Course 8G Illustrative Solutions

Solution 1

a) Describe the major issues to be considered in performing this audit

1. Was the ***claimant eligible at the date of service?***
What was ***provider's status and Payment***
2. ***Arrangement?***
- provider contracted or not?
were contractual obligations
- followed?

Were ***policies and procedures followed*** when claim
3. adjudicated?
do policies and procedures represent acceptable
- levels of control?
does organization follow its own
- rules

b) Describe the quality targets used in the contract

1. ***Overall Accuracy***
Percentage of Claims paid correctly in every respect
- and with no errors
- 95% considered good

2. ***Payment Accuracy***
Proportion of claims for which payment amount is correct but
- other processing
- 97% considered good

3. ***Financial Accuracy***
= [Overpayments + Underpayments] /
- Total Amount Paid
- 99.3% considered good

Solution 1 (continued)

c) Determine if the TPA met its targets and calculate the ultimate administrative fee for PMI.

1. Overall Accuracy:

Claims with errors:		350	
Total Claims		15,000	
Overall Accuracy			97.7%
Penalty	$	0.90	
Meet Target:	No		

2. Payment Accuracy:

Claims with errors:		125	
Total Claims		15,000	
Overall Accuracy			99.2%
Penalty	$	-	
Meet Target:	Yes		

3. Financial Accuracy:

Sum of over/underpayments:		28,750	
Total Claims		2,250,000	
Overall Accuracy			98.7%
Penalty	$	0.90	
Meet Target:	No		

4. Ultimate administrative fee:

Contracted Amount	$	18.00	
less penalties:			
Overall Accuracy	$	0.90	
Payment Accuracy	$	-	
Financial Accuracy	$	0.90	
Net Payment	**$**	**16.20**	

Solution 2

a) **Describe the Responsibilities of a Product Manager**

Develop Promotional Materials
Develop Annual Plan
- Specific projects
- Profit Objectives
- Premium Growth Targets
- New Business

Manage Profit & Growth
Manage Market Developments – Competition, buyer
Plan and Manage a range of products within each Product Line
- New products
- New uses of existing products
- Enhance existing products
- Withdraw redundant products

b) **Describe different product development processes**

Product Driven Approach – Used by Traditional Groups and Carriers
Steps:
- Generation of Ideas – comes from several sources
- Idea screening – to determine which ones are compatible with company
- Concept Development – refine the concept into a product
- Business Analysis – pricing and ROI analysis
- Product Development – The product is given physical form here.
- Test Marketing – Sales in real world markets
- Commercialization – Full Manufacturing and distribution

Market Driven Approach - Used by Modern Health Plans
Steps:
- Assess the Target Market needs
  - Select a target market and research it's needs
  - A competitive analysis is done
- Identify Differential Advantage
  - Differentiate the product from the competition to better meet customer needs
- Strategic formulation
  - Build and deliver the product
- Pretest in limited market
- Fully implement

Solution 2 (continued)

c) **Describe the different distribution models available for group and individual products and indicate where suitable for a hospital-surgical product.**

Brokerage / General Agency
- Individual and small group
- Lower capital required and staffing for the insurance company
- Higher commissions
- Self Employed
- Sells products of other companies

Group Field Force
- Full time salaried staff
- Used for large group products
- Sell through agents and consultants
- Higher overhead

Direct Sales
- Salaried employee sells directly to Groups
- No commissions to Agents
- Compensated based on performance
- Blue Cross uses
- Mass Mailing, telemarketing, websites

Sales to participants – marketing to individual plan participants
Worksite Marketing – 100% EE paid

Multi-level Model
- Sophisticated sales force
- Used by national carriers
- Different channels allowing flexibility
-

d) **Describe the underwriting practices of individual products**

Non-medical – applicant fills out questionnaire detailing medical health history; attending physician statement may be requested; no medical exam.
Paramedical – medical health history information is provided along with attending physician statement; medical exam is conducted by a paramedical (like a nurse)
Medical – medical health history information along with attending physician statement, medical exam is administered by a doctor.

Solution 2 **(continued)**

Sources of information available to UW

- Inspection report
- Application
- Medical exam
- Internal database of information – applied for other coverage?
- Agent information
- MIB
- APS
- Financial questionnaires

Final decisions include:

- Approve as applied for
- Decline
- Issue coverage but different than applied for:
    - Higher premium
    - Higher cost sharing – higher deductible or coinsurance
    -

e) **Describe special characteristics and regulations which would be applicable to this product.**

- Disclosure – Outline of Coverage
- Replacement Provisions
- Prior approval of advertisements

Solution 3

a) Association – members of an organization formed to further a common interest

- participation is low, usually < 5%, so potential for anti-selection
- evidence of insurability is important
- often limited to life or disability insurance

Multiple Employer Trust (MET) – multiple employers from the same industry come together to participate in a trust

- Has minimum participation rules
- Often self-insured – MEWAs (Multiple employer Welfare Associations)

b) Successful multiple-employer plans:

- Large number of eligible members
- Sponsoring association is a strong entity
- Small average size employer (<50)

Successful underwriting:

- Closely monitored premium collection
- Limited plan design
- Limited evidence of insurability
- Pre-existing condition limitations
- Age-rating

c) Taft-Hartley Plans:

- Noncontributory and covers 100% of eligible employees
- Only covers full time employees
- Strict rules on restatements
- Strict definition of eligibility and minimum hours worked
- Strong administration facilities are required – established by trustee

Purchasing alliances:

- Groups that come together to purchase insurance (no other purpose or affiliation)
- Purpose is to have negotiation leverage and purchasing power
- Typically fully insured

Solution 3 (continued)

- May contract directly with providers
  - Limited set of plans
  - Favored plan promoted in each location
  - Restrictions on offering plans not sponsored by the association

- Common premium rates for all groups
  - Hard to keep healthiest groups

d) Association plans would fit.

- Association plans are generally individual life and disability.
- Wonderful Life sells individual medical, individual LTD, and specialty products. These may be marketed through direct marketing channels (mail, internet, affiliations, etc.) similar to how association group products would be marketed.
- Underwriting for association group products would be simple accept/reject or short form, similar to LTD or specialty products. Underwriting rules regarding EDI,GI, and participation would need to be developed. Therefore, Wonderful Life would need to expand its underwriting expertise.
- Billing systems are already set up for both individual and group billing so Wonderful Life would be able to bill associations.

Solution 4

a) Steps in Health Risk Assessment Process are:
   1) Risk assessment – compare each person's predicted claims to average
   2) Payment adjustment – to reflect differences from above

b) Risk classification methods are typically based on one of the following:
   1) Medical history
   2) Functional health status
   3) Perceived health status
   4) Utilization and claims measures
   5) Demographics
   6) Diagnosis and pharmacy information
   7) Lifestyle and behavior factors

   Common risk classification methods include:
   1) Chronic Illness and Disability Payment System
   2) Adjusted Clinical Groups
   3) RxGroups
   4) Episode Risk Groups
   5) Diagnostic cost groups
   6) Medicaid Rx
   7) Clinical risk groups
   8) RxRisk

c) Adjusted claims experience

Using age/gender and region factors	Group 1	Group 2
Total claims below $50K pooling	$34,000	$2,520,000
÷ Region factor	0.90	1.20
÷ Age/factor	0.90	0.95
÷ Exposure	25 * 12	1500 * 12
Adjusted Experience PEPM	139.92	122.81

Using risk scores	Group 1	Group 2
Total claims below $50K pooling	$34,000	$2,520,000
÷ Risk score	1.07	1.30
÷ Exposure	25 * 12	1500
Adjusted Experience PEPM	105.92	107.69

d) Comparing results from b)
   1) Group 4 produces much lower adjusted PEPM when using current rating factors
   2) Difference is smaller when using risk scores – risk scores are better predictors of cost differences than rating factors
   3) However, Group 1 is small (25 versus 1500) so result may not be credible

Solution 5

a)

Carriers are required to offer all products on a guaranteed acceptance and renewal basis.

Individual employees or dependents cannot be single out for special rating treatment or prior health experience.

Pre-existing limitations/exclusions cannot be imposed on individual employees who have had coverage for a period of 12 months.

Pregnancy cannot be considered a pre-existing condition.

Duration curve should become flatter and rating is limited by most states.

b)

Underwriting the group

Financial viability
- Need to retain the group long enough to recoup acquisition costs
- High turnover increase administration cost

Industry
- Some states no longer allow or limit surcharge to a maximum of 15%
- Can be work related
- Can be lifestyle issues

Group size
- Larger the group, the more lives to spread morbidity risk over
- Administration expense decreases per capita as size increases

Workers compensation
- Lack of worker compensation could be a cause of rejection

Participation
- Must be a certain percent

Required employer contribution

Prior coverage and experience

Eligibility rules
- 1 to 3 months of waiting period for new entrants
- Only full time employees allowed coverage

Solution 5 (continued)

Underwriting the individual

Enforcement of eligibility

Apply pre-existing conditions when allowed

Treatment of new entrants / late entrants

Medical assessment – short or long form

c)

Group size
Plan design
Trend
Area
Provider reimbursement level
Incurred claims
Date of issue
Exposure
Underwriting
Pre-existing conditions limitations

d)

Year	Average claims PMPM	Trend of 13.5%	Age/sex factor of 1%	Adjusted claims PMPM	Duration factor
0	$70.40	1.000	1.000	$70.40	0.64
1	$126.10	0.881	0.990	$110.00	1.00
2	$166.24	0.776	0.980	$126.50	1.15
3	$223.71	0.684	0.971	$148.50	1.35
4	$265.94	0.603	0.961	$154.00	1.40

Average claims PMPM = claims / exposure
Adjusted claims PMPM= average claims PMPM x trend x age/sex factor
Duration factor = adjusted claim PMPM of year t / adjusted claim PMPM of year 1

Solution 6

a)

Allows ER to share the experience. It also minimizes the risk for the insurer (since bad experience can be recouped and allows insurer to charge lower rate)

Most common form of employer refund liabilities

CSR = previous balance + premiums + investment income - incurred claims - minus risk and retention

b)
Prior balance = 0
Premiums = 92,384,000
Investment Income = (.03)*(1/2)(sum of IBNR for 2004 in table)*(.1) = 236,145
Assumption is interest rate of .015 and IBNR is 10% of IBNR in table since claims are 10% of claims in table

Incurred claims = (.1)*(sum of incurred est in table) = 73,723,000

Expenses = .159 * (92,384,000) = 14,689,056

min CSR level =15,397,333 (92,384,000/12*2)

CSR Balance = 0+92,384,000+236,145-73,723,000-n 14,689,056=4,208,089

An additional 15,397,333-4,208,089=11,189,244 needs to be held for the CSR to meet 2 months of premium requirement.

No refund

Solution 7

a)

Reinsurer financial condition and continuity

Reinsurance intended to protect ceding company, so reinsurer should have capacity to absorb risk

Rates and terms

Beware of rates which look "too good to be true" - look longer term!

Reinsurance administration costs

Retention limits should be set to minimize the reinsurance expenses

Degree of management involvement

Reinsurer could provide useful consulting and thereby save the company's own management time

Profits lost to reinsurer

Retention amounts and premiums should be such that ceding company retains as much profit possible

Flexibility

Reinsurers offer varying levels

Reinsurer experience and ability

Reinsurer should also be profitable to maximize long-term value
Particularly if ceding company is relying on reinsurer for industry knowledge & expertise

Reinsurer services offered

Business relationship

Reinsurance demands utmost in good faith between ceding and reinsurer, compromises often required

Reinsurer underwriting

Must be sure that reinsurers' underwriters have ceding companies best interests at heart

Solution 7 (continued)

Name	Incurred in	Paid in	Paid claim		Total Eligible	Paid under Anderson's Specific SL	Eligible for Anderson's Aggregate SL (exclude specific)	Paid under OX's Reinsurance
John Smith	November, 2004	June, 2005	$ 175,000					
	January, 2005	July, 2005	$ 195,000					
	September, 2004	August, 2005	$ 105,000	INELIGIBLE				
Total			$ 475,000		$ 370,000	$ 120,000	$ 250,000	$ -
Mary Thompson	October, 2004	March, 2005	$ 65,000					
	January, 2005	February, 2005	$ 105,000					
	March, 2005	September, 2005	$ 100,000					
Total			$ 270,000		$ 270,000	$ 20,000	$ 250,000	$ -
Annie Chan	June, 2004	January, 2005	$ 150,000	INELIGIBLE				
	December, 2004	March, 2005	$ 55,000					
	February, 2005	March, 2005	$ 80,000					
	August, 2005	December, 2005	$ 115,000					
	April, 2005	May, 2005	$ 1,000,000					
Total			$ 1,400,000		$ 1,250,000	$ 1,000,000	$ 250,000	$ 630,000 but limited to $500,000
All other employees total*			$ 4,500,000		$ -	$ -	$ 4,500,000	
Expected 2005 claim per employee			$ 2,750					

**no other individual employees hit the stop loss limit*

Totals	$ 1,140,000	$ 5,250,000
Expected Claims		4,125,000
Aggregate stop loss attachment point		4,950,000
Aggregate stop loss reimbursement		$ 300,000
(i) Payments from OX to Anderson		
Specific Stop Loss		$ 1,140,000
Aggregate Stop Loss		$ 300,000
Total		$ 1,440,000

Solution 7 **(continued)**

c)

Reinsurance Coverage Period

Group medical reinsurance is generally written on a "Loss Occurring" basis while stop-loss reinsurance coverage is provided on a "Risk Attaching" basis.

Under a Loss Occuring contract, reinsurance coverage is based on whether the loss occurred during the period of the reinsurance agreement.

Coverage under a Risk Attaching contract is based on whether the underlying risk insured was sold or renewed during the period of the reinsurance agreement.

Example: there are 2 separate 12-month reinsurance agreements, one for group medical excess and the other for specific and aggregate coverage, beginning 7/1/2000 and ending 6/30/2001. Group excess medical reinsurance coverage ends 6/30/2001 unless renewed. Under the stop-loss reinsurance agreement, reinsurance would continue for 12 months from the date that each contract was written by the insurer while the reinsurance agreement was in effect even if the reinsurance agreement between the ceding company and reinsurer terminated.

Solution 8

(a)
The actuary should adjust past experience for any known or expected changes that, in the actuary's judgment, are likely to materially affect expected future results. These can include:

1. changes in the selection of risks
2. demographic changes
3. benefit changes
4. changes in premiums, claims, expenses
5. trends in mortality and morbidity

The actuary should adjust past experience based on earned premium and incurred claims to reasonably match claim experience to exposure.

The actuary should update prior earned premium and incurred claims estimates to reflect premium and incurred claim development experience to date, when material.

The actuary should consider the applicability and statistical credibility of the data and make appropriate modifications as necessary.

The actuary should consider provider contract changes and other pertinent plan provisions not written into the plan documents.

The actuary should consider available data relevant to new plans or benefits.

(b)
I do not agree that the rates given should be changed, because:

1. The student did not consider exposure, they only considered the premium dollar change. Changes in the number of covered lives accounts for some of the increase.
2. Since the renewal dates are different, some groups have not yet been renewed and had the previous 10% rate increase that went into effect 10/1/2005.
3. The student's rate increase is a simple average of the individual rate increases. It should have been done on a weighted average/per life basis (gives +9.4%).
4. The cases may not have been a random sample.
5. A sample size of 10 cases is likely to be too few.
6. The new cases may not be comparable since old premium was with another company and likely on a different pricing basis.
7. The age/sex mix of individual cases may change through time, leading to different premium levels.

Solution 9

a)

Consider the following

Examine the market. Physicians must be educated and given the opportunity to adapt.
Gain the support of physicians.
Use clinical guidelines or pathways to allow physicians to improve quality.
Ensure that the reimbursement method properly aligns incentives.
Invest in a good data collection system
Providers should understand the risks that they are taking on.
    They may need stop loss insurance to limit catastrophic risk
Health plan and provider risks must be balanced.
Good relationships should be fostered by all parties.
Give physicians regular feedback on performance

b)

Fee for Service - Physician receives payment for each service.
Discount off of Billed charges - Agree to percentage of before service is performed.
Fee schedule - determined by health plan
Relative Value Scale - most widely used is RBRVS by Medicare
Mandatory reductions in all fees - If total expenses exceed budget.
Budgeted Fee-For-Service - Similar to above.
    Except each specialty has its own budget
Sliding Scale Individual Fee allowance - Similar to above.
    Except each physician is compared to benchmark.
Capitaton - Physician received fixed fee.
    Full Risk Capitation - professional services
    Global Capitation - all medical expenses
Incentives - In addition to underlying method. an inducement to practice efficiently.
    Withhold - keeps a percentage of physician fee.
    Bonus - for satisfying performance criteria.
Case rates or Global Fees - single fee regardless of time or effort.
Bundled case rate or packaging pricing
Salary - Typically used for staff model HMO.
Retainer - used for specialists. Fixed fee per month.

Solution 9 **(continued)**

c)

Episode Based Global Fee
- Bundles all services related to a particular disease across continuum of care.

Contact Capitation
- pays a specialty lump sum upon first contact with new patient.

Physician DRG
- receives set payment adjusted by severity of the illness

Market Share Capitation
- Uses market share to allocate capitation to specialty groups.

Direct contracting between employers and physicians
- marketed directly to self-funded groups.

Gainsharing
- focus must be on quality
- restricted use in federal programs

Reimbursement for internet consulting
- pays physician a fixed dollar amount for online communication w/ patients.

Quality-based Incentive Arrangements
- basis for bonus is quality of care provided.
- such as preventive care, HEDIS measures

Fee Incentive Methodology
- uses a flat fee methodology to change physician behavior

Solution 10

a) Describe typical LTC coverage and plan features

eligibility/benefit triggers – if insured requires assistance with a minimum of 2 ADLs (activities of daily living) and/or cognitive impairment

covered services – includes nursing home (SNF), home/community based care, assisted living facilities, adult dare care, respite care, etc.

benefit amounts – can pay for a fixed amount per day/per service or related to cost of service (percent of cost or capped at a max)

benefit duration – maximums for benefit days and/or dollars

Guaranteed renewability requirement

b) Necessary pricing assumptions

1. Morbidity – insurer's data is best source if credible
   Cost varies by type of benefit
   There is a substitution effect among benefits
2. mortality- consider selection and select mortality table
3. Voluntary lapses
4. Expenses
5. Taxes
6. Investment income
7. Mix of business – consider age, gender, marital status, underwriting class, benefits, marketing
8. Change over time assumptions – reflect expected charges in assumptions

c) Possible changes in consumer's behavior affecting future LTC costs

1. Utilization will increase because services are insured (anti-selection)
2. Nursing home construction has been controlled by CON (certificate of need) laws in many states – if changed, SNF utilization would increase
3. Medical advances might change LTC needs
4. Current attitude towards nursing homes may change
5. Divorce rates may reduce the number of care providers available to care for impaired in the home
6. Changes may occur in government funding
7. New LTC services may be developed and existing services may be used more substantially

Solution 11

a)

Section A – Taxation

- Employer provided insured premium or self insured claims and administrative fees paid for Active employees, and their spouses and children is deductible as a business expense
- Employer provided insured premium or self insured claims and administrative fees paid for Retired employees and their spouses and children is deductible as a business expense

b)

Section B – FASB 106

- Issued by the Financial Accounting Standards Board (FASB)

- The Statement establishes accounting standards for employers' accounting for postretirement benefits other than pensions (hereinafter referred to as postretirement benefits).
- Although it applies to all forms of postretirement benefits, this Statement focuses principally on postretirement health care benefits
- Applies to any program - written or unwritten - that provides benefits to a former employee after he/she retirees.
- Applies to the following (non-pension) retiree benefits
  - Health benefits
  - Group Life
  - Tuition assistance
  - Day care
  - Legal services
  - Housing subsidies
- It does not cover pre-retirement disability benefits
- It significantly changed the prevalent current practice of accounting for postretirement benefits on a pay-as-you-go (cash) basis by requiring accrual, during the years that the employee renders the necessary service, of the expected cost of providing those benefits to an employee and the employee's beneficiaries and covered dependents.
- Employers must use the best information and estimates to develop actuarial assumptions
  - Interest/Discount rates
  - Health care cost trend rates
  - Medicare reimbursement rates

Solution 11 (continued)

- Turnover
- Retirement age
- Participation rates
- Mortality

Solution 12

a)

	Fully Insured	Self Insured
1	Insurance Company takes risk	Employer Takes risk
2	Add retention (expense margin; profit; taxes, deficit recovery charge)	Pay admin expenses (called ASO if carrier administers)
3	Carrier chooses how to invest reserves	Freedom to fund claims account & reserve
4	Subject to state laws (premium taxes, mandated benefits)	ERISA prempts state laws (no premium taxes, no mandated benefits
5	Carrier may purchase reinsurance or use pooling methods	Employer can purchase individual or aggregate stop loss
6	Catastrophic claims are insurer's responsibility	Catastrophic claims are funded from employers account
7	Insurer pays claims directly with premium received	Employer funds account which is used to pay claims expenses

b) In addition to FI & SI plans above, alternative arrangements include:

1 Minimum premium contracts
still fully insured, but employer funds account to pay claims, so claim expense avoids premium tax. Insurer still bears risk of claims over set premium

2 Stop loss contracts
Individual stop loss covers claims for an individual over a certain deductible & aggregate covers claims over attachment point for entire group; usually purchased by self insured

3 Reserveless plans
Insurance company foregoes a set amount of premium up front equal to reserve amount so employer can invest this how they choose. Employer subject to termination risk charge at end of contract to make up

4 Retrospective premium arrangement
At the end of rating period, the experience of the group is compared to the premiums collected. After a set claims stabilization reserve is held by insurer (to cover risk of terminating after "bad" year) an experience refund (or alteratively payment if "bad" year) are paid to employer. Expensive to implement - need to make sure group is large enough to bear risk

Solution 12 **(continued)**

c)

Consideration when changing funding:

* Is current experience favorable? Has it been consistently that way?
* Is group large enough to switch to a self-insured arrangement?
* How much risk can company bear to shoulder?
* Are there any political sensitive requirements?
* How much would premium tax savings amount to?
* What is the current retention level (if fully insured)?
* Do you have a knowledgeable advisor to help invest funds & manage plan (if going self-insured)
* Is the company ready for change?
* Have you explored all options? Which are available?
* Why do you want to change?

Solution 13

a) Components and potential causes

- Provider reimbursement trend
    - Change in provider reimbursement for same service
- Residual trend-
    - Utilization trend
        - Change in frequency of services
        - Caused by selection and provider practice patterns
    - Change in intensity
        - Change in the mix of services performed
    - Change fluctuation
        - Cat claims, epidemics
    - Change in technology
        - Development of more advanced treatments
    - Code Creep
        - Charging for service more intense than the one actually performed
    - Cost shifting
        - Increase the cost for one segment (Commercial) to subsidize lower reimbursement in another (Medicare)
        - Shifting of services from IP to OP
    - Government intervention
        - Mandated benefits leads to higher cost
    - Demographic changes
        - Age, gender, industry
    - Product mix changes
        - Introducing a new product/plan affects trend

b) Approaches for performing base trend analysis

- Analysis of historical claims experience
    - Monitor cost per service and utilization of service
    - Separate by product line
- Analysis of provider contracting changes
    - Isolate residual trend
    - Separate analysis by service category (IP, OP)
- Track changes
    - Establish a standard approach of tracking contracts
    - Summarize contractual rates for each service category
    - Indicate the type of arrangement (per diem)
    - Track risk sharing provisions
        - Track hospital usage (DRG), physician usage by procedural code
        - Develop assumption for FFS provider
        - Track capitation rates

Solution 13 (continued)

- Large claims
  - Monitor over time to understand the impact on trend
- Demographic changes
  - Age, gender
- Develop trend report and include
  - Historical changes in FFS claims
  - Historical changes in provider contracts, capitation rates
  - Trend in allowable PMPM
  - Residual trend

c) Macro-economic variables that may be considered in an econometric trend model

- Wealth
  - As this increases people spend more on health care
  - More research is done
- General inflation that increase all costs
- Effect of third party payers
  - They reduce consumers sensitivity to cost
- Physician supply
  - Expectation is that increased supply leads to a reduction in price
  - This has not happened
- More specialists
  - Leads to more intensive therapies
- Demographic effect
  - Population aging
  - Causes an increase in consumption
- Growing impact of managed care
  - Expected to decrease costs, but only recently has market share increased for effects to be seen

Solution 14

a) describe different patient-directed health care approaches

1. provide single benefit plan – this is Archaic's current plan
2. multi-plan option – offer different plan options with different premiums
3. multi-plan option + flexible spending account (FSA) – EE can contribute pre-tax to FSA and cover expenses that are not covered by insurance – use or lose it for FSA funds
4. healthcare supermarket + FSA – helpful for small employers who can't offer multiple self-administered plans, reduces their administrative burden, may be risk-adjusted in pool
5. healthcare supermarket + FSA + PHA (personal health account) – employer contributes to PHA – it can rollover from year to year and can be used to purchase insurance
6. high deductible plan + PHA + FSA – low cost high deductible plan may be attractive to younger or wealthier employees – HDHP provides insurance for catastrophic events
7. FSA + PHA – eliminates need to buy insurance – employee can decide to buy or cover expenses out of pocket and save funds for future – lowest administrative cost for employer, but may not be willing to offer health insurance for employees
8. New generation PHA – both employer and employee contribute, portable, can purchase insurance, requires changes in regulations to work

b) key dimensions used to differentiate between approaches

1. breadth of coverage choice for employees
2. consumer's stake in spending decisions
3. flexibility of funding options for employees
4. continuity of coverage and care afforded to employees
5. employer administrative stewardship

c) evaluate which approaches may be suitable for Archaic

Currently Archaic only offers an indemnity plan with a $500 maximum out-of-pocket. They are on the extreme end – least patient drive. Exploring PDHB options is a great idea, but a PHA will be too extreme a change and may upset employees too much.

Going to a multi-plan option with a FSA will allow Archaic to move down the continuum and allow their employees to get used to increase cost sharing and start becoming better health care consumers. Currently they are completely isolated from actual cost of services

Solution 15

a) Quota share reinsurance:
- company reinsures a specific percentage of claims, and gives up that percentage of premium (less ceding allowance for expenses)
- usually used by company with a small block of LTD
- rely on reinsurer for underwriting

Excess reinsurance:
- company reinsures all or a portion of the claim over a specified amount
- like a catastrophic protection
- usually used by company with larger block of LTD

b) Wonderful Life reinsures 50% of its exposure up to $15,000.

		Gross monthly benefit (A)	**Reinsured volume**	**Incidence rate (per 1,000)**
		(salary / 12) x 75%, max $20,000	**(A - $15,000) + 50% x ($15,000)**	
52 M	6	$ 17,187.50	$ 9,687.50	6.62
57 M	2	$ 18,750	$11,250	11.87
62 M	1	$ 20,000	$12,500	16.71
52 F	3	$ 16,250	$8,750	7.28
57 F	1	$18,125	$10,625	10.68

Reinsured volume x Incidence rate x 53 x Number of employees per cell

= $61,762

c) Verify eligibility
- was the coverage in force on the date of disability
- validate pre-existing conditions

Determination of the disability
- review APS
- most difficult part
- validate the disability definition (own occ)

Solution 15 (continued)

Determine the benefit amount
- % of salary (up to max) - offset

Offset
- the key is Social Security benefits

Monitor the on-going disability
- at least once a year
- when disability definition changes
- when status or medical conditions change

d) Age at disability: 62
Age at valuation: 63
Benefit: 310,000 / 12 x 75%

Time	Continuance	Benefits	Discount	Reserve
1	(1-.06) = .94	19,375 x 1.03 = 19,956.25	1 / 1.05	$ 17,866
2	.94 * (1-.06)	19,956.25 x 1.03, max $20,000 = $20,000	$1 / 1.05^2$	$ 16,029
Total				$ 33,895

Solution 16

a) Monthly Case Claim Rates

i) Life Insurance Rate

	Number of employees		Benefit (1 x pay)		Expected Monthly Claim Rate per $1,000	
Age	**Male** (1)	**Female** (2)	**Male** (3)	**Female** (4)	**Male** (5)	**Female** (6)
27	300	200	50,000	40,000	0.0904	0.0326
42	500	300	80,000	65,000	0.2018	0.0984
57	200	100	120,000	90,000	0.9610	0.4042

Expected monthly claim rate at 27 year old (male) = (3/5) x 0.094+(2/5) x 0.085 = 0.0904

Expected monthly claims from table above :

Age	**Male** (1)x(3)x(5)/1,000	**Female** (2)x(4)x(6)/1,000
27	1,356	261
42	8,072	1,919
57	23,064	3,638
Total	$32,492	$5,818

Expected total monthly claims = $32,492+$5,818 = $38,310

Total volume coverage = number of employees x benefit
= (300 x 50,000 + 200 x 40,000 + … + 200 x 120,000 + 100 x 90,000)
= $115,500,000

Expected monthly claim rate per $1,000 = $38,310 / ($115,500,000 / 1,000)
= **$0.3317 (Manual rate)**

Average actual monthly claims = ($280,000 + $0 + $540,000) / (12 x 3) = $22,778

Actual monthly claim rate per $1,000 = $22,778 / ($115,500,000 / 1,000)
= **$0.1972 (Experience-based rate)**

Experience 40% credible, final rate = 60% x Manual rate + 40% x Experience-based rate

Monthly case claim rate per $1,000 = 60% x $0.3317 + 40% x $0.1972 = $0.2779

Solution 16 (continued)

ii) Long-Term Disability Rate

Monthly base rate $_{x,g,e,w}$ = Incidence $_{x,g,e}$ x Reserve $_{x,g,e,0}$ / 12

where x = age, g = gender, e = elimination period and w = maximum benefit duration

	Number of employees		Monthly Benefit (70% x pay / 12)		Annual Incidence per 1,000		LTD Reserve per $1 of Benefit	
Age	**Male** (1)	**Female** (2)	**Male** (3)	**Female** (4)	**Male** (5)	**Female** (6)	**Male** (7)	**Female** (8)
27	300	200	2,917	2,333	0.89	1.16	50	54
42	500	300	4,667	3,792	2.02	3.05	60	56
57	200	100	7,000	5,250	11.87	10.68	48	42

Expected monthly claims = number of employees x monthly benefit x monthly base rate from table above

Age	**Male** (1)x(3)x((5)/1,000x(7))/12	**Female** (2)x(4)x((6)/1,000x(8))/12
27	3,245	2,436
42	23,567	16,190
57	66,472	19,625
Total	$93,284	$38,251

Expected total monthly claims = $93,284 + $38,251 = $131,535

Total volume coverage = number of employees x monthly benefit
= (300 x 2,917 + 200 x 2,333 + … + 200 x 7,000 + 100 x 5,250)
= $6,737,500

Expected monthly rate per $100 of monthly benefit = $131,535 / ($6,737,500 / 100)
= **$1.952 (Manual rate)**

Actual 3-year claims = 70,000 + 235,000 + 350,000 + 4,500,000 = $5,155,000

Average discounted actual annual claims (mid-period) = $5,155,000 x 1.07^(-1.5) / 3
= $1,552,500

Actual monthly rate per $100 of monthly benefit = ($1,552,500 / 12) / ($6,737,500 / 100)
= **$1.920 (Experience-based rate)**

Solution 16 **(continued)**

Experience 40% credible, final rate = 60% x Manual rate + 40% x (Experience-based rate)

Monthly case claim rate per $100 of monthly benefit = 60% x $1.952 + 40% x $1.920 = $1.939

b) Information/Adjustments to Consider to Determine the Gross Premium Rates

Premiums should also include retention charges (target loss ratio):

- Profit
- Administrative expenses
- Taxes

Additional underwriting considerations :

- Occupation
- Industry
- Geography/area
- Employer contributions
- Disability provisions (such as definition of disability)
- Benefit level and offsets (worker compensation, social insurance,…)

Solution 17

	Typical benefit design	Pricing issues	Employee/employer cost sharing
Vision and hearing	Covers corrective devices Negotiated reimbursement schedule Lenses/frames covered once per year Covers exams	Anti-selection is high Rapid increase in claims with age	Usually employee pay all, often using FSA
Group legal	Limited or comprehensive Limited would be wills Comprehensive would be adoption or divorce Doesn't cover criminal	Little selection unless employee option with flex credits	Usually employer paid
Group P&C	Employer sponsored auto & homeowners Premiums usually discounted	Individually underwritten	Usually employee paid via payroll deduction
Hospital indemnity	Limited daily benefit when confined to hospital Limited benefit period = 30 days Paid in addition to group benefits	Primary underwriting is pre-existing condition	Usually employee paid
Specified illness	Pays a lump sum when diagnosed with a specified illness such as cancer, stroke, coma	Underwriting uses pre-existing condition, graded benefit provision, and attained age benefit limits	Usually employee paid

Solution 18

a)

FAS 43 accounting if all the following conditions are met:

- Benefits vest or accumulate
- Benefits are attributable to prior service
- Payment of benefits is probable
- Payment amount can be reasonably estimated

If this approach is used gains/losses are amortized

FAS 5 accounting if both of the following conditions are met:

- At the time of measurement it is probable that a liability has been incurred
- The amount of the loss can be reasonably estimated

If this approach is used gains and losses are immediately recognized.

b) First check the criteria for FAS 43. Payment is not probable since only one person has been eligible in last five years, so fails FAS 43.

Therefore account for under FAS 5 since a liability has been incurred as of the measurement date. Gains and losses are immediately recognized under FAS 5.

Solution 18 (continued)

c)

Benefit obligation at 12/31/2005:

Monthly benefit * number of expected monthly payments left at 12/31/2005 * number of employees

Group 1 = $6,250 * 3 * 10 =	$187,500
Group 2 = $7,500 * 2 * 6 =	$90,000
Group 3 = $17,500 * 1 * 3 =	$52,500
Total	$330,000

Benefits paid during 2005:

Monthly benefit * number of monthly payments made during 2005 * number of employees

Group 1	$0
Group 2	$45,000
Group 3	$105,000
Total	$150,000

Obligation at January 1, 2005	0
2005 Expense	X
Benefits paid during 2005	($150,000)
Obligation at December 31, 2005	$330,000

X = $480,000

Solution 19

a) Adverse selection assumes that individuals have some knowledge of their future health care costs. Given a choice, they will choose the option that will best meet their needs – they will choose the richest benefit if they know they will use it. This will drive up the cost.

Adverse selection depends on both the availability of choices and the ability for the employees to predict their benefit needs.

b) Reduce the number of options
- too many options in this plan for only 400 employees. Recommend to reduce it to 2-3 options.

Limit the frequency of change
- longer period, more difficult to predict expenses
- recommendation: reenrollment period only every 2 years

Limit the degree of change
- use the staircase rule
- recommendation: only allow employees to move up or down one option at a time

Limit the spread between options

Requires proof of insurability

Group certain coverages together
- group predictable and non predictable expenses together
- recommendation: to group vision with medical care

Delay full payment
- recommendation: apply an elimination period of 6 months or one year

Solution 19 **(continued)**

Offer Health care expense account
- this removes the element of insurance and eliminates anti-selection
- recommendation: replace this benefit with an HCEA

Maintain parallel design

Test the program with employees
- this validates the weaknesses of the plan

Solution 20

a). **Source of Morbidity Data**

1. Population based data
- National Nursing Home Survey
- Good source of data when insurance data unavailable
- Need to adjust for
  - Population
  - Transfers between facilities
  - Reinstatements
  - Nursing home beds restriction

2. Insured based data
- Could be obtained from other companies, reinsurers, & consultants
- Preferred source as it better reflects utilization
- More timely and relevant
- Credibility could be low

3. SOA LTC Intercompany Experience Study
Limitations due to:
- Companies could have inconsistency in coding data
- Product changes over time.
- Different underwriting among companies
- Mix of business changes over time
- Medical advances and environmental impacts
- Methodology leads understatement of claim incidence and lapse rates
- Early plans included little home care benefits
- Data not smoothed or extrapolated
- voluntary lapses could be overstated due to unreported deaths

b). **Factors Considered**

- Coverage integration - stand alone nursing home or home health is more costly than combined
- Reinstatements
- Transfers between facilities – needs to be reflected appropriately in frequencies and continuance curves
- Coordination with other coverages, e.g. with Medicare
- Pre-X - more relevant in group coverage
- Charge levels vary by area and level of service
- Utilization by area

Solution 20 **(continued)**

- Policy options and benefit triggers
- Demographics - age and gender
- Marital status
- Future morbidity improvement
- Underwriting philosophy and experience
- Marketing and distribution
- Claim administration
- Regulatory considerations

Solution 21

a) **Change in 2007 Expected Company Cost**

Employer cost = Claims + Credits – Price tags

2005 Actual claims = sum of 2005 annual costs
= ($6,000 + $35,000 + … + $40,000 + $375,000) = $2,051,000

2005 Credits = credits x number of employees
= $850 x 400 + $2,000 x 1,200 = $2,740,000

2005 Price tags = price tags x number of employees
= ($100 x 50 + $250 x 150 + … + $400 x 75 + $1,000 x 400)
= $1,960,000

2005 Employer cost = $2,051,000 + $2,740,000 - $1,960,000 = $2,831,000

2007 Employer cost = 2007 credits (since the realistic price tags approach is used, 2007 price tags are equal
to 2007 expected claims)

2007 Credits = 2005 credits indexed by option B inflation rate over 2 years

Option B inflation rate (weighted by claims)
= [($65,000 + $550,000) x 1.08^2 + ($50,000 + $350,000) x 1.05^2] / $1,015,000
= 1.141 or 14.1%

2007 Employer cost = 2007 Credits = $2,740,000 x 1.141 = $3,126,340

Change relative to the 2005 employer cost = $3,126,340 - $2,831,000 = $295,340

Solution 21 (continued)

b) **Opt-Up-or-Opt-Down Approach**

2007 Price tags = 2007 expected annual claims per employee
= 2005 annual cost / number of employees x inflation x change in option benefit

	2005 Annual Cost per Employee				Annual Inflation Rate		Option Changes	
	Medical		Dental					
Plan	Single (1)	Family (2)	Single (3)	Family (4)	Medical (5)	Dental (6)	Medical (7)	Dental (8)
A	120.00	233.33	80.00	233.33	1.05	1.04	1.00	1.00
B	260.00	687.50	250.00	700.00	1.08	1.05	1.06	0.97
C	750.00	1,700.00	533.33	937.50	1.12	1.06	1.10	0.95

2007 Price tags before opt-up-or-opt-down adjustment from table above

	Medical		Dental	
Plan	Single (1)x(5)^2x(7)	Family (2)x(5)^2x(7)	Single (3)x(6)^2x(8)	Family (4)x(6)^2x(8)
A	132.30	257.25	86.53	252.37
B	321.46	850.01	267.36	748.60
C	1,034.88	2,345.73	569.29	1,000.71

Revised 2007 Price tags to reflect opt-up-or-opt-down approach

Make Option B a zero price tag for year 2007 for both single and family coverage and subtract the option B
price tag from Options A and C price tags

	Medical		Dental	
Plan	Single	Family	Single	Family
A	-189.16	-592.76	-180.83	-496.23
B	0	0	0	0
C	713.42	1,495.72	301.93	252.11

Revised 2007 Credits to reflect opt-up-or-opt-down approach

Reduce the original 2007 credits by the sum of original Option B price tags for medical and dental coverage

- 2007 Credits (Single) = $850 x 1.141 – $321.46 - $267.36 = $381.03
- 2007 Credits (Family) = $2,000 x 1.141 - $850.01 – 748.60 = $683.39

Solution 21 **(continued)**

Potential Drawbacks :

- Employee does not see the actual cost of the options
- Difficult to explain what these numbers represent
- Diffcult to communicate/explain future price increases
- Less flexibility in cost management (binds the employer to cost increases in the $0 Option B)

Solution 22

a) **Maximum Marketing Cost to Achieve 12% Profit**

Profit Margin = (pv Premiums - pv Expenses and Claims - Mktg) / pv Premiums

12% =(300,000-210,000-Mktg)/300,000

Solve for Mktg = $54,000

The maximum marketing cost for a profit margin of 12% is $54,000.

b) **Actions to Increase Profit Margin**

1. Improve persistency
2. Increase the response rate
   Need fast issue, minimum underwriting
3. Increase premium
4. Consider lower marketing cost
5. Lower issue expense without impacting mortality
6. Better mortality without increasing mortality costs

c) **Possible Profitability Measures for Marketing Campaign**

- PV of Cash Flow
- PV of statutory profit
- PV of free earnings released or stockholder dividends
- IRR – internal rate of return
- GAAP Profit Margin
- GAAP ROE=GAAP Income/GAAP Surplus
- Stat ROE= Stat Income/Stat Surplus
- Economic Value Added

Should choose measures that are consistent with companies financial goal.