Institute of Actuaries of India

Subject SP1 – Health and Care Principles

June 2019 Examination

INDICATIVE SOLUTION

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.

Solution 1:

i) Full data vs Model points

Full data:
- It is always best to use all the data that is available
- Results will be more accurate
- ... and are not subject to any judgement on model point selection
- It is better if the underlying data is heterogeneous
- … there is no risk of losing all the characteristic of the data, their correlation, which may be compromised when taking model points
- No need to group data and lose any characteristic of the data impacting morbidity significantly
- The risk/rating factors may be many, in which case it will be challenging and time consuming to choose the model points, which is a fair representative of the full data.
- .. there is a risk of losing some risk characteristic in the process
- Time spent in identifying relevant model points without losing any characteristic of the group may outweigh the time saved in running the model
- In some regulatory regimes, for some work (like say statutory valuation) it may be compulsory to use full data (model point basis reserve not acceptable)
- .. keeping the importance of the statutory reserve activity the company itself would prefer more accurate results and hence use full data modelling [3]

Model Points:
- Quick way to get results
- If the data is homogeneous the results will be fairly accurate
- Full data may be time consuming
- You can run many times, say for more scenarios quickly
- Also data storage for various scenarios on full data basis may be difficult
- If it is a very large company, it will save itself a lot of model running time. Especially for intermediate period reports.
- Sometime challenge in getting the full data extract from IT department. No need to wait for that
- It may be a better approach if there is a lot of missing data or inaccurate data
- If it is a small portfolio with inadequate data, better use the model point file, till the portfolio builds
- Output will be manageable
- For some jobs like pricing this may be a better approach [3]

[6]

ii) Model points selection

The model points should be set such that
- They are fair representative of the underlying data
- Number of model points should be a trade-off between time saved and accuracy
- not too less
- .. to not cover all the variability
- not too many
- … to lose the advantage of not using the full data
- Based on the products features, should decide which parameters that can be grouped
- Level of heterogeneity of data
- … more heterogeneous more model points needed
- Purpose of the modelling, the factor which you want to group may vary
- .. say for pricing initial commission is significant, it is not for reserving
- The model points should be once validated by running the results on full data and comparing
- .. assessing the error levels
- There has to be some maximum error levels that should be set and
- The model points used in the previous investigation would be a starting point

- .. with any modifications to be done for any change in portfolio mix since the previous investigation. [4]

[10 Marks]

Solution 2:

i) Possible reasons

- To provide fair treatment to those affected as the infection could be accidental and not necessarily self-inflicted – in that context it is no different from other illnesses and so should not be excluded
- Providing care to those affected through public health care facilities is proving to be expensive or there is lack of capacity in Govt. facilities – inclusion in insurance could alleviate some of the burden and direct the care to private sector
- The Regulator is concerned with the trend of insurers repudiating claims by liking up illnesses to the AIDS/HIC infection even though the illnesses in question might not necessarily have been attributable to the infection
- A public interest litigation could have led to a Court order directing insurers to cover the risk [2]

ii) Factors to consider

- This is difficult to price due to lack of data or uncertainty.
- Since the regulator is implementing it for all insurers, there will be no competitive advantage or disadvantage.
- AIDS/HIV may be associated with certain lifestyle choices. So, there is a high chance of anti-selection, which is probably why this exclusion existed.
- Need to consider both incidence and termination rates; termination could include both death as well as getting cured and thus being able to return to work
- There will be additional claims but with likely relatively shorter income period due to reduced longevity
- Implication of any counselling/rehabilitation to enable the affected individual to return to work (may be partially) on the termination rates to be considered
- Medical advancements for treatment of AIDS/HIV may make the affected lives longer even though they are disabled
- Government or Regulator may have some population data in this regard, which can be used
- May need to seek reinsurance support for assessing the impact on morbidity rate, especially, on any practical experience in other markets
- If the reinsurers are not willing to offer the cover or it turns out that the reinsurance is expensive, then the insurer should assess the capital/profitability implications of writing the product…
- .. perhaps, limit the volume or write only group contracts where the anti-selection is less likely
- ..or not write in some geographies where there is higher concentration of risk
- co-insurance arrangements be considered to mitigate geographical concentration
- The assumption is that this will be applicable to only new contracts written and not for all existing policies.
- …if it has to be offered at renewal for all existing policies and if it increases the premium rates substantially, there is a risk of selective renewals
- .. which may worsen your experience even further.
- How much the competitors are going to increase it by, will also be a consideration. You cannot be too far from the competition.
- However, it may depend on the customer group (social, geographical segment) each company is selling to. It may differ from company to company.
- It is important also analyse how may claims got rejected due to AIDS/HIV exclusion.

- May be it is not very prevalent in the insured population and the exclusion is more because of the perception.
- And the regulator actually feels the removal of this exclusion may not substantial increase in risk for the insurers.
- the regulator may not expect a big increase in the rates
- Based on if the rates have to be guaranteed or reviewable, the prudence in the assumption will need to be built.

[8]

[10 Marks]

Solution 3:

i) Options

- An option is a choice given to the policyholder to opt for certain additional benefit, complimenting his existing policy, without further evidence of health. This option can be exercised at some time during the policy or at the end of the policy. [1]

- The various options that could be added to the lump sum critical illness product include
    - Increase the sum assured on certain life-events (eg. marriage, birth of a child)
    - Extend the term of the policy for a further period
    - Reinstatement of cover after payment of a claim
    - Covered under a Group CI - continuity of cover on individual basis after quitting the job
    - Convert (all or part of) the lump sum claim into an income stream for a period of time [2]

[3]

ii) Risks and mitigation

Risks:
- Anti-selection is the key risk
- i.e. the policyholders who expect to benefit from exercising the option will likely avail it
- The risk that the option premium charged may be inadequate for the additional risk
- … it is difficult to estimate the impact of anti-selection
- Medical advancements may create more information asymmetry (eg. Genetic testing)
- insured will know more than the insurer - making the anti-selection more onerous
- Not enough sales happening, option pricing is effective only if you have a reasonable pool of lives taking up the option
- Operational risk - you have to have all system readiness, processes in place, valuation mechanism, etc for these options; it may be not cost effective if we do not have sufficient sales
- Options may have higher perceived cost than benefit and thus reducing the sales and making the product proposition unattractive to the insurer [4]

Mitigation:
- Option is available only to those lives underwritten as standard lives.
- … sub-standard lives will be a much higher risks
- Option can be exercised only at specified time.
- … say, at some policy anniversary or maturity
- Or on specific events (e.g, marriage, child birth etc.)
- Limit these events, to reduce the opportunity to anti-select
- If increase in benefit is allowed, let the increase be within reasonable inflation adjustment (policyholder should not be unduly benefited by claiming)
- … have a maximum for the increase, say not more than 100% of the original sum assured

- .. and the upfront underwriting should keep in mind the maximum sum assured that the customer can avail of
- All the policy conditions should be clearly mentioned in the policy contract
- .. reducing the possibility of customer disputes and legal interpretation against the insurer
- Send reminders to all lives to exercise the option, as more lives opting will make it a better pool of risk and
- Will be cost effective also
- Monitor sale of these plans, if they are not selling sufficient of these policies, withdraw the plan; selling less of these product will make it prone to volatility of risk
- In the light of new medical advancement
- .. monitor terms and conditions offered
- … sufficiency of premium rates
- … emergence of new illness not priced for
- … adequacy of the cost of the option
- Keep taking reinsurers advice in this. They usually have early warnings from other markets
- Set up additional reserves if the experience worsens and reprice new policies at the earliest. [5]

[9]

[12 Marks]

Solution 4:

i) Investigations

Critical illness incidence rates compared to pricing assumptions split by

- Illness covered (since the limit varies by illness) [½]
- Other risk factors (to the extent data permits and credible) such as
    - Age
    - Gender
    - Policy duration
    - Underwriting status (standard/sub-standard)
    - Smoker status
    - Distribution channel
    - Geographical location
    - Ethnic background (if there are multiple nationalities living in the country)
    - Occupation
    - Additionally, for group business, size of group and industry type
    - Any other rating factors such as survival period [2]

Critical illness claim severity

- by illness [½]
- by medical providers [½]
- by Third Party Administrators [½]

Claim reporting pattern/IBNR [½]

Medical trend over time vs pricing assumption [½]

Longevity post a critical illness claim by illness [½]

Analysis of any regulatory/court ruling on claim repudiation and potential implications for the future experience [½]

Analysis of volume of sales in terms of size and mix by various rating factors [½]

Analysis of persistency by
- Duration
- Distribution channel
- Policy size [1]

Any rate review post 5 years and changes to lapse/claim experience (selective withdrawal) [½]

Benchmarking against any industry studies/ prior internal studies/ reinsurance rates [½]

Reconcile data across different sources for accuracy and completeness [½]

Have regard to changes in terms of product features/underwriting/claim management during the period of investigation [½]

[6]

ii) Reasons for deterioration and actions to take

Deterioration as a result of
- Poor underwriting/mis-alignment with pricing
- Age mix within each age-band being different from that assumed in pricing (the age-banded rating structure)
- Gender mix being different from that assumed in the pricing – competition might have started offering gender specific rates
- Distribution channel mix/target market being different from that assumed in pricing
- Premium rates for new business not increased enough in line with experience, and/or, Premium rates for existing business not revised adequately after 5 years
- Legal activism exposing weakness in the policy terms (CI definitions) leading to more claims
- The CI definitions no longer robust given the medical advancements leading to disputes and higher claims
- Govt. screening programs leading diagnosis of Cis that might have otherwise gone undiagnosed or leading to early diagnosis
- Fraud (TPA or service provider)
- Recent advances in treatment of CIs leading to longer income pay-out period and/or administrative errors leading to income pay-out paid even after death
- sales volumes have dropped too significantly to cover overheads

<u>Steps the company can take to improve the experience</u>

- Improved risk selection (underwriting) to mitigate anti-selection
    - application form redesigned to ask for more information, in order to minimize information asymmetry
    - reduced non-medical limits/introduce newer medical tests
- Introducing or increasing waiting period before cover commences
- Review of definitions/exclusions to make them more robust considering feedback from the claims department and market/medical developments
- Reinsurance to reduce volatility of claim outgo
- Identify segments of the business that is anti-selective or loss-making and not write business from those segments
- Introduce age/gender based rating
- Regular review experience and benchmarking with competition
- Limits for each illness reviewed in line with medical trend

- Increase the sales volumes for the profitable segments by creating incentivises
- Improve persistency/run renewal campaign
- Negotiate better terms from service providers (hospitals/TPA)
- Better operational controls to avoid fraud or over-payment (eg. Income pay-out)

For group business,

- reduced free cover limit
- introduce minimum group size and minimum take-up or compulsory participation
- Introduce experience refund to incentivise good risks

[8]

[14 Marks]

Solution 5:

i) Distribution channels

Insurance intermediaries (brokers)

- Insurance intermediaries must act independently of any particular insurance company
- Their aim is to provide the most suitable solution to the clients basis the clients' needs
- They are usually remunerated via commission payments from the insurer. Alternatively, they may receive a fee from their clients.
- It will often be the client who initiates the sale. However, they may also promote themselves actively to existing clients.
- Products sold through this channel can be complicated as well.

Tied agents

- These are insurance intermediaries who are sells the products of one or two insurance companies.
- Typically, they may be employees of a bank or other similar financial institution. Where the tie is to more than one company, the product ranges of the companies are usually mutually exclusive.
- Tied agents are remunerated via commission payments from the companies to which they are tied.
- Often the policyholder will initiate the sale, but some tied agents may actively engage in selling.

Own Salesforce

- They are employees of an insurance company; hence they will only sell the products of that company.
- They may be remunerated by commission or salary or a mixture of both.
- It will usually be the salesperson who initiates a sale, making use of client lists. The client often initiates further sales once the salesperson manages to build a relationship.

Direct marketing

- This could take the form of Mailshots/Telephone selling/Press advertising/Internet
- The initiator of the sale varies according to the marketing method used
- Products sold through this channel generally need to be relatively simple due to absence of face to face interaction

[6]

ii) Suitability for Group Critical Illness

- Complex nature of the product and the requirement to deal with financially sophisticated buyers (CFO or HR head of a corporate) makes the brokers channel the most suitable, especially for large groups.
- Corporates would also like independent advice and so would prefer brokers to others. Brokers also tend to perform admin aspects of the insurance for the corporates including payment collection and claim processing
- Well trained Own sales force could be suitable for small/medium size groups.

- By selling through own sales force insurer shall be closer to client and may also be able to impact retention and build a relationship with employer.
- Tied agents are generally not prevalent in group market.
- Direct marketing is not a suitable channel given the need a personal interaction due to complexity. [3]

[9 Marks]

Solution 6:

i) Reasons for analysing supervisory surplus and change in EV

Analysis of surplus

- To show the financial effect of divergences between the valuation assumptions and the actual experience
- To expose which assumptions are the more financially significant
- To show the financial effect of writing new business
- To provide a check on the valuation data and process, if carried out independently
- To identify non-recurring components of surplus thus enabling appropriate decisions to be made about the distribution of surplus
- To give information on trends in the experience of the company

Analysis of change in EV

- To validate the embedded value calculations, assumptions and data used
- To reconcile the embedded values for successive years
- To provide management information
- To provide detailed information for publication in the company's accounts or those of any parent company, in particular the value of new business taken on by the company
- To decide on management remuneration based on performance [5]

ii) Possible reason for losses

- Pricing basis has not been updated in line with emerging experience
- Medical trend has been much higher than expected in the recent years
- …and pricing increases have not been put through due to competitive reasons
- Aggressive sales to increase topline/market share in the recent years compromising underwriting/risk selection.
- Competition introduced more segmented pricing attractive to good risks and thus leading to anti-selective renewal for the insurer
- Expenses might have been higher than expected due to staff inefficiency, higher expenses in day to day running of business etc
- Lesser renewals than expected might have expected on account of poor customer service, lesser competitiveness etc
- Reserving basis might be extra prudent leading to higher capital requirement and consequently losses
- Product design might be faulty leaving scope for anti-selection [3]

iii) Low solvency implications

- It depends on how low relative to required solvency and relative to competition
- … if it is still solvent and not far off from competition, then the impact will be minimal
- Low solvency will impact sales due to market perception of the insurer's financial strength
- …and, if not addressed it will lead to a vicious cycle of losses and further weakening of the solvency position

- if it is a listed company, its share price will likely fall
- if the solvency is below the regulatory threshold for intervention, regulator will intervene and ask for a plan to improve solvency
- if it is insolvent (below regulatory minimum), insurer will likely be asked to stop writing business [3]

iv) Actions to improve solvency

- Inject capital to restore solvency to where it was a few years back
- Improve captial position through other means (eg. financial reinsurance)
- Slow down on sales to avoid further capital being consumed
- Analyse the drivers for losses and take actions to prevent further losses
- Buy proportional reinsurance to reduce the capital requirement
- Review IBNR reserving for any over-conservatism
- Review pending claims reserve for any over-conservatism
- Review provision for experience refund, if any, for over-conservatism
- Increase the admissibility of assets (eg. reduce ageing of outstanding premium payments)
- In case of risk based capital regime, consider shifting investments
- …strengthen operational processes to reduce operational risk captial
- Increase sales in profitable segments to cover overheads
- If the Group PMI contracts are sold with longer term guarantees, make them YRT contracts
- Negotiate with health care providers/TPA for better terms
- Review case reserving for any large claims for conservatism [6]

[17 Marks]

Solution 7:

CA and students:

Firstly it needs to be evaluated whether the employees hold any existing cover or not.

Probably CA would have an existing personal or company sponsored cover. For them, PMI may be needed but only with quite a high excess.

For students, PMI would be needed with low excess since they are still studying and would need full cover.

Health cash plans may not to be needed unless the hospitalization last for longer period in which case the income protection insurance will likely be more suitable.

Income protection insurance will be desirable, particularly for younger members of staff, (to cover, for example, monthly mortgage payment or salary replacement) but only to such an age as to not provide an overlapping benefit with the ill health early retirement.

Critical illness would be a useful benefit, to cover, for example, a mortgage. This is unlikely to be covered by any other benefits available from working at the office.

This would mostly be needed for young qualified CAs and not students since students would not still have taken a mortgage loan.

Clerical staff:

Income protection would need to be a more comprehensive cover since in case being unable to work their family would be impacted most on account of lower savings as compared to CA and students

PMI and CI would be needed with a lower excess than students. However, it should be ensured that there is no overlapping with Government sponsored benefits

General points -

Possible benefits to employer include attracting/retaining good staff.

Consider the affordability of the benefits if staff are required to contribute;

CAs are more likely to be able to afford them. May need to offer different options to different staff and different levels of excess and there may be different incapacity definitions used.

Compare with what is offered at other practices.

[7 Marks]

Solution 8:

i) Key product design features

- Inpatient care – important feature as it can push people into worst financial crisis
- Should be on cashless basis as there may not be enough cash-flow at that time
- ….further, claim reimbursement process would prove to be cumbersome
- ….and unsuitable for the target given the low level of financial sophistication
- Prolonged hospitalization would mean loss of income to the family
- …implying something serious
- .....so, daily cash for hospitalization exceeding say 5 days or so would be suitable
- Coverage for regular check-ups during pregnancy
- ….and maternity/childbirth complications are important for the target population
- ….owing to limited access to care and relatively poor hygiene conditions
- Preferably, monthly premium mode to make it easier for the target to make their premium contribution
- …and, to allow some periods of premium holidays at difficult times (eg. drought, national disaster)
- … should cover preventive medicine such as vaccinations
- Periodic health check-ups depending upon age
- …to help early diagnosis and treatment and reducing overall cost in long term.
- … those treatments not medically necessary (eg. cosmetics) to be excluded to keep the cost low
- … treatment only at designated list of health care providers to control costs and monitor quality
- … whole country coverage as some might move to different places for work
- Income protection insurance in the event of bread-winner of the family is totally disabled for a period of 5 years or until age 60, whichever is earlier
- …this allows continued production to the family for some time until they make alternative source of income
- Product should be guaranteed renewal for whole of life
- No initial underwriting except 6 months PEC [9]

ii) *Selection criterion for insurers*

- Large company with wider geographical reach in all parts of the country
- Good track record of writing health business for a certain number of years
- Commitment to continue offering this product for a certain number of years
- Has maintained solvency above a certain threshold
- Any experience of running any similar schemes in the past would be a plus
- Robust admin systems for hassle from handling of enrolments/claims
- Wide network of hospitals/clinics etc.
- Robust complaints-handling process
- Any innovative ideas to improve the health of the target population [3]

iii) *Risks and mitigation*

- Anti-selection – with no initial underwriting and that part of the premium to be paid by the member, less healthy lives are more likely to opt

- ….PEC provides some protection but will still need to assume a mix of relatively high proportion of substandard lives
- ….higher take up would mitigate the risk to some extent
- ….keep the premium rate attractive enough (not significantly higher than competition) to increase the take-up
- … ensure the enrolment process is smooth and easy to increase the take-up
- … run effective marketing campaign and go to market asap to gain from first mover advantage (again, to increase the take up
- ….target the healthy segment (eg. employees who are actively at work) of the population
- ….target the younger age group
- Pricing mis-estimation – no directly relevant past experience
- … the target population is likely not insured and so population stats by income-strata would help
- … the maximum limit set up Govt. will give some indication
- … seek help from reinsurers/consultants who might be able to help from their experience overseas
- …look for external data sources (hospital statistics etc.)
- Pricing mis-estimation as a result of flat premiums structure – due to business mix being different from that assumed
- ….err on the side of caution and monitor exposure data closely and adjust pricing quickly
- ….mix assumption consistent with the segment of the target market that is targeting through campaigns
- Fraud/mi-use risk – leading to higher claim outgo
- …. Robust claim processing systems
- …. Strict SLAs with providers having provision for significant penalty for mis-use
- ….predicative analytics to target the claims that are more likely to be fraudulent
- Volume risk – volume too high for the company's admin systems to handle leading to over-payments/ poor claim processing etc.
- … limit enrolments to the capacity
- Volume risk – volume too low to cover overheads and thus expense incurred higher than that allowed for in the pricing
- …get the pricing right compared to competition and the execute the measures outlined above for higher take-up [9]

[21 Marks]

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