- (a)
- Support management of assets/liabilities
- Productivity measurement
- Staffing level needed and task allocation
- Measures turnaround time (TAT)
- Measure work flow
- Identifies problems and strengths such as:
 - Insufficient training
 - Inadequate systems.

(b) Strengths:

- Provide information such as: monthly paid claims and unpaid, average days to process, exposure per month.
- All receipts are logged.

Weaknesses:

- No split by claims type
- Differentiate by electronic and paper claims
- No suspended/pended reports
- No information on claims transferred to another department
- No department reports which include all activity
- No claims status by date of receipt
- No paid claims report
- No individual count sheets Daily
- No mail room status

(c) Intranet:

• Internal system based on Internet technology but blocked to external users.

Internet:

- System of reference and interactions available worldwide, user-friendly.
- Client Groups Employers:
 - Access to experience
 - Update of billing addresses, etc.
- Clients Employees:
 - List of providers
 - Form to be downloaded
- Brokers/Agents:
 - On-line quotes
 - On-line underwriting
 - Access to product description

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Interactive Voice System/Voice Response Unit:

• System of automatic response by phone.

Optical Character Recognition:

 Technology that permits to read handwritten forms and convert it to match company's systems.

Electronic Funds Transfers:

- Avoid check manipulation
- Money is transferred directly.

Electronic data interchange.

E-Commerce Functions:

- Static: Information is provided only user cannot enter own data.
- Interactive: Simple information can be keyed into system.
- Semi-integrated.
- Integrated.

Adopt e-commerce mindset:

- Commitment from management
- Everyone must be involved.

Accept that development will be continuous – be flexible.

Adopt rapid iterative design, develop and implementation approach (less than three months).

Have sound technical infrastructure.

- (a) Financial Management Process includes the following:
 - 1. Business Planning:
 - Process of determining company's key goals, objectives, and strategies to meet them.
 - Can use financial forecast model to test results of alternative plans/scenarios.
 - 2. Implementation Implementing activities to meet goals such as:
 - Rating changes (i.e., pricing, profit margins, claim trend assumptions)
 - Change in underwriting practices
 - Managed care initiatives
 - Provider contract initiatives
 - Marketing initiatives
 - Information systems improvement
 - Reduce administrative expense.
 - 3. Reporting and Monitoring of Emerging Results:
 - Specific reports should be designed at a business-segment level to monitor results, comparing actual emerging experience to forecast assumptions.
 - Routine internal reports should be developed showing restated financial results
 - 4. Corrective Actions:
 - Forecasting process combined with an effective system for monitoring results provides a continual fine-tuning of business plan.
 - If the need for corrective action is identified early, modest "course corrections" may be sufficient.
- (b) Ways to project claims PMPM:
 - For managed care plan, the ideal way to project claims might be to apply specific provider contracting assumptions to a database containing information on each provider network.
 - A simpler approach would be to apply assumed trends to base period claims values.
 - While it is possible to project claims by type of service, the simplest and most manageable approach is to combine fee-for-service claims into a very small number of major categories for projection and trend application purposes; capitated components will be projected separately.
 - One approach to projecting claims includes applying trends directly to the monthly value from the base period, in effect giving full credibility to the pattern in the base period data.
 - Another approach to project claims involves starting with an average claims-permember value for the timeline month base period, then projecting a progression of monthly values corresponding to trend changes, essentially ignoring the monthly variation in the base data.

- Claims can also be projected by projecting an average monthly value for each projection year, then applying factors to reflect seasonal variations as well as any one-time increases such as those reflecting provider contract changes.
- Treatment of changes in product mix should be handled in a manner consistent with projected income.
- Special analyses will often be required to adequately reflect specific provider contracting provisions.
- Loss ratios can be used to project claims but is not generally a good vehicle for projecting incurred claims for most business segments because the implicit assumption is that claims levels will be consistent with the pricing assumptions.
- (c) Estimation of January 2001 PMPM:
 - Annual Trend Method:

Claims
$$PMPM_{01/2001}$$
 = Claims $PMPM_{01/2000}(1 + \text{Annual Trend})$
= $(54.52 + 45.81)(1 + 0.154)$
= 115.78

• Monthly Trend Method:

Claims
$$PMPM_{01/2001}$$
 = Claims $PMPM_{12/2000}$ (1+ Monthly Trend)
= $(109.01 + 81.63)(1 + 0.012)$
= 192.93

Seasonal Trend Method:

Claims
$$PMPM_{01/2001} = (Claims PMPM_{2000})(1 + Annual Trend)$$

 $\times (Seasonality Factor) \times (Seasonality Normalization Factor)$

Claims
$$PMPM_{2000} = \frac{(100.33 \times 945,000) + ... + (190.64 \times 979,000)}{945,000 + ... + 979,000}$$

Claims $PMPM_{01/2001} = 118.57 \times 1154 \times (January Seasonality Factor) \times 1.00$

• Loss Ratio Method:

Claims
$$PMPM_{01/2001} = (Proj Premium Income $PMPM_{01/2001}) \times (Loss Ratio)$$$

Projected Premium Income
$$PMPM_{01/2001} = \frac{165,000,000}{980,000} = 168.38$$

Claims
$$PMPM_{01/2001} = 168.38 \times 0.78 = 131.34$$

- (d) I would recommend the seasonal trend method due to the following reasons:
 - In projecting claims, it will be necessary to develop a monthly claims pattern. Actual claims patterns typically exhibit some fluctuation from month to month, due in part to seasonal variation.
 - Since the business segment is not largely capitated, the seasonality approach is recommended.
 - Loss ratio is not generally recommended because the implicit assumption is that claim levels will be consistent with pricing assumptions.
 - Do not use the monthly trend method because it ignores seasonal variations (unless only looking at quarterly results).

- (a) Pooling methods:
 - Catastrophic claim removal:
 - ASL or ISL
 - Remove large claims on an aggregate or individual basis.
 - Add pooling charge.
 - Credibility weighting of manual claims and groups' own experience.
 - Multiple-year averaging:
 - Combine multiple years of data.
 - Give greater weight to more recent experience.
 - Can't use for medical where you have high turnover or anywhere else experience rapidly gets out of date
 - Limits on loss ratio:
 - Same effect as aggregate stop loss and limiting % increase in rate.
- (b) <u>General:</u> Usually credibility uses group sizes based on independent claims each year. Not necessarily true. Therefore, can understate credibility factor. This can understate bad group or not credit good group enough.

Theoretical:

- If frequency is small, claims more volatile and increase greater, credibility is lower.
- If claim size varies greatly, will reduce credibility.
- Credibility assumes claims are independent year to year, may not be true. Be careful with life years.
- Group size → higher group size, higher credibility.
- Process variance → as it decreases, credibility increases.
- Variance of hypothetical mean → as it grows, credibility increases.

$$\frac{n}{n+k}$$

n =number of observations

 $k = \frac{\text{expected value of process variance}}{\text{variance of hypothetical means}}$

Practical considerations:

- Competition's rates
- Effect on groups during transition to credibility rating
- Administrative costs
- Underwriting skills
- System capabilities
- Management philosophy.

(c)

Manual Rate	Group 2	Group 3
Composite rate per employee	263	263
Trend	$(1.012)^1$	$(1.012)^2$
Age/Sex factor	1.05	110
Regional factor	1	0.9
Benefit plan factor	<u>0.75</u>	0.75
Net	209.60	199.99

Experience Rate	Group 2	Group 3
Claims < 50,000	186,000	567,000
Trend	$(1.009)^{12} \times (1.012)^7$	$(1.009)^{12} \times (1.012)^8$
No. of employees	100	300
Net PMPM	$\frac{186,000 \times (1.009)^{12} \times (1.012)^{7}}{100 \times 12}$ = 187.62	$\frac{567,000 \times (1.009)^{12} \times (1.012)^7}{300 \times 12}$ = 192.94
Pooling charges	$\frac{35}{\left(1.009\right)^{12} \times \left(1.012\right)^6} = 29.26$	$\frac{35}{\left(1.009\right)^{12} \times \left(1.012\right)^6 = 29.26}$
After pooling PMPM	216.88	222.20

	Group 2	Group 3
Credibility to experience	25%	50%
Formula	$(0.25 \times 216.88) + (0.75 \times 209.6)$	$(0.5 \times 222.2) + (0.5 \times 199.9)$
Net PMPM	211.42	211.095
+ Admin. expenses	18	15
÷ (1 – commission – risk/profit load)	(1-0.08-0.05)	(1-0.06-0.04)
Gross PMPM	263.20	251.22

(d) Manual rates will be the same as calculated above.

Experience Rate	Group 2 (initial)	Group 2 (revised)
Total claims	207,000	216,000
Trend	$(1.009)^{12} \times (1.012)^7$	$(1.009)^{12} \times (1.012)^7$
No. of employees	100	120
Net PMPM	208.80	181.57

Using the multi-year approach and equal weighting, rate for Group 2 is:

$$(0.5 \times 208.8) + (0.5 \times 181.57) = 195.185$$

Manual rate = 209.60

Credibility rating = $0.25 \times 195.185 + 0.75 \times 209.6 = 206.00$

+ Admin. exp. = 18

÷ $(1 - \text{comm.} - \text{risk / profit}) = 1 - 0.08 - 0.05$

Revised Gross PMPM = 257.47

Manual rate will be the same as in (c):

Experience Rate	Group 3 (initial)	Group 3 (revised)
Total claims	644,000	581,000
Trend	$(1.009)^{12} \times (1.012)^8$	$(1.009)^{12} \times (1.012)^8$
No. of employees	300	225
Net PMPM	219.14	235.02
Manual rate	199,99	199.99
Credibility to experience	50%	25%
Formula:	$(0.5 \times 219.19) + (0.5 \times 199.99)$	$(0.25 \times 23.502) + (0.75 \times 199.99)$
Net PMPM	209.565	208.25
+ Admin Expenses	15	18
\div (1 – comm. – risk/profit)	(1-0.06-0.04)	(1-0.08-0.10)
Gross PMPM	249.52	260.63

Multi-year weighting = $0.5 \times 249.52 + 0.5 \times 260.63$

Revised Gross PMPM = 255.075

Underwriting considerations for group insurance:

- Minimum participation percent need 75%
- Minimum enrollment
- Minimum group size
- Don't underwrite high risk groups
- Expected employees' contribution
- Eliminate self-employed groups
- Eligibility Actively at work
- Financial viability of group
- Payroll deduction ability
- Part-time service limits part timers at least 20-30 hours/week
- Benefit plan richness
- Family business? Insurance just for the sake of family?
- Prior history of group other insurers?
- Rate guarantees
- Rate tiers
- Average age limits usually under 45
- Sex mix Limit to 75% female.

(a)

- <u>Case Reserves or Direct Enumeration</u>, also known as <u>Examiner's Method</u> = Claim Examiner's best guess or estimate of ultimate claim amounts. Most often done for catastrophic or litigated claims. Still need IBNR estimate.
- Average-Size Claim Method = average claim amount times number of reported claims. Not a good method if much variance.
- <u>Projection Method</u> = average claim PMPM × exposure base or number of members

 paid claims. Used if unreliable data or lack of data, say when volume is
 insufficient for other types of analysis. Good reasonableness check of other
 methods.
- Loss Ratio Method = Estimate a projected loss ratio and multiple by earned premium. Subtract know paid claims. For new block of business without credible history.
- <u>Tabular Method</u> = Apply a continuance table to estimate duration of claims. Useful for Disability and LTC claims. Can only be applied to reported claims. Additional estimates needed for ICOS and IBNR.
- <u>Development Methods</u> = Develop claims triangle of paid claims by incurral month and by paid month. Must be able to record an incurred (service) date and payment date for each claim. Assume historical lag pattern, possibly with adjustments, accurately represents incurred claims that have not been paid. Suitable for most medical coverages.

(b)

	•	<u>Ultimate</u>	
	1/98 Runout	Based on 1/98	Completion Factor
Jan. '98	4,300	45,500	9.45% accumulated paid claims for 1/98
Feb. '98	24,100	45,500	52.97% (line 1, 1/98, Table MM-4a, in 1000s)
March '98	34,900	45,500	76.70%
•	paid as of 12/00	49,300,000	Accumulated paid claims as of 12/00
Nov. 2000	paid as of 12/00	39,200,000	(last column Table MM-4b, in 1000s)
Dec. 2000	paid as of 12/00	8,100,000	•
		96,600,000	

49,300,000 ÷0.767 = Ultimate Claims
49,300,000 ÷0.767 = 64,276,402 (Oct. 00)
392,000,000 ÷ 0.5297 = 74,004,153 (Nov. 00)
8,100,000 ÷ 0.0945 = 85,714,286 (Dec. 00)
223,994,841

Oct. 2000 unpaid balance as of 12/00 = 14,976,402 (64,276,402 - 49,300,000)Nov. 2000 unpaid balance as of 12/00 = 34,804,153 (74,004,153 - 39,200,000)Dec. 2000 unpaid balance as of $12/00 = \underline{77,614,286} (85,714,286 - 8,100,000)$ 127,394,841 Outstanding liability as 12/31/00

(c)

Based on 1/98
Runout
40,200
42,000
43,200

	Ultimate		
	1/98 Runout	Based on 1/98	Completion Factor
Accumulated	40,200	45,500	88.35% after 4 months
Paid claims for 1/98	42,000	45,500	92.31% after 5 months
(Table MM-4a, in 1000s)	43,200	45,500	94.95% after 6 months

	Ultimate Claims	% Paid	Paid Amount	
	(from part b)	by 3/31/01	As of 3/31/01	
Oct. 2000	64,276,402	94.95%	61,030,444	
Nov. 2000	74,004,153	92.31%	68,313,234	
Dec. 2000	<u>85,714,286</u>	88.35%	<i>75,728,572</i>	
	223,994,841		205,072,249	Amt. paid by 3/31/01

223,994,841 - 205,072,249 = 18,922,592 outstanding liability as of 3/31/01.

Outstanding liability as of 12/31/00 = 127,394,841 (from part b)

Portion of above outstanding liability expected to be paid by 3/31/01: 127,394,841 - 18,922,592 = 108,472,249 or 85.1%

(a) Trend change in costs from one time period to the next.

Trend uses:

- Rating
- IBNR
- Provider contracting
- Competitive position
- Managed-care initiatives
- Projecting costs into future.

Components:

- Provider reimbursement trend usually largest component. Δ in reimbursement to provider for a service. Measure by analyzing provider contracts.
- Residual trend
 - Utilization trend change in frequency of use of service.
 - Fluctuation large claims, epidemics
 - Intensity Δ
 - Technology Δ
 - Demographic Δ
 - Product mix Δ
 - Code creep
 - Cost shifting
 - Government intervention
 - Deductible leveraging.

(b) Problems:

- Insufficient resources data, models, people
- Lack of detailed data.
- Effect of claim payment pattern Δs.
- Competition may not be able to unilaterally Δ rate trend as desired.
- Loss ratio incorporates effect of many premium distortions (e.g., inaccurate managed-care pricing, retrospective premiums)
- Antiselection
- Random fluctuation catastrophic claims, epidemics.
- Cost increase spiral.
- High-variance cases cancel after high-cost year. Future low years are forgone.
- Anomalies due to change in data systems and products.
- Method used to analyze must balance short-term vs. long-term (Short-term get most recent data; long-term more statistically credible)
- Pulse outliers (temporary) and know cause.

- Risk shifting
- Cost shifting
- Data integrity
- Managed-care initiatives.

Techniques to analyze:

- Historical averages/graphs.
 - Highly aggregated data
 - Use judgment, competitive analysis, historical analysis to set trend levels.
 - Recent trends highly influences choice of assumptions
 - Root cause of cyclical nature.
- Actuarial models:
 - Detailed build-up of cost components.
 - Consider "known" impacts and reasonable assumptions.
 - Recent experience heavily influences choice of assumptions.
 - "Known" impacts may not be as accurate as hoped.
- Linear regression tantamount to using historical average.
- ARIMA models:
 - Fit past experience and extrapolate.
 - Does not deal well w/seasonality.
 - Accurate only for short time
- External indicators:
 - Statistical
 - Leading indicators.

(c) Total trend = 1.12

Deductible leveraging:

Manual claim cost =
$$263 \times 12 = 3,156 - 250.85 = 2905.16$$

 $\times 1.12 = 3253.78 + 250.84 = 3504.62$

$$\Delta = \frac{3504.62}{3156} = 1.11$$

Deductible leveraging =
$$\left(\frac{1.12}{1.11}\right)$$
 = 1.009 - 1 = 0.9%

(a) Part (i):

Ranges of appropriate levels of surplus vary greatly as opposed to other types of insurance products.

The appropriate level of surplus will vary based on:

- Quality of management
- Other products offered
- Regulatory environment.

RBC is most commonly used to determine surplus. External benchmarks are available to determine RBC for various purposes such as statutory filings and rating agency requirements.

RBC is designed to provide a reasonable margin of safety for insurance operations.

A limitation of RBC is that it does not account for vitality surplus – the extra capital needed to undertake corporate initiatives such as starting a new product line. Vitality surplus can also mean increased C4 margins.

Rating agencies may require additional levels of surplus before they will give an insurer a specific rating.

Insurance companies also wish to avoid being taken over by regulators. In order to assure this, they often keep RBC at 200% of the NAIC level.

After developing a preliminary RBC formula for management purposes, the entire product should then be priced in order to meet the company's required return on capital. If the price determined for a product is too high to be competitive, it indicates one or both of the following:

- The product is not competitive and should be removed from the market
- The RBC formula is too conservative and should be reformulated.

Part (ii):

ASO – This will require generally low levels of required surplus because the firm is assuming little or no risk for the coverage.

Major Medical – Fortunately, the riskiest product, traditionally indemnity, is only 5% of the business. The required level of surplus for the PPO business will be less than the indemnity business, but significantly higher than the ASO and managed-care lines.

Group Life and Disability – Greater surplus than other types of insurance

Managed-Care:

- New level of complexity into the financial management process.
- The type of MCO is not sufficient to determine as appropriate level of RBC, risk characteristics vary greatly
- Revenue is generally capitated, expenses vary.
- Thorough analysis of claims structure is required.
- Risk characteristics of the business can be adjusted to improve situation.
- New guidelines for MCO may require increased required surplus.
- (b) The close relationship between profit and growth is partly a result of acquisition and valuation strain. It is a function of the inverse relationship between rapid growth and large profit margins.

One approach to address the relationship between profit, growth, and required surplus is to establish the required level of surplus as a percentage of premium.

In order to be self-supporting, a line of business must generate enough surplus to fund its own risk fluctuation reserve or RBC.

Stock companies must also generate sufficient profits to provide investors with their required stream of dividend payouts.

Several factors affect the size of the required level or surplus:

- Size of company
- Other product lines written
- Underwriting philosophy
- Product mix
- Contingency margins or explicit profit margins in rates.

Interaction of the following factors need to be considered when determining the level of profit needed to fund the required surplus:

- Growth rate
- Operating gain as a percentage of premium
- Long-term surplus requirements.

Alternative way to approach the relationship is for upper-level management to determine what it considers to be an appropriate level of return on equity or capital for each line of business, based on the line's risk characteristics.

Must apply rate to the true level of capital or surplus as opposed to the historically accumulated level

The desired rate or return for investors must also be considered.

In a growing business line, profits must be sufficient to cover the increases in required surplus or risk fluctuation reserves.

- (a) Challenges of using data:
 - Consistency of data Need the most consistent data to compare results over various time periods. Inconsistent data can lead to wrong conclusions. Consistency and reasonableness of the data is the responsibility of the actuary. Accuracy and comprehensiveness is the responsibility of the data preparer.
 - Availability of data Can you get the data you require? Source of data electronic (faster) or manual (more costly). You may need the data quickly. Can systems operate fast?
 - Reliability of data Must check validity of data. Check data against itself. Actuary responsible for reasonableness/consistency. Data preparer responsible for accuracy/comprehensiveness. If data not reliable, determine effect/bias on results and disclose.
 - Value of data Can meaningful decisions be made from the data and subsequent analysis?
 - Extract from data How the data is presented depends on the audience. The amount of time available for assessment also may impact how data is extracted.

Actuarial Standards of Practice #23 – Data Quality:

- Selection of data:
 - Consider intended use of data.
 - Intended use dictates nature and extent of review needed.
 - Data should be reasonable and comprehensive with attention to internal and external consistency.
- Availability of data:
 - What alternatives are available?
 - Cost and time frames reasonable?
 - Actuaries should disclose source of data.
 - What sampling methods used to collect data?
- Reliability of data:
 - Is data appropriate for purpose and is it current enough?
 - Data preparer responsible for accuracy/comprehensiveness.
 - If you can review data, do it. Otherwise state that you can't and not limitations
 - Accuracy and comprehensiveness is responsibility of those who supply data. However, actuary should review for reasonableness and consistency when practical.
 - Use of imperfect data (incomplete, inaccurate) result in material bias.
 - Disclose extent to which imperfect data produces material bias to work.
 - Document adjustments/modifications made because of imperfections.
- Value of data:
 - Disclose materiality of any potential bias due to imperfect data.
 - If you still have concerns, note them in the report.
 - If you departed from any procedure in the Standards of Practice materially, be prepared to justify.

(b) <u>Part (i):</u>

Comparability of data is the most important thing when developing HP performance measurement criteria:

- Review data for accuracy, consistency, reliability, comprehensiveness.
- Determine number of unusable records.
- Periodically audit/review data.
- Data retain value if moved.
- Determine time period.
- Is it from an appropriate source?

Source of HP performance data:

- Claims system data:
 - Usually electronic
 - Readily available
 - Cheap to access
 - Limitation is the accuracy and completeness of coding by providers and claims examiners.
- Medical records (patient records):
 - More accurate
 - Costly to use
 - Doesn't capture services provided by another provider.
- Patient-reported data:
 - Only source for some of more cognitive items
 - Usually done by survey
 - Form of survey can influence outcome
 - Reliability subject to interpretation.
- Population exposure data:
 - Usually provided by employer.
 - Not always optimal.

Part (ii):

Measurement Process:

- Use defined standards and definitions.
- Ensure quality of data (see above).
- Use statistically credible sample.
 - Stratified or random
 - Results affected by turnover of providers, number of providers, size of group
- Make sure population is relevant Don't ask 18-year-old male about maternity.
- Disclose and make available your methods.

- Provide an interpretation:
 - Sources of data
 - Credibility
 - Interpretation of results
 - Comparative data (socio-economic)
- Areas to compare?
 - Opportunity to receive treatment
 - Number of providers
 - Access to specialty
 - Cost/financial
 - o Adjust for age/benefits
 - o 3-year trend
 - o National trend
 - Member satisfaction
 - o Out-of-network use
 - o Waiting time
 - o Grievance
 - o Complaints
 - Medical effectiveness
 - o Proxy indicators
 - o Outcomes
 - o Compliance with protocols
 - o Cost-management data
 - o Preventive practices.

- (a) External sources must understand:
 - Characteristics of population that would affect mortality and morbidity
 - Time period
 - Limitations of collection mechanism
 - Appropriateness of the data for the task.

Example of sources:

- Federal government publications (e.g., Medicaid, CPI, etc.)
- Actuarial publications (e.g., SOA reports and tables)
- Reinsurer, consultants, state.

Internal sources – very important source of information.

Example of sources:

- Claim paying system data
- Premium billing system
- Commission payment system.

(b) Assumptions:

- Morbidity
- Mortality
- Interest (since long-term)
- Lapses (function of marketing, distribution, price)
- Expenses
- Taxes
- Future trends in LTC costs.

Standards of Practice:

- Reflect the actuary's best judgment of future events.
- Have to consider available data and expected future changes.
- Should incorporate appropriate provisions for adverse deviations.
- Should be reasonable (not unduly optimistic nor pessimistic)
- Should be consistent with each other.
- + → sensitivity analysis should be made. Also cash-flow testing.

(c) <u>Part (i):</u>

Claims Reserves:

- Due and unpaid liabilities Claims reported and processed but payment not recorded.
- In course of settlement Claims reported but not yet adjudicated and paid
- Incurred but not reported Claims anticipated but not reported.
- Loss adjustment expense Cost associated with adjudication of unpaid claims.
- Present value of amount not yet due Incurred before valuation date but not accrued yet.
- Resisted claims (Known litigation situation exists)
- Outstanding accounting feeds.

Active Life Reserves:

• Unearned premium reserves – Portion of premiums covering a period of time beyond valuation date.

Contract Reserves:

• Portion of premium covering claims costs > ret. premium later.

Premium Deficiency Reserves.

Part (ii):

Methods:

- Case reserves Estimate ultimate claims Amount already paid.
- Projection method Develops historical claims rate.
- Loss-ratio method Develops based on historical ratios of incurred claims to earned premiums.
- Tabular method:
 - Uses continuance table.
 - Interest discounting
 - Develops PVANYD.
- Development method.

- (a) Measures Related to Growth:
 - Premium equivalents:
 - Should be adjusted for trend
 - Inflation could mask a declining book of business.
 - Risk-based adjustments
 - Convert into premium equivalent that would be generated if customer purchased traditional, fully-insured indemnity insurance.
 - New cases sold
 - Number of group contracts
 - Number of employees and dependents covered
 - Commissions
 - Investment income.
- (b) Measures Related to Profit:
 - Statutory vs. GAAP measures
 - Using profit as a percent of premium is a good idea. It adjusts for growth.
 - Underwriting gain vs. operating gain
 - Underwriting gain does not include net investment income.
 - Operating gain includes net investment income.
 - Return on equity: GAAP Profits

 GAAP Capital and Surplus
 - Economic Value Added:
 - Better measure than ROE measure. Opportunities may be passed up if ROE is used even though value could be added.
 - Defined as the excess profit from a business over and above its cost of capital.
 - Loss Ratios:
 - May be distorted by reserve adjustments, seasonality, and cyclicality.
 - o Seasonality issue Use 12-month rolling loss ratios.
 - Cyclicality issue Try to get the whole cycle period in the loss ratio calculation.
 - Service Businesses Calculate profit per employee.

(c)
$$ROE = \frac{Profit}{Surplus + Capital} = \frac{Profit}{20\% \text{ of Premium}} = 18\%$$

Profit = $0.20 \times 0.18 \times \text{premium} = 3.6\% \text{ of premium}$.

.. operating gain = 3.6% of premium.

Investment Income = 0.30 premium $\times 5\% = 1.5\%$ of premium.

Underwriting gain (after-tax) = 3.6% of premium - 1.5% of premium = 2.1% of premium

Pre-tax underwriting gain = $\frac{2.1\%}{0.63\%}$ = 3.33% of premium.

- (a) Basic information requirements necessary for the proper handling of health claims:
 - Information to identify the policyholder and the claimant:
 - Entity contracting
 - Individual insured
 - Dependent relationship
 - Eligibility of claimant.
 - Proof of loss According to contract.
 - Date of loss Whether the contract was in-force.
 - Amount of loss Eligible charge based on the contract.
 - Information on to whom the payment should be made:
 - Beneficiary
 - Assignee.
- (b) Health claim adjudication process:
 - Benefit eligibility and proof of loss:
 - Contract provisions
 - Exclusions, limitations, pre-existing conditions.
 - Collect bills from hospital and doctors
 - Date of accident or illness.
 - Determine eligible charges Scheduled or usual, customary and reasonable.
 - Determine gross benefit level
 - Apply deductible, co-payment, and out-of-pocket
 - Apply policy maximums.
 - Determine net benefit level
 - Coordinate with other coverage
 - Primary or secondary payer.

- (a) Smith Corp. should consider the following:
 - Reimburse on a least expensive alternate treatment (LEAT) basis only.
 - Create an extensive set of age/time limitations to guide care.
 - Exclude cosmetic/experimental care.
 - Waive deductible for preventive (overall dental health will be improved)
 - Lower coinsurance for orthodontia.
 - Add a separate deductible for orthodontia.
 - Set annual maximum of \$1,000.
 - Raise the deductible to something substantially higher.
 - Raise family deductible from 2X to 3X.
- (b) Plan design characteristics to limit anti-selection include:
 - Limits on frequency of choice.
 - Limits on degree of change (e.g., can only move one tier at a time).
 - Modify current dental plan and add one or two coverage options but limit spread among options.
 - Require proof of insurability.
 - Delay full payment (i.e., full coverage for cavities after one-year wait).
 - Maintain a parallel plan design (e.g., the same lifetime max/ortho max should be used for all).
 - Package with other plans (i.e., include a low-cost dental with low-cost medical and a high-cost dental with a high-cost medical)
 - Test plan assumptions with a test group of employees.
 - Changing coordination of benefits provision to exclusion or carve-out method.
 - Add waiting/deferral periods for new/late enrollments (non-contributory plan).
 - Add waiting period for certain procedures.
 - Exclude pre-existing conditions (i.e., missing tooth).
 - Limiting extension of benefits provision.
 - Add a managed-care option (fixes payment levels for various expenses and encourages preventive care).
 - Fix employer contribution and vary employee contributions (will allow opting-out while still maintaining minimum participation level)
 - Eliminate dental coverage altogether (i.e., offer a health-care expense account for dental expenses).
 - Consideration of rules for transferred business.
 - Create a list of eligible industries.
 - Create a definition for eligible individual (e.g., don't cover dependents if they are covered by spouse's plan).

- (a) Business Objectives:
 - Growth How will that affect reinsurer?
 - Simple vs. complex goals
 - Reasonable and consistent goals
 - Clearly defined goals
 - Market conditions
 - Target markets

Administration:

- Are procedures followed?
- Are restatements active and followed?
- Reporting frequency.

Management:

- Competent
- Appetite for risk
- Attitude

Objectives of Reinsurance Program:

- Maximum profits? Minimum volatility? Maximum stability? Access to services?
- Tailor program and objectives.

Financial Condition:

- Rating agencies
- Financially capable of meeting objectives
- Where would additional financing come from?

Underwriting:

- Who will do?
- Skill level
- Authority level.

Claim Adjudication:

- Claim-paying philosophy
- Authority level of examiners
- Workload, compared to industry norms.

Marketing and Sales:

- Training
- Target market
- Market segments

Solution # 12 -- Continued

Expected Profits to Reinsurers:

- Adequate premium
- Appropriate spread of risk

(b) LTC Challenges:

- Young product -- benefits continually expanding.
- Low frequency, high severity
- Claim-cost curve is steep. Decades for experience to emerge.
- Future direction of claim costs is debatable. Medical advances could extend treatment. Cures could reduce costs.
- Insured claim cost data is scarce. Most pricing based on population data...
- Capital intensive:
 - RBC requirements onerous
 - Substantial reserves
 - Small employers may have trouble competing.
- New financing approaches
- Homogeneous data difficult to get. Variances in underwriting, marketing, distribution, claim administration
- Reinsurer expertise is limited
- Specialized nature
- Low participation can lead to antiselection.
- Small market Small employers' pricing is questionable. Large employers' have not pursued reinsurance since small percentage of premium dollar.
- Changing consumer behavior:
 - New services and expanded availability of existing services.
 - Changing family structure
 - Changing attitude towards nursing homes
 - Easing regulation of beds
 - Medical advances could increase or decrease costs
- Need accurate assumptions lapse, expense, interest.

DI Risks:

- Low frequency, high severity
- Handling of offsets (e.g., WC, SS) usually kept by insurer
- Basis upon which to price
 - Reinsurer favors individual calculation (more complicated, costly).
 - Insurer favors percentage of premiums (easier, beware of deductible leveraging).
- Potential antiselection
- Potential abuse particularly during downturns in economy
- Attachment point estimation
- Capital intensive
- Need substantial reserve
- Accurate assumptions lapse, expense, interest.

Medical Risk:

- Attachment point estimation
- Misestimate trend
- Antiselection
- Rate increase spiral
- Need accurate and excellent pricing, underwriting, claim adjudication
- Misestimate expenses.

(c) Programs:

- DI Automatic Excess:
 - Retain first x of monthly benefit, reinsure excess.
 - "Follow fortunes" of insurer.
 - Can charge premium to reflect risk
 - Protects insured from catastrophic claims.
- LTC Proportional reinsurance:
 - Receive x% of premium and pay y% of claims, x not equal to y, usually.

Use both

- Can set x and y so as to meet needs of customer and profit.
- Medical:
 - Individual stop-loss Limits exposure on each individual life
 - Aggregate stop-loss Limits exposure on aggregate.
 - o Beware of deductible leveraging.
 - o Attachment point set at expected plus margin.
 - o Could only cover 70% -- insurer retains cost control incentive.
 - Need to accurately project expected.
 - o Can adjust attachment points to meet customer needs

- (a) Major drivers of consumerism in the health-care industry:
 - Growth of Consumerism in Society:
 - Aging workforce
 - More educated
 - Increased wealth
 - Greater demand for more convenient goods and services.
 - Employers:
 - Shift to defined-contribution plans
 - Force employees to become more involved in health care
 - Government Initiatives:
 - HIPPA
 - Media and Public Perception
 - Information Technology Internet
 - Private accreditation and advocacy groups enables consumer to distinguish plans based on quality.
 - Social trends value on self-reliance.
- (b) Current managed care trends that might contribute to the cost increase:
 - Restructuring Physicians regrouping, abandoning solo practice. Direct contracting by employer has challenged the existing system.
 - Competition Growing number of for-profit health plans.
 - Cost increases Cost shifting strategies have run their course.
 - Quality Trend toward real quality of care.
 - Reduction in available capital for health-care plans.
 - Aging The graying of America.
 - The effect of the Internet on business.
- (c) Approaches the employer could use to mitigate this rate increase:
 - Provider community:
 - Report cards at provider level
 - Review quality assessment
 - Consider alternative medicines
 - Direct contracting
 - Employer clinics
 - Telemedicine
 - Case management
 - Centers of excellence
 - Risk-sharing arrangements

- Health plan:
 - Report cards
 - Case management
 - Risk-sharing
- Employees:
 - Increase cost-sharing

 - Total health management
 Choice of competing options
 Health risk assessments.

(a) It can be assumed that claims fall off evenly through the year. I have assumed they only end at the year-end. Otherwise, use average amount, e.g., age 32 year 1: (18,000 + 13,680)/2 = 15,840.

Part (i):

Age 32:

Frequency = 0.00105

60% Salary = \$18,000 per year

Termination Rates, years 1-5: 0.25, 0.24, 0,16, 0,10, 0.08 Continuance Rates, years 1-5: 0.76, 0.76, 0.87, 0.90, 0.92

Interest Factor v' - 0

Year	Benefit x Cumulative Continuance Rate	Formula
Year 1	\$18,000	60% of salary
Year 2	\$13,680	(1-0.24) x Year 1
Year 3	\$10,397	(1-0.24) x Year 2
Year 4	\$8,733	(1-0.16) x Year 3
Year 5	\$7,860	(1-0.10) x Year 4
Total	\$58,670	

 $$58,670 \times 0.00105 = 61.60 per year.

Age 42:

Frequency = 0.00202

60% Salary = \$24,000 per year

Termination Rates, 1-5: 0.19, 0.19, 0.12, 0.07, 0.05

Continuance Rates, years 1-5, 0.81, 0.81, 0.88, 0.93, 0.95

Interest Factor v' = 0

Year	Benefit x Cumulative Continuance Rate	Formula
Year 1	\$24,000	60% of salary
Year 2	\$19,440	(1-0.19) x Year 1
Year 3	\$15,746	(1-0.19) x Year 2
Year 4	\$13,857	(1-0.12) x Year 3
Year 5	\$12,887	(1-0.07) x Year 4
Total	\$85,930	

 $$85,930 \times 0.00202 = 173.58 per year

Age 52:

Frequency = 0.00662

60% Salary = \$30,000 per year

Termination Rates, years 1-5: 0.14, 0.14, 0.09, 0.05, 0.05 Continuance Rates, years 1-5: 0.86, 0.86, 0.91, 0.95, 0.95

Interest Factor v' = 0

Year	Benefit x Cumulative Continuance Rate	Formula
Year 1	\$30,000	60% of salary
Year 2	\$25,800	(1 – 0.14) x Year 1
Year 3	\$22,188	(1-0.14) x Year 2
Year 4	\$20,191	(1-0.09) x Year 3
Year 5	\$19,182	(1-0.05) x Year 4
Total	\$117,361	

 $$117,361 \times 0.00662 = 776.93 per year.

Total Premium:

Age 32: 100 employees x 61.60 = \$6,160 Age 42: 200 employees x 173.58 = \$34,716 Age 52: 100 employees x 776.93 = \$77,693

Grand Total: \$118,569

Part (ii):

\$500 per month offset = \$6,000 per year.

For age 32, \$6,000 is 1/3 of \$18,000

For age 42, \$6,000 is 1/4 of \$24,000

For age 52, \$6,000 is 1/5 of \$30,000

Therefore, new premium is:

61.60 x 2/3 x 100 = \$4,107 173.58 x 3/4 x 200 = \$26,037 776.93 x 4/5 x 100 = \$62,154

Grand Total = \$92.298

Part (iii):

I assumed rate for 30 was for age 30, not 30-34, so I interpolated q_x to get rates for age 32, 42, 52.

Monthly premium calculation:

<u>Age</u>	Employees	Rate/1000	<u>Units</u>	<u>Total</u>
32	100	0.0910	60	546
42	200	0.2018	80	3,229
52	100	0.6010	100	6,010
Total:				-

Expenses: 17.2% = \$11,817 per month

(b) Part (i):

Mortality and morbidity aren't necessarily the same for both groups of employees. The industry could be very different (white-collar vs. blue-collar). The demographics (age/sex) between the groups could be very different.

Verification of claims might be an issue. LTD could be a disaster. There's no good system to know if they'd go back to work, if rehab is available, what economics are in Koganistan, etc. Koganistan has high unemployment – the environment is less stable and there could be higher incidence and malingering. Need to know possible offsets.

For life coverage, no insurance law applies. Thus, no mandated rates apply, conversions aren't required, and there are no nondiscrimination rules.

Part (ii):

<u>Life:</u> Perhaps lower the amount of coverage until experience is gained. Tight eligibility records will be needed. Though a contributory plan may decrease exposure, it could severely hurt participation. Stay non-contrib. No conversions.

LTD: Make plan "any occ." Require company doctor's opinion. Have no ancillary benefits: survivor, pension, COLA. Limit to one-year benefit. Maybe use a lower percentage of salary. Longer elimination period. Or switch to ASO (uninsured) plan, or offer TPD in conjunction with life insurance cover instead of LTD.

Part (iii):

Mortality – Look at Koganistani government studies and compare to U.S. government studies to get insured numbers by ratio of insured (U.S.) /government (U.S.) = insured (Koganistan)/government (Koganistan). But government numbers there should be suspect.

Are there insurance entities there?

Look at actual company data if it exists; group should be large enough to be credible.

Other companies? They might share. Can you pool with them?

Data for similar countries? (Internet or SOA table manager software)

Consultants (careful), reinsurer.

Own insurer experience.

(c) Part (i):

Probability of being disable before 65 = 1 – Probability of never being disabled before 65

Probability of never being disabled:

$$\left[1 - \left(\frac{0.89}{1000}\right)^{3}\right] \times \left[1 - \left(\frac{1.05}{1000}\right)^{5}\right] \times \left[1 - \left(\frac{1.37}{1000}\right)^{5}\right] \times \left[1 - \left(\frac{2.02}{1000}\right)^{5}\right] \times \left[1 - \left(\frac{3.56}{1000}\right)^{5}\right] \times \left[1 - \left(\frac{6.62}{1000}\right)^{5}\right] \times \left[1 - \left(\frac{11.87}{1000}\right)^{5}\right] \times \left[1 - \left(\frac{16.71}{1000}\right)^{5}\right] = 0.8026$$

$$1 - 0.0826 = 19.74\%$$

Part (ii):

Want 50% = product [1 - t(x)], where t(x) is the termination rate at time x.

$$(1-0.28) (1-0.27) (1-0.18) = 0.431$$

 $0.5256 \times 0.82 = 0.431$
 $0.5256 \times [0.983598417]^{12} = 0.431$
 $0.5256 \times [0.983598417]^4 = 0.4919564$
 $0.5256 \times [0.983598417]^3 = 0.5001598$

So, between 2 years and 3 months and 2 years and 4 months, exactly 50% will be recovered.

COURSE 8: November 2001 Health and Group Life Segment

(a) <u>Underwriting</u>

- Lifestyle:
 - > Coherency
 - > Living status (married, single, living alone)
 - > Overall general habits.
 - > Make phone call.
- Health:
 - > Attending physician statement
 - > Drug screening
 - > Medical history

Group LTC

- For employee, often have guaranteed issue. Pre-existing condition limitation will apply.
- For spouse, often have simplified underwriting.
- For retirees, parents of employee, often have more underwriting in the form of non-medical underwriting.
- Late applicants, usually have to charge group rate even though have different types of underwriting.
- Combination of approaches Short-form evidence for spouses.
- Other underwriting field underwriting.
- Impact of risk selection

Pricing considerations for morbidity assumptions:

- Morbidity concerns:
 - ➤ Area Utilization and costs vary. Individuals return to home state.
 - > Pre-existing conditions Helps minimize antiselection.
 - > Prerequisites Removal increases prices.
 - ➤ Reinsurance Available.
 - > Reinstatements Consider time between discharge and admission
 - ➤ Offsets.
 - > Integration of coverage More appropriate use of care should reduce costs.
 - > Administration of claims.
 - > Transfers Handle consistently, appropriately.
 - ➤ Data sources Snapshots vs. exposure. Data bias.
 - ➤ Underwriting Health and lifestyle.
 - ➤ Marketing Claims cost vary by method.
 - ➤ Mental and nervous Adds significantly to cost below age 65.
 - ➤ Insured vs. population data Add load to population data. Underwriting can offset load.

- Facility type Definition varies by state.
- ➤ Level of care/Charge levels:
 - o Frequencies, LOS vary
 - o Skilled stays are short, custodial longer.
- > Minimum group size
- Minimum participation requirement. Participation usually low but need to help spread risk, minimize adverse selection.

Average age is younger than individual. Lapses are lower than individual. Hopefully, this continues to help spread risk.

(b) Sources and limitations of data available from which to estimate claim costs for institutional care benefits.

Institutional:

- 1985 National Nursing Home Survey
- Long-Term Care Intercompany Study 10 companies
- NCHS
- Medicare
- Adult Day Care data NJ
- Own data
- State programs.

Limitations:

- Population data needs to be adjusted.
- Has to be adjusted for different benefit features.
- Institutional data Needs to adjust for time frame that benefits are payable.
- Adjust for correct benefit triggers.
- Own data has low credibility.
- New coverage so very little experience exists...
- Product has changed, so claims change.
- Little is known about future due to antiselection and lapse.

(c) Voluntary lapses – Usually includes mortality because it is hard to differentiate

Anti-selection – Voluntary lapses usually mean increased antiselection or morbidity cost on the remaining block. Certain minimum lapse rate does not increase antiselection.

1985 NNHS is similar to insured with conservatism. Environment in 1985 was little insurance. SOA LTC experience not developed from valuation actuary standpoint.

Need to make adjustments to 1995 NNHC:

- Features of product nonforfeiture benefits, inflation protection, benefit amounts.
- Area
- Triggers Determine eligibility.
- Instrumental activities of daily living.
- Activities of daily living.
- Medical necessity.
- Cognitive impairment.
- Spousal discounts often large discounts. Take discount in reserves?
- Other.

(a)
$$PM = 1 - V - SC/(RR \times AF \times G)$$

Where:

- PM = Profit margin
- V = Expense and claim rates
- SC = Solicitation cost per policy
- RR =Response rate
- AF = Annuity factor
- G = Annual gross premium

$$10\% = 1 - (30\% + 20\%) - \frac{0.2}{(RR \times 2.7 \times 50)}$$

$$0.4 = \frac{0.2}{\left(135 \times RR\right)}$$

$$RR = 0.0037$$
 or 0.37% .

(b) Solve for Solicitation Cost/1st year premium.

$$X = \frac{SC}{RR \times G}$$

Substituting into equation from part (a):

$$PM = 1 - V - X / AF$$

$$10\% = 1 - (30\% + 20\%) - \frac{X}{2.7}$$

$$0.4 = \frac{X}{2.7}$$

$$X = 1.08$$

Therefore, solicitation cost = 108% of first year premium.

(c) How to improve response rates and persistency?

Response Rates:

- Figure out best target market:
 - > Segmentation analysis using statistical models such as regression analysis.
 - > Solicit current policyholders.
 - > Get endorsements from the association.
- Lower Price:
 - > Reduce expenses.
 - > Lower solicitation costs.
 - > Price at \$49.99 instead of \$50 for psychological impact.
- Simplify underwriting
- Simplify product by including only one benefit.

Persistency:

- Improve benefits related to persistency (e.g., return or premium provisions).
- Simplify Product:
 - > Offer payroll deductions or electronic payment.
 - > Reduce premium frequency (annual vs. monthly).

1 Benefit Amount:

- LTD is high. Consider lowering to between 50% and 66.6%.
- STD is high. Consider lowering or grading down benefits after a few weeks.
- The higher the benefit percentage, the less incentive to return to work.

2 Maximum Benefits:

- Should have a maximum.
- Typical maximums are \$5,000-\$6,000 per month for LTD; \$500-\$1,000 per week for STD.

3. Elimination Period:

- For LTD, usually could be longer, say 60-180 days.
- For STD, 0/7 OK, but could make it longer.

4 Maximum Benefit Period:

- To age 65 for LTD is typical, but could be limited to as little as two years.
- For STD, could reduce to 13-26 weeks.
- Should integrate STD benefit period with LTD elimination period to avoid duplication of benefits.

5 Definition of Disability:

- Most common structure is "own occupation/any occupation" definition.
- "Own occ" means cannot perform material and/or substantial duties of own occupation.
- "Any occ" means cannot perform substantial duties of any occupation for which reasonably suited, based on education, training, experience.
- "Specialty occ" is variation of "own occ" for certain professions such as physicians, lawyers (more favorable to claimant).
- Could provide partial benefits if claimant can return to work part-time (motivation to get back to work).

6. Integration of Coverage:

- Usually integrate with other income received by claimant during disability (especially LTD); e.g., Social Security disability.
- Direct integration reduces benefit payable on a dollar-for-dollar basis.
- All sources integration pays least of:
 - > 70% of salary less all other income.
 - > 60% of salary.
 - Maximum monthly benefit.

- 7. Cost-of-Living Adjustments (COLA):
 - Mitigate effects of inflation by increasing benefit.
 - Could delay COLA to after initial period.
 - May want to remove availability of benefit.
- 8. Survivor Benefits Should be only with LTD, if at all.
- 9. Minimum Benefits Can have minimum but may make product more expensive.
- 10. Pension Contribution Benefits Should be only with LTD, if at all.
- 11. Eligibility:
 - Should have minimum-work-week requirement.
 - Require "actively at work" for coverage to start.
- 12 Exclusions and Limitations:
 - Most STD and LTD contracts contain some exclusions (e.g., felonies, war).
 - Often have pre-existing condition limitation.
 - Often have mental/nervous limitation (but legally, future is unclear).

- (a) Identify additional information you would need in order to provide a specific and aggregate stop-loss quote.
 - Location Claims cost vary by area.
 - Legal business entity.
 - Operations How many years under current management?
 - Subsidiaries covered
 - Industry Standard industrial classification code.
 - Union members covered.
 - Has proposed effective dates.
 - Has paid claims and time frame.
 - Has average employee count. Would like current count.
 - Need age/sex distribution. Average age is not enough and very misleading.
 - Current premium.
 - Need to determine growth rate and reasons for
 - How long had current carrier?
 - Current rate.
 - Any plan changes? This could affect claims lag.
 - Is the quote on incurred or paid claims basis?
 - Deductible leveraging: Consider because this will help keep employers' percentage of risk the same and keep rate increase controllable.
 - Financial viability of company.
 - Consider whether specific deductible is adequate to protect the aggregate coverage. This will affect rate. The higher the specific deductible, the more that flows through to aggregate claims.
 - Get claims separately for medical and dental.
 - Were there catastrophic claims?
 - When were catastrophic claims and are they ongoing?
 - Get employee and dependent counts monthly.
 - What was plan design during experience period?
 - Who is TPA?

- (b) Explain steps required to develop the annual aggregate deductible.
 - Total paid claims.
 - Subtract catastrophic claims (claims covered under specific). Gives the claims that would fall under the aggregate policy.
 - Do this for the two most recent time frames; each being 12 months would be good.
 - Do for medical coverage and other separately. Looks like only medical
 - Divide total claims by exposure (number of members) and by a monthly conversion factor. This gives per-member, per-month cost.
 - Need to anticipate future changes.
 - Adjust for trend.
 - Adjust for age/sex factor.
 - Adjust for plan design changes.
 - Adjust for deductible (if in 1st year).
 - Adjust for area.
 - Gives total claims adjusted for future.
 - Weight the claims cost for the two time frames equally and develop average.
 - If the more recent time frame is larger, use that amount.
 - Multiply by 120%. The 20% is the margin for claims deviations.
 - Multiply by 12 to make annual.
 - Multiply by current number of employees.

- (a) Use pre-tax employee contributions:
 - Simplest approach
 - Very tax effective for employees
 - Works in U.S. but not in Canada.

Use a health spending account:

- Tax advantaged reimbursement for employees
- Gives employee complete freedom on how to use money.
- Company cost is fixed, thereby allowing company to control costs.
- However, employee does not have catastrophic medical coverage.
- Might be better to use a health spending account along with a high deductible medical plan.

Offer different medical options (e.g., include various managed-care options).

Use one of various credit-based flexible-benefit approaches:

- Allows company to give employees choices and ability to customize benefits while allowing company to control costs at the same time.
- Modular flex plan.
- Core + Options
- Coreless
- Company has the ability to set or freeze flex credits, which gives the company excellent control of costs in the future.

A combination of the above approaches may be most successful.

(b) Approach 1 – No rollover at all (U.S. rule). In Canada, can choose either of Approach 2 or 3 (rollover claims or balance) but not allowed to rollover both.

Approach 2 – Allow rollover of account balance.

- Allowed to roll over for one year only (must forfeit at the end of year 2).
- If rollover balance, cannot roll over expenses.

Approach 3 – Allow unpaid claims to be paid in from the following year's balance:

- If rollover expenses, cannot roll over balance.
- Any unused balance at the end of year is forfeited.

(c)

	No Rollover	Claims Rollover	Balance Rollover
Year 1:			
Beginning balance	\$500	\$500	\$500
Eligible claims	\$675	\$675	\$675
Claims paid	\$500	\$500	\$500
Claims carry-forward to year 2	\$0	\$175	\$0
Claims paid out-of-pocket	\$175	\$0	\$175
Forfeiture	\$0	\$0	\$0
Balance carry-forward to year 2	\$0	\$0	\$0
Year 2:		\$500	\$500
Beginning balance	\$500	\$500	
Eligible claims	\$300	\$475 (\$300 + \$175 from year 1)	\$300
Claims paid	\$300	\$475	\$300
Claims carry-forward to year 3	\$0	\$0	
Forfeiture	\$200	\$25	
Balance carry-forward to year 3		\$0	\$200

(d)

• Company changing to balance carry-forward.

• Therefore, employee can over-contribute in year 3 because any balance at the end of the year can be carried forward to year 4.

• Claims in year 1 and 2 have averaged just under \$500; highest year = \$675.

• Suggest contributing \$700; so that all claims will be paid even in worst-case (\$675) year.

• Remaining balance will be rolled forward to year 4.