

CSP-GH Illustrative Solutions

Spring 2008

1.

Solution:

(a)

State regulatory issues for HMO plans:

- Licensure: need provider contracts, insolvency protections, quality improvement, grievance procedure, capital requirements, etc.
- Enrollee: each enrollee must be given a certificate and a copy of contract
- Provider issues: focus on provider selection & termination. Hold harmless clause.
- Solvency: RBC ratio
- Annual filing: require annual filing of rates
- Financial exam: require financial exam every 3 years
- Prior approval: rate increase may require prior approval
- Access to care: Need to ensure proper access to care
- Utilization review & quality assurance: Specific requirements apply
- Grievance procedures: Ensure prompt resolution
- External appeal: Specify policyholder's rights to appeal externally
- HIPAA: State has a major role in HIPAA implementation
- Multi-state operations: Need to be licensed in each state

(b)

Requirements found in state managed care legislation

- Any-willing-provider: HMO should include any providers willing to meet the requirement
- Access to specialty care: Some states allow member to go to specialists without referral, or choose specialist as PCP
- Drug formulary: Require disclose of drug formularies
- Clinical mandates: States mandate clinical procedures
- Mandated benefits: States mandate benefits to be covered
- Extended legal liability
- Deem utilization review as practice of medicine: physicians performing utilization review could be liable
- Preempt providers from anti-trust law: providers could bargain collectively
- Require emergency care to be covered

1. (b) continued

- Open pharmacy law:
 - Any willing provider
 - Limited use on mail order
 - Require pharmacy vendors to be licensed
- Unitary drug pricing: Require drug manufacturers to sell to vendors at the same discount.

2.

Solution:

(a)

Meeting Choice Based Competition
Wide array of products leads to anti-selection

User of Internet
Need to be HIPAA compliant
EE-info, services
Provider – Real time claim status, verify coverage
ER – Billing, financial reports
Distributors – Group status, new information

Strategic Sales Goals
May be too ambitious given current market place, economy, competition, etc.
Set realistic, balanced financial and growth goals

Quality
Movement toward defining and measuring
Impact satisfaction

Increasing Medical Cost
Need new and creative ways to control costs for-profit companies still need to have a favorable stock rating
Increase case / utilization management

Regulatory Pressures
Guarantee issue, bill of rights
Uniform protocols, Medicare Part D

Consolidation / Competition
Changing / restricting
Better economies of scale
New competition

(b)

Target opportunities – marketing can find niches, clients or prospective markets
Prospect opportunities – meet opportunities direct attention to BDM
Assess the need the MCO can meet can. Determine where MCO can best meet needs
Underwrite the risk – can help explain what type of risk, who the product is intended for
Prepare proposal – marketing can focus attention to BDM
Decide what features to emphasize

2. (b) continued

Present proposal
Marketing can guide sales on best features

Close the sale
Sale to employer/BDM

Customer Sale
Ultimate consumer = employee

Brand
Becoming increasingly important

Note: BDM = Business Decision maker

(c)

Budget – Money available
Goal – who is the target
Best vehicle – in a region
Best vehicle for a given population
Alternate budget / goal
Alternative vehicles
Best vehicle to get message out
Time

3.

Solution:

(a)

2006 Med Part D costs

<u>Low</u>	<u>High</u>	<u>Beneficiary</u>	<u>Plan</u>	<u>Medicare</u>
\$ 0	\$ 250	100%	0%	0%
250	2250	25%	22%	53%
2250	5100	100%	0%	0%
5100	∞	5%	15%	80%

	<u>2005 Total Costs</u>	<u>Trend (1)</u>	<u>2007 Costs</u>
Father	1500	1.1449	1717.35
Mother	6000	1.1449	6869.40
Uncle	8000	1.1449	9159.20

(1) Trend = $1.07^2 = 1.1449$

Assumes Total Cost in problem description = total medical claims prior to discounts and cost sharing.

(b)

2006 Med Part D Costs Percentages (Look at part (a))

Father – costs = 1717.35 (from part (a))

	Cost Amt	(Member) Beneficiary	Plan	(Government) Medicare
0-250	250	250	0	0
250-2250	1,467.35	= 25% 366.84	= 22% 322.82	= 53% 777.70
2250-5100	0	0	0	0
5100+	0	0	0	0
Total	0	(i) = 616.84	(iii) = 322.81	(ii) = 777.70

Mother – costs = 6869.40 (from part (a))

	Cost	Member	Plan	(Government) Medicare
0-250	250	250	0	0
250-2250	2000	500	440	1060
2250-5100	2850	2850	0	0
5100+	1769.4	88.47	265.41	1415.52
Total	6869.40	(i) = 3688.47	(iii) = 705.41	(ii) = 2475.52

3. (b) continued

Uncle – costs = 9159.20 (from part (a))

	Costs	Member	Plan	(Government) Medicare
0-250	250	250	0	0
250-2250	2000	500	440	1060
2250-5100	2850	2850	0	0
5100+	4059.20	202.96	608.88	3247.36
Total	9159.20	(i) = 3802.96	(iii) = 1048.88	(ii) = 4307.36

Summary

	(i)	(iii)	(ii)
	Member	Plan	Government
Father	616.84	322.81	777.70
Mother	3688.47	705.41	2475.52
Uncle	3802.96	1048.88	4307.36

4.

Solution:

(a)

Unconventional Risk Vehicles used to Cover Conventional Risks:

- Captives – subsidiary that takes on parent company risk
- Rent-A-Captives – Multiple Insurers combine and rent a captive
- Integrated Policies
- Multi-trigger and Integrated Policies – basket of risks; requires multiple events/losses to occur for benefit to be paid
- Earnings Protection – protects in case of earnings shortfall
- Self-Insured Retentions – Keep a portion of the risk (%); or similar to a deductible
- Risk Retention Groups – Self-Insured capital pool; member is paid upon a loss from the pool
- Finite Insurance – Smooths profits and losses
- Multi-year, multi-line policies – Basket of risks; over multiple years (protection).
- Vehicles in which a payment is made when an event occurs (usually catastrophic)

Other ART Vehicles Used in Capital Markets:

- Insurance-Linked Bonds – forfeits principal and interest when a certain event occurs (usually catastrophic)
- Securitization – packaging of risk into debt and equity
- Cat-E Puts – option to sell equity at a given price
- Contingent Surplus Notes – Allows company to get capital when needed
- Credit Default Swaps – Buyer pays premium to seller; when an event occurs (usually catastrophic), seller pays buyer for loss
- Weather Derivatives – tied to meteorological events

(b)

Advantages:

- The Cost of Risk is Reduced – Required economic capital is reduced
- Companies Can Focus – Allows company to do what it does best and transfer risk outside
- Customized Risk Transfer Product – Beneficial for companies with unusual portfolios of risk
- Cost is Reduced – natural hedges reduce overall cost (diversification)
- Earnings stability – same level of hedging can be achieved as with multiple conventional products

4. (b) continued

Disadvantages:

- ART cannot completely eliminate all risks
- ART does not have a long history some methods may need refining
- ART may require larger initial outlays than conventional products
- ART alters the way employees define, measure and manage risk
- Requires executives to be better educated on products and regulation
- Difficult to determine fair prices and reasonable terms
- Some risk may be impossible to quantify with certainty
- Complexity of ART makes the deal-making and legal documentation processes lengthier
- Confusion surrounding its regulation

(c)

7 million cost
50% risk reduced

$$\begin{aligned}\text{Before: Cost of Capital} &= \text{Required Capital} \times \text{Cost of Risk} \\ &= 175 \times 0.15 = 26.25 \text{ million}\end{aligned}$$

$$\begin{aligned}\text{After: Required Capital} &= 175 \times 0.5 = 87.5 \text{ million} \\ \text{Cost of Capital} &= 87.5 \times 0.15 + 7 \text{ million} = 20.125 \text{ million}\end{aligned}$$

Therefore, the company should pursue this strategy (cost of capital is lower).

5.

Solution:

(a)

Benefits:

- Organizational effectiveness
 - Organization is more streamlined
- Risk reporting
 - Since all risks of enterprise managed together, risk reporting is enhanced
 - Can report on natural hedges and risk interactions
- Improved Business performance
 - Due to natural hedges

(b)

Steps:

- Identification and classification of risks
 - Determine all risks company faces
 - Classify into categories
- Risk measurement and prioritization
 - Use sensitivity testing to determine which risks pose the greatest financial threat
- Risk management and aggregation
 - Combine all risks into one portfolio
 - Manage risks together

(c)

Operational

- Billing and collections
 - Must be timely and accurate
- Claims processing
 - Lawsuits may occur over errors and turn-around time
- Contract wording
 - Needs to be clear to avoid misunderstandings and lawsuits
- Data and technology management
 - Need accurate data to stay abreast of changes and risks
- Internal Fraud
 - Touchy subject; can affect financial bottom line
- Human Resources
- Reinsurance
 - Can use to reduce amount of risk retained
- Network management
 - Ensure that contracts are being honored
- Training
 - Appropriate training will reduce potential errors

5. (c) continued

- Sales force
 - Need to ensure they are complying with laws and regulations
- Vendor relations

Pricing Risks

- Anti-selection
 - Tendency of healthy members to lapse and unhealthy ones to stay
 - Causes poorer experience over time
- Authority
- Competition
 - May prevent insurer from charging appropriate rates due to concern that members will leave for a competitor's plan
- Data
 - Needs to be accurate
- Financial viability of capitated providers
 - If capitated providers become insolvent, insurer will be liable for paying for claims to other providers
- Model Risk
 - Risk model is inappropriate or does not consider all relevant factors that it should
- Mortality Risk
 - Risk that mortality experience is worse than expected
- Reinsurance Risk
 - Risk of not being able to reinsure part of the risk at acceptable prices
- Regulatory / Legislative Risk
 - Risk of changes in laws causing additional liability for insurer
 - Mandated benefits is an example
- Cost Trend
 - Risk of cost of medical services increasing more than expected
- Frequency / Severity Trend
 - Risk of having more serious conditions than assumed
- Inflation Trend
- Utilization Trend
 - Risk of having higher than anticipated utilization
- Underwriting Risk
 - Risk of poor underwriting leading to acceptance of poor risks

5. (d) continued

(d)

- Aggressive Loss Ratio: Risk of medical costs or utilization increasing
- Target Margin Increase: May require higher prices to achieve, leading to lapses and anti-selection
- Sales Increase: May lead to strains on administrative system
 - May also cause poorer UW and hence poorer experience
- Reduced Commission: May run the risk of losing talented agents
 - Agents may perform less field underwriting
- Decreased Claim Accuracy: May cause lawsuits, or require payments under performance guarantees with policyholders
- Increase Attachment Point: May cause greater financial risk
 - Insurers should determine maximum amount of risk they can handle and reinsure claims above that amount
- Increased Capitated Providers: Increases the risk that a capitated provider will become insolvent

(e)

- Vision and Mindset
 - Needs to go from filling beds to improving patient care
 - Provider must share this vision
- Physician Incentives
 - Want incentives based on quality, not utilization
 - Some incentives encourage physicians to not take on patients with serious health conditions
 - Monitor physician activity to ensure this does not happen
- Medical Management
 - Improved Case Management, Utilization Management
 - Goal is to improve health status
 - Provide feedback to physicians
- Accounting and other reporting systems
 - Need to be timely and accurate
- Administrative Systems
 - Keep records of PCPs and members
 - Used to pay providers on capitation
- Subcapitation
 - Providers accepting capitation may pay part of that capitation to another provider for specific services
 - Provider should only keep responsibility for services it can provide

6.

Solution:

(a)

“Shrink to Glory” – Because statutory accounting penalizes profitability of new business (must take all acquisition costs in year sold) and rewards lapses (can release the very conservative reserves), a company can look profitable while it literally goes out of business.

“Grow out of the Problem” – New business acquired at a cost greater than the hurdle rate means company could be growing and destroying economic capital at same time.

Company could look unfavorably at cost of business that is profitable but not as profitable as rest of block, even though it is adding value to take it on. That is, reject due to lowering overall margin through economic value added.

(b)

- Used to develop regulatory capital
- Aids in developing risk tolerance limits
- Provides a risk-adjusted value of new business
- Provides a fresh look at items that drive value at the line of business level
- Provides benefits of diversification
- Provides for better risk measurement and management
- Provides a method of allocating capital
- Provides a consistent measure for comparison across companies
- Provides an incentive to optimize and manage risk/return tradeoffs
- Focuses on one measure of capital
- Aligns business unit goals with share price
- Helps uncover hidden risk and profit enhancers

(c)

- A clear easy process and appropriate tools are required for implementation
- Results may be difficult to understand
- EC must be balanced with rating agency and regulatory requirements
- May be difficult to map to local accounting
- Specific risks need to be calculated which may be difficult
- Diversification benefits are hard to measure
- May be difficult or costly to adapt to
- Significant resources may be required
- Is it a management versus measurement tool?

7.

Solution:

(a)

ASOP #8 – Health Rate Filing Regulations

- Items to be included in the Rate Filing
 - Filing purpose and scope
 - Use of business plan to project future results
 - New plan provisions
 - Plan provisions (current)
 - Assumption
 - Reasonableness of the assumptions
 - Use post experience to project future results
 - Regulatory benchmarks (projection of the benchmarks)
 - Surplus, capital and profit

- Adjustments made to past experience when projecting future results
 - Demographic mix
 - Business objective
 - Utilization
 - Level of premium
 - Level of benefits
 - Cost of services
 - Risk selection methods
 - Administrative service cost
 - Provider contracts
 - Health Care Delivery System
 - Policy provisions

- Assumptions used in the rate filing
 - Health care cost trend
 - Enrollment
 - Mortality, lapse, interest, trend
 - Provider contract
 - Profit and surplus
 - Interest rate – discount rate
 - Prem and rate change
 - Expenses, commissions, taxes
 - Reinsurance
 - Policy provisions

Other ASOPs related to Rate Filings:

7. (a) continued

ASOP #23 – Data Quality

- Selecting data
- Limitations
- Use of data
- Reliances
- Review of data
- Documentation
- Disclosure

Items to consider when selecting data:

- Reasonableness
- Assumptions: methods and data
- Sampling method used
- The cost and feasibility of obtaining alternate data
- The cost and benefit of using alternate data
- Any known limitations

ASOP #41 – Actuarial Communications

(This ASOP may be relevant if a consultant is preparing the rate filings on behalf of HAL company)

- Form & content – must be well written and organized
- Advocacy
- Non-Independence
- Timing of the Communication
- Other Obligations – other than ASOPs: regulation, federal law, state law
- Method & Assumptions
- Reliance
- Identify all actuaries responsible for the work
- Principal & scope of the document

ASOP #5 – Claim Liabilities & ASOP #42 – Liabilities Other Than Claims

This ASOP may be needed if the actuary had to use calculations to determine incurred claims

ASOP #28 – Items to include in an actuarial opinion

7. (a) continued

Finally, the actuary must make the following certifications for a small group rate filing:

- Must file an annual rate certification, certifying compliance with the small group NAIC model compliance act
- The certification must be signed by a qualified actuary
- The actuary must certify that the rating assumptions are reasonable and appropriate
- The actuary must indicate if the certification is qualified or non qualified

(b)

Components of the NAIC Model Act

Class of Business – Between Class Rule

- Up to nine classes allowed
- Based on distribution system, acquired blocks, associations
- 20% limit on min to max

Affiliate Rule – Any single carrier that files its own consolidated tax return is required to comply with the small group model law act

Applicability – the law applies to plans offering small group (2-50) employee coverage on behalf of an employer

Index Rate – Within a class rule

- This is the arithmetic mean of the highest and lowest rate charged within a class
- Limit is $\pm 25\%$
- e.g.: If the new business rate is \$100, highest rate for a

renewing group cannot be $100 \left(\frac{1.25}{.75} \right) = 166.67$ and the

lowest rate for a renewing group cannot be less than \$100

Allowable Case Characteristics

- Age, gender, group size (20% limit min/max), geographic area, industry (15% limit min/max), family composition, and other (if allowed by the state commissioner)

Rate Increase Limitations

- New business rate (for the ratings period being tested)
- Plus 15% annually for experience
- Plus any rate changes due to a change in coverage or case characteristics

7. (b) continued

The actuary must also verify that underwriting requirements are fair and sound

The actuary must also certify that ratings assumptions are appropriate and actuarially sound

8.

Solution:

(a)

Types and Purpose:

Statutory

- Refers to accounting conventions required to be used by all life and health insurance companies for the NAIC blank
- Focus is to demonstrate solvency of the insurer
- Has balance sheet orientation
- Conservative standards are mandated
- Assumptions and methods for Statutory reporting are specified in the NAIC Standard Valuation Law
- Can distort current levels of earnings and historical trend in earnings
- Tends to accelerate expense recognition and delay revenue recognition
- Attempts to determine the value of the insurer if it is forced to liquidate

GAAP

- Refers to accounting conventions adopted by the Financial Accounting Standards Board (FASB)
- GAAP standards provide for consistent framework for comparing statements of different entities
- Attempts to more accurately reflect earnings during a reporting period
- Attempts to match the incidence of revenues with expenses
- Attempts to determine the value of the insurer on a going concern basis
- Has conservatism in the provision for the adverse deviation

Tax

- Refers to accounting conventions required by various taxing authorities in the determination of tax liability
- Deferred Acquisition Cost (DAC) tax impacts taxable income
- Requires that insurers delay the recognition of certain expenses when calculating current taxable income

Managerial

- Modification of other financial reporting methods
- Used to provide a more accurate picture of the impact of management decisions on the value of the insurer

8. (a) continued

Policyholder Reporting

- Provides information on the results of any risk-sharing arrangements
- Documents the flow of funds involved in the insurance arrangement
- Provides information to fulfill government reporting requirements
- Includes ERISA and IRS reporting for VEBA's
- Provides information necessary for the policyholder to complete his or her own financial reports
- An example is an actuarial reserve for self-funded or other liability determination

Provider Reporting

- Provides information for provider risk-sharing arrangements
- Provides information for medical management reporting

How They Relate:

- Statutory financial reports are the starting point for tax reporting with certain adjustments for reserve items
- Managerial financial reporting starts from a GAAP basis with adjustments made to address GAAP's limitations
- Statutory financial reports use more conservative assumptions than GAAP
- Statutory financial reports use minimum morbidity and mortality tables whereas GAAP is more flexible
- GAAP is more flexible
- Statutory financial reports use a maximum interest rate whereas GAAP is more relaxed
- GAAP financial reports have full recognition of deferred taxes whereas Statutory financial reports do not
- GAAP financial reports have recognition of market value of most assets whereas Statutory financial reports do not
- GAAP financial reports recognize lapse in the reserves whereas Statutory financial reports do not
- GAAP financial reports allow for capitalization of DAC whereas Statutory financial reports do not
- GAAP financial reports recognize all receivables and allowances whereas Statutory financial reports do not
- GAAP financial reports remove the asset valuation reserves and the interest
- GAAP financial reports remove the asset valuation reserves and the interest maintenance reserves (AVR and IMR) whereas Statutory financial reports require them

8. continued

(b)

Types and Purpose:

Statutory

- For Life-1 annual statement to be filed with the Office of Superintendent of Financial Institutions of Canada
- Canadian Institute of Chartered Accountants publishes generally accepted accounting principles
- GAAP approach in Canada emphasizes consistency of the income statement
- GAAP approach wants expenses to match revenues
- Liabilities should be calculated according to recommendations in the CICA handbook
- Liabilities are on a going concern basis
- Can use the provision for adverse deviation
- Can use all acquisition costs without arbitrary limits
- Includes all costs except income tax, marketing overhead and shareholder transfer

Tax

- According to the Canadian Income Tax Act
- Federal Income Tax is based on Statutory accounting adjusted for various income and expense items
- The Investment Income Tax is 15% paid by life insurance companies on investment income earned on assets supporting certain liabilities

Managerial

- Same as in the U.S.

Consumer Protection Plan

- Indemnifies policyholders in the event of the insolvency of the insurer
- All direct writing companies must belong to the plan
- Companies must meet minimum surplus requirement similar to the RBC calculations in the U.S.

Differences with the U.S.:

- Majority of the differences are in the regulatory environment
- The use of two financial statements on different bases is not allowed in Canada

8. (b) continued

Consumer Protection Plan

- Policyholder Reporting is similar to the U.S. except for government reporting requirements
- Companies must issue income tax forms to their policyholders and must report interest credit to refund deposit accounts as taxable income to the policyholder

(c)

Ruling Bodies:

United States

- NAIC for statutory statements
- State Government for financial statements
- FASB for GAAP statements
- IRS code for tax statements
- Treasury regulations for tax statements

Canada

- Provincial Authorities for statutory standards
- Federal Authorities for statutory standards
- OSFI supervises the health insurance business

- Actuaries who set reserves are subject to professional standards of practice

- Actuarial Standards Board in the US
- Canadian Institute of Actuaries in Canada

9.

Solution:

(a)

Key Assumptions and Considerations underlying Actuarial Appraisal

Assumptions should be best estimate assumptions with no margin for conservatism

Assumptions should be based on:

- Company experience
- Industry experience
- Management expectations

Assumptions included:

- Morbidity – can be based on industry tables
– should include effects of lapse
- Mortality – can be based on industry tables or company experience if credible
- Persistency - # of lapses likely to occur
- Investment Returns and Spread Assumptions
- Operating Expenses – Expenses of running the business

Determining the Discount Rate

- Should use CAPM to value weighted average cost of capital (WACC)
- $$WACC = \frac{D}{D+E} r^D + \frac{E}{D+E} \left[r_f + B(r_m - r_f) \right]$$

Cost of Required Capital Retained to Support Business

- $$\text{Cost of Required Capital}_t = \text{Required Capital}_{t-1} \times (\text{Discount Rate} - \text{After tax investment earnings rate})$$

Taxes

- Equals tax rate times taxable income
- Taxable income is statutory earnings with adjustments

9. continued

(b)

Circumstances that lead to proper buyer / seller fit

Seller's block of business is profitable but is not the seller's core business

Seller's block of business would be profitable but the admin expenses are too high

- The buyer thinks they can run the block more efficiently to reduce admin costs

Seller's block of business is not profitable because of high operating costs as a result of poor management

- The buyer thinks they can manage the program better

Seller's block of business has active life reserves that are too conservative that can be released upon the sale

- The buyer can set up less conservative reserves

Seller's reputation prevents it from making corrective actions

Regulatory action leading to a fire sale

(c)

Typical Adjustments A Buyer Would Make to the Seller's Analysis

Discount Rate

- The buyer will adjust the discount rate to better reflect their own experience and cost of capital

New Business Values

- The buyer will adjust the new business values to reflect what they think will be possible after the acquisition

Structure Anticipated By the Buyer

- The buyer will adjust the structure of the business to reflect the structure of their company

Experience and Management Assumptions

- The buyer will adjust the assumptions to be more in line with the buyer's experience and assumptions
-

Adjustments to the Synergies of Cost Savings

- The buyer will determine what savings it thinks it will realize from the acquisition

9. continued

(d)

Potential Uses of Buyer's Actuarial Analysis

Buyer may use the actuarial appraisal to benchmark ongoing performance

- Used to check if performance is going as anticipated by the analysis

May be used to determine business objectives

10.

Solution:

(a)

- Too much reliance on bed days estimate and referral service data
- Believe they can count every referred and preauthorized service data to estimate IBNR
- CEOs don't understand the difficulty of estimating IBNR
- Not enough consideration of trending previous years experience
- Not enough tail analysis
- Not enough consideration given to provide contract changes
- Not enough margin for adverse deviation
- Not enough consideration for claim adjustment expenses
- Not enough consideration for in-network, out-of-network mix changes
- Not enough attention to the pattern caused by high deductible, coinsurance and other cost sharing
- Not enough attention to the impact of large claims
- The liabilities will fall onto the HMO if HMO has contract with other parties on reimbursement basis, and the party fails to pay

(b)

- Seasonality can skew claims within a year
- Remove large claims and offset reinsurance recoveries
- Year-over-year trend considerations
 - Mix change – demographic mix, geographic mix, product mix (if aggregating across different products), benefit richness (if aggregating across different benefit plans)
 - Contract changes – unit cost inflation or fee schedule changes (i.e. % of Medicare)
 - Durational effects – if prior year was 1st year, durational impacts may hinder calculation of trend rate
 - Utilization change – change in risk sharing; impact of new procedures
- Trend Methodology
 - Forecast method – regression, simulation, time series
 - Credibility – is data credible, should it be blended with benchmark
- Outside Sources – i.e. may use industry norms such as information from consultants or Medicare fee schedule changes to blend with actual observed trends
- Metrics – look at:
 - Enrollment fluctuations (mix / churn)
 - Utilization patterns (visits, days / 1000)
 - Admits; LOS patterns
 - Rx utilization may be “leading indicator” for physician since it completes faster

11.

Solution:

(a)

An HMO must serve the community as a whole

- No meaningful restrictions on membership
 - Individuals compose a substantial portion of membership
 - An active program to attract individual members
 - community rating system
 - Individual and group members have similar rates
 - No substantive age or health barriers for determining eligibility for individual or groups
- Provides health care services and maintains facilities and staff
- Offers services to nonmembers on a FFS basis
- Provides care and extends reduced rates to indigent persons
- Cares for persons covered by Medicare, Medicaid and similar programs
- Makes ER facilities avail to community regardless of an ability to pay
- Operates a meaningful subsidized membership program
- Forms a board of directors that is broadly representative of the community
- Offers health education programs that are open to the community
- Conducts health research programs
- Has health insurance providers who are paid on a fixed-fee basis
- Uses surplus fund to improve facilities, equipment, patient care, etc.

(b)

Primary & predominant activity is the issuance of insurance contracts

- Generally met is >50% of a company's business relates to issuance of insurance contracts

An insurance contract exists if the contract shifts and distributes risk

- An insurable risk of economic loss must be shifted from an insured to an insurer
 - HMO contractually assumes obligation to provide service to member on illness or injury
 - Premium payment to HMO is a fraction of the possible loss

Risk must be distributed among several unrelated insureds

- Distributed among the number of members in an HMO

11. continued

(c)

Substantial insurance activities may jeopardize the HMO's tax-exempt status

- Shifting risk to providers would avoid being considered to be engaged in insurance activities

Insubstantial insurance activities will not threaten the HMO's exempt status

- Insubstantial insurance activities may be taxed as unrelated trade or business

12.

Solution:

(a)

Product-Driven Approach

- Generate ideas / concepts from different sources
- Idea Screening
 - Go through all of the ideas and identify the ones that are compatible with the business /company objectives
- Business Analysis
 - Complete ROI analysis
- Product Development
- Test Marketing
 - Release to a small segment of the market
- Commercialization
 - Release to everyone

Market-Driven Approach

- Identify your target market
- Determine the differential advantage, distinguish yourself from the competition
- Formulation of the product
- Begin mass marketing through various media

(b)

Individual products have more options, such as cost of living and partial / residual benefits

Individual products have a higher level of anti-selection, thus higher morbidity
Group products pool the risk and may require participation requirements to limit antiselection

Group products are underwritten on an overall basis versus individual basis for individual products

Group products are issued on a group basis and are more efficient with lower issuing and marketing cost

Individual products have high administrative costs

Individual products are sold through brokers / individual agents and direct

Group products are through direct group representatives, brokers, and consultants

Group disability premiums can be paid by the employer – and if so, the benefits are taxable

12. (b) continued

If group disability premiums are paid by the employee using after tax dollars, the benefits are not taxable

Individual disability premiums are paid for with an individual's after tax dollars and benefits are not taxable

13.

Solution:

(a)

DuPont Formula

$$\text{ROE} = (\text{Profit Margin}) \times (\text{Asset Leverage}) \times (\text{Financial Leverage})$$

$$= \left(\frac{\text{Net Income}}{\text{Sales}} \right) \times \left(\frac{\text{Sales}}{\text{Assets}} \right) \times \left(\frac{\text{Assets}}{\text{Equity}} \right)$$

$$= \text{ROA} \times \text{Financial Leverage}$$

$$= \left(\frac{\text{Net Income}}{\text{Assets}} \right) \times \left(\frac{\text{Assets}}{\text{Equity}} \right)$$

$$\text{ROE} = \frac{\text{Net Income}}{\text{Equity}} = \text{Net Income from Existing Equity}$$

$$\text{Profit Margin} = \frac{\text{Net Income}}{\text{Sales}} = \text{income produced from sales; depends on pricing strategy and ability to control operating expenses}$$

$$\text{Asset Leverage} = \frac{\text{Sales}}{\text{Asset}} = \text{sales squeezed out of existing assets; usually varies inversely with profit margin}$$

$$\text{Financial Leverage} = \frac{\text{assets}}{\text{equity}} = \text{assets from existing equity; increases as debt increases, but this also } \uparrow \text{ risk of firm so not necessarily ideal; high leverage should only be allowed for stable firms / businesses}$$

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Assets}} = (\text{Profit Margin}) \times (\text{Asset Leverage})$$

Measures income produced for both creditors and shareholders since assets = equity + debt

Measured net income coming from existing assets

(b)

$$\text{ROE} = \frac{\text{Net Income}}{\text{Equity}}$$

2006

$$\text{Net Income} = 501,639$$

$$\text{Equity} = 2,554,703$$

$$\text{ROE} = \frac{501,639}{2,554,703} = 19.64\%$$

13. (b) continued

2007

Net Income = \$560,045

Equity = 2,953,002

ROE = 18.97%

(c)

Formula		2006 Figures	2007 Figures
	ROE	19.64%	18.97%
$\frac{\text{Net Income}}{\text{Assets}}$	ROA	$\frac{501,639}{4,895,172} = 10.25\%$	$\frac{560,045}{5,665,107} = 9.9\%$
$\frac{\text{Net Income}}{\text{Sales}}$	Profit Margin	$\frac{501,639}{6,611,246} = 7.59\%$	$\frac{560,045}{7,733,756} = 7.24\%$
$\frac{\text{Sales}}{\text{Assets}}$	Asset Leverage	$\frac{6,661,246}{4,895,172} = 1.35$	$\frac{7,733,756}{5,665,107} = 1.37$
$\frac{\text{Assets}}{\text{Equity}}$	Final Leverage	$\frac{4,811,172}{2,554,793} = 1.92$	$\frac{5,665,107}{2,953,002} = 1.92$

- ROE ↓ slightly from 2006 to 2007
- This is mostly due to ROA ↓ since financial leverage stayed consistent
- To breakdown ROA, profit margin contributed to the ↓ since this ↓ from 7.59% to 7.24%; asset leverage increased slightly from 1.35 to 1.37 so this helped neutralize the overall drop in ROA and ROE
- Decreasing profit margins reflect pricing strategy and ability to control operating costs
- Sales and operating expenses both ↑ from '06 to '07, but operating expenses ↑ by more

(d)

ROE Problems

Timing Problem – ROE is backward looking and only looks at current period earnings

Ignores future earnings and multiperiod investment decisions.

Economic income is better measure of value being added to the firm and is forward looking

13. (d) continued

Risk Problem – ROE can be ↑ by adding more debt since ratio and denominator stays the same regardless of how much debt

Better measure of return while accounting for debt

$$= \text{EOIC} = \frac{\text{EBIT}(1 - \text{tax rate})}{\text{equity} + \text{interest bearing debt}}$$

Value Problem

ROE based on book value of equity

Shows true return if shareholders purchased at book value (rarely the case!)

Economists argue should calculate return on market value since this is the true value of share

Market value ratio comparable to ROE

$$\Rightarrow \text{earnings yield} = \frac{\text{net income}}{\text{market value equity}} = \frac{\text{FPS}}{\text{price per share}}$$

$$\text{PE Ratio} = \frac{\text{price per share}}{\text{earnings per share}}$$

Accountants argue ROE better measure since book value is stable, not sensitive to investor expectations, comparable, not affected by outside factors and not subjective – better to be precisely wrong than vaguely right

(e)

RAROC = return on required capital value

EV = economic value = measures PV future distributable cash flows and dividends

ROIC = return on invested capital

$$= \frac{\text{EBIT}(1 - \text{tax rate})}{\text{equity} + \text{interest bearing debt}}$$

$$= \frac{(896,348 + 52,446) \times (1 - 0.375)}{2,953,002 + 10,000 + 750,500} = 15.96\%$$

$$\text{Tax rate '07} = \frac{336,303}{896,348}$$

$$= .375$$

$\frac{\text{Earnings Yield}}{\text{PE ratio}}$ - can't calculate without stock price

$$2006 \text{ ROIC} = \frac{(799,425 + 58,144) \times \left(1 - \frac{297,786}{799,425}\right)}{(760,500 + 10,000 + 2,554,703)} = 16.19\%$$

14.

Solution:

(a)

$$\text{Interest Cost} = (\text{APBO} + \text{CSC})(i) - \frac{1}{2} \text{Ben}(i)$$

- Interest on Assets is separate and not included in the interest cost; although it is part of the net benefit cost

$$\begin{aligned} \text{Int. Cost current year} &= (2,850,000 + 370,000)(7.5\%) - \frac{1}{2}(200,000)(7.5\%) \\ &= 234,000 \end{aligned}$$

- APBO gets a full year of int. since it is valued at the beginning of the year
- Assuming CSC (Current Service Cost) is valued at the beginning of the year
- Since benefit payments (BEN) are paid throughout the year, they are approximated to accrue half a year of interest (approximately assumes paid throughout is the same as paid in the middle of the year).

(b)

$$\begin{aligned} \text{Expected APBO}_t &= (\text{APBO}_{t-1} + \text{CSC}_{t-1})(1+i) - \text{Ben}_{t-1} \left(1 + \frac{i}{2}\right) \\ &= (2.2M + .35M)(1.075) - .21M \left(1 + \frac{7.5\%}{2}\right) \\ &= 2,741,200 - 217,875 \\ &= 2,523,375 \end{aligned}$$

$$\begin{aligned} * \frac{\text{Loss}}{\text{(Gain)}} &= \text{Actual APBO} - \text{Expected APBO} \\ &= 2,850,000 - 2,523,375 \\ &= 326,625 \end{aligned}$$

* Assuming prior cumulative Gain / Loss = 0

$$\text{Current Cumulative Loss} = 326,625 + 0 = 326,625$$

Amortize amount in excess of the corridor

$$\begin{aligned} \text{Corridor} &= 10\% \max(\text{APBO}, \text{Assets}) \\ &= 10\% \max(2,850,000; 22,000) \\ &= 285,000 \end{aligned}$$

14. (b) continued

$$\begin{aligned}\text{Excess of Corridor} &= 326,625 - 285,000 \\ &= 41,625\end{aligned}$$

Amortize excess of corridor over EARSL (Expected average remaining Service Lifetime) since we are not provided EARSL using 20

$$\text{Amort amt} = \frac{41,625}{20} = 2,081.25$$

(c)

Restrictions of FAS106 amortizing Gains / Losses

- Gains and Losses should be amortized over EARSL (see (b) for definition); however, if most of the group are retired, use average remaining lifetime
- Gain and Losses can be immediately recognized but first must offset and remaining Transitional Obligation / Asset must be done consistently.
- Can only amortize amount in excess of corridor = 10% max (APBO, Assets)
- Cumulative gain loss not amortized gets carried over to the next year and revalued for amortization with current gain / losses.
- Straight line amortization is more commonly used = $\frac{\text{Amort}}{\text{Amort. years}}$
- Can use accelerated amort. method
 - Need to use consistently

(d)

Plan change will create negative prior service cost and this negative amount must first be used to offset any unrecognized prior service cost, and then offset the unrecognized transition obligations. The remaining will be amortized by using one of two approaches:

- **Standard Method**
 - Amortize over the remaining services until expected full eligibility
- **Straight Line Method**
 - Amortize over the average future service years

If all or most of employees are retired, the expected life time may be used

15.

Solution:

(a)

Factor Method

- As a percentage of premium; could be used for group life and STD; generally used for products with a short lag or run off period.

Development Method

- Develop paid claims by period of incurral and payment; develop a claim runout or lag chart; could be used for group life, ADD and STD.

Tabular Method

- Could be used for life premium waiver, LTD disabled life reserves;
- LTD minimum standard for Stat reserve is based on 64CDT or 87CGDT: Table based on age of disablement, duration, benefit period.

Average Size Claim Method

- Reserve = AverageSize X # Reported Claims – Paid amount before valuation date; need separate IBNR for unreported claims.

Loss Ratio Methods

- Reserve = Earned Prem X estimated LR – Paid amount; generally used when sufficient info not available to use other methods, e.g. new block of business or experience not credible.

Examiners Method

- Claim examiner estimate remaining claim payments expected on known claims; often used for litigation; need separate IBNR for unreported claims.

Stochastic Method

- Reflect probabilistic distribution of certain reserving parameters; provide explicit guidance on potential variability; however, might create false sense of confidence. Modeling techniques include: Parametric distribution-fitting, OLS, GLM, Stochastic time series models, Monte Carlo.

15. continued

(b)

- Incurral dating methods used, basis of reserve calc.
- Whether the calc are on the statutory, GAAP, tax, or other basis.
- Controls and Reconciliation: Ensure data used by actuary reconcile and are consistent w the data and accounting reporting practice.
- Internal Company Practice: Internal practices may vary, causing lag to be faster or slower than normal.
- External Influences: e.g. Epidemics, government mandates and new laws.
- Policy Provisions: Types of benefit, utilization incentives or claim sizes can significantly affect claim payments.
- Insurance Characteristics: New plans will typically have long lags initially.
- Reserve Cells: Separate reserves by business line; hospital claims vs. drug claims
- Managed Care
- Trends
- Seasonality

(c)

Claim Reserves

Additional layer of complexity for IBNR calculation; fund balance and gap may affect insurers' liability; Paid claim pattern is often different for high deductible plans.

Policy Reserves

Not necessary for HSA's, as funds are vested immediately to EE's; Maybe necessary for HRA's , if funds can be rolled-over to next year, or can be used after retirement.

Premium Reserves

Need for premium deficiency reserves is more likely for a new product with unproven claim history; Different from policy reserves in that policy reserves reflect expected timing difference between claim and premium payment; Insurers usually cannot combine CDHP and PPO plans in determining premium deficiency reserves per NAIC

16.

Solution:

(a)

(i)

Unearned Premium

Portion of the premium to be used for coverage beyond the valuation date. This is calculated on a time proportional basis. Unearned premium reserves are usually required for group insurance products

Unearned Premium = Premium \times (1 – period elapsed / policy duration)

For non-annual mode the policy duration can be replaced by the payment duration (e.g. 3 months for quarterly mode).

$$\text{Unearned Premium} = \$1,200,000 \times \left(1 - \frac{4}{12}\right) = \$800,000$$

(ii)

DPAC

DPAC is a deferred policy acquisition cost asset set to recognize that the higher acquisition cost incurred initially should be matched with the premium over the period of the policy. Group acquisition costs are usually lower due to simple underwriting.

$$\text{DPAC} = 10\% \text{ of unearned premium} = \$800,000 \times .10 = \$80,000$$

(iii)

Recoverability Testing

Recoverability testing is a way of calculating whether the DPAC can be recovered from the premiums or if a premium deficiency reserve will be needed

- If the Loss Ratio + the total expense ratio is $> 100\%$ then the DPAC is written down until the combined ratio doesn't exceed 100%
- If the DPAC is completely offset and the combined ratio is still in excess of 100% then a premium deficiency reserve is set up such that

$$\text{Premium Deficiency} = \text{Combined Ratio} - \text{DPAC}$$

$$\text{Here } 65\% + 10\% + 15\% = 90\%$$

$90\% < 100\%$ so the test is passed and no premium deficiency reserve is required

(iv)

Premium Deficiency Reserve (PDR) and DPAC

If Loss ratio – 80% then the combined ratio = $.80 + .10 + .15 = 1.05$

Reduce DPAC to 5% of unearned then combined ratio = 1.00

DPAC reduced to $.05 \times \$80M = \$40M$

No premium deficiency reserve required

If Loss Ratio = 90% then the combined ratio = $.90 + .10 + .15 = 1.05$

Reduce all the DPAC (= 0) and the combined ratio is still 1.05

So Premium deficiency reserve set up equal to 5% of unearned = \$40M

(b)

Active Life reserves – usually limited to Unearned Premium Reserves

Claim Reserves

Incurred but Not Reported (IBNR)

Outstanding (unpaid claim reserves)

- Reported but not processed
- Processed but not paid
- In course of settlement

Claim Adjustment expense

Reserve for Experience Refund agreement

17.

Solution:

(a)

Claim experience fluctuation risk

- Part of H2 (UW risk)
- Underwriting risk of fluctuations (no control – mispricing, epidemics, ...) in claim experience
- Depends on type of coverage, premium, claims, managed care factor

Categories	Maximum
Comprehensive Medical (includes hospital)	\$1,500,000
Medical Only	\$750,000
Medicare Supplement	\$50,000
Dental	\$50,000
Other	\$50,000

Claim experience fluctuation risk = max (A, B)

A = 2 × risk coverage for each category (up to max)

B = incurred claims × risk factor × managed care factor

Risk Factors	Premium		
	< \$3 million	\$3 – 25 million	> \$25 million
Comprehensive medical	0.15	0.15	0.09
Medical	0.15	0.15	0.09
Medicare Supplement	0.105	0.067	0.067
Dental	0.12	0.076	0.076
Other	0.13	0.13	0.13

H_2 risk = claim experience fluctuation risk and other UW risk

Managed Care Factors	
FFS	0.1
Contractual Fee	0.85
Bonus / Incentives	0.7 – 1
Cpitation	0.4
Noncontingent expenses	0.25

(b)

Group total premium = \$110,000,000

Individual total premium = \$60,000,000

Other underwriting risk:

$$\text{Group} = \$45 \times 0.15 + \$5 \times 0.05 + \$60 \times 0.03 = \$ 8,800,000$$

$$\text{Ind.} = \$35 \times 0.35 + \$15 \times 0.25 + \$10 \times 0.07 = \$16,700,000$$

$$\underline{\$25,500,000}$$

\$22,740,000 is from using incurred claims
Should be using premium to get \$25,500,000

18.

Solution:

(a)

An actuarial analysis of historical results

Historical data needed

- Patient age/sex
- Assigned DRG
- LOS
- Type of payer
- Gross charges
- Net charges
- Costs

Additional helpful data

- Transfer status
- ICD-9 diagnostic codes
- ICD-9 procedures codes
- Readmission information
- Whether the patient died prior to discharge

A basic calculation of the degree of health care management includes:

- Using the hospitals' actual distribution of cases by DRG, recalculate the composite LOS from both unmanaged and optimally managed care standards by DRG
- For each DRG, interpolate the system's position on the spectrum

Some other useful analyses

- Targeted improvement
- Charge comparisons
- Degree of medical management by line of business
- Service filtering

A clinical chart review

Examination of patients charts by clinician

Measure:

- Unnecessary admits
- Perfect stays
- Unnecessary days

Actuarial analysis and clinical chart review can be combined to provide a more realistic estimate of the degree of health care management

18. continued

(b)

Estimated LOS case mix = Optimal LOS by DRG applied to hospital case mix /

$$\text{Optimal managed Utilization LOS} = \frac{2.7}{3.0} = .90$$

Necessary ratio = necessary ALOS of patient audited charts / ALOS of patient

$$\text{audited charts} = \frac{3.05}{3.5} = .871$$

Estimated necessary ratio = necessary ratio \times ALOS from hospital's commercial population experience = $.871 \times 2.9 = 2.526$

Estimated severity index = estimated necessary ratio / optimal LOS by DRG

$$\text{applied to hospital case mix} = \frac{2.526}{2.7} = .936$$

Case-mix / severity index = estimated LOS case mix \times estimated severity index

$$.90 \times .936 = .8424$$

19.

Solution:

(a)

Consideration for opinion:

Plan provision and business practices

- An organization may decide that incurred claim liabilities need to be at a minimum level
- Some products may require holding more liabilities than other product

Economic condition

- Particularly, consider inflation
- Also consider number of increased lapses that may arise during poor economic times → increases revenue

Organizational claim administration

- May increase revenues

Risk characteristics and organizational practices by block

- If a block is considered more risky, more reserves will need to be held

Regulative requirement

- May decrease revenues if government provides benefits during disability

Carveout

For LTP, consider the effect of inflation, benefits, and effect of institutional care versus home based care

(b)

ASOP #23 Data Quality

- Selection of Data
 - Source
 - Appropriateness
 - Reasonableness
 - Intended Use
 - Known Material Limits
 - Cost / Availability / Benefits of Alternate Data
 - Sampling Methods Employed

19. (b) continued

- Review of Data
- Reliances
 - Discloses any reliances for data from others (ex: XYZ)
 - Reliances on other information used
 - Premium studies
 - Industry information
 - Consultant information
- Limit of Actuary's Responsibility
 - Not required to audit data
 - Don't have to determine if it was intentionally misleading data
 - How I used it
- Use of data
- Documentation
 - Any review done, material adjustments made, defects
- Disclosure
 - Know limitations
 - Results bias from data being unresolved
 - Limits on use

20.

Solution:

(a)

- Rating and rerating
 - Reinsurer must set the premium rate correctly to be profitable and to attract client
- Expertise
 - Reinsurer must have strong knowledge in pricing, product design, and underwriting. Even if the ceding company does the underwriting, reinsurer needs to have good understanding of the process and the risks involved.
- Client mix
 - A large number of small clients is better than a small number of large clients
- Consistency
 - Reinsurer must be able to manage out of a period of adverse experience
- Credible size
 - Reinsurer should focus on their niche market and not spread the client segments too thin

(b)

Automatic or Treaty

- Reinsurer accepts all cases that meet a pre-determined underwriting criteria
- Any case that does not meet the criteria can be submitted to reinsurer on a case-by-case basis

Facultative

- Each risk is sent to reinsurer on case-by-case basis
- Typically used for large cases
- Insurer may not write the risk if reinsurer does not accept the case
- More expensive in administration than automatic

(c)

(i)

- Out of network (OON) utilization since OON costs are higher
- Age/sex distribution
- Pre-admission certification may help

(ii)

- Out of network utilization
- More careful underwriting

(iii)

- Requires analysis of catastrophic claims
- Reinsurer would have to enter into separate contract with employer

21.

Solution:

(a)

Three primary tests

- Eligibility test
 - Can't require over 3 years employment
 - Can't discriminate in favor of highly compensated employees
- Benefits and Contributions test—contributions can't exceed
 - 100% of cost of benefits available to similar highly compensated or
 - 75% of cost of most expensive ben elected by similar highly compensated employee
- Key employee concentration test
 - Benefits to key employees can not exceed 25% of aggregate benefits
 - Key employee is
 - Officer
 - 5% owner
 - 1% owner with annual pay over \$150K

(b)

Advantages

Employee - Under Section 125 plan employee can choose between cash and other non taxable benefits

- Non taxable benefits include
 - Medical/dental
 - Disability
 - 401(k)
 - Legal
 - Dependent day care
 - FSA
 - Life < \$50K
- Taxable benefits include
 - Cash
 - Vacation
 - Life >\$50K
- Ineligible benefits include
 - Deferred compensation
 - Cash value life insurance
 - Meals/lodging
 - Cosmetic surgery

Employer - cost of plans not taxable but reduces taxable wages increasing employee value and decreasing payroll taxes

21. continued

Disadvantages

Employer - need to comply with non-discrimination rules

Employee - can't change annual election except for change in marital status,
employment change, etc.

22.

Solution:

(a)

Face page

- Title of policy
- Insuring clause – tells who is covered
- Consideration clause – premium for a promise
- Renewal provisions – under what conditions policy is renewable
- 10 day free look period – can return within 10 days
- Execution clause – says contract is being enforced
- Form number
- Reliance clause – relying on info provided by applicant

Table of Contents

Schedule page

- Identifying information about the policy
- Identifies policyholder and insured
- Benefit and premium information

Definitions used in policy

Premiums and reinstatement

- Grace period – usually 31 days
- Reinstatement – states if premium paid during grace period, policy is reinstated without penalty or evidence of insurability

Benefit provisions

- Eligibility, lost sharing provisions, annual maximums

Exclusions

- Many exclusions from individual health policies
- Care provided by Medicare, cosmetic procedures, lifestyle treatments, etc.

Other provisions

- Entire contract, confirming with state statutes, notice of claim, proof of loss, etc.

22. continued

(b)

Non-cancellable

- Policy cannot be cancelled
- Premium cannot be increased

Guaranteed renewable

- Policy cannot be cancelled
- Premium may be increased

Non-renewable for stated reasons only

- Policy can be cancelled if certain conditions in contract occur
- Premium can be increased

Conditionally renewable

- Policy can be cancelled if insurer cancels all policies within the same class
- Premium can be increased

Optionally renewable

- Insurer has discretion to renew or cancel the policy
- Premium can be increased