Age x</th>
<th>Number of apartment residents</th>
<th>Number of permanent transfers</th>
<th>Number of health care residents</th>
<th>Survival-discounted apartment expenses</th>
<th>Survival-discounted health care expenses</th>
<th>Total survival-discounted expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>75</td>
<td>100.000</td>
<td>2.496</td>
<td>0.000</td>
<td>$ 1.20</td>
<td>$ 0.00</td>
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</tr>
<tr>
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<td>2.712</td>
<td>2.434</td>
<td>$ 1.27</td>
<td>$ 0.06</td>
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<td>$ 0.14</td>
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<td>16.793</td>
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<td>$ 0.79</td>
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<td>83</td>
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<td>18.579</td>
<td>$ 1.58</td>
<td>$ 0.96</td>
<td>$ 2.54</td>
</tr>
<tr>
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<td>84</td>
<td>55.473</td>
<td>4.134</td>
<td>19.980</td>
<td>$ 1.57</td>
<td>$ 1.13</td>
<td>$ 2.70</td>
</tr>
<tr>
<td>10</td>
<td>85</td>
<td>49.403</td>
<td>4.151</td>
<td>20.915</td>
<td>$ 1.54</td>
<td>$ 1.30</td>
<td>$ 2.84</td>
</tr>
<tr>
<td>11</td>
<td>86</td>
<td>43.323</td>
<td>4.102</td>
<td>21.315</td>
<td>$ 1.48</td>
<td>$ 1.46</td>
<td>$ 2.94</td>
</tr>
<tr>
<td>12</td>
<td>87</td>
<td>37.332</td>
<td>3.977</td>
<td>21.131</td>
<td>$ 1.41</td>
<td>$ 1.59</td>
<td>$ 3.00</td>
</tr>
<tr>
<td>13</td>
<td>88</td>
<td>31.538</td>
<td>3.767</td>
<td>20.348</td>
<td>$ 1.31</td>
<td>$ 1.69</td>
<td>$ 2.99</td>
</tr>
<tr>
<td>14</td>
<td>89</td>
<td>26.066</td>
<td>3.469</td>
<td>18.991</td>
<td>$ 1.19</td>
<td>$ 1.73</td>
<td>$ 2.92</td>
</tr>
<tr>
<td>15</td>
<td>90</td>
<td>21.041</td>
<td>3.095</td>
<td>17.147</td>
<td>$ 1.05</td>
<td>$ 1.72</td>
<td>$ 2.77</td>
</tr>
<tr>
<td>16</td>
<td>91</td>
<td>16.572</td>
<td>2.667</td>
<td>14.954</td>
<td>$ 0.91</td>
<td>$ 1.65</td>
<td>$ 2.56</td>
</tr>
<tr>
<td>17</td>
<td>92</td>
<td>12.732</td>
<td>2.218</td>
<td>12.589</td>
<td>$ 0.77</td>
<td>$ 1.53</td>
<td>$ 2.30</td>
</tr>
<tr>
<td>18</td>
<td>93</td>
<td>9.548</td>
<td>2.782</td>
<td>10.234</td>
<td>$ 0.64</td>
<td>$ 1.37</td>
<td>$ 2.00</td>
</tr>
<tr>
<td>19</td>
<td>94</td>
<td>6.997</td>
<td>1.387</td>
<td>8.044</td>
<td>$ 0.51</td>
<td>$ 1.18</td>
<td>$ 1.69</td>
</tr>
<tr>
<td>Sum*</td>
<td>1,064.675</td>
<td>293.274</td>
<td>$26.79</td>
<td>$24.05</td>
<td>$50.84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The sums are based on projections to age 110.

The probability of survival is shown in Table D–3. The survival-discounted revenues and expenses are calculated based on different apartment and health care center expenses. Column 6 contains the survival-discounted apartment expenses (initially assumed to be $1.20, increased by 10 percent per year). Column 7 contains survival-discounted health care expenses (health care expenses are twice projected apartment expenses). The total survival-discounted expenses, given in column 8, are the sum of columns 6 and 7.

Figure D–3 shows the relationship between survival-discounted expenses and revenues. It can be observed from this graph that expected expenses are at their highest value after 12 years, while monthly fee

---

Table D–3 also shows the development of survival-discounted expenses based on different apartment and health care center expenses. Column 6 contains the survival-discounted apartment expenses (these are initially assumed to be $1.20, increased by 10 percent per year). Column 7 contains survival-discounted health care expenses (health care expenses are twice projected apartment expenses). The total survival-discounted expenses, given in column 8, are the sum of columns 6 and 7.

It should be noted that apartment center mortality rates are significantly less than those for health care center residents. This may not be apparent from Table D–3 since the total number of health care residents increases for a period while apartment residents decrease. This is due to the fact that the number of permanent transfers to the health care center exceeds the number of deaths during the first 13 years.
revenues and entry fee earnings reach their highest levels in 11 and 14 years, respectively.  

Table D-4 shows the expected expenses and revenues discounted for both interest and the probability of survival, with expenses weighted according to the differential costs of apartment center versus health care center. This table shows that the present value of future expenses, based on expense projections and survival to the assumed end of the life span, is equal to $16.86, which is 33 percent ($16.86 ÷ $50.84) of projected expenses not discounted for interest. The present value of future monthly fees is $11.76, and the entry fee (the present value of entry fee earnings) must now be $5.11 to make up the difference. Hence, by incorporating interest discounts, probability of survival, and cost differentials, the true actuarial liability of a continuing care contract can be estimated. In other words, today’s value of expected expenses is $16.86, while the cash flow associated with those expenses will be 3 times more than the present value.

---

8 This graph also illustrates several key considerations in developing a theoretically sound methodology for earning entry fees. Under the proposed pricing philosophy, initially very small portions of the entry fees should be earned in order to match revenues with expenses correctly. Maximum entry fee earnings should occur some 10 to 12 years after entry into the community. Also, the earnings schedule should not be limited to a fixed time period, such as life expectancy, which is 13 years in this case, since expenses exceed monthly fees after that point.
TABLE D-4
Present Value of Future Expenses and Revenues Discounted for Interest and Survival

<table>
<thead>
<tr>
<th>Year t</th>
<th>Age x</th>
<th>Present value of expenses discounted for interest and survival</th>
<th>Present value of monthly fees discounted for interest and survival</th>
<th>Present value of entry fee earnings discounted for interest and survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>75</td>
<td>$ 1.20</td>
<td>$ 1.00</td>
<td>$ 0.20</td>
</tr>
<tr>
<td>1</td>
<td>76</td>
<td>1.19</td>
<td>0.97</td>
<td>0.22</td>
</tr>
<tr>
<td>2</td>
<td>77</td>
<td>1.18</td>
<td>0.94</td>
<td>0.24</td>
</tr>
<tr>
<td>3</td>
<td>78</td>
<td>1.17</td>
<td>0.90</td>
<td>0.27</td>
</tr>
<tr>
<td>4</td>
<td>79</td>
<td>1.15</td>
<td>0.87</td>
<td>0.28</td>
</tr>
<tr>
<td>5</td>
<td>80</td>
<td>1.13</td>
<td>0.83</td>
<td>0.28</td>
</tr>
<tr>
<td>6</td>
<td>81</td>
<td>1.10</td>
<td>0.79</td>
<td>0.32</td>
</tr>
<tr>
<td>7</td>
<td>82</td>
<td>1.07</td>
<td>0.74</td>
<td>0.33</td>
</tr>
<tr>
<td>8</td>
<td>83</td>
<td>1.02</td>
<td>0.69</td>
<td>0.33</td>
</tr>
<tr>
<td>9</td>
<td>84</td>
<td>0.97</td>
<td>0.64</td>
<td>0.33</td>
</tr>
<tr>
<td>10</td>
<td>85</td>
<td>0.91</td>
<td>0.59</td>
<td>0.33</td>
</tr>
<tr>
<td>11</td>
<td>86</td>
<td>0.85</td>
<td>0.53</td>
<td>0.32</td>
</tr>
<tr>
<td>12</td>
<td>87</td>
<td>0.77</td>
<td>0.47</td>
<td>0.30</td>
</tr>
<tr>
<td>13</td>
<td>88</td>
<td>0.69</td>
<td>0.41</td>
<td>0.28</td>
</tr>
<tr>
<td>14</td>
<td>89</td>
<td>0.60</td>
<td>0.35</td>
<td>0.25</td>
</tr>
<tr>
<td>15</td>
<td>90</td>
<td>0.51</td>
<td>0.29</td>
<td>0.22</td>
</tr>
<tr>
<td>16</td>
<td>91</td>
<td>0.42</td>
<td>0.24</td>
<td>0.18</td>
</tr>
<tr>
<td>17</td>
<td>92</td>
<td>0.33</td>
<td>0.19</td>
<td>0.15</td>
</tr>
<tr>
<td>18</td>
<td>93</td>
<td>0.26</td>
<td>0.14</td>
<td>0.12</td>
</tr>
<tr>
<td>19</td>
<td>94</td>
<td>0.20</td>
<td>0.11</td>
<td>0.09</td>
</tr>
<tr>
<td>Sum*</td>
<td></td>
<td>$16.86</td>
<td>$11.76</td>
<td>$5.11</td>
</tr>
</tbody>
</table>

* These sums are based on projections to age 110.

Generalized Actuarial Pricing Equation

The generalized actuarial pricing equation, incorporating interest discount, probability of surviving by living status, and living status cost differentials, is as follows:

\[
(MF_{0}\cdot v_{0}p_{0} + EFE_{0}\cdot v_{0}p_{0}) + (MF_{1}\cdot v_{1}p_{1} + EFE_{1}\cdot v_{1}p_{1}) + \cdots = (E_{a}\cdot v_{0}p_{0} + E_{b}\cdot v_{0}p_{0}) + (E_{a1}\cdot v_{1}p_{1} + E_{b1}\cdot v_{1}p_{1}) + \cdots \]

where

- \( p_{t} \) = Probability of being alive in year \( t \)
- \( p_{t}^a \) = Probability of residing in the apartment center in year \( t \)
- \( p_{t}^b \) = Probability of residing in the health care center in year \( t \)
- \( E_{a} \) = Apartment center expenses in year \( t \)
- \( E_{b} \) = Health care center expenses in year \( t \)

By regrouping values on the left-hand side of the generalized actuarial pricing equation, we get
The above equation is summarized as:

$$PVEF + PVMF = PVFE$$

or

$$PVFR = PVFE$$

where

- PVEF = Present value of entry fee earnings
- PVMF = Present value of monthly fees
- PVFE = Present value of future expenses
- PVFR = Present value of future revenues

Even though this formula appears to be somewhat complex, it is a straightforward extension of the initial actuarial pricing equation developed at the beginning of this appendix. With appropriate assumptions for determining expenses and revenues, this equation can be used to develop pricing structures that meet the pricing objectives set forth in Chapter 7. Other refinements to this general pricing equation include the development of probabilities for the temporary utilization of the health care center and the expenses associated with such utilization and the development of survival probabilities that vary by age, sex, number of occupants in a particular unit, and mortality improvements.
Appendix E

Illustrative CCRC Financial Statements

| Statements of Changes in Financial Position of Unrestricted Funds For the Years Ended March 31, 1981 and 1980 |
|---|---|
| | 1981 | 1980 |
| Sources of working capital: | | |
| Resident entry fees received | $1,202,400 | $1,432,150 |
| Increase (decrease) in advance deposits | (1,000) | 22,000 |
| Equipment donated | 20,241 | 13,746 |
| Transfer from restricted funds | 6,296 | — |
| Working capital provided | 1,227,937 | 1,467,896 |
| Uses of working capital: | | |
| Excess of (revenues) expenses | 7,006 | (417,752) |
| Items not providing (requiring) working capital: | | |
| Depreciation and amortization | (1,040,837) | (1,033,122) |
| Resident entry fee amortization | 1,538,458 | 2,141,182 |
| Working capital used in operations | 504,627 | 690,308 |
| Repayments and current maturities of long-term debt: | | |
| Scheduled | 271,205 | 290,310 |
| Advanced payment | — | 600,000 |
| Transfer of loan | 150,000 | — |
| Entry fee refunds | 64,620 | 52,228 |
| Working capital used | 1,132,135 | 1,674,978 |
| Increase (decrease) in working capital | $ 95,802 | $(207,082) |

Working capital changes—increase (decrease): | $ 303,056 | $(383,462) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash, certificates of deposit, and short-term investments</td>
<td>$ 94,451</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>(59,012)</td>
</tr>
<tr>
<td>Accrued interest receivable</td>
<td>13,783</td>
</tr>
<tr>
<td>Inventory and prepaid expenses</td>
<td>20,008</td>
</tr>
<tr>
<td>Current portion of long-term debt</td>
<td>(26,518)</td>
</tr>
<tr>
<td>Accounts payable and accrued expenses</td>
<td>(61,064)</td>
</tr>
<tr>
<td>Advance billings for residents’ care</td>
<td></td>
</tr>
<tr>
<td>Increase (decrease) in working capital</td>
<td>$ 95,802</td>
</tr>
</tbody>
</table>
Statements of Changes in Fund Balances
For the Years Ended March 31, 1981 and 1980

<table>
<thead>
<tr>
<th>Fund Type</th>
<th>1981</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted operating</td>
<td>$664,505</td>
<td>$9,560</td>
</tr>
<tr>
<td>Reserve fund I</td>
<td>$112,069</td>
<td>$36,827</td>
</tr>
<tr>
<td>Reserve fund II</td>
<td>$24,003</td>
<td>$11,000</td>
</tr>
<tr>
<td>Financial assistance fund I</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Financial assistance fund II</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Funds I and II</td>
<td>$281,516</td>
<td>$11,026</td>
</tr>
<tr>
<td>Life income fund I</td>
<td>$258,028</td>
<td>$20,250</td>
</tr>
<tr>
<td>Life income fund II</td>
<td>$25,655</td>
<td>—</td>
</tr>
<tr>
<td>Independent housing project fund</td>
<td>$20,250</td>
<td>—</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,115,534</td>
<td>$10,840</td>
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</table>

Balances, March 31, 1979

<table>
<thead>
<tr>
<th>Fund Type</th>
<th>1979</th>
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<tbody>
<tr>
<td>Unrestricted operating</td>
<td>$664,505</td>
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<tr>
<td>Reserve fund I</td>
<td>$112,069</td>
</tr>
<tr>
<td>Reserve fund II</td>
<td>$24,003</td>
</tr>
<tr>
<td>Financial assistance fund I</td>
<td>$11,000</td>
</tr>
<tr>
<td>Financial assistance fund II</td>
<td>—</td>
</tr>
<tr>
<td>Funds I and II</td>
<td>$281,516</td>
</tr>
<tr>
<td>Life income fund I</td>
<td>$258,028</td>
</tr>
<tr>
<td>Life income fund II</td>
<td>$25,655</td>
</tr>
<tr>
<td>Independent housing project fund</td>
<td>$20,250</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$1,115,534</td>
</tr>
</tbody>
</table>
Statements of Revenues and Expenses
of Unrestricted Funds
For the Years Ended March 31, 1981 and 1980

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>1980*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenues:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident care fees</td>
<td>$5,210,137</td>
<td>$4,517,295</td>
</tr>
<tr>
<td>Amortization of entry fees</td>
<td>1,538,458</td>
<td>2,141,182</td>
</tr>
<tr>
<td><strong>Medical center fees:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident</td>
<td>1,025,357</td>
<td>844,836</td>
</tr>
<tr>
<td>Medicare and other insurance reimbursement</td>
<td>453,261</td>
<td>343,927</td>
</tr>
<tr>
<td>Nonresident</td>
<td>146,826</td>
<td>226,439</td>
</tr>
<tr>
<td>Registration fees</td>
<td>13,000</td>
<td>19,700</td>
</tr>
<tr>
<td>Interest income</td>
<td>253,955</td>
<td>233,549</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>27,244</td>
<td>20,266</td>
</tr>
<tr>
<td><strong>Total revenues</strong></td>
<td>$8,668,238</td>
<td>$8,347,194</td>
</tr>
</tbody>
</table>

| **Expenses:**    |        |        |
| General and administrative | $1,044,267 | $861,213 |
| Housekeeping      | 528,213 | 468,020 |
| Maintenance       | 697,687 | 633,384 |
| Food service      | 1,731,152 | 1,598,093 |
| Medical center    | 1,750,849 | 1,487,369 |
| Utilities         | 784,527  | 668,584 |
| Real estate taxes | 360,599  | 318,674 |
| Depreciation      | 972,219  | 964,482 |
| Amortization of preopening expenses | 68,618 | 68,641 |
| Interest expense  | 732,199  | 843,932 |
| **Other**         | 4,914   | 17,050  |
| **Total expenses**| 8,675,244 | 7,929,442 |

**Excess of revenues (expenses)** | $ (7,006) | $ 417,752 |

* Reclassified to conform to 1981 presentation.
Appendix F

Sources of Additional Information Regarding State Statutes

Arizona Department of Insurance
1601 West Jefferson
Phoenix, Arizona 85007

California Department of Social Services
744 P Street
Sacramento, California 95814

Colorado Department of Insurance
201 East Colfax Avenue
Denver, Colorado 80203

Florida Department of Insurance
Office of the Treasurer
State of Florida
Tallahassee, Florida 32304

Indiana Department of Securities
Room 102, Statehouse
Indianapolis, Indiana 46204

Maryland Office on Aging
301 West Preston Street
Room 1004
Baltimore, Maryland 21201

Michigan Corporation Securities Bureau
Department of Commerce
PO Box 30220
Lansing, Michigan 48909

Minnesota none

Missouri Division of Insurance
Department of Consumer Affairs
515 East High Street
Jefferson City, Missouri 65101
AAHA
American Association of Homes for the Aging
Suite 770
1050 17th Street NW
Washington, D.C. 20036

LCSC
Life Care Services Corporation
800 Second Avenue
Des Moines, Iowa 50309
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