Chapter 2
Long Term Care in the United States

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2.1 Introduction

- In 2016 Genworth, a Virginia-based insurance company with over $100 billion in assets and over one million Long Term Care insurance (LTCI) policyholders, announced it was in the process of being acquired by China Oceanwide Holding Group Co., for $2.7 billion. Genworth, which became a publicly traded company in 2004, started marketing LTCI policies in 1974.
- In 2017, the Pennsylvania Commonwealth Court approved the liquidation (bankruptcy) of Penn Treaty Network America Insurance Company and its subsidiary, American Network Insurance Company, with 67,000 LTCI policies. The rehabilitation and liquidation process had started in 2009.[1]
- In 2018, General Electric, a global company with over $100 billion in market value, announced that it will add $15 billion over seven years, mostly to the LTCI reserves of 300,000 policies reinsured by its reinsurance unit, Employer Reassurance Corporation.

From a peak of 750,000 Long Term Care insurance policies issued in 2002, to 100,000 in 2016, individual stand-alone lifetime Long Term Care coverage is being replaced by policies providing limited duration, and products combined with life insurance or annuities which mitigate the risk borne by the insurer.

However, the Long Term Care risk impacts everyone, whether insured or not, and must be properly understood and measured to become a viable insurance product as well as to allow public policy-makers to meet the increasing challenges to protect the population against the risk.

This book concentrates on the measurement of biometric risks that bear on incidence and continuance of the Long Term Care risk. Some of the major LTCI risks are not inherent to the risks insured but are due to the different regulatory structure

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E. Dupourqué et al. (eds.), *Actuarial Aspects of Long Term Care*,
Springer Actuarial, https://doi.org/10.1007/978-3-030-05660-5_2

of jurisdictions, to regional and global economic and financial developments, and to medical and technical advances, among other factors. As of 2018, in the United States, most if not all policy values, such as premium and reserves, are calculated on a nationwide and level premium basis. This is to be contrasted with auto or medical insurance, which are based on regional experience and annually renewable premium. While LTCI rates can differ by gender and risk levels, assumptions are usually based on national data: 30-year treasury bonds, the 2000A mortality table, Society of Actuaries (SOA) Intercompany claim experience studies, and Life Insurance Marketing Research Association (LIMRA) persistency rates reports. However, insurance is not directly regulated nationwide but by laws and regulations in each constitutional jurisdiction (50 states, 1 district, 5 territories). Most policies were marketed to cover a lifetime risk, both for benefit and premium payments. As experience developed, it became clear that aggregate reserves for policies issued ten to twenty years earlier would not be sufficient to fund projected claims. Policy contract reserves (active life and claim) did not reflect current and developing experience. Early policies priced on asset-share projection models assumed voluntary termination (lapse) rates comparable to individual life and annuities policies and were priced during the 1980s' double digit interest rate environment. Premium from lower than expected lapses are not sufficient to fund expected claims for remaining policies, due to smaller reserve release and higher claim exposure. Lower investment income from declining interest rates aggravated the deficiency trend. Statutory reserves[2] are calculated based on a regulatory fixed interest rate. Regulations prescribing changes in interest rates are rather inflexible and modifying these regulations requires legislative and regulatory actions that can take several years.

Individual policies are contractually guaranteed renewable, allowing a company to increase premiums on a class-wide basis. Insurance contracts are not only subject to applicable laws, but to regulations which give regulators the right of approval to rate increase requests. Many policies offer a Cost of Living Adjustment (COLA) rider, as required to be Tax Qualified[3] for Federal income tax purposes. The most popular (and expensive) COLA being a 5% compound annual increase. For early policies, daily benefits (DB) were mostly for Nursing Home coverage, reimbursing about $75 per day, with 40% offering a COLA rider, for an annual premium of about $1,000.[4] That premium would be based on an annual claim cost, the present value of the expected duration and severity of a claim. Much like mortality rates for life insurance, an incidence rate determines the likelihood of a claim. The present value of the expected benefit payments would be applied to this incidence rate to derive the expected claim cost at the time of incidence. High annual mortality rates and lapse rates would contribute to lower future claim exposure, lowering the ultimate loss ratio[5] (LR). That discounted loss ratio would also be reduced by high interest rates since claims increase by duration while the premium is level. Active life mortality rates and lapse rates remained substantially lower than expected, and many dementia related claims were substantially longer and costlier. To give a rough estimate, by halving expected mortality, lapse, and interest rates, and increasing the average claim by 10% while keeping incidence rates as expected, in fifteen years a company would find its investment income half as expected while its claims doubled. Its remaining

exposure to future claims would be twice as expected, with many policies having their Daily Benefit increased through the automatic COLA (a $100 DB would have risen to $189).

Faced with increasingly deficient portfolios that threatened their own solvency or the soundness of their other lines of insurance, companies filed for rate increases. Reactions to these requests from state regulators have been varied: from 'deemed' approvals, without review, to outright disapproval. The number of rate increases as well as their magnitude generated widespread adverse media coverage.

The different state reactions to rate increase requests have led to an increasingly balkanized regional environment for premium rates which have little actuarial relationship to the risk insured.

This is compounded by the long-term nature of the risk, both during the active/premium paying period and the claim continuance. Long-Term Services and Supports (LTSS) costs vary widely across the US, impacting both premiums and claims since most policies reimburse the policyholder for LTC daily costs, up to a stated amount in the policy. In 2017 the average daily Nursing Home cost in Louisiana was $174[6] and 7,000 km north, the average cost in Alaska was $800.[6] While policyholders will purchase coverage commensurate with the LTSS costs in his or her own state, inter-state mobility rates should be taken into account. While the average US inter-state mobility has declined to about 1.5% per year,[7] the longer a policy is inforce, the higher the variance around the average claim. This variance behavior is rendered more complex as states have different rate reviewing regulations and policies, which means that two policyholders from different states buying an identical policy will likely pay substantially different premiums over the duration of same premium period. Of course, the relationship of regional inflation to Cost of Living riders[9] should not be ignored. This regional disparity is probably more relevant to policyholders than to companies as their Long Term Care policy may not reflect costs in their new state of residence. Even if the Actual to Expected ratio of original assumptions for mortality, morbidity, persistency, or interest rate remained stable, premiums and reserves would not reflect the current environment. Demographic, LTSS cost, and regulatory heterogeneity add to external factors which strongly impact the LTCI risk.

This chapter will attempt to describe the environment which a US actuary must consider for the LTC risk.

The risk is not new, but the insurance market is relatively new compared to other insured risks, such as life, disability, or even cars, which have been mass produced for about one hundred years. Most personal insurance is based on well defined, tabulated and formulated events which trigger claims. LTCI aims to reimburse an individual for costs arising from loss of autonomy. Early policies were extensions of Medicare Supplemental (Med Sup) policies which reimbursed medical costs not covered by the federal old age social insurance program. Medicare[10] reimburses nursing home care for only a few days of residence, as it is meant to insure acute care, as opposed to chronic care. Med Sup policies regularly increase their premium based on annual experience. LTCI policies differed from Medicare Supplement policies in that they were less like annually renewable health insurance, and more like level

premium Long-Term Disability (LTD) insurance. Over the years LTCI evolved to cover all service providers, through so-called comprehensive policies: Nursing Home Care (NHC), Assisted Living Facilities (ALF), Adult Day Care (ADC), and Home Care (HC), as long as the policyholder met the ADL[11] or cognitive minimum claim threshold. ALF differs from NHC in that they offer only paramedical services.

As Table 2.1 indicates, ALF requires about half the cost of NHC, but incidence, continuance, and utilization rates must be taken into account to determine its proper share of expected aggregate claim from which premium and reserve are derived.

Most policyholders and policymakers prefer the Home Care option, as long as possible. This option presents its own feasibility and risk measurement challenges, such as caregiver costs and availability.

The era in which Long Term Care risk is now studied is global, with Big Data feeding predictive models. Pre-1970, the main tools to compute insurance values were annual mortality and disability rates, commutation functions, mathematical formulas and constant loads based on few variables and static assumptions applied to net present values. The approach was deterministic, based on fixed expected values. Expected loss ratio[5] would be calculated, with a 65% loss ratio[5] being standard for Long-Term Disability insurance. Most insurance was principally governed through state valuation and marketing regulations. The advent of computers allowed asset-share models to project expected cash flows over the maximum duration of an insurance policy or a portfolio. Variables not inherent to the covered risk could be introduced to calculate present values of cash flow scenarios. Stochastic models were developed to account for the variability of averages as well as around averages. Instead of profits being imbedded as premium load, premium was set to meet Internal Rate of Return (IRR) or Return on Equity (ROE) targets. Rapid increase in computer capacity has allowed the application of Markov processes and complex distributions to produce predictive models. The internet allowed access to a volume of data not previously readily available. Globalization of information and data, as well as the growth of multi-national insurers, has brought forward complex analytic and accounting tools and standards such as Principle Based Reserving, Solvency 2, and International Accounting Standards. The Long Term Care risk started to be approached for insurance purposes on the tail end of the commutation function era and its complexity can now be approached with the newer tools.

Table 2.2 shows that private insurance contributes about 10% of Long-Term Services and Supports costs, its annual growth rates have been in the single digits since 1997, although it has been increasing sporadically since 2010. It should be noted

Table 2.1 2017 LTC provider annual cost[6]

2017 LTC provider annual cost	
Adult day care	$18,204
Assisted living facility	$45,000
Home care	$48,558
Nursing home care	$91,614

Table 2.2 Long-term services and supports costs, private insurance and gross domestic poduct[8]

	LTSS as % of		Private insurance as % of LTSS	Annual growth (%)		
	Health expenditures	GDP		LTSS	Private insurance	GDP
1980	7	1	3	16	38	9
1981	7	1	3	15	30	12
1982	7	1	4	13	31	4
1983	7	1	5	13	31	9
1984	7	1	5	11	29	11
1985	7	1	6	10	27	8
1986	7	1	7	10	30	6
1987	7	1	8	6	16	6
1988	7	1	9	14	34	8
1989	8	1	10	14	17	8
1990	8	1	10	17	21	6
1991	8	1	10	12	11	3
1992	8	1	10	11	12	6
1993	9	1	10	10	13	5
1994	9	1	11	9	19	6
1995	9	1	13	13	29	5
1996	10	1	13	9	16	6
1997	10	1	13	6	6	6
1998	9	1	14	2	9	6
1999	9	1	14	0	−1	6
2000	9	1	13	4	−6	6
2001	8	1	12	7	−5	3
2002	8	1	11	5	1	3
2003	8	1	10	7	−4	5
2004	8	1	9	7	−6	7
2005	8	1	9	7	4	7
2006	8	1	8	4	−2	6
2007	8	1	8	9	3	4
2008	8	1	8	6	3	2
2009	8	1	7	5	4	−2
2010	8	1	8	5	7	4
2011	8	1	8	4	4	4
2012	8	1	8	2	10	4
2013	8	1	8	2	6	3
2014	8	1	9	3	8	4

(continued)

Table 2.2 (continued)

	LTSS as % of		Private insurance as % of LTSS	Annual growth (%)		
	Health expenditures	GDP		LTSS	Private insurance	GDP
2015	8	1	9	4	11	4
2016	8	1	10	3	5	3
Average				4	7	3

that in the table LTSS includes only Nursing Homes and Home Care, the total LTSS related expenses is higher, and the ratio to Health Expenditure is closer to 10% than 8%; private insurance includes all insurance sources, such as Medicare Supplement, and the ratio of LTCI to total LTSS expenses is closer to 7% than 10%.

2.1.1 Legal Environment

Long Term Care is highly regulated. Both at the federal and state level, laws are created through an executive (president/governor) and a bicameral legislature (except Nebraska, which is unicameral). Most regulatory jurisdictions have an insurance supervisory office and several supervisors, or commissioners, are elected by the voting population. Many LTSS providers must be licensed by the state in which they operate; LTCI agents must comply with continuing education programs, the American Academy of Actuaries publishes Actuarial Standard Of Practice[12] guidelines; the federal government, through its taxation code,[3] has defined what is known as tax qualified Long Term Care policies; most states have defined what is known as partnership Long Term Care policies,[13] which can be used in conjunction with their Medicaid[14] programs. The 1945 McCarran–Ferguson Act legislated the rights of states to regulate insurance, but federal laws increasingly impact how insurance products are designed, valued, and marketed. The 1933 Glass–Steagall law separated investment and commercial banking and made interstate banking subject to federal supervision. Glass–Steagall prevented banks from fully participating in the insurance market and this has led to the quasi absence of bancassurance. While Glass–Steagall was repealed in 1999, the 2008 global financial crisis has brought further national and international oversight of the financial market. LTSS providers and LTC insurers must comply with the Health Insurance Portability and Accountability Act (HIPAA)[15] a 1996 federal law which sets privacy rules and defines minimum requirements for a LTCI policy to allow its premium to be included in the annual medical expense tax deduction and its benefits excludable from taxation. HIPAA also sets the maximum number of Activities of Daily Living[11] which an insurer can require to pay full benefits: 2 out of 5. Other federal laws impact Long Term Care Insurance. For instance, the Employee Retirement Income Security Act (ERISA, 1974), which regulates pensions, allows some group insurance plans to bypass state mandates.

The legal environment plays an important role. LTSS is a newly identified sector of the economy which affects a segment of the population considered particularly vulnerable, but increasingly politically powerful. It involves complex, not purely financial, transactions between consumers and providers. At the national level, the federal judiciary consists of a Supreme Court, twelve regional circuits and ninety-four judicial districts. In general, states have a similar judicial structure, down to municipal courts. Common law, which relies heavily on past rulings, applies throughout the US, except in Louisiana, which relies on a mixture of common law, French (so-called Napoleonic code), and Spanish law. Insurance companies usually market their product on a nationwide basis, but are domiciled in one state, while the individual policyholder resides in the smallest judicial level, so litigation can be complex. Several states require extra territorial jurisdiction, where group insurance contracts covering one of its residents must comply with the resident insurance laws and regulations. It is also likely for a local lawsuit to be broadcasted by national news or social media and impact the image of the insurer. Since there is little LTCI history, how it will fit into the fabric of the US society remains to be seen.

2.1.2 Community Living Assistance Services and Supports Act

In 2010 the Community Living Assistance Services and Supports Act[16] (CLASS Act), part of the Patient Protection and Affordable Care Act (ACA), authorized the first nationwide Long Term Care social insurance initiative. It would have created a voluntary but Guaranteed Issue (no underwriting) long term care insurance option for active employees. Participation would have been optional but would have required the employee to decline the coverage, instead of electing the coverage. The spouse of an enrolled employee would also have been eligible subject to some underwriting requirement. A five-year waiting period would apply before any benefit would be paid. Uni-gender premiums varied by issue age. Premium increases were allowed but were restricted for participants over 65. The minimum daily cash benefits were to be $50 per day, based on 2 ADLs out 6, with higher benefits payable for more severe impairments, based on nationwide criteria.

A critical provision of the law required the actuarial adequacy of the program over a 75-year period, i.e. premiums received over that period must fund benefits, to be certified annually. The voluntary and Guaranteed Issue aspects, as well as limits on premiums, created concerns about the actuarial viability of the program. That provision was withdrawn in 2013 without being implemented.

2.2 Social Environment

2.2.1 Economic Dependency

With a rapidly aging population, measurements such as healthy life expectancy and dependency ratios attract more attention. Dependency ratios measure the ratio of the non-working population to the labor force. Table 2.3 points to the need to address growing economic dependency among the elderly.

According to the Bureau of Labor statistics, in 2016, for every 65-and-older dependent, about 4 persons were in the labor force, and by 2026, about 3 persons are projected to be in the labor force for each older dependent. Another way to measure the age dependency ratio is to compare the 65-and-older population with the 16-to-64 year old population, but as Table 2.3 shows, that population has its own dependent population. Economic dependency depends on the country's definition of labor force, which in the US includes the unemployed but excludes the military.

Dependency ratios and trends have a significant impact on LTCI viability, which is faced with a decreasing pool of potential policyholders and caregivers, as well as an increasing population in need of the coverage.

Long Term Care is concerned with health-related dependence, a subset of economic-related dependency. While dependency in the Long Term Care context is mainly concerned with incidence and continuance, economic dependency greatly impacts how LTC behaves: for insurance, most policies are offered to non-economic dependent individuals, and for policy-makers LTSS expenses have much different implications than unemployment or education. The whole state of dependency should, at a minimum, not be ignored.

Table 2.3 Economic dependency[17]

Economic dependency				
	Total population	Labor force	Dependent population	Dependency ratio (%)
Total 2026	347,304,498	169,582,274	177,722,224	105
Under 16	72,065,076		65,967,505	39
16–64	208,301,911		59,353,796	35
65 and older	66,937,511		52,400,923	**31**
Total 2016	322,400,000	159,524,988	162,875,012	102
Under 16	69,432,000		64,448,095	40
16–64	204,488,000		58,705,195	37
65 and older	48,480,000		39,721,722	**25**

2.2.2 Age and Gender

While female to male ratios remain rather even through age 60, they climb to 1.1 at 70 and 2 at 90, ages of particular importance to Long Term Care due to higher female LTSS utilization (Fig. 2.1).

2.2.3 Income

The following three graphs[19] display differences in household income levels between ages, genders, and regions (Figs. 2.2, 2.3 and 2.4).

Income plays an important role in LTCI affordability and need. While LTCI is regarded as asset protection insurance, the higher the income, the more affordable it

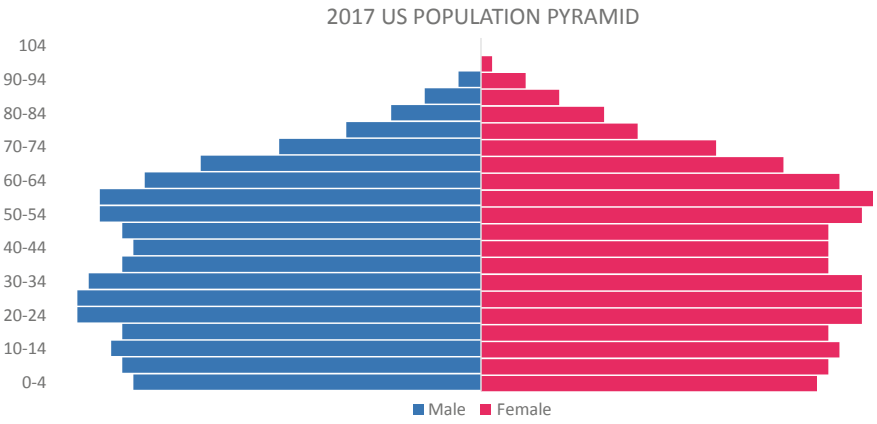

Fig. 2.1 2017 US population pyramid[18]

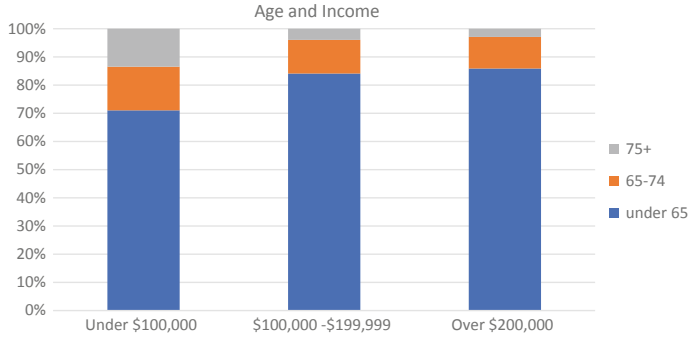

Fig. 2.2 Age and income

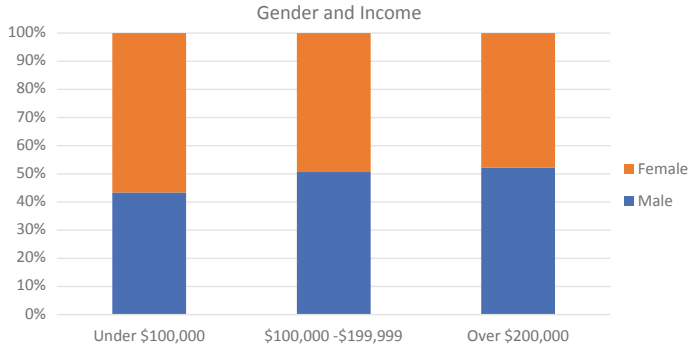

Fig. 2.3 Gender and income

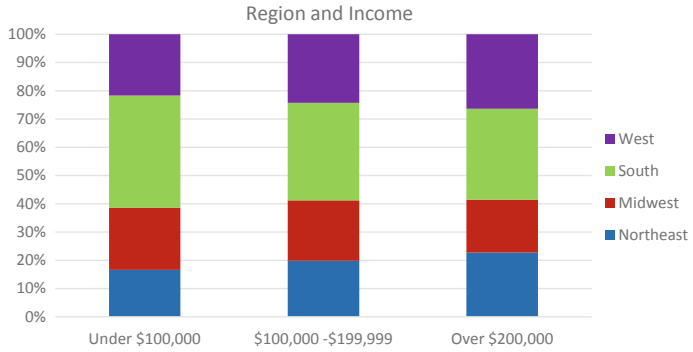

Fig. 2.4 Region and income

becomes but the less the need for such an expensive insurance. The older the person, the more expensive a policy is, but also that person is likely to be in the lower income range. Females comprise a majority of the under $100,000 income range but are in the segment of the population that may need LTCI the most. Paradoxically, the Northeast, with about 18% of households and over 20% of over $200,000 income, accounts for about 28% of Medicaid[14] spending, Medicaid[14] being the largest LTSS payor. Lower income areas tend to have lower LTSS costs and individuals buying LTCI would not need to purchase a policy with as high a Daily Benefit maximum as an individual living in a higher cost region.

2.2.4 Assets

As Table 2.4 shows, assets for people aged 65 and over are skewed at the higher range. While this may be a good argument to buy LTCI for asset protection, careful estate

planning must now account for the shorter LTCI benefit periods currently available in the US market.

Actuarial models should not ignore asset and income levels as the need for Long Term Care is closely linked to health, and health is correlated to income and wealth.[21] Income is also correlated to education.

2.2.5 Affordability of Long-Term Services and Supports

The four tables below, derived from a 2016 report,[22] 'Long-Term Services and Supports for older Americans: risks and financing' summarize another challenge LTC presents. Table 2.5 estimates expected costs of lifetime LTSS, per payer, per person. At first glance LTSS seems a manageable personal expense, which is borne out by the fact that over 50% of the costs are paid by individuals. But when the cost per population is shifted to cost per user of services (Table 2.6), the cost doubles, which strains individual financing and indicates the need for insurance. The last two Tables 2.7 and 2.8, show the corresponding average values for females and males, with expenses almost doubling for women.

2.3 Measurement Tools

2.3.1 The Sullivan Index

In 1971 Daniel Sullivan introduced a life expectancy index in an article ("A Single Index of Mortality and Morbidity", 1971)[23] which defined healthy and disabled life expectancy. The following is a brief description of the index, which is based on the 1965 US Life table, a public table, and assuming a stationary (instead of generational) population:

l_x: Total population at age x.

L_x: Average stationary population within observation interval.

T_x: Person-years lived at and over age x, calculated by summing L_x values at and over age x.

w_x: Number of days of disability per person per year in the interval beginning at age x.

I_x: Disability-free prevalence factor, or Sullivan index $= 1 - (w_x/365)$.

e_x: Life expectancy at x.

L^h_x, T^h_x, e^h_x, are defined as above, but for healthy (disability free) lives (Table 2.9).

Table 2.4 2013 asset distribution by household[20]

Head of household age	Zero or negative	$1–$4,999	$5,000–$9,999	$10,000–$24,999	$25,000–$49,999	$50,000–$99,999	$100,000–$249,999	$250,000–$499,999	$500,000 or over
Less than 35 years (%)	32	14	8	11	9	9	10	4	3
35–44 years (%)	21	9	5	8	8	10	18	10	11
45–54 years (%)	16	7	3	6	7	10	18	14	19
55–64 years (%)	12	7	3	5	5	9	18	16	26
65 years and over (%)	6	7	2	5	5	10	21	18	27
65–69 years (%)	7	6	3	6	6	9	19	14	30
70–74 years (%)	6	6	3	5	5	10	19	21	28
75 and over (%)	6	8	2	4	5	10	23	19	24

Table 2.5 Average lifetime LTSS expenditures per adult turning 65 in 2015–2019

Average sum (2015$) of LTSS expenditures from age 65 through death projected for adults turning 65 in 2015–2019								
	Payer							
	Medicare	Medicaid	Other public	Total public	Out-of pocket	Private insur-ance	Total private	Total
Nursing facility								
Dollars	$7,200	$33,300	$700	$41,200	$22,500	$1,600	$24,100	$65,300
Percentage	11.03%	51.00%	1.07%	63.09%	34.46%	2.45%	36.91%	100.00%
Community-based								
Dollars	$6,600	$14,100	$400	$21,100	$49,600	$2,100	$51,700	$72,800
Percentage	9.07%	19.37%	0.55%	28.98%	68.13%	2.88%	71.02%	100.00%
Total expenditures								
Dollars	$13,700	$47,400	$1,100	$62,200	$72,200	$3,700	$75,900	$138,100
Percentage	9.92%	34.32%	0.80%	45.04%	52.28%	2.68%	54.96%	100.00%

Table 2.6 Average lifetime LTSS expenditures per adult turning 65 in 2015–2019 and using LTSS

Average sum (2015$) of expenditures from age 65 through death projected for users of paid, formal LTSS who turn 65 in 2015–2019								
	Payer							
	Medicare	Medicaid	Other public	Total public	Out of pocket	Private insur-ance	Total private	Total
Nursing facility								
Dollars	$14,000	$64,000	$1,000	$79,000	$44,000	$3,000	$47,000	$126,000
Percentage	11.11%	50.79%	0.79%	62.70%	34.92%	2.38%	37.30%	100.00%
Community-based								
Dollars	$12,000	$27,000	$1,000	$40,000	$96,000	$4,000	$100,000	$140,000
Percentage	8.57%	19.29%	0.71%	28.57%	68.57%	2.86%	71.43%	100.00%
Total expenditures								
Dollars	$26,000	$91,000	$2,000	$119,000	$140,000	$7,000	$147,000	$266,000
Percentage	9.77%	34.21%	0.75%	44.74%	52.63%	2.63%	55.26%	100.00%

2.3.2 1985 National Nursing Home Survey

Early insurers in the LTCI field relied on National Nursing Home Surveys[24] for actuarial estimates of claim rates using incidence and termination tables published in the Transactions of the Society of Actuaries 1988–1990 Reports, Report of the Long Term Care Experience Committee, 1985 National Nursing Home Survey, Utilization data.[25] The survey estimated an insurance population by excluding individuals whose diagnoses would not qualify them for individual insurance, which is almost always underwritten.

Table 2.7 Average lifetime LTSS expenditures per female turning 65 in 2015–2019

Average sum (2015$) of expenditures from age 65 through death projected for female turning age 65 in 2015–2019								
	Payer							
	Medicare	Medicaid	Other public	Total public	Out of pocket	Private insurance	Total private	Total
Nursing facility								
Dollars	$8,800	$48,200	$800	$57,800	$27,500	$2,300	$29,800	$87,600
Percentage	10.05%	55.02%	0.91%	65.98%	31.39%	2.63%	34.02%	100.00%
Community-based								
Dollars	$7,900	$18,800	$400	$27,100	$64,800	$2,700	$67,500	$94,600
Percentage	8.35%	19.87%	0.42%	28.65%	68.50%	2.85%	71.35%	100.00%
Total expenditures								
Dollars	$16,700	$67,000	$1,100	$84,800	$92,400	$5,000	$97,400	$182,200
Percentage	9.17%	36.77%	0.60%	46.54%	50.71%	2.74%	53.46%	100.00%

Table 2.8 Average lifetime LTSS expenditures per male turning 65 in 2015–2019

Average sum (2015$) of expenditures from age 65 through death projected for men turning age 65 in 2015–2019								
	Payer							
	Medicare	Medicaid	Other public	Total public	Out of pocket	Private insurance	Total private	Total
Nursing facility								
Dollars	$5,500	$17,400	$600	$23,500	$17,100	$900	$18,000	$41,500
Percentage	13.25%	41.93%	1.45%	56.63%	41.20%	2.17%	43.37%	100.00%
Community-based								
Dollars	$5,100	$9,100	$400	$14,600	$33,600	$1,400	$35,000	$49,600
Percentage	10.28%	18.35%	0.81%	29.44%	67.74%	2.82%	70.56%	100.00%
Total expenditures								
Dollars	$10,600	$26,600	$1,000	$38,200	$50,600	$2,300	$52,900	$91,100
Percentage	11.64%	29.20%	1.10%	41.93%	55.54%	2.52%	58.07%	100.00%

Table 2.10 illustrates two annual continuance calculations, from Tables 11 and 14 of the 1985 NNHS report. The first part (Proportion of Admissions at End of Period) shows the annual compound survival rates from admission, which is used to calculate the Average Length Of Stay (ALOS), or the disabled life expectancy. The second part (Proportion of Days Left After Period) displays the likelihood that a stay will exceed a number of years, which can be useful to calculate variances.

Table 2.9 Life expectancy

Computation of the approximate expectation of life free of disability (e_x^h) for white males, civilian resident population, United States, mid-1960s								
Age group	Exact initial age	Disability						
		1965 abridged life table value		Days/year	Weighting factor	Life table values, weighted for disability		
	x	l_x	L_x	w_x	l_x	L_x^h	T_x^h	e_x^h
Under 15	0	100,000	1,457,411	12	0.967	1,409,316	6,252,783	62.5
15–44	15	96,767	2,830,657	13	0.964	2,728,753	4,843,467	50.1
45–64	45	90,639	1,623,962	31	0.915	1,485,925	2,114,713	23.3
65–74	65	65,901	532,960	72	0.802	427,434	628,788	9.5
75 and over	75	39,665	318,095	134	0.633	201,354	201,354	5.1

The report includes tables for prevalence rate, the fraction of total dependent population at a point in time. A relationship formula between incidence and prevalence is sometimes used:

$$\text{(incidence rate)} \times \text{(ALOS)} = \text{prevalence rate}.$$

Prevalence rates can be used to estimate outstanding claims in cash flow analysis, but the authors of the paper found that the above relationship does not bear out if the

Table 2.10 Continuance and utilization

Years from admission	Proportion of admissions at end of period			Proportion of days left after period		
	All	Female	Male	All	Female	Male
0	1.00000	1.00000	1.00000	1.0000	1.0000	1.0000
1	0.38621	0.42884	0.31949	0.7974	0.6915	0.5839
2	0.26299	0.31527	0.20227	0.6720	0.5073	0.3891
3	0.19243	0.23023	0.14193	0.5708	0.3779	0.2685
4	0.14841	0.18193	0.10511	0.4850	0.2843	0.1928
5	0.11384	0.14371	0.08717	0.4084	0.2136	0.1358
6	0.08344	0.11043	0.06174	0.2982	0.1604	0.0949
7	0.06070	0.08289	0.04540	0.2955	0.1225	0.0680
8	0.04454	0.06176	0.03459	0.2204	0.0963	0.0490
9	0.03334	0.04719	0.02647	0.2226	0.0780	0.0349
10	0.02549	0.03856	0.02016	0.1679	0.0644	0.0245

(continued)

Table 2.10 (continued)

Years from admission	Proportion of admissions at end of period			Proportion of days left after period		
	All	Female	Male	All	Female	Male
11	0.01969	0.03036	0.01513	0.1711	0.0539	0.0169
12	0.01525	0.02474	0.01113	0.1296	0.0456	0.0114
13	0.01181	0.02049	0.00801	0.1329	0.0389	0.0076
14	0.00921	0.01741	0.00557	0.1013	0.0334	0.0049
15	0.00731	0.01521	0.00376	0.1043	0.0287	0.0031
16	0.00584	0.01360	0.00251	0.0794	0.0246	0.0020
17	0.00474	0.01236	0.00170	0.0815	0.0209	0.0013
18	0.00387	0.01136	0.00114	0.0615	0.0175	0.0008
19	0.00320	0.01053	0.00079	0.0624	0.0144	0.0005
20	0.00264	0.00979	0.00053	0.0458	0.0116	0.0003
21	0.00223	0.00916	0.00037	0.0453	0.0089	0.0002
22	0.00187	0.00859	0.00026	0.0309	0.0065	0.0001
23	0.00157	0.00806	0.00017	0.0273	0.0041	0.0001
24	0.00131	0.00759	0.00013	0.0142	0.0020	0.0000
25	0.00114	0.00714	0.00009	0.0000	0.0000	0.0000
ALOS	20 months	24 months	16 months			

populations and the observation periods for incidence and prevalence do not exactly match.

For premium rate calculations, models closely followed life insurance assumptions and tables, such as mortality rates, lapse rates, and interest rates. Usually a present value of continuance rates, using a fixed interest rate, would be multiplied by the appropriate incidence rate to calculate a claim rate, and then, to fit existing models, would be applied like a life insurance benefit to active lives at the end of a policy year. In some instances, incidence rates being small compared to active life termination rates, its count would not be excluded from the active life exposure of the next year. While this may seem a conservative approach by increasing the exposure for future years, differences in mortality rates between active and dependent lives make this assumption less appropriate, as it distorts active life termination rates in unpredictable ways.

2.3.3 Long Term Care Intercompany Experience Studies

Since 1993, the Society of Actuaries has published five LTCI intercompany studies for claims[26] and since 2002, with the Life Insurance Marketing Research Associa-

Table 2.11 Society of actuaries long term care intercompany experience study—aggregate database 2000–2011 report—incidence rates

Age group	Incidence rates											
	Total				Female				Male			
	Total (%)	Nursing facility (%)	Assisted living facility (%)	Home health care (%)	Total (%)	Nursing facility (%)	Assisted living facility (%)	Home health care (%)	Total (%)	Nursing facility (%)	Assisted living facility (%)	Home health care (%)
0–49	0.05	0.00	0.00	0.03	0.05	0.00	0.00	0.03	0.04	0.00	0.00	0.03
50	0.07	0.01	0.00	0.05	0.08	0.01	0.00	0.06	0.05	0.01	0.00	0.03
55	0.09	0.01	0.01	0.06	0.09	0.01	0.01	0.07	0.07	0.01	0.01	0.05
60	0.13	0.02	0.01	0.08	0.15	0.02	0.01	0.10	0.10	0.02	0.01	0.07
65	0.27	0.06	0.03	0.15	0.32	0.06	0.04	0.19	0.21	0.05	0.03	0.10
70	0.67	0.19	0.11	0.31	0.78	0.21	0.13	0.38	0.51	0.17	0.09	0.22
75	1.62	0.56	0.31	0.64	1.87	0.60	0.38	0.76	1.28	0.51	0.22	0.46
80	3.51	1.36	0.76	1.18	3.89	1.42	0.90	1.35	2.93	1.28	0.54	0.92
85	6.44	2.79	1.39	1.93	6.79	2.82	1.55	2.08	5.82	2.74	1.10	1.67
90+	9.55	4.72	1.85	2.58	9.70	4.76	1.98	2.57	9.20	4.64	1.55	2.60

tion (LIMRA), three policy persistency studies.[27] Reliable uses of the data are held back due to lack of standard classifications for termination rates such as deaths, lapse and recoveries, and clear and uniform reporting among different companies (and sometimes within a company) is difficult to achieve. The volume of the data, however helps to analyze trends. Table 2.11 shows incidence rates derived from the 2000–1011 report. These rates aggregate incurral dates, Waiting Periods,[28] and Elimination Periods.[28]

As the continuance Table 2.12 indicates, data credibility declines with claim duration as claims occur many years after a policy is issued, and may take its full course over many more years. The lack of reliable reporting for diagnostic and termination types, and dates, requires great care in the use of these rates. The 2000–2011 report mentions that, even with the large amount of data collected, only the first four years are reliable. The Average Length of Stay (ALOS) shown here is the average claim duration for the 17-year observation period, not the expected Length of Stay of a policyholder.

Continuance rates are calculated from claim termination rates, much as survival rates are derived from mortality rates, except that while continuance means survival in the 'dependent' status, termination rates may include deaths, recoveries, or transitions to another dependent status or provider. Provider and ADL[11] specific termination rates may be required to obtain an accurate measure of claim continuance rates.

The majority of stand-alone LTCI policies reimburse claimants on actual expenses incurred, subject to a maximum daily benefit. Table 2.13 displays the amount of reimbursement relative to maximum daily benefit, or claim utilization rate ('utilization' has multiple meanings depending on the context), a key morbidity assumption for modeling long term care policies with reimbursement provisions.

Since a model will usually take a maximum daily benefit amount as its assumed benefit, utilization materially impacts the validity of a model's results. Especially when annual cost of living increases are applied to benefits.

Much of LTC cost modeling assumes simplified transitions from one dependent state to another, but a reimbursement model should take into account transitions to and from providers which may reflect transitions from one dependent state (partial) to another (total).

Active life termination rates, when a policyholder ceases to pay premiums, have a critical impact on the ability of an insurer to fund its future liabilities. While active life reserves and claim reserves are calculated on a per policy basis, a termination causes actual reserves to be released as well as reducing the risk exposure and contributing to the overall balance of cash flows for the portfolio. Variations in termination rates outside a narrow margin from expected cause a set of circumstances that greatly impact reserve adequacy and the ability of future premium to fund such reserves, especially when investment income drops below expectations. Higher than expected terminations, especially with lapses, may not symmetrically improve financial results due to anti-selection. Table 2.14 was taken from the 2015 inter-company termination study.[27]

Table 2.12 Society of actuaries long term care intercompany experience study—aggregate database 2000–2011 report—claim termination rates—all causes

Claim duration	Claim termination rates								
	All terminations			Recovery			Mortality		
	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)
1	48.81	45.38	55.27	15.19	17.24	11.50	33.62	28.13	43.77
2	24.49	21.35	31.13	3.43	3.74	2.80	21.05	17.61	28.32
3	26.21	23.99	31.47	4.60	5.07	3.54	21.60	18.92	27.93
4	26.78	24.50	32.61	4.19	4.36	3.74	22.60	20.14	28.87
5	28.29	26.75	32.55	5.84	6.17	4.98	22.44	20.58	27.57
6	26.27	24.96	30.15	3.74	3.76	3.70	22.53	21.20	26.45
7	24.79	23.90	27.57	2.98	3.05	2.79	21.81	20.85	24.79
8	24.25	24.16	24.58	2.08	2.19	1.71	22.17	21.97	22.87
9	23.42	24.53	19.91	2.05	2.20	1.54	21.38	22.33	18.37
10	25.30	26.65	21.35	2.43	2.56	2.05	22.87	24.09	19.30
11	21.44	21.35	21.75	1.40	1.30	1.68	20.03	20.05	20.07
12	23.66	25.38	18.73	0.44	0.32	0.82	23.22	25.06	17.91
13	32.27	34.80	24.48	3.89	3.75	4.26	28.38	31.05	20.22
14	20.54	26.32	5.11	1.25	0.64	2.95	19.30	25.67	2.16
15	35.16	33.38	41.44	3.76	3.84	3.71	31.40	29.54	37.73
16	20.90	25.68	0.00	6.56	7.98	0.00	14.34	17.70	0.00
17	37.92	49.57	0.00	11.46	13.14	0.00	26.46	36.42	0.00
ALOS	24 months	27 months	18 months						

Table 2.13 Society of actuaries long term care intercompany experience study—aggregate database 2000–2011 report—utilization rate

	Claim utilization rate			
	Total (%)	Nursing facility (%)	Assisted living facility (%)	Home health care (%)
Female and male	75	81	93	60
Female	75	82	94	60
Male	73	80	91	59

Active life experience mortality rates are at about 2/3 of current annuity mortality rates, moreover most statutory reserves are based on older mortality tables which would make that ratio lower.

The availability of credible data for incidence, continuance, and dependent mortality is scarce compared to data available to evaluate other personal insurance, such as life and annuities.[29]

Table 2.14 Policy terminations—aggregate database—2000–2011 report

Policy year	Aggregate voluntary lapse (%)	Active life mortality rates					
		Mortality rates			Actual to expected to 2012 IAM		
		Female (%)	Male (%)	Aggregate (%)	Female (%)	Male (%)	Aggregate (%)
1	5.8	0.15	0.24	0.19	22.17	26.59	24.44
2	4.3	0.26	0.38	0.31	33.88	37.93	35.93
3	3.3	0.34	0.52	0.42	40.40	46.68	43.55
4	2.8	0.43	0.65	0.52	44.59	52.05	48.29
5	2.6	0.53	0.80	0.65	49.62	57.73	53.59
6	2.4	0.64	0.97	0.78	53.61	62.63	57.99
7	2.2	0.76	1.16	0.93	57.42	67.69	62.35
8	2.2	0.92	1.37	1.11	62.03	71.46	66.52
9	2.1	1.11	1.64	1.33	66.44	76.42	71.14
10	2.2	1.32	1.93	1.57	68.73	79.06	73.52
11	2.3	1.56	2.28	1.84	72.02	82.45	76.82
12	2.3	1.79	2.73	2.16	73.71	87.56	80.02
13	2.4	2.09	3.08	2.48	77.28	88.14	82.16
14	2.6	2.36	3.54	2.81	79.33	91.49	84.73
15	2.7	2.63	3.92	3.11	81.43	93.45	86.70
16	2.8	2.87	4.31	3.40	82.55	95.59	88.20

(continued)

Table 2.14 (continued)

Policy year	Aggregate voluntary lapse (%)	Active life mortality rates					
		Mortality rates			Actual to expected to 2012 IAM		
		Female (%)	Male (%)	Aggregate (%)	Female (%)	Male (%)	Aggregate (%)
17	3.1	3.13	4.61	3.67	84.71	96.42	89.72
18	3.4	3.44	4.95	3.99	87.45	97.41	91.64
19	4.0	3.78	5.36	4.34	89.72	98.68	93.43
20	4.4	4.01	5.77	4.62	87.86	98.63	92.22
Aggregate	3.0	0.97	1.34	1.12	63.42	71.37	67.15

IAM: Individual Annuity Mortality

2.4 Diagnosis

Diagnosis may be the most critical actuarial aspect of Long Term Care, as current research in healthy versus disabled life expectancy and the relationship between mortality and morbidity indicate.

Pricing and reserving a Long Term Care risk must recognize the impact in severity (utilization) of different providers and continuance (duration) of different ailments, especially cognitive and physical. As Table 2.15 shows, over 50% of reimbursements made of claims for identifiable diagnoses went to cognitive related claims.

Tables 2.16, 2.17 and 2.18 show different results between cognitive and physical ailments that lead to Long Term Care Insurance claims. Termination rates are also divided by gender and recovery and death. The Average Length of Stay over the 17 years is more than double for cognitive versus physical diagnostics. Of 214,967 claims, 94,291 were either unknown or not clearly identifiable. While identifiable cognitive and physical claim numbers are almost equal, 61,617 and 59,059, the cost of cognitive claims is likely to be more than twice as costly. In this report, data after two years becomes increasingly less credible. As mentioned above, the intercompany study is very useful to study emerging trends and identify emerging risks not taken into account while averaging claim rates for the insured population. This data alone should not be used to price or reserve a Long Term Care insurance product.

Overall, reliable tools specific to the Long Term Care risk are scarce for pricing and reserving, leaving actuaries to use company and reinsurer experience for products that provide long-term coverage.

Table 2.15 2000–2011 LTC experience study claim utilization analysis per diagnosis

Claim paid by diagnosis ($million)				
Diagnosis	Amount paid	Share (%)	Cumulative	
			Amount paid	Share (%)
Alzheimer's	**1,156**	**25**	**1,156**	**25**
Mental	**635**	**14**	**1,791**	**39**
Stroke	**543**	**12**	**2,334**	**51**
Arthritis	527	11	2,861	62
Nervous system and sense organs	401	9	3,262	71
Injury	394	9	3,656	79
Circulatory	361	8	4,017	87
Respiratory	198	4	4,215	91
Cancer	149	3	4,364	95
Diabetes	75	2	4,439	96
Digestive system	55	1	4,494	97
Genitourinary system	54	1	4,548	99
Hypertension	28	1	4,576	99
Endocrine/Immunity system	21	0	4,597	100
Skin and subcutaneous tissue	12	0	4,609	100
Pregnancy disorders	4	0	4,613	100
Congenital	4	0	4,617	100

2.5 Evolution of the Insurance Market

As we have seen earlier (Table 2.2), private insurance benefits accounts for less than 10% of LTSS expenditures. A 2016 National Association of Insurance Commissioners[4] report, 'The State of Long Term Care Insurance', states that at the beginning of this century over 100 insurers marketed LTCI, fifteen years later, about a dozen were still in the stand-alone market. As a result, claims are rapidly overtaking premium income, as Fig. 2.5 indicates.

Group insurance products for employees offer products with lower benefits and premium (significantly lower average issue age) than individual LTCI. Coverage is predominantly elective and requires minimal underwriting, if any, for an individual actively at work. Sometimes the employer matches employee contributions. Like stand-alone individual LTCI, group LTCI has steadily declined, with few insurers offering coverage. Group insurance sales as a proportion of total LTCI sales dropped by over 50% in ten years. By 2014 Group insurance accounted for 20% of new sales and 30% of outstanding policies.[4]

The US federal government offers group coverage as part of its Federal Employees Health Benefits (FEHB) program. The program currently has 278,000 participants.

Table 2.16 Claim termination rates for identified cognitive and physical ailments

Cognitive and physical									
Claim duration	Claim termination rates								
	All terminations			Recovery			Mortality		
	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)
1	49.45	46.68	54.60	17.94	20.36	13.65	31.51	26.32	40.94
2	25.75	22.56	32.35	4.15	4.49	3.49	21.60	18.07	28.86
3	26.80	24.54	32.03	4.86	5.31	3.85	21.95	19.23	28.18
4	27.79	25.46	33.64	4.63	4.81	4.17	23.16	20.65	29.48
5	28.97	27.21	33.77	5.72	6.00	4.97	23.25	21.21	28.80
6	27.17	25.68	31.51	3.30	3.34	3.18	23.87	22.34	28.32
7	25.51	24.68	28.06	2.36	2.34	2.43	23.14	22.35	25.63
8	25.53	25.15	26.76	2.20	2.18	2.27	23.33	22.97	24.49
9	24.25	25.45	20.34	2.21	2.22	2.21	22.04	23.23	18.13
10	26.98	28.29	22.91	2.22	2.17	2.38	24.76	26.12	20.53
11	23.32	23.59	22.61	1.19	0.96	1.89	22.14	22.63	20.72
12	24.10	26.44	16.95	0.00	0.00	0.00	24.10	26.44	16.95
13	32.50	36.40	20.31	3.15	2.80	4.21	29.35	33.61	16.10
14	23.15	30.61	4.14	1.70	0.88	4.14	21.45	29.74	0.00
15	40.36	34.37	64.86	1.20	0.00	3.25	39.17	34.37	61.61
16	20.50	22.89	0.00	9.71	10.78	0.00	10.79	12.11	0.00
17	49.58	55.17	0.00	13.16	13.45	0.00	36.42	41.72	0.00
ALOS	23 months	26 months	17 months						

Table 2.17 Claim termination rates for identified cognitive ailment diagnoses

Cognitive[a]									
Claim duration	Claim termination rates								
	All terminations			Recovery			Mortality		
	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)
1	28.79	24.80	35.24	8.89	9.24	8.30	19.90	15.56	26.95
2	23.01	19.57	29.26	3.06	3.22	2.78	19.95	16.35	26.49
3	26.15	23.49	31.51	4.01	4.40	3.27	22.14	19.09	28.24
4	27.56	25.26	32.62	4.10	4.29	3.69	23.46	20.98	28.93
5	28.70	26.80	33.22	5.21	5.54	4.47	23.49	21.26	28.75
6	26.81	25.03	31.39	2.87	2.92	2.76	23.94	22.11	28.63
7	25.39	24.62	27.50	2.02	2.06	1.92	23.37	22.56	25.57
8	26.28	26.10	26.80	1.90	1.79	2.16	24.38	24.31	24.64
9	24.53	26.09	20.19	1.85	1.70	2.30	22.68	24.39	17.90
10	26.67	29.02	20.52	1.67	1.85	1.19	25.00	27.17	19.32
11	21.99	22.62	20.48	0.44	0.33	0.71	21.55	22.29	19.78
12	21.66	24.60	14.37	0.00	0.00	0.00	21.66	24.60	14.37
13	32.08	36.62	21.24	1.69	1.48	2.35	30.39	35.14	18.90
14	20.57	28.90	4.96	2.43	1.39	4.96	18.14	27.51	0.00
15	39.53	30.35	63.60	1.73	0.00	3.72	37.80	30.35	59.89
16	15.98	19.06	0.00	0.00	0.00	0.00	15.98	19.06	0.00
17	33.82	40.86	0.00	0.00	0.00	0.00	33.82	40.86	0.00
ALOS	33 months	37 months	26 months						

[a]Alzheimer, mental, stroke, nervous system and sense organ

Table 2.18 Claim termination rates for identified physical ailment diagnoses

Physical[a]									
Claim duration	Claim termination rates								
	All terminations			Recovery			Mortality		
	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)	Total (%)	Female (%)	Male (%)
1	64.57	61.29	71.36	22.46	25.78	15.97	42.11	35.51	55.39
2	30.00	26.72	38.38	5.81	6.22	4.80	24.19	20.50	33.59
3	27.93	26.18	33.22	6.33	6.74	5.18	21.60	19.44	28.04
4	28.20	25.77	36.12	5.59	5.67	5.31	22.61	20.11	30.81
5	29.47	27.89	35.20	6.65	6.76	6.25	22.82	21.12	28.95
6	27.84	26.80	31.86	4.10	4.05	4.31	23.73	22.76	27.55
7	25.74	24.81	29.53	3.00	2.82	3.70	22.74	21.99	25.83
8	24.10	23.52	26.72	2.80	2.86	2.56	21.30	20.66	24.16
9	23.75	24.38	20.78	2.87	3.06	1.95	20.88	21.32	18.83
10	27.54	27.04	30.05	3.25	2.72	5.70	24.29	24.32	24.34
11	26.06	25.25	30.23	2.61	1.97	5.56	23.45	23.28	24.67
12	29.95	30.30	29.50	0.00	0.00	0.00	29.95	30.30	29.50
13	33.57	35.90	18.12	6.99	5.55	18.12	26.57	30.35	0.00
14	29.95	34.88	0.00	0.00	0.00	0.00	29.95	34.88	0.00
15	48.08	41.88	58.53	0.77	0.00	0.00	47.31	41.88	58.53
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	30.00	42.87	0.00	0.00	0.00	0.00	30.00	42.87	0.00
ALOS	15 months	17 months	10 months						

[a]Arthritis, cancer, circulatory, congenital, diabetes, digestive system, endocrine/immunity system, hypertension, injury, pregnancy disorders, respiratory, skin and subcutaneous tissue

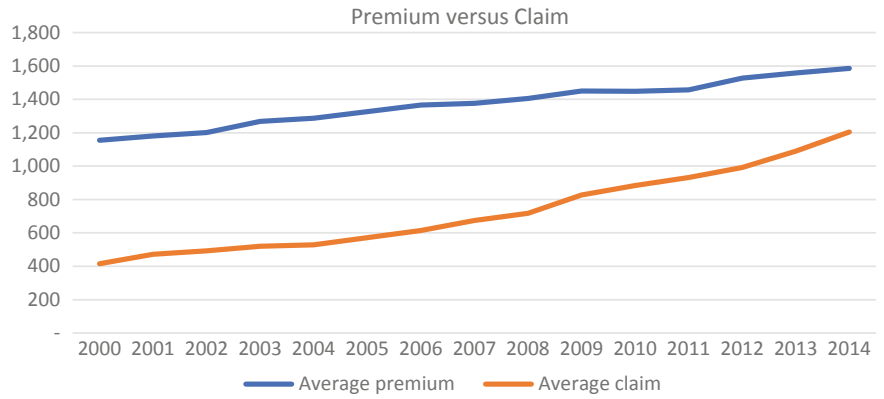

Fig. 2.5 Premium and claim[4]

California offers coverage to its state employees and dependents through its Calpers Long Term Care program, with 128,000 participants. Both plans were subject to significant premium increases. Individual insurance is also marketed to members of associations, such as the American Association of Retired Person (AARP), with full underwriting.

Table 2.19[4] indicates that the LTC risk is increasingly being insured through combination, or hybrid, products. While these products offer many advantages, such as not losing one's premium if the need for LTSS does not arise, benefits are limited and do not usually cover what can be catastrophic expenses; and total policy premiums can even be higher than the stand-alone LTCI policy to provide for the life or annuity coverage. Other products being introduced are underwritten immediate annuities, so-called Immediate Needs Annuities. Other insurance-like products are reverse mortgages and accelerated benefits on a life insurance policy. Many of these products offer risk hedging opportunities to the insurer but are partial solutions to the Long Term Care risk for the insured. Overall the reaction of insurers has been to reduce the coverage period and limit the amount of benefit, while increasing premiums.

2.6 Salient Differences Between the United States and France

Several chapters describe the French Long Term Care environment. Following are further remarks to contrast the US and French systems.

Table 2.19 Stand-alone versus combination

Year	Sales of stand-alone LTCI and combination products								
	$million					Percent of total sales			
	All products	Stand alone	Combination products			Stand alone (%)	Combination products		
			All	Annuity	Life		All (%)	Annuity (%)	Life (%)
2012	3,190	580	2,610	210	2,400	18	82	7	75
2013	3,266	406	2,860	260	2,600	12	88	8	80
2014	3,156	316	2,840	440	2,400	10	90	14	76
2015	3,831	261	3,570	470	3,100	7	93	12	81
2016	4,306	226	4,080	480	3,600	5	95	11	84

2.6.1 Jurisdictions

Insurance products in both countries are priced and marketed nationwide, but the United States companies have operated for a long time in a dual statewide jurisdiction and nationwide market. French insurance companies, until the second half of the twentieth century, have operated in a highly regulated, quasi monopolistic nationwide market. The European Union has opened the insurance market but brought new regulations, such as uni-gender premiums. Long Term Care services standards and regulations are rather uniform in the US and in France, but not in the European Union, which has longstanding cultural and political differences. French insurance companies must now take these differences into account. For social responses to the LTSS risk, there is now a similarity between US states and the French national government. They mostly have the same fiscal tools to fund programs, but the French government is now restricted by EU budget deficit limit (3% of GDP). The monetary tools are also limited as the French government cannot issue Euros and the US states cannot issue Dollars.

2.6.2 Actuarial Memorandum

Insurance companies are required to file in each insurance jurisdiction marketing, contract, and rate information. That filing must be approved, within a period after which a filing is 'deemed' approved, usually 30 days, before a product can be marketed. The same applies to any revision to the policy, including rates, before any change can be introduced. Actuarial memoranda are included in such filing, certified by an actuary (sample document in end-notes).[30] In France, the policy information and documentation for the actuarial basis of the premium rates and reserve calculations are kept on file and are subject to audit. Insurance regulations in the US are rather specific to a product, in France the three insurance regulations (see Section 4.d 'Prospects for Medical and Social Evolutions' note 5) are comparatively vague, leaving much leeway to the insurance company and the actuary to price and reserve a product. The flip side of this freedom is that an audit can radically change the marketing viability of a product and may require its withdrawal from the market. US states have joined an interstate insurance compact[31] to streamline the insurance filing process, but the basic requirements have not changed.

2.6.3 Gender

Starting in 2012, insurance policies sold in the European Union cannot vary premium or benefits by gender, after a 2011 ruling by the European Court of Justice. At that time, LTCI products in France and the United States were mostly offering uni-gender

premium rates. But US companies have started offering different rates for males and females, with higher premium rates for females. As mentioned earlier, there are wide differences in biometric and utilization rates between genders, and performing projections over a long horizon combining genders for active life, and continuance distributions can be challenging, if not an added risk in itself.

2.6.4 Social Insurance

The social insurance approach taken in each country is very different but offers some similarities. The social and political environment in the United States, which shapes its insurance markets, has been rather stable since its 19th century Civil War and the early 20th century Great Depression. The brunt of LTSS financing is carried by the government through the federal old age insurance program, Medicare,[6] which has an eligibility age of 65 (with exceptions), and the federal/state health insurance program, Medicaid,[12] which is means-tested (for income and assets). Both programs primarily reimburse medical and nursing care expenses where Long Term Care is ancillary. Medicare is funded through a payroll tax and premiums, Medicaid is Pay-As-You-Go, each state funding its share as its sees fit. Most states have income taxes, a source of revenue not available to French administrative regions responsible for the APA program.

France's current social and political environment derives a great deal from mid-twentieth century events, with the end of World War II and the introduction of the European Common Market. Long Term Care is partly covered through its social security program (*Securité Sociale*), which has four main programs: health, workers' compensation, retirement, and family. For several years, Long Term Care has been proposed to be added as a fifth branch. France has a relatively new program for LTSS, APA (*Allocation Personnalisée d'Autonomie*, or Allowance for Personal Autonomy). It is Pay-As-You-Go partially funded nationally through an additional 0.3% payroll tax generated by a forfeited holiday (*Pentecôte*). Participation is universal and is income based through a graded co-pay, but has no asset requirement. Like Medicaid, funding and payments are shared by national and regional governments, but the administrative regions have fewer fiscal tools to fund the benefits than US states. Like French LTCI products, benefits take the form of cash benefits.

2.6.5 Cost-of-Living Adjustments

Cost-of-Living Adjustments (COLAs) are a common feature of US LTCI products, the more so since this option must be offered for its premium and benefits to be income tax qualified.[3] This option is also a requirement in partnership plans.[13] Many early products offered a 5% annually compounded benefit increase. In the 1980s when the first products were introduced this feature could reasonably be priced as the average

CPI for that decade was 5% and the average long-term interest was still about 10%. Projections usually used fixed assumptions over the expected duration of the policy. One of these assumptions was a higher than expected voluntary policy termination. By 2000 the average CPI was about 3% while the average long-term interest rate was about 5%. A $100 daily benefit in 1985 was worth $265 by 2015, while its level premium earned a much lower rate of return. That divergence between costs and income is mitigated by the reimbursement nature of the benefit: as LTSS inflation was lower than expected (although health inflation is higher than average inflation), claims would not reach the maximum benefit level. But as claim exposures became much higher than expected, daily benefit amounts became higher as well, increasing expected utilization, to be added to a much longer continuance of Alzheimer claims. This concordance of worse than expected experience is greatly exacerbated by the presence of the 5% compound COLA. Companies have responded by offering a lower annual COLA increase, such as 3% or CPI, and simple annual increases. Future Guaranteed Issue purchases are also available and must be purchased at the insured's attained age. Overall, upward, guaranteed, benefit adjustments are complex features which are not only challenging to price and reserve, but also to administer.

2.6.6 Premium Persistency

French pricing and reserving do not take voluntary termination into account, whereas US models take lapse rates into account. Another peculiarity is that French products include a reduced paid up benefit after a policy has been retained for at least eight years, a feature that should increase lapse rates; US products offer such features as an optional rider. Lapse rate assumptions have played a key role in US insurance companies' drive to seek premium rate increases. At the introduction of Long Term Care products, companies used assumptions based on the experience of life insurance, annuity, and disability products, using early lapse rates close to 10%, grading to 5% per year. As Table 2.14 indicates, actual lapse rates turned out to be close to half the assumed rates. This additional premium income should be welcome if all other variable assumptions and their distributions behaved as priced. If, on a per-policy basis, biometric distributions, discount rates, and expense assumptions were appropriate, and a sufficient profit margin was incorporated, why would higher than expected retention worsen the financial viability of a portfolio? Most products were priced on a deterministic basis, with a long-term horizon. When higher retention is combined with lower interest rates, lower mortality rates, longer than expected cognitive type of claims, and higher utilization, it rendered early products deeply deficient. By the time companies were aware of the deficiencies, many years had elapsed, making a premium adjustment much more difficult, notwithstanding the reluctance of state regulators to grant high rate increases. All risk aspects of a Long Term Care insurance policy should be taken into account, but, lacking credible information, a conservative approach, such as ignoring lapse, may be called for; however this is not a permanent

solution, as a well-priced product should withstand lower than expected, as well as higher than expected, lapse rates.

2.6.7 Cash Versus Reimbursement

Most private or social insurance Long Term Care benefits in France take the form of cash monthly annuities. The cash approach treats Long Term Care benefits as a lifetime monthly annuity with an incidence age as a starting age, and a continuance rate equal to the mortality rate. The benefit paid does not vary by region, nor is it directly dependent on inflation. The cash approach does not require the occurrence of payments for services after the claim has been approved, that is, no change in benefit status is assumed when expenses are lower or no longer required while the claimant is alive. The introduction of Partial versus Total dependence (see Section 12) has changed that situation somewhat, but monthly payments are still based on an ADL trigger as opposed to expenses incurred. In the US, most private and social Long Term Care insurance benefits take the form of reimbursement. For private insurance this means that the base benefit is defined as a maximum daily amount, ranging from $100 per day to $500. Another popular type of benefit is indemnity, which is the payment of a stated amount if an expense was incurred, whether lower or higher. The difference between an indemnity and cash benefit is that an expense must be incurred to receive a benefit payment for the indemnity type. The indemnity amount can be stated as a daily, weekly, or monthly amount. For the weekly or monthly type, only one occurrence of an expense needs to occur to receive the whole period's amount. It is common to price and reserve a policy on an indemnity basis, using a well defined annual amount at the start of a projection. But these estimates should be subject to regional and utilization variations.

2.6.8 Reserves

Methodologies and most assumptions for reserves are not prescribed in French regulations but are required to be sufficient to cover future liabilities. The interest rate, however, is prescribed (as a function of average French treasury bonds rates). This approach to reserving is very similar to what is known in the United States as Principle Based Reserving,[32] where the actuary is called to use calculations and assumptions appropriate to the risks reserved for.

US contract reserves[2] are defined by state regulations. For instance, the current Active Life Reserve method is One Year Preliminary Term as prescribed by the Commissioner Reserve Valuation Method (CRVM).[33] Mortality rates, lapse rates, and interest are prescribed and require a change in regulation. The major risks reserved for, incidence, continuance, and utilization, are not defined, however. Actuaries apply Provisions for Adverse Deviation (PAD) to claim rates, but these are fixed and are

small compared to the magnitude of premium and reserve increases. Modifying these regulations require legislative and regulatory actions that can take several years, by which time the Long Term Care risk environment may have changed significantly enough to make these new regulations obsolete.

An important reserve for Long Term Care in the US is the Incurred But Not Reported (IBNR) reserve. This reserve accounts for claims that are not yet known to the insurer. This is critical for an insurance which covers old age risks, especially Alzheimer-type ailments where the insured may not know if he or she has a Long Term Care Insurance policy.

Besides insurance regulatory reserves, other important reserves are gross premium reserves, which reflect gross premium and expenses and are used to determine the financial soundness of a portfolio; and tax reserves for income tax purposes, as prescribed by the Internal Revenue Services (IRS). Since they are prescribed and are maximum reserves, they tend to limit the amount of reserves a company is willing to set up in a particular year due to its tax status. Publicly owned companies calculate Generally Accepted Accounting Principles (GAAP) reserves as prescribed by the Financial Accounting Standard Board (FASB); this method incorporates an expense reserve and the Deferred Acquisition Costs (DAC) asset, an important feature for US companies as commissions are usually front loaded. Multi-national companies are subject to International Financial Reporting Standards (IFRS) as prescribed by the International Accounting Standards Board (IASB). Most of these reserve standards are not specific to the Long Term Care risk and are defined for general insurance contracts.

One major difference between the current reserving approach used in the US for LTC is that it is deterministic, whereas the proposed PBR technique is stochastic.

In France, reserving and pricing are closely linked through the revalorization process, which contractually gives the right of a company to reassess premium and benefits based on developing experience.

2.6.9 Facultative Versus Mandatory

Long Term Care insurance is predominantly underwritten, even for group insurance, which is mostly facultative. In France about 20% of Long Term Care is through mandatory, guaranteed issue, group insurance.[34]

LTC insurance in France is mainly sold through '*mutuelles*', (see 'mutuals and mutuelles' below). In 2010, 2 million members of a '*Mutuelle*' connected with the educational system, MGEN (*Mutuelle Générale de l'Education Nationale*), were insured for Long Term Care through their group contract, which almost overnight brought the number of insureds to 5.5 million. The automatic or mandatory addition of the insurance to an individual's existing coverage has a great impact on the actuarial soundness of the Long Term Care plan as the number of covered individuals is larger and anti-selection is avoided.

Most Long Term Care coverage in group contracts in France are part of a portfolio of savings, retirement, medical, and disability benefits and are usually integrated with these benefits. For instance, in some plans, it is possible to earn 'points' which accumulate in the participant's account and can be used by the participant upon leaving employment, through retirement or otherwise.

The Group/Individual, mandatory/elective, Guaranteed Issue/Underwritten distinction, however, is not clear-cut since '*mutuelles*', such as MGEN, offer Long Term Care insurance to other employers (non-education) and to individuals with various levels of election options and underwriting requirements.

2.6.10 Mutuals and Mutuelles

In the US there has been a trend to demutualize insurance companies, but several mutual companies market Long Term Care insurance. The major difference between non-mutual products and mutual products are dividends. This difference is significant in the premium increase environment LTC insurance has found itself in. While premium increases have sometimes been in the 100% range and dividends are in the 10% range, the fact that mutual insurers can reflect developing experience on an annual basis, as opposed to the extended process of a rate increase state approval, means that mutual companies are much better equipped to manage the LTC risk.

In France the public function of the '*mutuelles*' has its own legal and regulatory framework. Mutual companies have kept the trade aspect of mutual societies whose main purpose is to help its members, through services and mutualization of risks. Many mutual companies offer Long Term Care services and provide such services instead of cash payments when a member becomes dependent. Several mutual companies have research centers to develop new products, services, and technologies.

2.6.11 Loss Ratios

Loss Ratios[5] are key indicators relied upon by US regulators to monitor the effectiveness of health insurance related products. While loss ratios are more relevant in a one year span, which eliminates the impact interest rate assumptions, they are widely used to assess the long-term behavior of LTCI products. The difference between the US and France is striking. In 2014 the US loss ratio was 76%[4] while the loss ratio in France was 42%[35] in 2016 for stand-alone Long Term Care insurance products. While there is a 10-year lag in the evolution of the market between the US and France and the 2006 US Loss Ratio was 45%, the French trend is not likely to resemble the US trend for several reasons.

- Few French companies have withdrawn from the market, which is very varied. The 42% Loss Ratio comes from 1.6 million policyholders who bought policies

from insurance companies. But an additional 5 million policyholders are covered by combination products through insurers such as *mutuelles*, described above, or companies whose primary function is not insurance such as the Post Office or banks (Bancassurance). That is, marketing is not as concentrated in a distribution channel or outlet as in the US.

- Benefits and premiums are much lower than the ones that were found in the initial US products, although their durations were all lifetime. The average annual premium corresponding to 42% Loss Ratio, with €1 = $1.18, is $422, and the average benefit is $176. In the US the 76% Loss Ratio average premium is $1,590 and the average claim is $1,204.
- Claim thresholds are much higher in France (see Section 3). In the US, only 2 ADLs are required to receive benefits, while 4 are required under a Total Dependence policy. Just about all contracts incorporate a three-year Waiting Period for cognitive impairment and a one-year Waiting Period for most others, except accidents, which have none. If the incidence date is within the Waiting Period, the premium is reimbursed, and no benefit is paid. In addition, a three month Elimination Period applies before benefits are paid.
- Few policies offer an annual Cost of Living Adjustment.
- Premiums can be revised through the revalorization provision.
- Many benefits, especially through *mutuelles*, take the form of services.

2.6.12 Marketing Distribution

Distribution channels are strikingly different. As we have seen earlier, the regulatory separation of banking and insurance operations in the US preclude the development of bancassurance. In France about 60% of Life insurance products (including annuities, which are the preferred form of Long Term Care products) is sold through bancassurance.

In the US about half of insurance products are sold through commission compensated independent agents. In France, only 10% of the products are sold through non-salaried agents.

Direct marketing, especially on the internet, also occupies a larger proportion of sales in France, 15%, versus 10% in the US.

These differences have an impact beyond the front-loaded, higher distribution costs of Long Term Care policies. One issue that arose during the rate increase wave in the US was the representation of lifetime level premiums, where the guaranteed renewability of the policy was not clearly disclosed at the time of the sale by the agent.

Bancassurance, through its branch advertising, also brings Long Term Care Insurance in the daily lives of the population.

In France the multiplicity of distribution channels is not confined to banks and the internet, but to operations that would not be expected in the United States, like the national postal service, which offers a wide array of insurance products, including

LTC, advertised and offered in many of its 16,000 offices. The post office has its own actuarial department which designs products that fit its other products and its customers' needs.

2.7 Conclusion

This chapter attempts to give a very brief overview of the LTC risk environment in the US.

Insurance companies have given several reasons for exiting the LTCI market[36]:

1. Poor performance, as exemplified in the three examples cited at the beginning of the chapter.
2. High capital requirement, which Solvency 2 is raising.
3. Ability to raise premium.
4. Worsening assessment of the risk.
5. Lack of risk management expertise.
6. Lack of reinsurers.
7. Reputation risk.
8. Risk of downgrade from rating agencies.
9. Too difficult to market.

Whether these concerns can be lifted over time remains to be seen, but this book attempts to address concerns 4 and 5.

The many factors that influence current and future LTSS costs call for actuarial tools which need to incorporate parametric distributions, and combinations of such distributions, not previously considered, with tools that build upon current developments in technologies such as data, computers, the internet, Artificial Intelligence; and actuarial research. Most of the book addresses the biometric aspect of the insurance risk, which deals with the benefit side of the equation, be it cash or cost reimbursement. But, even if benefits are becoming more limited, many premiums are still on a lifetime basis, which means exposure to non-biometric volatility. And that volatility is not only found in quantifiable factors such as interest rates, assets, persistency, or expenses, but also in less quantifiable social, political and geographical factors. For insurance companies, the Long Term Care risk is also more akin to disability insurance than life insurance, in that it is exposed to a high occurrence of fraudulent claims. While it may be expedient to ignore these non-biometric risks at the time of setting premium rates, when premiums are spread over an extended but receding period and are not easily modified, then it is likely that the current US experience will be repeated. Beyond the insurance sphere, the impact of the Long Term Care risk is not only defined by quantifications and projections, but no adequate approach can be reached without its adequate measurement, which requires new methodologies.

This book concentrates on two markets, France and the United States, and this chapter delves into the legal and regulatory environment of the United States. The

legal and regulatory environment of France, now part of the relatively new European Union, will increasingly resemble that of the US.

Looking back at the three cases described at the beginning of this chapter, they illustrate several facets of the Long Term Care risk.

- Global risk: one stated reason for a Chinese insurance company's interest in purchasing Genworth is the LTCI experience Genworth has generated and how it could be beneficial for insuring the risk in China. In 1979, China instituted a one-child policy, which was phased out in 2016. The policy has produced the 'four-two-one' phenomenon where an adult may be faced with the care of two parents and four grandparents.
- Jurisdiction: Penn Treaty's policyholders will not be treated equally through its liquidation process, as each state has its own Guaranty Fund statutes which govern how, and to what extent, their residents insured by the Pennsylvania company can receive their benefits.
- Reinsurance and reserves: General Electric's decision to substantially increase the reserves of its reinsurer has had a major impact on their client ceding companies.

End Notes

1. http://www.penntreaty.com/Liquidation/CourtDocuments.aspx. http://www.penntreaty.com/Portals/0/PDFs/PTNA/penn_treaty_nework_america_ins_company_rehabilitation_order_jan_6,_2009[1].pdf.
2. Statutory reserves regulated by the jurisdiction where the insurance is sold. In this chapter, statutory reserves refer to Active Life Reserves (ALR) and Claim Reserves (CR). http://us.milliman.com/uploadedFiles/insight/2016/long-term-care-insurance-valuation.pdf.
3. https://www.irs.gov/pub/irs-regs/td8792.pdf.
4. http://www.naic.org/documents/cipr_current_study_160519_ltc_insurance.pdf.
   NAIC: National Association of Insurance Commissioners (1871). A non-governmental organization governed by the chief insurance regulators from the 50 states, the District of Columbia and five U.S. territories. The NAIC assists state insurance regulators in establishing standards and best practices, conduct peer reviews, and coordinate regulatory oversight. Its organization is divided into four zones: Northeastern, Southeastern, Midwestern and Western. The NAIC acts as a forum for the creation of model laws and regulations. Each state decides whether to pass each NAIC model law or regulation, and each state may make changes in the enactment process. The NAIC also acts at the national level to advance laws and policies supported by state insurance regulators. The NAIC is also responsible for creating the statutory accounting principles (SAP) upon which insurance accounting is based and is notable for its very conservative valuation methods. The NAIC promulgates the annual statement which incorporates SAP and must be filed with the department of insurance in every state in which an insurance company conducts business.

5. Loss Ratio.
   In Health insurance products, a Loss Ratio (LR) is the ratio of the annual medical costs and the annual premium. In Long Term Care Insurance pricing and regulatory pricing, this ratio is the present value, or the accumulated value, of the benefits and the present value of premiums. For projections the numerator and denominator can take several forms:
   Benefits can be Paid or Incurred, and may include Active Life Reserve.
   The relationship between Paid (PC) and Incurred (IC) claims is IC = PC + change in IBNR, where IBNR is Incurred But Not Reported Reserve.
   Premium can be on a Paid or Earned basis.
   The relationship between Paid (PP) and Earned (EP) premium is EP = PP + change in UR, where UR is Unearned Premium Reserve. A common Loss Ratio measure is the cumulative ratio, where past paid claims are divided by past paid premiums, accumulated at the applicable interest rates.
6. Genworth Cost of Care Survey.
   https://www.genworth.com/about-us/industry-expertise/cost-of-care.html.
7. Mobility rates
   http://libertystreeteconomics.newyorkfed.org/2016/10/what-caused-the-decline-in-interstate-migration-in-the-united-states.html.
8. LTSS costs, Private Insurance and Gross Domestic Product.
   Source: National Health Expenditure Accounts, Office of the Actuary, Center for Medicare and Medicaid Services. LTSS is the sum of Total Nursing Care Facilities and Continuing Care Retirement Communities and Total Home Health Care Expenditures.
9. Riders are optional benefits that can be added to a policy for an additional premium. A Cost of Living Adjustment is required to be offered for a Long Term Care insurance policy to be considered Tax Qualified, but an applicant can opt not to add it.
10. Medicare (1966) is a single-payer federal social medical insurance program, funded through federal payroll tax and general revenue. It provides health insurance for Americans aged 65 and older who have worked and paid into the system through the payroll tax. In 2016, it provided health insurance for over 48 million people age 65 and older.
    https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/ReportsTrustFunds/Downloads/TR2017.pdf.
11. **A**ctivities of **D**aily **L**iving, as defined in the Internal Revenue Code:

    (1) Eating
    (2) Toileting
    (3) Transferring
    (4) Bathing
    (5) Dressing
    (6) Continence.

12. ASOP (Actuarial Standards of Practice)

LTC: http://www.actuarialstandardsboard.org/wp-content/uploads/2014/02/asop018_136.pdf.
Data: http://www.actuarialstandardsboard.org/wp-content/uploads/2017/01/asop023_185.pdf.

13. Partnership: these plans are designed to help an individual to offset their Long Term Care insurance benefits from their Medicaid asset limit eligibility requirements. https://www.ltcfeds.com/help/faq/miscellaneous_partnership.html.
14. Medicaid (1966) is social insurance program funded jointly by the national (federal) government and each state. It is administered by individual sates but subject to federal minimum requirements to receive funding. Medicaid is a Pay as You Go program, annually funded. As of this writing Medicaid is the largest institutional payor of LTSS. Eligibility to Medicaid benefits depends on need and financial resources. As of 2017, 74 million people have received Medicaid benefits.
15. https://www.hhs.gov/hipaa/for-professionals/privacy/laws-regulations/combined-regulation-text/index.html.
16. CLASS
file:///C:/A/textbook/Chapters/US/CLASS/Class-Act-Legislation.pdf.
http://www.ncsl.org/documents/statefed/health/CLASSOvrview21313.pdf.
https://www.actuary.org/files/publications/class_july09_0.pdf.
17. Economic dependency
https://www.bls.gov/emp/tables/economic-dependency-ratio.htm.
18. https://www.populationpyramid.net/united-states-of-america/2017/.
19. Current Population Survey: Bureau of Labor Statistics and Census Bureau.
20. https://www.census.gov/data/tables/2013/demo/wealth/wealth-asset-ownership.html.
21. 'How are income and wealth linked to health and longevity?', Urban Institute https://www.urban.org/research/publication/how-are-income-and-wealth-linked-health-and-longevity.
22. https://aspe.hhs.gov/reports.
23. A Single Index of Mortality and Morbidity by Daniel F. Sullivan *HSMHA Health Reports*, Vol. 86, No. 4 (Apr., 1971), pp. 347–354: http://dx.doi.org/10.2307/4594169.
24. The National Nursing Home Survey (NNHS) is a series of nationally representative sample surveys of United States nursing homes, their services, their staff, and their residents. The NNHS was first conducted in 1973–1974 and repeated in 1977, 1985, 1995, 1997, 1999, and most recently in 2004. Although each of these surveys emphasized different topics, they all provided some common basic information about nursing homes, their residents, and their staff. All nursing homes included had at least three beds and were either certified (by Medicare or Medicaid) or had a state license to operate as a nursing home. In 2012, NCHS initiated the National Study of Long Term Care Providers (NSLTCP)—a biennial study of adult day services centers, residential care communities, nursing homes, home health agencies, and hospice agencies. NSLTCP uses administra-

tive data for the nursing home sector obtained from the Centers for Medicare and Medicaid Services (CMS).

25. Transactions of the Society of Actuaries 1988–1990 Reports, Report of the Long Term Care Experience Committee, 1985 National Nursing Home Survey, Utilization data. The survey was based on 1982 data collected by the National Center for Health Facilities from which 1,079 facilities were sampled producing a sample of 5,243 residents and 6,023 discharged residents. https://www.soa.org/Library/Research/Transactions-Reports-Of-Mortality-Moribidity-And-Experience/1980-89/1988/January/TSR886.aspx.
26. SOA Long Term Care Intercompany Experience Study Intercompany study
1984–91: https://www.soa.org/library/research/transactions-reports-of-mortality-moribidity-and-experience/1990-99/1993/january/TSR934.pdf.
1984–93: https://www.soa.org/experience-studies/2000-2004/ltc-84-93-insurance-experience-study/.
1984–2000: https://www.soa.org/experience-studies/2000-2004/hlth-1984-2001-long-term-care-experience-committees-intercompany-study/.
1984–2007: https://www.soa.org/experience-studies/2005-2009/research-ltc-study-1984/.
2000–2011: https://www.soa.org/experience-studies/2015/research-ltc-study-2000-11-aggregrated/.
2015 models: https://www.soa.org/experience-studies/2015/2000-2011-ltc-experience-basic-table-dev/.
27. Policy persistency:
2002–04: https://www.soa.org/experience-studies/2005-2009/ltci-ins-persistency/.
2005–07: https://www.soa.org/experience-studies/2011/05-07-ltc-ins-persistency-report/.
2008–11: https://www.soa.org/experience-studies/2016/research-ltc-insurance/.
28. Waiting Period: The number of years during which the insurer will reimburse premium but not pay any benefit in case of a claim.
Elimination Period: The number of months after which benefit payments start after the incidence date. The EP can vary from one month to 18 months. Some policies will retroactively pay benefits accrued during the Elimination Period. Regulations may limit the maximum Elimination Period.
29. https://mort.soa.org/?_ga=2.170063268.587304493.1514832902-422425784.1465397146.
30. Actuarial Memorandum (from NAIC Model Law 641)
Model 641 s 10
Initial filing requirements
A. This section applies to any long term care policy issued in this state on or after [insert date that is 6 months after adoption of the amended regulation].

B. An insurer shall provide the information listed in this subsection to the commissioner [30 days] prior to making a long term care insurance form available for sale.
Drafting Note: States should consider whether a time period other than 30 days is desirable. An alternative time period would be the time period required for policy form approval in the applicable state regulation or law.
(1) A copy of the disclosure documents required in Section 9; and
(2) An actuarial certification consisting of at least the following:
(a) A statement that the initial premium rate schedule is sufficient to cover anticipated costs under moderately adverse experience and that the premium rate schedule is reasonably expected to be sustainable over the life of the form with no future premium increases anticipated;
(b) A statement that the policy design and coverage provided have been reviewed and taken into consideration;
(c) A statement that the underwriting and claims adjudication processes have been reviewed and taken into consideration;
(d) A complete description of the basis for contract reserves that are anticipated to be held under the form, to include:
(i) Sufficient detail or sample calculations provided so as to have a complete depiction of the reserve amounts to be held;
(ii) A statement that the assumptions used for reserves contain reasonable margins for adverse experience;
(iii) A statement that the net valuation premium for renewal years does not increase (except for attained-age rating where permitted); and
(iv) A statement that the difference between the gross premium and the net valuation premium for renewal years is sufficient to cover expected renewal expenses; or if such a statement cannot be made, a complete description of the situations where this does not occur;
(I) An aggregate distribution of anticipated issues may be used as long as the underlying gross premiums maintain a reasonably consistent relationship;
(II) If the gross premiums for certain age groups appear to be inconsistent with this requirement, the commissioner may request a demonstration under Subsection C based on a standard age distribution; and
(e) (i) A statement that the premium rate schedule is not less than the premium rate schedule for existing similar policy forms also available from the insurer except for reasonable differences attributable to benefits; or
(ii) A comparison of the premium schedules for similar policy forms that are currently available from the insurer with an explanation of the differences.
C. (1) The commissioner may request an actuarial demonstration that benefits are reasonable in relation to premiums. The actuarial demonstration shall include either premium and claim experience on similar policy forms, adjusted for any premium or benefit differences, relevant and credible data from other studies, or both.

(2) In the event the commissioner asks for additional information under this provision, the period in Subsection B does not include the period during which the insurer is preparing the requested information.

31. Insurance Compact:
http://www.insurancecompact.org/about.htm.
32. Principle-Based Reserving:
https://www.actuary.org/files/LTC_PBR_Report_012116_0.pdf.
33. Commissioner's reserve valuation method.
(1) Reserves according to the commissioner's reserve valuation method, for the life insurance and endowment benefits of policies providing for a uniform amount of insurance and requiring the payment of uniform premiums, must be the excess, if any, of the present value, at the date of valuation, of future guaranteed benefits provided for by the policies, over the then present value of any future modified net premiums. The modified net premiums for any policy must be the uniform percentage of the respective contract premiums for the benefits that the present value, at the date of issue of the policy, of all modified net premiums must be equal to the sum of the then present value of the benefits provided for by the policy and the excess of Subsection (1)(a) over Subsection (1)(b), as follows:
(a) a net level annual premium equal to the present value, at the date of issue, of benefits provided for after the first policy year, divided by the present value, at the date of issue of an annuity of one per annum payable on the first and each subsequent anniversary of the policy on which a premium falls due. However, the net level annual premium may not exceed the net level annual premium on the 19-year premium whole life plan for insurance of the same amount at an age 1 year higher than the age at issue of the policy.
(b) a net 1-year term premium for benefits provided for in the first policy year.
(2) (a) For each life insurance policy issued on or after January 1, 1987, for which the contract premium in the first policy year exceeds that of the second year, for which a comparable additional benefit is not provided in the first year for the excess, and that provides an endowment benefit, a cash surrender value, or a combination of both in an amount greater than the excess premium, the reserve according to the commissioner's reserve valuation method, as of any policy anniversary occurring on or before the assumed ending date as the first policy anniversary on which the sum of any endowment benefit and any cash surrender value then available is greater than the excess premium, is the greater of the reserve as of the policy anniversary calculated as described in Subsection (1) or the reserve as of the policy anniversary calculated as described in Subsection (1) with the following exceptions:
(i) the value defined in Subsection (1)(a) is reduced by 15% of the amount of the excess first-year premium;
(ii) all present values of benefits and premiums are determined without reference to premiums or benefits provided for in the policy after the assumed ending date;
(iii) the policy is assumed to mature on the assumed ending date as an endowment; and

(iv) the cash surrender value provided on the assumed ending date is considered an endowment benefit.
(b) In making the comparisons in Subsection (2)(a), the mortality and interest bases [stated in another section] must be used.
(3) Reserves according to the commissioner's reserve valuation method for the following must be calculated by a method consistent with the principles of this section, except that any extra premiums charged because of impairments or special hazards must be disregarded in the determination of modified net premiums:
(a) life insurance policies providing for a varying amount of insurance or requiring the payment of varying premiums;
(b) group annuity and pure endowment contracts purchased under a retirement plan or plan of deferred compensation, established or maintained by an employer, including a partnership or sole proprietorship, or by an employee organization, or by both, other than a plan providing individual retirement accounts or individual retirement annuities under Section 408 of the Internal Revenue Code, as amended;
(c) disability and accidental death benefits in all policies and contracts; and
(d) all other benefits, except life insurance and endowment benefits in life insurance policies and benefits provided by all other annuity and pure endowment contracts.
(4) (a) Subsection (4)(b) applies to any annuity and pure endowment contracts other than group annuity and pure endowment contracts purchased under a retirement plan or plan of deferred compensation established or maintained by an employer, including a partnership or sole proprietorship, or by an employee organization, or by both, other than a plan providing individual retirement accounts or individual retirement annuities under Section 408 of the Internal Revenue Code, as amended.
(b) Reserves according to the commissioner's annuity reserve method for benefits under annuity or pure endowment contracts, excluding any disability and accidental death benefits in the contracts, must be the greatest of the respective excesses of the present values, at the date of valuation, of the future guaranteed benefits, including guaranteed nonforfeiture benefits, provided for by the contracts at the end of each respective contract year, over the present value, at the date of valuation, of any future valuation considerations derived from future gross considerations required by the terms of the contract that become payable prior to the end of the respective contract year. The future guaranteed benefits must be determined by using the mortality table, if any, and the interest rate or rates specified in the contracts for determining guaranteed benefits. The valuation considerations are the portions of the respective gross considerations applied under the terms of the contracts to determine nonforfeiture values.
(c) The commissioner's reserve valuation method provided by this section is subject to the provisions of the valuation manual as adopted by the commissioner.

34. Mandatory insurance:

http://www.argusdelassurance.com/mediatheque/9/5/4/000013459.pdf.
35. Long Term Care Insurance in France https://www.ffa-assurance.fr/content/assurance-dependance-68-millions-de-personnes-couvertes-la-fin-de-annee-2015.
36. "Exiting the Market: Understanding the Factors behind Carriers' Decision to Leave the LTC Insurance Market" Lifeplans 2013.

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2. Lally, N.R., Hartman, B.M.: Predictive modeling in long-term care insurance. N. Am Actuar. J. **20**(2) (2016)
3. Report of the American Academy of Actuaries' Long Term Care Risk Based Capital Work Group to the NAIC Capital Adequacy Task Force
4. Report on Principle-Based Reserve Modeling for Long-Term Care (LTC) Insurance, American Academy of Actuaries