

Solution #1:

- (a) A premium deficiency reserve is needed when it is anticipated that the current premiums are not sufficient to cover future claims and expenses. A gross premium valuation should be done to determine if the reserves in aggregate are sufficient.

It is critical to recognize whether surplus runs the risk of becoming impaired.

Premium deficiency reserves are different from contract reserves in that the premiums were originally intended to be sufficient, but later it is determined that they will not be adequate.

Often, premium deficiency reserves are not held for group customers because rates can be increased in the future, but it is necessary to consider how long rates are guaranteed into the future if premiums are locked in at a level below expected costs.

Policies can be grouped and sufficiencies within the grouping can offset deficiencies. The grouping should be material to the results and consistent with the way the company manages the business.

Suggested groupings: Medical – individual, large group, small group, mega group  
Medicare  
Medicaid  
HMO

- (b) Reserve increases – must be realistic and need to consider whether regulatory bodies will allow; consider the impact of rate increases on persistency.

Enrollment – improvements cannot be used to eliminate the deficiency unless historically proved to do so.

- Consider lapses
- Cancellations – only include if likely to occur.

Interest Rate

Future Claims Trend

Expenses – if other products will cover overhead, overhead does not need to be included.

Taxes – projection should be after-tax.

Provider Reimbursement Contracts: Amounts owed can only be included if the amount has been determined and actually billed.

Solution #1 - Continued

Include Capitation at the current levels.

Consider the need to purchase services on a fee-for-service basis (more expensive) if a contracted provider goes insolvent.

Reserves must be held from the valuation date until the deficiency no longer exists.

Some deficiencies are eliminated through premium increases; some continue forever.

(c) Premium Deficiency Reserve:           =    Present Value of Future Claims  
  +    Present Value of Future Expenses  
  -    Present Value of Future Premiums  
  -    Present Value of Future Premiums  
  -    Current Premium Reserves  
  -    Current Contract Reserves  
  -    Current Claim Reserves

Premium in 1999       = 8,352,000  
Employees             = 3,000  
Increase               = 5%  
So, premium in 2000 =  $8,352,000 \times 1.05 = 8,769,600$

Claims 7/98-6/99      = 8,769,000  
Trend from 1/99-7/00 from midpoint to midpoint  
Trend factor           =  $(1.009)^{12} \times (1.012)^6 = 1.196$

Therefore, expected claims for 2000 are  $(8,769,000) (1.196) = 10,488,832$ .

There are no contract reserves held.  
Administrative expense =  $12 \times 3000 \times 12 = 432,000$ .  
Commission 5% premium =  $8,769,600 \times 0.05 = 438,480$ .

Expected claims	10,488,832
Premium charged	-8,769,600
Administrative expense	432,000
Commission	<u>438,480</u>
Deficiency Reserve	2,589,712

Solution #2

(a) Table MM-1 (in 000s)

1998 reported incurred claims	= 1,129,000
1999 reported incurred claims	= 1,283,000
Increase	= 13.64%

Per Table 2, claims trend:

The claims trend from midpoint 1998 to midpoint 1999

$$= \left[ \frac{(1.008)^6}{6 \text{ mos '98 trend}} \right] \times \left[ \frac{(1.009)^6 - 1}{6 \text{ mos '99 trend}} \right] = 10.69\%$$

Member Growth must account for the difference:

$$\text{Member growth} = \left( \frac{1.1364}{1.1069} - 1 \right) = 2.66\%$$

This calculation assumes that the age/sex and plan design at Wonderful Life has not changed. If it has, then 1998 and/or 1999 claims should be adjusted to reflect this before determining growth increase percentages.

Solution #2 – Continued

(b) Our trend =  $\left[ (1.008)^6 \times (1.009)^6 - 1 \right] = 10.69\%$

Industry trend = 7.0%.

Reasons for difference:

- Plan design – high/low deductible, Rx coverage
- Regional variances
- What is industry trend?
  - △ Premiums?
  - △ Claims?
  - △ CPI?
  - △ Plan designs?
- Major medical is not MCO and with lesser controls, its trend may be higher.
- Wonderful Life's aggressive negotiations with PPOs might help immunize against cost shifting.
- If Wonderful Life's trend can be supported by the market without reducing prospects and losing clients, it is not a major concern.

Trends:

Trend is made up of two main components:

- Increase in price levels
- Residual trend.

The primary reason trends can vary from the industry and is not price but the residual price.

- Utilization
- Case severity mix
- Demographic changes (aging population)
- Geographic mix
- New technology
- Shifting practice patterns.

Also, plan design is key.

- Plans with different deductible/co-pay provisions will have different impact on leveraged trend factors and leveraging effect of fixed deductible.

Solution #2 – Continued

(c) Underwriting Cycle:

Claims trends are determined by looking at historical changes in prices and utilizations and assuming that those changes will persist. When claims trends are rising, insurance companies are playing catch-up since they cannot anticipate the higher-than-expected trend. (This is the bad part of the cycle.) When trends are decreasing, the insurers are overestimating trend and this is the good part of the cycle.

Essentially, premium increase trends lag claim increase trends.

The cycle is also driven by more aggressive underwriting in periods of gain and more conservative in periods of loss.

Underwriting cycles are the nature of the business. Managed care has some better control due to provider contracting.

If loss ratios are increasing, this implies that the company is in the downward portion of the underwriting cycle and that trends may be higher than anticipated. However, because the industry trend is at 7%, Wonderful Life cannot increase premiums to much without concern for losing business.

Surplus must be saved during “good times” to compensate for the “bad times.”

Cycle has been six years (three years of gains and three years of losses) and was driven, to a great extent, by changes in claim trends.

Results for individual plans have frequently been different from the aggregate cycle.

If the historical cycle of three years followed by three years of losses is used to predict the future, underwriting gains should be expected in 1999. If the extended nature of the most recent phases is an indication, the period of underwriting losses could continue through 1999.

Wonderful Life’s enrollment was flat in 1997 and 1998 (see Tables MM-5a, MM-5b, or MM-6b) but increased between 1998 and 1999.

The loss ratio increase between 1998 and 1999 might be related to the underwriting cycle, if the enrollment growth was due to more aggressive underwriting.

There was also price pressure to market.

Solution #3

(a)

Credibility	Group 1 0%	Group 3 50%
<u>Manual Claims:</u>		
Base Claim Rate	263	263
× Trend	1.00	$(1.012)^2$
× Age/Sex	0.9	1.1
× Plan Design (Benefit)	0.7	0.75
× Region	<u>0.9</u>	<u>0.9</u>
	149.12	199.99
<u>Experience Claims:</u>		
Claims < 50K	N/A	567,000
× Trend		$(1.09)^{12}(1.012)^8$ *
		$\frac{567,000(1.09)^{12}(1.012)^8}{300(12)} = 192.94$
× PEPM		
<u>Gross Premium:</u>		
Z = Credibility Factor		
[(1-Z) (Manual Claims)	(1) (149.12)	(0.5) (199.99)
+Z × Experience Claims]		+ (0.5) (192.94)
+ Admin.	20	15
÷ (1 - commission % - risk %)	<u>(1 - 0.1 - 0.06)</u>	<u>(1 - 0.06 - 0.04)</u>
	\$201.33	\$234.96

\* 9/1/2000 midpoint

Solution #3 – Continued

(b)

Experience Refund Balance	
= Prior Balance Carry Forward .....	-25,000
+ Premiums .....	8,352,000
+ Investment Income .....	0
- Claims > 50K .....	5,658,000
+ Pooling Charge .....	29.26 (12)(3000)
- Administration .....	(3000)(12)(12)
- Commissions .....	0.05 (8,352,000)
- Risk/Profit .....	0.03 (8,352,000)
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	515,480

Pooling Charge:  
Mid-Point = 1/1/99

Trend Adjusted:

$$\text{Pooling Charge} = \frac{35}{(1.09)^{12}(1.012)^6} = 29.26$$

## Solution #4

(a) Projection Elements are:

1. Definition of Projection Cells
  - Define by market segments, product classes, etc.
  - Need to be homogeneous.
2. Base Period
  - Should generally be a period of 12 months, to eliminate seasonal effects.
  - At least three months of claims run-out be available.
  - Ability to reconcile with financial statements.
3. Projection Period
  - Usually 2-5 years.
  - Should have a clear understanding of purpose for which it will be used.
4. Membership Projection
  - Changes to membership can be expressed as absolute increases or decreases, or in the form of percentage changes.
  - Consider interrelationship of membership growth and premium rate increases.
  - Know whether projections are sales goals, desired results, or realistic best-estimate.
5. Income Projection
  - Could be on a cell basis or a group-by-group basis.
  - For early months, use assumed average rate increases.
  - For later months, set rate increases based on projected incurred claim levels, to produce a specified target loss ratio.
  - Consider "product mix" such as changes in benefits, demographics composition, morbidity level, etc.
6. Claims Expense Projection
  - Apply specific provider contracting assumptions
  - Apply trends to base period monthly claim value.
  - Start with an average claim-per-member per value for the 12-month base period, then projecting monthly value corresponding to trend changes.
  - Applying factors to reflect seasonal variations.
  - Loss ratios are not generally a good vehicle because the implicit assumption is that claim levels will be consistent with pricing assumptions.



Solution #4 – Continued

7. Administrative Expense Projections
  - Based on separate budget.
  - Adjusted for membership.
  - Expenses should be treated consistently with expenses in the company's financial statement.
8. Other Items
  - Premium tax, commissions, investment income, etc.
9. Comparison of Interim Period Results
  - To test reasonableness of the forecast.
  - Some fine-tuning of the forecast may be needed.

- (b) Important to restate base values because:
- To produce realistic picture of the underlying experience.
  - Restated results can be viewed as business performance reports.
  - Restated result is a more accurate representation of performance.

- (c) (i)

Determine the effect of the above items on restated operating earnings before taxes.

$$\begin{aligned}\text{UPR}_{\text{Difference}} &= \text{UPR}_{\text{Restated}} - \text{UPR}_{\text{Original}} \\ &= 32,000 - 35,000 \\ &= -3,000\end{aligned}$$

$$\begin{aligned}(\text{D/U}) \text{ Due Unpaid Difference} &= \text{D/U}_{\text{Restated}} - \text{D/U}_{\text{Original}} \\ &= 24,000 - 28,000 \\ &= -4,000\end{aligned}$$

$$\begin{aligned}\text{IBNR}_{\text{Difference}} &= \text{IBNR}_{\text{Restated}} - \text{IBNR}_{\text{Original}} \\ &= 148,000 - 150,000 \\ &= -2,000\end{aligned}$$

Solution #4 – Continued

$$\begin{aligned}\text{Restated Premium Income} &= 1,584,000 - (-3,000) + (-4,000) \\ &= 1,583,000\end{aligned}$$

$$\text{Restated Change in Reserve} = 4,000 + (-2,000) = 2,000$$

(ii)

**1999 Restated Financial Statement**

<b>Premium Income</b>	1,583,000
Paid Claims	1,279,000
Change in Reserves	2,000
<b>Total Claims Expense</b>	1,281,000
<b>Gross Margin</b>	302,000
General Administrative Expense	157,000
Commissions	81,000
Premium Tax	32,000
<b>Total Expense</b>	270,000
<b>Operating Margin</b>	32,000
Investment Income	49,000
Other Income	1,000
<b>Total Other Income</b>	50,000
<b>Operating Earnings before Taxes</b>	82,000
Taxes	30,800
<b>Operating Earnings after Taxes</b>	51,200

Solution #5:

- (a) Factors influencing the reasonableness of the raw completion factors include:
- IBNR Model output uses 6-month average completion factors, which may not accurately reflect current run-out patterns.
  - System conversion resulted in faster claim payments at all lags.
  - Claim lags prior to 1998 may not reflect recent experience.
  - System conversion resulted in faster claims submissions by Providers.
  - Historical completion factors may be lower than current.
  - Year 2000 efforts to reduce claim inventories by year end 1999.
  - Removal of claim edits will speed up processing.
  - Claim Department overtime to reduce inventories will change recent lag factors.
  - Reserve estimates for recent lags will be volatile due to processing changes.
  - Completion factors for early months are not a good estimate. For example, the December 1999 hospital factor is too high. Also, the November 1999 hospital factor, as compared to the November 1998 hospital factor, is greater by 26%.
  - As a result, adjustments are needed to reflect processing changes to produce reasonable reserve estimates.
- (b) Other techniques include: (relevant examples can also be drawn from the case study)
- Simple averaging, such as 3-months, 6-months, or 12-months, is commonly employed.
  - Removing “bumps” by throwing out high and low values used in creating the average values not likely to be replicated in future payment patterns. Also, “bumps” can be smoothed by removing catastrophic or “shock” claim dollars from incurred and paid cells.
  - Weighted averaging, such as sum of digits, squared sums of digits, or constantly declining percent weighting.
  - Using other types of means such as harmonic or geometric means.
  - Using dollar weighted ratios by first averaging dollars, then creating ratios.
  - Using per-member-age-to-age ratios (first divide payments per lag by exposure to PMPM payments).

Solution #5 – Continued

(c) Adjustments or alternatives to produce an improved IBNR estimate include:

- Blending with the projection method. By dividing small incurred and paid amounts by numbers close to zero, the resulting minor differences are magnified into large swings in incurred claims. Thus, a credibility process is used to substitute for unstable values. Typically, completion factors below 40% to 70% should be replaced with other estimates.
- Also, trended PMPM projections are often employed by replacing the last few months of unstable completion estimates by incurred claim estimates developed by exposed membership by trended PMPM costs. Further, multiple trends and PMPM projections may be used to produce a number of estimates.
- Blending with the Loss Ratio Method: This method could be used when membership is not available and may be used to compare the results of the development and projection methods.
- Historical earned premiums and completed incurred claims can be used to develop a loss ratio pattern. Then the loss ratios are applied to earned premiums for recent months to obtain incurred claims.
- The Loss Ratio Method is often used for newly issued blocks of business.
- Pricing assumptions are often used for loss ratios until experience has developed. However, developing incurred claims may indicate that premiums are inadequate and thus, the Loss Ratio Method would understate incurred claims.
- Application of Credibility Weights: Involves blending completed estimates with projected claim cost estimates. Weights are usually assigned in inverse relationship to how close completion factors are to 1.000. For the first month, the completion factor is commonly zero. Three to five months of completed estimates are often blended with alternative methods.
- Tests of suitability of loss ratios or PMPM estimates is to check figures produced by completion versus projection or loss ratio method.
- Ad Hoc and Other Over-Riding Adjustments: Factors include trends, claim inventory and processing-system changes, and reinsurance coverage.

## Solution #6

1. Participation Requirement
  - Minimum 75% in all employer's plans
  - Bailey's has 90%, so this is OK.
2. Minimum Enrollment
  - Needed to achieve efficiency in premium collection
  - Varies by size of employer
  - Bailey's is good, with 1,350 enrolled.
3. Eligible Group – Group Definition
  - Bailey's is a true employer/employee relationship
4. Minimum Size of Group
  - Bailey's is good with 1,500 employees.
5. Eligibility
  - Require an actively-at-work provision.
6. Financial Viability
  - Employer has to be strong financially. Check credit rating and financial information on employer, quarterly results, business plan, proposed expansion or merger.
  - Need financial information on Bailey's.
7. Employer Contribution
  - Expected that employer contributes
  - Bailey's pays 80% of health-care cost.
8. Payroll Deduction
  - Should not be too much higher than other plans to avoid anti-selection.
  - Employees pay 20% of cost regardless of coverage tier.
9. High-Risk Groups
  - Usually excludes high-turnover groups.
  - Usually have a no-write list.
  - Bailey's is a white-collar company.
10. Average Age
  - Want age below 45 to use community rates
  - Calculate an age/set factor for the group and reject it if factor is too high.
  - Bailey's average is below 45.

Solution # 6 – Continued

11. Male/Female Mix
  - Exclude groups with too many females (i.e., 75%) because of high maternity cost.
  - Bailey's has less than 40% females.
12. Part-time Employees
  - Require a minimum number of hours per week.
  - Bailey's only has full-time employees.
13. Past Carriers
  - Do not want employers that have high turnover rate (more than three in last five years).
14. Family Business
  - May give employment to family members to get insurance.
  - Not really a concern with a large employer like Bailey's.
15. Rate Tiers
  - Use same-rate tiers as competing plans.
  - Need to match PPO rate structure in Bailey's case.
16. Benefit Design
  - Avoid rich plan at high price to avoid anti-selection.
  - Avoid providing too rich benefit in HMO compared to indemnity plan.
  - Bailey's HMO benefits are reasonable compared to PPO.
17. Rate Guarantees
  - Typically 12 months.
  - Has Bailey's requested one?
18. Individual Underwriting
  - May require all employees to complete a short-form questionnaire.
  - Minimum required for a large employer like Bailey's.
19. Claim Experience
  - Ask for any information on previous large claims, maternity costs.
  - Is Bailey's claims experience available?
  - Anything that should be known about Bailey's past or future expected experience?

## Solution #7

### 1. Inventory Control

- Log claims into system properly.
- All transactions, regardless of form, should be counted.
- Front-end control. Date stamped and recorded immediately.
- Transfers to other departments noted with agreed times of return.
- Store work centrally. Maintain file integrity.
- Physical inventory of work on hand. Update with daily counts of receipts, productivity, and remaining inventory.

### 2. Pended/Suspended Claims

- Largest portion of problem cases
- Should be documented procedures for every category of suspend claims.
  - Which department is responsible for solving the issue?
  - What information will be needed to resolve the issue?
  - What is the timeframe for getting the information to the decision-maker?
  - What is the timeframe for response?
  - How are decisions conveyed to the claims staff?
  - What is the timeframe for completing the claim?
- Tracking monitoring mechanism.

### 3. Work Flow

- Work flow begins when a claim is received by the organization, not the department.
- Handle transaction as few times as possible.
- Use electronic claims submission.
- Claim work flow should be reevaluated periodically.
  - Major events may have caused changes in work-flow design.
  - Innovative clerk procedures may differ from established work flow. These should be expanded or curtailed.

### 4. Turnarould Time Management

- Goals for turnaround time based on:
  - Contractual requirement
  - Regulatory requirement
  - Provider billing cycle
  - Competitor practice.
- Should be incremental goals for points where a claim stops during processing.
- Reports to monitor
  - Pended/suspended claim reports
  - Paid claims reports
  - Check register
  - Lag claims report.

### Solution # 7 – Continued

- Bottlenecks investigated.
  - Insufficient staff.
  - Delays in resolving pended/suspended claims.
  - Delays in check runs.

#### 5. Staff Training

- Classroom training for new staff
  - Managed care orientation
  - Probationary period
- Self-assessment surveys
- Use quality assurance results.
- Begin with issues that will affect the biggest improvements.
- Train those with greatest need.
  - Use standardized materials.
  - Include pages from a procedure manual.

#### 6. Quality Assurance

- Typical flow of quality review process: The reviewer:
  - Gets report of productivity by analyst.
  - Randomly selects claims for review.
  - Audits claims.
  - Completes the audit sheet.
  - Meets with the analyst to discuss discrepancies.
  - Reaches consensus about which cases have errors.
  - Have the errors corrected.
- Standards for quality
  - Overall percentage of claims paid correctly.
  - Financial payment accuracies – percentage of claims with right amount paid but with other errors. Add overpayments and underpayments and divide by total amount paid.
- Audit claims
  - Was claimant eligible at date of service?
  - What was the provider status and payment arrangement?
  - Were procedures, policies, and guidelines followed?
- Repeated errors indicate training needs, policy clarification, or tightening of policies, guidelines, or procedures.
- Track adjusted claims
  - Types of claims susceptible.
  - Categories of adjusted claims.
  - Which analysts are responsible for adjusted claims?



Solution # 7 – Continued

7. Policies and Procedures

- Comprehensive policy manual.
- Standard format for procedures.

8. Coordination with Other Departments

- Positive working relationships.
- Information and process needs should be identified with every department.
- Monitoring/feedback to evaluate effectiveness of coordination.
- When claims decisions are delayed or payments inaccurate, customers do not care which department is at fault.

9. Data Processing

- Cut steps with automation.
- Improve accuracy, workflow, consistency.
- The system should provide necessary data (demographic, medical, payment eligibility, benefits).
- Validity edits during data entry.
- Claims adjudication.
- Easy to use system.
- Staff in areas responsible for data used in claims processing must understand their impact.

10. Customer Service

- Track complaints from members/providers.
- Maintain close contact with Member Services and Provider Relations.

Solution #8

(a) Potential markets for individual disability and health insurance:

Personal Medical Expenses

1. Hospital Inpatient – Those who are apprehensive of high hospital costs and are willing to bear OPD costs or have insufficient funds for more coverage.
2. Major Medical – Generally for those who want coverage for extremely expensive medical cost at a low premium, are willing to pay for routine costs, and can afford considerable cost sharing.
3. Comprehensive Coverage – Have ability to pay and are unwilling to share in risk of high medical expenses.
4. Short-Term Medical – For newly qualified students as they enter professional market or for individuals between jobs or ineligibility period. Usually covers a range from 60 to 180 days.
5. Supplementary Medical Expense Product
  - Complements a limited medical expense policy or fills a general need irrespective of other policies.
  - Medicare Supplemental Insurance may pay for benefits not covered under Medicare.
  - Design a policy with a very high or no deductible to supplement.
6. Travel Insurance, Travel Sickness, Sports Accidents – Customer-specific.
7. Personal Insurance Disability Income Protection – For a self-employed individual or someone without benefits at work;
  - Looking for an appropriate replacement ratio after social insurance programs.
8. Supplementary Disability Coverage – Generally tops-up coverage if inadequate individual policy or limited group policy.
9. Business Overhead Expense Disability – Pays for business overhead expense once you get disabled.
10. Disability Buy-Out Insurance – Pays for the amount equivalent to disabled partner's share in business so that remaining partners may purchase his share.

Solution # 8 – Continued

(b) Marketing Channels

1. Agent and Broker – Most prevalent. Agent may be exclusive or general agent.
2. Cross-Selling: Sell one company's life products and another company's health product.
3. Sell Supplemental Health Insurance to employees on a deduction basis. Requires rough canvassing of the employees by agents or special solicitors.
4. Direct Marketing Sales - Mass – Most common to associations. Sponsoring organizations is better, sometimes just a list.
5. Direct Marketing Sales – Newspaper – Customer has to call or send a coupon for more information. Call may be followed up by a call from the insurer to solicit client.
6. Direct Marketing Sales – Telephone – Initial contact is by phone. Objective of call is to establish contact.
7. Direct Marketing Drawbacks – Lack of face-to-face. Limited to simple coverage with low premium.
8. Site Marketing – Vending machines/booths at airports. Simple, low probability, high benefit products (e.g., accidental disability, travel insurance).
9. Group Conversions – High premium, low benefit.

Compensation Approaches

10. Large, early-year commission. More common for disability income insurance than for medical expense. Reflects the fact that disability is often sold in conjunction with life. Also, disability historically profitable, so deserves sales emphasis. Example is 55% first year, 5% afterwards.
11. Lower Initial and Higher Renewal Compensation: Common for medical expense policies because premium is generally higher and persistency poorer. Pattern helps to make first year commission attractive enough to stimulate sales and sufficiently small to amortize expenses.

Solution # 8 – Continued

12. Single Premium Compensation: May pay same sales compensation on single-premium products as for annual premium products as long as rate is not too high. May need to do it to avoid agent's selection of one product.
13. Employee Payroll and Telemarketing: May use salaried personnel instead. Could use agents compensated on a percentage-of-premium basis.
14. Vesting in Renewal Compensation: Vesting greater if agent is not an employee of the company. Limit vesting if agent was financed by the company at the beginning. Vesting may vary in proportion to agent's length of service.
15. Compensation Treatment on Premium Increases: Treat premium increases on attained-age rated policy or with built-in increases as renewal increases for compensation purposes. Increase in benefit limits, initiated by agent, possible first year commission.
16. Persistency Bonuses: Sometimes paid to encourage better customer service and more careful selection of customers. More important for medical expenses insurance than for life or LTD because of the higher lapse rates seen. Some companies offer a volume bonus on disability business. May also pay higher commission on less frequent premium payment periods to recognize better persistency inherent to the premium mode.
17. Replacement Policies Compensation: First year compensation only on increase in premium as a disincentive to unnecessary switching. Some companies may pay full compensation to encourage replacement.
18. Conversion Policy Compensation: Usually not much involvement from agent thus no sales compensation paid. The agent may receive a service fee for the work he did to help. Full compensation is paid in a fully individual underwritten policy sold in lieu of the group conversion.

Solution #9.

- (a) In setting rates, the credibility of the group's experience and the confidence are considered. Credibility of data is a relative concept and is the weight to give to experience. Confidence is an absolute measure and represents the likelihood that the experience is close to the theoretical value. Hence, partial consideration is given to group's experience and part to the manual rate when setting rates. ABC's medical experience is deteriorating at a greater rate than the overall block. Life rates were set a rate manual or "pure premium" levels.

Why health rates are increasing and life rates are not decreasing – as a medium-sized insurer, the life business is not credible, while the medical business is 50% credible. This is due to the fact that:

1. As volatility of claim experience decreases, credibility increases. The medical business is much less volatile than the life business due to lower claim amounts and more frequent claims. Therefore, the confidence in experience is higher since medical claims are homogeneous (similar in size).
2. To be considered credible, the life business needs many more life-years of experience than does medical; confidence in the group's actual experience is low as there are few claims.

(b) Methods that can be used to pool life or medical claims:

1. Remove catastrophic claims above a set level from experience. This is also known as specific claims pooling. A charge to cover the average cost of catastrophic claims is charged to all groups.
2. Aggregate stop loss where aggregate claims experience above a set level is removed from the experience. Again, a charge representing the average cost of aggregate pooling is charged to all groups.
3. The group's experience can be credibility-weighted with the entire pool's experience. If the group's experience is considered  $Z\%$  credible, then:

$$\begin{aligned} \text{Credibility – Weighting} &= Z \times \text{Group's Experience} \\ &+ (1 - Z) \text{Pool Average Claim Cost.} \end{aligned}$$

Solution # 9 – Continued

4. Multi-year averaging is a weighted average of several years' experience that helps smooth out random fluctuations in experience. As an example:

Period Claims in year  $A =$

$$\frac{\text{Group claims in year } A \times 5 + \text{group claims in year } (A - 1) \times 3 + \text{group claims in year } (A - 2) \times 1}{9}$$

5. Loss Ratio/Rate Increase Limits. Similar to aggregate stop loss. Must charge a pooling charge. Place an upper limit on loss ratio for setting future rates.

(c) Disadvantages:

1. Employer takes financial risk that would otherwise belong to the insurance company.
2. Employer now must take care of administration or pay a TPA to administer.
3. May need stop loss coverage from insurer.
4. Company must be able to handle claim fluctuations.

Advantages:

1. Don't subsidize bad experience of other groups that are insured. The goal is to save money.
2. Avoid premium tax, risk margins, and state-mandated benefits.
3. Because there is less regulation, the company has more flexibility in plan design and funding.
4. Employer cash flow has increased flexibility and possibly increased investment income as assets backing liability are held directly by employer.

Solution #10:

(a)

<b>1. Calculate IN network charges</b>	<b>IN network = 0.7 × industry average</b>
Diagnostic =	$30 \times 0.7 = 21, 15 \times 0.7 = 10.5$
Preventative =	$40 \times 0.7 = 28, 20 \times 0.7 = 14$
Restorative =	$50 \times 0.7 = 38.50, 25 \times 0.7 = 17.5$
Prosthodontic =	$400 \times 0.7 = 280, 500 \times 0.7 = 350$
<b>2. Calculate Gross IN Network Charges</b>	<b>Gross per member per month = projected annual services per 1000 member IN NETWORK* average cost per service/1000/12</b>
Diagnostic =	$800 \times 21 / 1000 / 12 = 1.4$
Diagnostic =	$700 \times 10.5 / 1000 / 12 = 0.6125$
Preventative =	$650 \times 28 / 1000 / 12 = 1.5167$
Preventative =	$200 \times 14 / 1000 / 12 = 0.2333$
Restorative =	$300 \times 0.9 \times 38.50 / 1000 / 12 = 0.8663$
Restorative =	$150 \times 0.9 \times 17.50 / 1000 / 12 = 0.1969$
Prosthodontic =	$200 \times 0.9 \times 280 / 1000 / 12 = 4.20$
Prosthodontic =	$100 \times 0.9 \times 350 / 1000 / 12 = 2.625$
<b>3. Calculate Gross OUT Network Charges</b>	<b>Gross per member per month = projected annual services per 1000 member OUT NETWORK* average cost per service/1000/12</b>
Diagnostic and Preventative	No changes because no out of network benefits paid for any diagnostic or preventative
Restorative =	$300 \times 0.1 \times 55 / 1000 / 12 = 0.1375$
Restorative =	$150 \times 0.1 \times 25 / 1000 / 12 = 0.03125$
Prosthodontic =	$200 \times 0.1 \times 400 / 1000 / 12 = 0.66667$
Prosthodontic =	$100 \times 0.1 \times 500 / 1000 / 12 = 0.416667$

Solution # 10 – Continued

(a)

<b>4. Calculate Gross IN Network Cost Sharing</b>	<b>IN network cost sharing per member per month = projected annual services per 1000 member IN NETWORK* average copay per service/1000/12</b>
Diagonostic and Preventative	0 because copay is 0
Restorative =	$300 \times 0.9 \times 15 / 1000 / 12 = 0.3375$
Restorative =	$150 \times 0.9 \times 15 / 1000 / 12 = 0.16875$
Prosthodontic =	$200 \times 0.9 \times 100 / 1000 / 12 = 1.50$
Prosthodontic =	$100 \times 0.9 \times 100 / 1000 / 12 = 0.75$
<b>5. Calculate Gross OUT Network Cost Sharing</b>	<b>Out of network cost sharing per member per month = projected annual services per 1000 member OUT NETWORK* average copay per service/1000/12</b>
Diagnostic and Preventative =	0 because no out of network
Restorative =	$300 \times 0.1 \times 25 / 1000 / 12 = 0.0625$
Restorative =	$150 \times 0.1 \times 25 / 1000 / 12 = 0.03125$
Prosthodontic =	$200 \times 0.1 \times 250 / 1000 / 12 = 0.416667$
Prosthodontic =	$100 \times 0.1 \times 250 / 1000 / 12 = 0.208333$
<b>6. Calculate NET IN Network Charges</b>	<b>NET IN network charges = gross per member per month less gross in network cost sharing</b>
Diagnostic =	$1.4 - 0 = 1.4$
Diagnostic =	$0.6125 - 0 = 0.61$
Preventative =	$1.5167 - 0 = 1.52$
Preventative =	$0.2333 - 0 = 0.2333$
Restorative =	$0.8663 - 0.3375 = 0.5288$
Restorative =	$0.1969 - 0.16875 = 0.02815$
Prosthodontic =	$4.20 - 1.50 = 2.70$
Prosthodontic =	$2.625 - 0.75 = 1.875$
<b>7. Calculate NET OUT network charges</b>	<b>NET OUT network charges = gross per member per month less gross OUT network cost sharing</b>
Diagnostic and Preventative =	No charges because no benefits paid for any diagnostic or preventative.
Restorative =	$0.1375 - 0.0625 = 0.075$
Restorative =	$0.03125 - 0.03125 = 0$
Prosthodontic =	$0.66667 - 0.41666 = 0.25$
Prosthodontic =	$0.41667 - 0.20833 = 0.20833$



Solution #10 -- Continued

(a)

<b>8. Calculate NET TOTAL Network Charges</b>	<b>NET TOTAL = NET IN network charges + NET OUT network charges</b>
Diagnostic =	$1.4 + 0 = 1.4$
Diagnostic =	$0.61 + 0 = 0.61$
Preventative =	$1.52 + 0 = 1.52$
Preventative =	$0.2333 + 0 = 0.23$
Restorative =	$0.5288 + 0.075 = 0.60$
Restorative =	$0.02815 + 0.00 = 0.03$
Prosthodontic =	$2.70 + 0.25 = 2.95$
Prosthodontic =	$1.875 + 0.20833 = 2.08$
<b>9. Calculate GRAND TOTAL</b>	<b>Sum of NET total diagnostic, preventative, restorative, prosthodontic</b>
	$+ 0.61 + 1.52 + 0.23 + 0.60 + 0.03 + 2.95 + 2.08 = 9.42$

- (b)
1. Age/Sex
    - Costs vary by demographics.
    - Males usually lower dental costs.
    - Hockey team usually all young males.
    - Hockey prone to teeth injuries  $\Rightarrow$  may not want to lower.
  2. Regional
    - Costs and utilization vary by regions.
    - Northeastern U.S. tends to have higher costs.
  3. Industry/Profession
    - Dental costs vary by industry
    - Teachers, actors, and athletes tend to have higher costs.
    - Hockey team prone to dental "accidents."
  4. Participation Levels
    - Dental experience varies by low many participate in the plan.
    - Need higher participation to keep costs down.

Solution # 10 – Continued

(b)

5. Benefit Designs
  - Cost-sharing features
  - Copays
  - Pre-exclusions
  - Industry data will likely have different benefit designs than this plan.
  
6. Trend
  - Industry data likely collected some time ago.
  - Dental Costs increase over time.
  - Adjust data to take into account current expense levels.
  
7. Reimbursement Mechanism/Utilization Management
  - Costs of league will vary from industry depending on type of network and reimbursement mechanism.
  - Hockey teams play “road” games and may be at out network when need dental care.
  
8. Plan Financing/Employer Contributions
  - How plan/premiums collected impact who enrolls
  - Want 50% contribution or 100% participation to keep costs down.

Solution #11

(a) Uses of reinsurance include:

- Improve financial capacity: Can sell higher benefit amounts and longer benefit periods than otherwise financially able.
- New business growth: Sell many policies in a short amount of time using reinsurer's advice to quickly get to market.
- Stabilize earnings: Smooth random fluctuation.
- Reduce capital strain: LTC is a capital-intensive product due to active live reserves and risk-based capital requirements.
- Improve balance sheet position: Meeting rating analysts' scrutiny and ratio requirements.
- Improve intellectual capacity: Knowledge and reinsurer's expertise in design, pricing, underwriting, etc.
- Acquisition: Buy profitable blocks of LTC insurance from other companies who want to leave market. The buyer assumes all obligations from the seller's portfolio through an assumption reinsurance agreement to give enough time to decide which company's paper will be used to write the policies. This improves persistency and maximizes values of policies purchased for both parties.
- Joint venture: Mutual interest of two companies entering the market can be a fronting arrangement, can be used when there is a lacking of ceding company commitment.
- Fronting may be used because the reinsurer is not licensed as direct insurer.
- LTC is a perfect candidate for reinsurance since it has a low frequency of accuracy but high costs upon occurrence.
- LTC is a relatively new and evolving product and there is little insured data. Experienced LTC reinsurer can help guide the company in expanding market share in a stable and profitable way.
- Reinsurance has strategic guidance, marketing support, market research sales compensation, design, product, development pricing, etc.

Solution # 11 -- Continued

(b) Criteria for selecting a reinsurer:

- Financial strength and continuity: Is the reinsurer financially strong enough to handle the growth? Will the reinsurer be able to withstand strain during poor experience?
- Rates and terms: Be sure company agrees with reinsurers' suggestions. Reinsurers manage results only as long as participating but ceding company is still liable for the LTC policies.
- Services: Broad range allows flexibility and meets ceding company's needs.
- Flexibility: Willing to adapt to different market changes and situations. Different reinsurance techniques offer varying degrees of flexibility.
- Experience: Are they experienced in LTC? How has their financial performance been?
- Understanding: Do they do their own underwriting or farm it out for a fee? Does the contracted underwriter have incentive to focus on financial performance?
- Loss of profit: Consider amount of lost potential profit when deciding what percent to co-insure.
- Management time: Reinsurance should reduce the need for ceding company's management involvement.
- Business relationship: Good rapport is needed when unforeseen arises.
- Degree of expertise in LTC.
- Reinsurance administration costs: Reinsurer's requirements and amount of risk willing to accept, affect ceding company's administrative costs.
- Availability of reinsurance to produce profit on its portfolio is just as important to its continued existence as it is for primary company.

Solution #12:

- (a) Potential reasons for low paid claims in 1996 relative to more recent years:
- Initial underwriting (short-form) leads to select a healthy population.
  - Favorable effect of underwriting is strongest in first year.
  - Actively-at-work requirement results in a more select group.
  - 1996 payments are limited to 1996 incurrals.
  - 1997 to 1999 may include several years of incurrals.
  - Notice of claim may be delayed, especially in the case of a long elimination period.
- (b) Basic assumptions behind cumulative antiselection theory.

CAST Theory Assumptions:

1. Antiselection occurs in health policies, whereby high users continue their policies and low users do not.
2. This causes lapses to occur whereby “good” risks exit for a different policy (higher lapse) and “impaired” risks stay on board (lower lapse rates).
3. This causes our morbidity experience to deteriorate.
4. This causes a need for us to raise premiums to meet even higher morbidity.
5. This causes further antiselection whereby we go back to step 1 (endless cycle).

More:

1. Antiselection is higher on health insurance than life because:
  - Frequency of claims is higher.
  - Easier for insurer to predict being sick than dying.
  - Elective/voluntary procedures.
2. Lapse rates are much higher for a block of health policies than for life policies.
3. CAST theory stronger for health because more of the bad risks stay on.
4. Split lives into healthy and impaired status.
5. Develop loss ratios for classical reserves and CAST reserves – CAST reserve long range will continue to deteriorate even if select-ultimate adjustments made to classical reserves.

- Divide population:  $l_x = \underset{\text{healthy}}{a}l_x + \underset{\text{impaired}}{i}l_x$

Instead of ultimate claim costs, claim costs that depend on duration are used throughout the life of the policy.

- Claim costs increase with duration.
- Each group, healthy and impaired, has claim costs independent of duration but dependent on attained age.

Solution #12 – Continued

Healthy lives are always select. The select factor applies at every duration.

$${}_a S_t = (\text{Select factor}) \times S$$

Published values of aggregate claim costs are correct for durations 0 and 1.

$$l_x S_x = {}_a l_x S_x$$

$$l_{x+1} S_{x+1} = {}_a l_{x+1} S_{x+1} + {}_i l_{x+1} S_{x+1}$$

- Divide claims costs:

Mortality:  ${}_a S_{[x]+t}$

Impaired:  ${}_i S_{[x]+t}$

Total:  $S_{[x]+t} = {}_a S_{[x]+t} + {}_i S_{[x]+t}$

- $q_{[x]+t}^{ai} = P(\text{member of } {}_a l_{[x]+t} \text{ becomes member of } {}_i l_{[x]+t+1}, \text{ net of reserves})$
- Claims costs of impaired lives are proportional to the claims cost of health lives:

$${}_i S_{[x]+t} = k_2 ({}_a S_{[x]+t})$$

$$k_2 > 1$$

$$k_2 = \text{function of } [x], t$$

- ${}_i q_{[x]+t} = k_1 ({}_a q_{[x]+t} - u) + u$   
 $0 < k_1 < 1$   
 $u = \text{“pure” lapse rate}$

${}_i q_{[x]+t}$  and  ${}_a q_{[x]+t}$  are the probabilities of lapsing from each class.

Solution # 12 -- Continued

(c)

- Validate Lapse Assumption:

Lapse rate for period

$$= \frac{\text{Total active lives at beginning of period} - \text{Total active lives at end of period}}{\text{Total active lives at beginning of period}}$$

Pricing Assumption Lapse Rates:

1996: 0.40

1997: 0.25

1998: 0.25

Actual lapse rates are consistent with pricing assumptions.

- Determine Restated Incurred Claims

Incurred Claims = Paid Claims + End-of-Year Claim Reserves - Beginning-of-Year Claim Reserve

Restated Incurred Claims:

1996: 2,352,000

1997: 2,664,000

1998: 2,563,000

1999: 2,089,000

- Determine Actual-to-Expected Claim Cost Ratios:

Number of healthy lives × expected incurred claim cost for healthy lives + number of impaired lives × expected incurred claim cost for impaired lives.

Expected Claims:

1996: 2,352,000

1997: 2,657,200

1998: 2,508,800

1999: 1,978,000

$$\text{Actual-to-expected ratio} = \frac{\text{Restated incurred claims}}{\text{Expected claims}}$$

Solution # 12 -- Continued

Actual-to-expected ratios:

1996:	1.000
1997:	1.003
1998:	1.022
1999:	1.056

Restated claims are consistent with pricing assumptions for 1996, but higher in subsequent years.

The gap between restated claims and pricing assumptions is growing.

- Development of CAST Claim Costs:

$$1996 \text{ healthy life claim cost} = \frac{\text{restated incurred claims}}{\text{number of lives}} = 49.$$

At each duration, claim costs for healthy lives are proportional to those assumed in pricing.

Pricing assumptions for healthy life expected claim costs in other years are consistent with experience.

- Estimate the Healthy/Impaired Partition:

Solve for  $X$  (the number of healthy lives).

$$\begin{aligned} X &\times \text{expected claim cost for healthy lives} \\ + &(\text{Total active lives} - X) \times \text{expected claim cost for impaired lives} \\ = &\text{restated incurred claims.} \end{aligned}$$

1996:	Healthy:	48,000	Impaired:	0
1997:	Healthy:	28,563	Impaired:	237
1998:	Healthy:	20,958	Impaired:	642
1999:	Healthy:	15,217	Impaired:	983

The partition into healthy and impaired lives is less favorable than assumed in pricing.



Solution # 12 – Continued

- Recommendations for Additional Analysis:
  - For each future duration, project the probability that a healthy life will lapse,  ${}_a q_{[x]+t}$
  - For each future duration, project the probability that a healthy life will become impaired,  $q_{[x]+t}^{ai}$
  - For each future duration, project the numbers of healthy and impaired lives,  ${}_a l_{[x]+t}$  and  ${}_i l_{[x]+t}$
  - For each future duration, project the amount of claims.
  - Determine the premium per life necessary to achieve the target profitability for this block of business.

(d)

- Rate increases can make antiselection worse.
- Rate increase can result in more lapses.
- The additional lapses tend to come from the healthy lives.
- The added lapses will result in a higher cost per remaining policy.
- A rate increase can lead to an assessment spiral.
- There may be contractual limits on the right to raise rates.
- Rates may not be changed for a “noncancelable and guaranteed renewable” contract.
- State insurance departments may not approve or take a long time to approve the rate increase.
- Or there might be long delays in approval.

Solution #13

(a) Advantages and disadvantages of providing medical benefits to retirees:

Advantages:

1. The benefits were popular when the retirees were active employees and they are familiar with them, so the retirees pressure the employer to continue them.
2. Offering retirees benefits allows the company to reward employees with a long time of service with the company.
3. As retiree benefit costs increase, there is a need for retirees to be able to choose more limited coverage as the required contribution grows.
4. Increasing cost of retiree benefits encourages employers to adopt a defined-contribution approach and offering flexible benefits allows employers to utilize this approach.

Disadvantages:

1. It is difficult to maintain communication since many retirees may live out of the area and may not be able to attend company-sponsored events.
2. Retirees may have less of a need for flexible benefits since they may be a more homogeneous group than active employees.
3. The reasons for giving flexible benefits to active workers do not exist for retirees.
4. The employer could incur large costs due to antiselection by those with chronic conditions who will elect options with the maximum coverage.

(b) Approaches to establishing credit in a retiree flexible benefit plan:

The employer determines the amount of credits to set aside in a fixed credit pool for each retiree based. As an example, credits can be based on service, age, or dependent status. The amount of credits can be distributed in one lump sum or in annual payments. The retiree determines how to spend credits:

- Retiree can use the credits as a bank and draw down the account every year based on selected options.
- The lump sum can be converted into an annuity with similar options as available in the pension plan.

The credits can be used to purchase medical, dental, or life insurance sponsored by the company or by an outside organization.

Solution # 13 -- Continued

(c) Methods available to QRS to reduce its retiree medical costs:

- Integrate retiree medical benefits with Medicare on an exclusion or a carve-out basis instead of standard COB.
  1. Standard coordination of benefits
  2. Exclusion: Excludes any benefit payable from primary plan, then apply the benefit formula from the secondary plan.
  3. Carve out: Employer benefit is determined as if there are no other plans, then other plan benefits/Medicare are subtracted from employer plan benefits.
  4. Supplement: A supplemental plan pays for expenses the primary plan does not.
- Introduce or reduce customary and reasonable expense limits.
- Encourage spouse to buy coverage from his/her own employer by applying penalties if he/she does not.
- Introduce dynamic benefit provisions (e.g., change deductibles as costs increase).
- Introduce managed care by using
  1. Utilization Review programs
  2. Large-claim management
  3. PPO, POS, or HMO
  4. Centers of excellence (e.g., cancer)
  5. Health care coalitions to address quality, affordability, and access issues.
- Manage pharmacy benefits using:
  1. Formularies
  2. Drug utilization review
  3. Requiring mail order for maintenance drugs
  4. Use of preferred pharmacies and real time administration
  5. Use of more favorable discounts and rebates.
- Increase retiree contribution level.
- Make eligibility more difficult to qualify for (e.g., stricter than pension plan qualification).
- Drop retiree coverage.

Solution #14

- (a) Summarize the current problems with the LTD block.
1. The LTD line is unprofitable.
  2. Incurred claims have risen significantly.
  3. Expenses have risen significantly.
    - May be temporary due to investment in system.
    - May also be from changing corporate allocation.
  4. Incidence rates rising.
    - Due to shift in ep to 90 days
    - Also due to shift toward flex plans (antiselection)
    - Given shifts, the expected incidence rate should not stay level at 3.50.
  5. Termination rate experience has been mixed over time.
- (b) Recommend areas for investigation to determine underlying causes of the current problems. Justify your recommendations.
1. Seek advice of reinsurer.
    - Reinsurer is in same loss situation on this block so it has incentive to help.
  2. Review pricing method.
    - Insure rates reflect participation levels on flex plans.
    - Insure rates reflect anticipated incidence and termination rates based on recent study of LTD financials.
  3. Review underwriting guidelines and practices.
  4. Review claims practices.
    - Are claimants getting assistance in applying for Social Security benefits?
  5. Review IBNR methodology.
  6. Review DLR morbidity assumptions.
  7. Review expenses.

Solution #15

(a) Group Life manual pricing is based on intercompany mortality study.

<u>Age</u>	<u>Volume (000's)</u>		<u>Actual/Expected</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
15	249	155	0.925	0.944
20	1,847	1,262	0.887	0.914
25	3,057	3,163	0.947	0.889
30	4,854	4,568	0.918	0.902
35	5,745	5,838	0.910	0.926
40	6,947	3,966	0.895	0.940
45	6,383	3,950	0.960	0.950
50	5,240	1,932	0.971	0.939
55	3,023	653	0.896	0.927
60	1,075	128	<u>0.896</u>	<u>0.960</u>
<b>Total</b>			0.925	0.924

- A/E study indicates about a 7-8% claims margin.
- Contradictory results – negative operating margins.
  - Underwriting discounts maybe?
- Can't count on investment income on its own.
- Cannot reduce rates by 10% and remain profitable.

(b)

- Usually employee-pay-all.
  - Thus employee can choose amount or opt out.
- High degree of selection by employee
  - Leads to higher overall cost.
- Can reduce antiselection by:
  - Step rated (age/sex) – More attractive to younger employees.
  - Short-form questionnaire – May offer open enrollment for first 30 days. Must be actively at work.
  - May offer guarantee issue up to a certain amount.
  - Late applicants usually subject to underwriting.
  - Minimum participation level required.
  - Are dependents to be eligible? Greater antiselection. No active-at-work requirement.

Solution #16

- (a) (i) Family credits = all get credits of highest-cost employee.  
 Highest is high option with dependents (1)  
 = \$1,900 × 0.8 (for 20% employee contributions)  
 = \$1,520 (2) = Price Tag.

Total Cost - Credits = Employee Cost.

		<u>Total Cost</u>	<u>Total Cost - Credits</u>	<u>Employee Cost</u>	No. of Partic.	<u>XYZ Cost (Credits × Participants)</u>
Employee	High	\$ 800	\$1,520	\$ -720	205	\$311,600
Employee	Medium	550	1,520	-970	130	197,600
Employee	Low	400	1,520	-1,120	90	136,800
Employee	Out	0	1,520	-1,520	25	38,000
Employee & D	High	1,900	1,520	380	525	798,000
Employee & D	Medium	1,300	1,520	-220	245	372,400
Employee & D	Low	900	1,520	-620	130	197,600
Employee & D	Out	0	1,520	-1,520	150	<u>228,000</u>
			(4)+(4)=(8)			$\Sigma = 2,280,000(1)$

- (ii) Average credits gives the average employer cost per employee to each employee(1).

Total Cost - Credits = Employee Cost.

		<u>Partial</u>	<u>Current Employer Cost</u>	<u>Total Cost = Price Tag</u>	<u>Total Cost - Credits</u>	<u>Employee Cost</u>	<u>= Credits × Partic. XYZ Cost</u>
Employee	High	205	\$ 640	\$ -800	\$909	\$-109	\$186,345
Employee	Medium	130	440	-550	909	-359	118,170
Employee	Low	90	320	-400	909	-509	"
Employee	Out	25	0	-0	909	-909	"
Employee & D	High	525	1,520	-1,900	909	991	"
Employee & D	Medium	245	1,040	-1,300	909	391	"
Employee & D	Low	130	720	-900	909	-9	"
Employee & D	Out	<u>150</u>	0	-0	909	-909	"
		1500					1,500 × 909 = 1,363,500

Average  
 131.2  
 57.2  
 28.8  
 798.0  
 254.8  
 93.6(1)  


---

 1,363.6 ÷ 1500 = 909

- (iii) Actuarial approach gives each employee average prior cost split by employee only versus employee & dependents to the employer(1).

		<u>Credits</u>	<u>Total Cost</u>	<u>Employee Costs</u>	<u>XYZ Cost</u>	<u>= Credits × Partic.</u>	<u>Partic.</u>
Employee	High	\$483	\$-800	\$317	\$131,200	\$99,015	\$205
Employee	Medium	483	-550	67	57,200	62,790	130
Employee	Low	483	-400	-83	28,800	43,470	90
Employee	Out	483	-0	-483	0	12,075	25
Employee & D	High	1,092	-1,900	808	798,000	573,300	525
Employee & D	Medium	1,092	-1,300	208	254,800	267,540	245
Employee & D	Low	1,092	-900	-192	93,600	141,960	130
Employee & D	Out	1,092	-0	-1,092	0	163,800	150
			(4)		$\Sigma = 1,363,600(2)$		

$$\text{Employee's credit} = \frac{205 \times 800 + 130 \times 550 + 90 \times 400}{450} \times 80\% = \$483$$

$$\text{Employee's & dependents credit} = \frac{525 \times 1,900 + 245 \times 1,300 + 130 \times 900}{1,050} \times 80\% = \$1,092$$



(b)

- Family credits:  
Advantages = equal allocation of credits.  
(Can buy back previous) → no losers, some winners. (1)  
(1) realistic prices (employee appreciation of costs).  
Disadvantages = additional employer costs (1).
- Average credits:  
Advantages = realistic prices (1)  
Equal allocation of credits  
No additional employer costs (1)  
Disadvantages = some losers (and some winners) (1).
- Actuarial credits:  
Advantages = no additional employer cost (1)  
No losers (1)  
Realistic prices (1)  
Disadvantages = unequal allocation of credits (employees may dislike).

- (c) (2) No impact on employer costs – same average per employee, just allocated differently.  
No impact on total employee costs, although the costs have been allocated differently.

Winners

Those opting out are \$909 better off ( $\$909 - \$0$ ).

Employee high – \$269 better off ( $\$109 + 160$ ) (Current employee's cost = (6)).

Employee medium – \$469 better off ( $\$359 + 110$ ).

Employee low – \$589 better off ( $\$509 + 80$ ).

Employee & dependent low – \$189 better off ( $\$9 + 180$ ).

(New net employee's costs = (6)).

Losers

Employee & dependent high – \$611 worse off ( $\$-991 + 380$ )

(Net employee's costs = 6).

Employee & dependent medium – \$131 worse off ( $\$-391 + 260$ ).

Solution #17

(a) Primary Differences:

- Marketing to groups requires flexibility with the benefits and administration offered while individual forms are filed with a finite number of options.
- Individual products are sold by agents while group is a multi-tiered sale.
- Average age of insured is lower in group products.
- Lapse rates for group LTC are significantly lower than for individual policies.
- Guaranteed issue is unique to group market.
- Expense assumptions for group LTC are a combination of group and individual so they tend to be higher than for individual LTC.

(b) Morbidity Assumptions:

- Available Data:
  - 1985 National Nursing Home Study
  - Medicare and state program data
  - NCHS
  - New Jersey Experience
  - National LTC survey
  - LTC Intercompany Study
- Data Considerations:
  - Only marketed in recent years so very little experience exists.
  - The product has changed significantly, which impacts expected and actual experience.
  - Little is known about future results due to antiselection, lapsation, underwriting awareness.
  - Impact of underwriting on incidence and continuance.
  - Policy definition of claim incurral.
- Also consider:
  - Intended use of data
  - Trends
  - Existing or pending laws or regulations.

- Features requiring adjustment:
  - Transfers between facilities
  - Reinstatements
  - Integration of coverages
  - Insured versus population data
  - Geographic area – utilization varies significantly by area
  - Level of care/charge levels
  - Level of underwriting
  - Marketing
  - Claim administration
  - Reinsurance

(c) Nonforfeiture Values:

- Reduced paid-up: Lower benefit – High cost option
- Extended term insurance: Shorter coverage period
- Return of premium: Low cost option
- Full daily benefit/shortened benefit period: Full benefit but shorter duration
- Cash value
- Life annuity.

Solution #18:

(a)

ADLS	CI	Duration %		
		Duration 6	Duration 3.6	$\Delta$
0	Yes	30.48	25.08	5.40
1	Yes	2.62	1.47	1.15
2	No	8.88	2.83	6.05
2	Yes	1.51	0.92	0.59
3+	No	9.70	3.17	6.53
3+	Yes	2.24	1.25	0.99
Total				20.71

$$\text{Incidence rate} = \frac{15.35}{1000}$$

$$\begin{aligned} \text{Annual cost} &= (\% \text{ of days}) (\text{incidence rate}) (\text{benefit amount}) \times (\text{average days}) \\ &= (0.2071) (0.01535) (75) (824) \\ &= \$196.46 \end{aligned}$$

(b)

- Difference between benefit trigger versus ADL/CI definitions in the table.
- Impact of underwriting
- Effect of antiselection lapsation
- How to reflect episodic policy limits for noninstitutional benefits
- Impact of aggregate lifetime limits
- Availability of informal care through family members
- Use of benefits if insurance is available.
- Conservative to assume full benefits are used.

Solution #19:

(a) LTD Claim Adjudication Process:

- Verify eligibility of individual.
  - Was plan in force on date of disability?
  - Does a pre-existing condition exclusion apply?
- Verify definition of disability is satisfied.
  - Review physician's records.
  - Compare disabling limitations to physical requirements of job.
- Determine payment amount.
  - Usually pre-disability income times benefit percentage less offsets.
  - Offsets include Social Security benefits.
- Provide proof of ongoing disability.
  - Claims are generally reevaluated a minimum of once a year.
- Available tools include:
  - Medical exams
  - Rehabilitation
  - Settlements
  - Financial evaluation.

(b) LTC Claim Adjudication:

- Benefit eligibility:
  - Degree of ADL impairment needs to be established.
  - Benefit qualifiers include cognitive impairment.
- Care management:
  - Work with claimants who can be cared for in the community of home.
  - Intent is to help claimant find and coordinate the services that will allow as much independence as possible.
  - Detailed assessment of claimants health status, living arrangements, and support network is made.
  - All available public and private services and resources are evaluated.
  - An individual plan of care is developed.
  - The final plan is modified to meet claimant, physician, and family preferences.

Solution #20:

- (a) A Health Care expense account is an individual employee account funded by employer contributions that provides reimbursement of certain eligible health care expenses. There are two ways to handle year-end balances:
- Unused amounts are forfeited at year-end, but prior year expenses can be carried forward, or
  - Any year-end balances can be rolled forward from one year to the next, but prior expenses cannot be carried forward. Year-end balances can never be taken as cash.

Eligible expenses include deductibles and coinsurance, along with dental and vision expenses. Amounts can be designated by employees to the account only once per year. Plans must incorporate a use-it-or-lose-it feature for terminating employees. The account may be part of a flexible benefit program or offered on a stand-alone basis.

- (b) Advantages:
- Simple way to test appeal of flexible benefits
  - Represents cost savings to employer
  - Encourages employees to self-insure predictable expenses that are subject to adverse selection.
  - Delivers compensation tax-effectively.

Disadvantages:

- Administrative costs may be too high.
  - Balance may be forfeited.
- (c) Funds can come from new employer money, dollars freed up from benefit trade-offs, or employee contributions (U.S. only). Funds can be available all at the beginning of the year or pro rata throughout the year.