Institute of Actuaries of India

Subject ST1 – Health and Care Insurance Specialist Technical

May 2011 Examinations

INDICATIVE SOLUTIONS

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

Q.1)

a) *Reasons for promoting healthcare insurance*

- Efficient mechanism to pooling and sharing of healthcare risks
- Individuals encouraged to obtain financial protection from unexpected healthcare expenditure
- Minimize Govt. burden on health and care
- Practice seen in other developing and developed markets working well and so do the same
- Individuals will have incentive to take care of themselves – otherwise they would need to shell out more for insurance
- Insurance providers will promote healthy life style amongst the insured to minimize cost of insurance
- Current life and general insurance offerings matured and appreciated by the public
- There is public demand for it
- Feels insurance is an important part of the overall well being and development of the country
- Insurance promotes build up of private health and care infrastructure
- The Govt. may have made electoral promises to promote healthcare insurance

b) *Actions to promote healthcare insurance*

- Offer tax incentives for effecting private healthcare eg. to individuals and employers
- Subsidise premiums
- provide subsidy to private healthcare providers
- tax incentives to healthcare insurers
- exclusions from State benefits (eg. part of the population excluded from the national welfare scheme)
- reduced general taxes where insurance is effected
- set up of a regulatory body to ensure checks and balances
- public-private partnerships in building healthcare infrastructure
- allowing foreign ownership in healthcare insurance companies to facilitate transfer of knowledge
- carry out a public campaign explaining the benefits of insurance
- access to Govt. data to help with product design and pricing (eg. Hospitalization data)

c) *means-tested State benefits vs. healthcare insurance*

- Improved medical infrastructure is obviously a reasonable expectation from the public who think part of their tax is meant for access to a good health care infrastructure. So, if the current infrastructure is seen inadequate, it can be well argued that the State should have the infrastructure improvement its key priority. Further, a robust healthcare insurance market relies heavily upon a strong healthcare infrastructure
- Means-testing reflects the key responsibility for the State – protecting the weak through redistribution of wealth. Ensures the high costs of healthcare provision are borne by the whole economy rather than those in need and who cannot afford.
- However, means-testing has its own disadvantages
    - no incentive for individuals to provide for themselves and thus discourage any sort of savings for future
    - means-testing would be administratively complex

- difficult to define affordability; political compulsions may mean more and more people may have to be admitted under the ‘unaffordable’ and thus may defeat the very purpose
- may be seen unfair by those who do not benefit (paying tax but not getting support in return)
- ‘State will take care’ type attitude may encourage “don’t care” type attitude amongst individual when it comes to taking care of their health
- even for the ‘affordable’ increasing healthcare costs might prove very expensive and thus unaffordable under certain circumstances
- misuse or mal-administration of the means-testing system may mean either the general taxes to be increased (which is politically unpopular) and/or cut spending on other important aspects such as education

- Providing premium subsidy and tax relief on healthcare insurance premiums may be a better alternative to direct means-tested benefits.
- Healthcare insurance may not provide cover to certain individuals or for certain conditions treated ‘uninsurable’. So, a level of State provision is a must. A well-regulated healthcare insurance market offers a number of benefits as outlined in (1) above. So, a minimal level of State provision complemented by a robust healthcare insurance market is likely to be more effective and efficient in ensuring a ‘healthy and productive nation’.

[Total Marks – 11]

Q.2)

a) *Product design – risks and market appeal*

- Risks
  - Morbidity risk - first of its kind in the market and so no prior data/experience – risk of getting the incidence rates wrong – ie., risk that more people incur a critical illness than expected - employees working in a particular industry may be more likely to contract certain critical illnesses & employers may offer regular health-checks leading to early diagnosis of certain illnesses – risk that these are not fully allowed for in the pricing

  - Anti-selection risk
    - By employers - only employers whose employees are more susceptible to certain critical illnesses take up this cover;
    - by individuals - especially if the rider is offered voluntary;
    - (linked to the above risk) mis-estimating proportion taking up the cover

  - New business mix risk – if cross-subsidy in pricing such as
    - Between base life cover and this rider
    - Between gender
    - Between industries/occupation classes

  - The risk that a reinsurer fails to make good on the reinsurance recoveries due

- Market appeal

- It is a welcome cover for employees and so employers may like to offer (if priced at right level) in order to attract and retain talent
- This will appeal to those employees for whom income protection cover is not available, including blue collar employees, and it is of particular value if TPD cover is included
- Price is likely to be lower than that of individual due to group dynamics and so might be seen better 'value for money, by employees even if they need to pay the premium and not their employer
- The company may be seen as innovator and so likely to help win more group life business
- 10-30 conditions covered may be perceived to be a very comprehensive cover and thus appeal more to the employees

b) *Pricing basis setting*

Incidence rates

- Look at experience on the individual CI accelerated rider over recent years
- Period to be long enough to have reliable data and short enough to be homogeneous
- Look at males and females separately
- Look at condition-wise for the major ones (eg. top 3-4 conditions may constitute over 90% of total claims)
- Allow for any changes over time in underwriting standards, claim procedures, number of conditions covered, definition of the CI conditions covered
- Repeat the above for stand-alone rider as well to get more credible data.
- Need to adjust for the fact that stand-alone CI would not pay if the policyholder dies within the survival period whereas all such cases would have been paid out in case of accelerated CI.
- the company is unlikely to have sufficient data to rely solely on its own experience. Look at domestic industry data
- adjust for particular circumstances of the company and its product structure
- consider any trends in experience
- once an estimate of the expected future experience on the individual CI rider, then adjust for group business dynamics (eg. relatively less scope for anti-selection if the cover is compulsory relative to individual business) by looking at difference between individual and group CI experience in other markets.
- Take reinsurers/consultants help in forming a point of view for this adjustment
- Similarly making reference to overseas experience, decide on adjustment to pricing basis for industry/occupational classification
- Decide on loading for voluntary participation by checking on the likely mix of standard/sub-standard lives (this will depend on the level of take-up)
- Allow for likely future deterioration in experience as CI awareness increases/medical advancements leading to diagnosis made easier or early

Mortality

- Similar to morbidity except that there will likely to be credible experience in the company/industry

Investment return

- This should reflect the expected return on underlying investments (net of expenses)
- For one year group contracts, this is of less significance

Business volume/cover size
- Look at the current take up rates for the individual CI rider and any trends (Is take up increasing in the recent years?)
- Look at experience in other markets and any local market research
- Look at the typical size of life cover on the groups; the rider cover will be half that size

Persistency
- Look at the level of persistency in the group term-life product
- For the rider, assumed persistency should not be better than the base product (companies will cut-down on the employee-benefit during tough business conditions and so the rider will be the first one to be cut even if the base cover is continued)

Expenses
- Look at expense analysis over recent years
- Look at expenses relating to the underwriting/claim admin on the individual CI
- Consider one-off costs associated with system changes for policy and claim admin
- Consider costs associated with product development and marketing efforts
- Translate the expenses into an annual cost taking into account expected business volumes, cover size and persistency

Expenses inflation

- National data on inflation of prices and earnings
- Expected future rates of inflation possibly measured by the difference in returns on government fixed interest and index-linked securities
- The expense inflation rate will be chosen to be consistent with the investment return assumption

Tax
- Suitable assumptions will need to be made taking into account the company s current and future tax position

Profit
- May be similar to that underlying the individual CI rider product but will relatively lower capital requirements given the yearly renewal nature

Other factors to be considered

- No competition currently, but competitors' reaction to this should be considered
- New Best estimate assumptions or slightly prudent
- Reserving bases
- Premium bases may be affected by regulation

c) *Suitable reinsurance arrangement*

- Accelerated benefit and so the same arrangement as for the base life cover could be a good starting point
- Quota share arrangement is suitable
- a 50:50 quota share could be considered to start with

- Reinsurers' would be willing to offer more competitive rates for quota share compared to a surplus arrangement
- Equal stake for both the parties makes the reinsurer comfortable
- administratively simpler
- can help leverage reinsurer's expertise on claim process
- with credible experience building-up, the insurer may consider either increasing the retained share or change to a surplus arrangement to protect itself from volatility from large claims
- if the insurer has already credible experience built on the individual CI rider, it may be appropriate to retain higher share because ceding to reinsurer involves ceding part of profit
- consider any capital and tax arbitrage and any mandatory retention requirements to decide how much to cede and retain

d) *Marketing director suggests..*

- top 3 illnesses /low cost /value for money
    - covering the top 3 most common illnesses if they are not on the list of illnesses covered already would increase the marketing appeal
    - however, only 3 conditions covered may be perceived to be not comprehensive
    - the top 3 illnesses are likely to constitute a vast majority (90%) of expected claims and so there will not be significant reduction in premium charged
    - the above two points will therefore reduce the marketing appeal
    - 'value for money' perception depends on the maturity of the market and level of understanding of the need/value of the cover offered
    - So, the higher the maturity/sophistication of the market/awareness the greater valid is the suggestion

- 3-yr premium guarantee
    - premium guarantee could appeal to the insured (employers') because of greater certainty on the insurance cost outgo over the next three years
    - unless the base cover rate is also guaranteed, this does not add much value from persistency view point
    - With yearly renewable contract the insured may be selectively taking advantage of the guarantee (that is, if the claim experience is worse the insured will renew else shop around)
    - If the contract is written more like a 3-year product, the insured may be concerned with the lack of ability to shop around if the experience proves better than implied in the charged premium
    - Guarantee will likely be welcomed by the brokers
    - Guarantee would lead the premium to be higher due to higher cost of capital and reserving requirements and so the guaranteed rates may prove to be uncompetitive

- 100% acceleration on terminal illness
    - welcome feature with marginal additional cost and thus would be appealing
    - the additional cost arise from early payment of otherwise death claim and covering deaths which would otherwise have been paid because they fall outside the cover period
    - 'terminal illness' may be difficult to define more objectively and so might lead to disgruntled insured

- Waiver of actively at work clause
  - will be welcomed by the insured feature because it ensures no discontinuity in cover for reasons of any temporary absence from work
  - help increase the persistency
  - increases the scope for anti-selection especially when voluntarily offered
  - premium would need to allow for this and so higher cost

- Offer to affinity groups
  - widens the market and so potentially more business
  - will be difficult to check actively at work and so voluntary cover will be risky
  - a simplified medical questionnaire could be used for underwriting
  - greater anti-selection scope in certain groups and so may be unable to offer to all types of affinity groups
  - there will be challenges in claim underwriting on certain groups
  - the premium would need to allow for all for these and so may become so high as to be unattractive

[Total Marks – 30]

Q.3)

a) *Importance & complexity of health insurance underwriting relative to life insurance*

- Underwriting is an important risk management tool for both life and health insurance for appropriate risk targeting
- Mortality is much more predictable than morbidity; and so, it is important for health insurance underwriting to be robust to ensure the risks taken are consistent with the pricing basis
- Long term life and health insurance contracts – main approach is medical underwriting which is similar
- Claim underwriting in case of life insurance is quite straightforward where it is complex in case of health insurance because the claim event is not as well defined as death
- Further claim underwriting needs to be dealt with sensitively in case of health insurance to ensure the policy holder who is going through a challenging time in terms of health is not put off by insensitive questions
- Also, claim underwriters should possess a great degree of medical understanding to be able to make judge the validity of a claim more accurately
- So, health insurance underwriters need to keep themselves up to date on what is happening in the medical world
- Short term health insurance contracts – underwriting gets tricky; need to strike a good balance between initial and claim underwriting
- Heavy initial underwriting is detrimental to sales but the policy holder are made clear at the outset what is and is not covered
- A moratorium approach to underwriting (Eg. pre-existing illnesses are excluded) is quite claim underwriting heavy and so is likely to lead to disgruntled policyholders

b) *Anti-selection vs. non-disclosure*

- Anti-selection – refers to the tendency that people who consider themselves to be of higher risk are more likely to take out policies, for example,
    - Sick or sub-standard lives legitimately renewing their PMI policies
    - Someone having a chest pain taking out a CI policy and then going to a doctor to see if the pain is due to a heart disease
- Non-disclosure- refers to the decision made by the policyholder at the proposal stage not to disclose all risk related information with the insurer, for example,
    - Pre-existing back pain not disclosed at the proposal stage for an IP cover
    - Family history of heart diseases not disclosed at the proposal stage for a CI cover

c) *Measuring effectiveness of underwriting for a health and care insurer*

- Initial underwriting should identify very sick lives and decline cover – could look at proportion of early claims which are repudiated
- Strength of any proposal form could be measured by looking at the number of policyholder complaints at claim stage relating to non-disclosure
- Any trends in claim experience should feedback into the initial underwriting – could look at if experience is deviating too far from the pricing (claims to premiums ratio falling between, say, 80%-120%), other things being equal
- Cost vs. benefit – cost of underwriting could be compared with additional claim outgo (due to claims that would have been admitted if there was no or less intensive underwriting)
- Strength of a claim form could be measured through number/amount of additional information sought from claimants after the form was first submitted
- Turn-around time – an effective underwriting mechanism should lead to quicker decisions (both at proposal and at claim)

[Total Marks – 12]

Q.4)

a) *Advantages and disadvantages of outsourcing*

Advantages
- IP claims are complex and so inability to handle claims can put constraints on pricing
- TPA can provide the expertise (in terms of disability counseling and rehabilitation)
- The company need to hire experienced staff for handling the IP claims where they have to regularly check whether the claim is payable at each duration or not
- Volume of claims may be low for IP so outsourcing becomes cheaper compared to in-house staffing
- Cost would be saved on maintaining data for dates at which each payment would be made, dates when follow-up evidence may be required, dates of claim expiry etc.
- Claims handling cost can reduce as TPAs are more process-savvy and so may be,. efficient
- Reduced cost can reduce premiums to the customers and the premiums may become competitive

- More time can be spent on other activities like pricing, reserving etc.

Disadvantages
- The company's staff will not gain knowledge about the claims processing.
- In long run it may prove costly as the TPA may charge high amount for their fees. And if the renewal fees are higher it may become difficult to get another TPA and transfer things to him
- The company may have poor quality control as the administration is outsourced
- The profit margins have to be shared or passed to the TPA
- Need to manage relationship with the TPA
- Possibility of third party default
- There may be restrictions on outsourcing by the regulator
- There are uncertainty of service and quality of service for which the company have to depend on the TPA

b) *Measures that can be taken to ensure policy-holder friendly claim servicing*

- Single-window servicing to deal with all claim related services
- Claim handlers are provided incentive for low complaints and/or penalized for high complaints
- Monthly claim payouts are credited directly to the claimant's accounts
- Track and ensure all complaints are attended to within a reasonable time frame – provide escalation procedures to the policyholders when they feel their claim settlement is taking inordinate amount of time
- Offer claim counseling and rehabilitation services by qualified/friendly resources
- Offer online services for someone to lodge and track claims
- Ensure the intermediaries/employers are clear on the claim procedures and they are communicated to the policyholders
- All the above ingredients should be in place whether the claims are handled in-house or outsourced to a TPA
- In case of TPA involvement, the service level agreements should spell out the claim process standards clearly and have built-in penalties for non-compliance

[Total Marks – 7]

Q.5)

a) *Principles of setting up statutory reserves*

- The amount of the reserves should be such as to ensure that all liabilities arising out of insurance contracts can be met by the insurance company
- The amount of the reserves should be calculated by a suitably prudent valuation of all future liabilities for all existing policies, including:
  - guaranteed benefits
  - options available to the policyholder
  - expenses, including commission
  - Taking credit for the premiums which are due to be paid under the terms of each policy in the future
- A prudent valuation is not a "best estimate" valuation, ie neither too much nor too little, but should include an appropriate margin for adverse deviation of the relevant factors.

- The valuation should take account of the nature, term and method of valuation of the corresponding assets, depending on the type of policy.
- The use of appropriate approximations or generalizations should be allowed.
- The rate of interest (where appropriate) used in the calculation of the reserves should be chosen prudently, taking into account the currency in which the policy is denominated, and having regard to the yields on the corresponding existing assets and to the yield which it is expected will be obtained on sums to be invested in the future.
- The elements of the statistical basis, that is the demographic and persistency assumptions, and the allowance for expenses used in the calculation of the reserves should be chosen prudently, having regard to the type of insurance, the territory of the persons insured, and the administrative costs and commission expected to be incurred.
- If a valuation method defines in advance the amount of expenses to be used in the valuation, the amount so defined should be not less than a prudent estimate of the relevant future expenses.
- The method of calculation of the reserves from year to year should be such as to recognize profit in an appropriate way over the duration of each policy and should not be subject to discontinuities arising from arbitrary changes to the valuation basis.
- Each insurance company should disclose the methods and bases used in the valuation.

b) *Reserves for hospital cash product*

- Unearned premium reserve- balance of premiums received in respect of periods of insurance not yet expired
- Additional unexpired risk reserve- additional reserve in respect of the unexpired cover if premiums are felt inadequate by looking at the claim trend
- Outstanding (reported) claims reserve
    - Reserve in respect of claims notified to the insurer but not fully settled
    - Discounted of value of expected benefit outgo – based on the type (ICU or normal) and likely duration of hospitalization
    - Discount rates used should be consistent with the investment return assumption
    - Some normal hospitalization claims could be become ICU claims if the health situation deteriorates and this possibility should be allowed for in the reserving
    - Waiver of future renewal premiums is also an outgo and should be reserved for
    - Can either adopt a case by case or a portfolio approach to assessing the likely duration of claims depending upon volume and volatility seen in the past experience

- Incurred but not reported
    - Reserve in respect of claims that have arisen but which have yet to be notified to the insurer
    - There will likely time lag expected between hospitalization and intimation to the company as there is no pre-authorization required
    - The time lag may vary between normal and ICU cases and so appropriate lag should be assumed based on past experience when building IBNR

- Claims in transit
    - reserve in respect of claims reported but not assessed, or not recorded
    - An estimate of duration of claim and chance of repudiation based on the past experience may be assumed

  - If a portfolio approach to estimating the duration of the claim outgo is adopted, then this reserve calculation will be similar to that of outstanding claims except that the chance of repudiation of the claim will need to be allowed for

- Investment mismatching
  - In some territories there may be a regulatory requirement hold an explicit investment mismatching reserving.
  - The size depends on the extent to which the assets held do not match the liabilities
  - This would relate to both type and duration mismatch between the claim and expense outgo and the premium and investment proceeds
  - With long duration claim payout structure, this reserving is important

- Other contingent reserves

  There may be a requirement to hold a reserve for less frequent high impact risks such as epidemics, natural catastrophes and third party failures etc.

[Total Marks – 12]

Q.6)

a) *Long-term care product types and benefits*

- Long term care refers to the personal and nursing care and associated domestic services for people who are unable to look after themselves and are not going to get better
- Different types of insurance solutions exist. They are broadly classified into Pre-Funded products and immediate needs products
- Pre-funded products are purchased by (relatively) healthy people to protect against the risk of additional day-to-day living costs due to disability at old age
- Premiums could be – single, regular or restricted regular that stops at a certain age (typically normal retirement age)
- The benefit payment is dependent on the claims definition which may be based on the level of disability defined as being unable to undertake certain number of activities of daily living
- The type of benefit payout could be lump sum, regular payments for a certain number of years, regular payable lifetime subject to ongoing disability, regular payments restricted to a maximum amount or period subject to ongoing disability
- Benefit can be defined in money terms (cash) or paid on an indemnity basis (pay for the actual cost of care)
- Immediate needs contracts are meant for those in need of immediate long-term care
- They protect those in need of care against the uncertain survival duration
- These products provide a guaranteed life time payment in return for a single premium
- Premiums individually calculated based on the health of the individual applicant
- The benefits cover the provision of cost of care in a home or in a domiciliary care

b) *Process of developing an investment strategy*

- Key principles
  - Investments should be appropriate to nature, term and currency of liabilities
  - Try to maximise overall return subject to level of risk

- pre-funded long term care products are of long term and so investment strategy is more critical
- Immediate needs products tend to be short-term and so investment is relatively less important element
- currency of investment should be the currency of Chindia to avoid currency-risk
- benefits fixed in nature could be matched to that of the liabilities
- real assets are a better match for indemnity based benefits
- Need model to project assets and liabilities for a given investment strategy and level of free capital
- Use Best estimate assumptions
- Sensitivity test the assumptions
- Model assets and liabilities
    - Assests – stochastic model, project income and changes in capital values
    - Expenses – inflation model
    - Liabilities – could be linked to investment conditions
- Look at difference (assets – liabilities) at each year end using supervisory basis
- Need to be sufficient – sufficiency depends on
    - Investment strategy being considered
    - Regulatory requirements
    - Nature of business (the higher the uncertainty the greater the cushion required)
    - Rating agencies/competitors
- Extend stochastic model to produce statistical distribution of amounts to cover level of solvency capital
- Calculate probability of insolvency for a particular investment strategy
- For proprietary company, extend to look at shareholder earnings
- Other factors that may be investigated
    - Liquidity requirements
    - Effect on product development and pricing
    - Method used for asset valuation
    - Policyholders' reasonable expectations (PRE)

c) *Impact of the Govt. measures on business*

Improved health-care systems

- If the government is just focused on creating infrastructure and not offer free care, then it builds a good case for a strong long term care insurance market
- Any provision of free care by the State to elderly would affect the long-term care business; any subsidy or partial care provision would mean products need to designed to complement the State provision
- A robust health-care system is likely to enable fraud-free insurance transactions; Part of improving health care systems is creating a regulatory environment which promotes health care insurance and so there will likely to be more new players and increased competition
- Pre-funded products cost may go up with life expectancy expecting to improve (lesser people will be dying during the funding phase and more people will survive to long-term care age) and also the duration of benefit payout is likely to increase – due to disabled lives living longer
- Improved health-care systems may lead to people not thinking of buying pre-funded products, and so the demand for pre-funded products may fall

Long-term debt market

- This will facilitate availability of long-term debt instruments – an additional instrument for investing assets backing long term liabilities
- Could improve the return on investments and reduce the cost of insurance (eg. for pre-funded products)

Socio-economic status of women
- Improved economic independence - women may buy more insurance but this may have greater impact on other health insurance products such as CI, IP and PMI than LTC (eg. screening leading to early CI claims)
- Female life expectancy will likely improve – affects the pricing

[Total Marks - 18]

Q.7)

a)
reasons for declining market share and increasing loss ratio

- More new players into the market
- New players more aggressive in pricing (low profit margins; loss leader approach)
- existing players getting aggressive with price
- new products introduced by other players more popular
- reduction of rates a few years back was not good enough
- new product introduced not selling well
- new product introduced was mispriced
- systems mess-up – claims paid erroneously beyond the combined limit for the family under the new product
- different/better risk classification by other players attracting/retaining good lives
- turnover of key personnel in marketing resulting in poor sales
- turnover of key personnel in claim process resulting in poor claim handling
- bad publicity due to a court ruling against the company
- bad publicity due to regulatory penalty for non-compliance
- more effective marketing strategy by other players
- competition pays higher commission and so secure more business
- competition using TPAs for claim administration and benefit from low expense and faster claim servicing

d) *data required for experience analysis*

- Policy number or other unique identifier
- Product type (individual vs. family product)
- Date of birth (age) - need for all family members for
- Sex of all family members
- Smoker status
- Underwriting status (any exclusions)
- Occupation of all family members
- Policy commencement date (or duration from entry)
- Sum assured (combined one for the family product)
- Current policy status (in force, lapse, accepted claim, pending claim)

- No claim discount level (if NCD exists)
- Distribution channel
- Date of status change
- Rated information (at least sufficient to divide policies between standard and sub standard risks)
- Territory/geography/address
- Cause of claim
- Date of claim notification.
- Date of acceptance
- Date of claim settlement
- Date of event
- Claim amount paid
- Hospital band

[Total Marks – 10]

[Total Marks - 100]

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