Institute of Actuaries of India

Subject SP1 – Health and Care Principles

March 2022 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)

1) Benefits need to be attractive to the target market and limits should be able to cover cost of treatment outside India
2) Benefits would need to meet customer needs (i.e. ancillary needs apart from hospitalization like international travel, accommodation for attendant etc. should be covered)
3) High service standards are likely to be important for this target segment
4) Would need to consider the appropriate distribution channel to reach the target market
5) Would need to consider competitor products providing similar covers
6) Would need to consider the rating factors used relative to competitors
7) Price of product would need to be such that prospective policyholders perceive value
8) Policy terms and conditions should be unambiguous and should be easy to understand
9) Level and manner of underwriting must be seamless and convenient for the target segment

(1/2 mark for each point and Maximum 3 Marks)

ii)

1) Anti-selection: policyholders only take out the product when they think their risk of claiming is elevated
2) Moral hazard: policyholders utilise healthcare services in countries where quality of care provided is superior/cost is higher even if treatment is available within India. This will lead to higher number of claims than allowed for in pricing.
3) High level of uncertainty regarding claims cost:
   This is due to
   a. currency risk
   b. lack of data to estimate severity of different countries and treatment protocol
   c. Insufficient volume (to cover fixed expenses and have an adequate risk pool)
4) Loss of control over claims cost due to international nature of benefits including monitoring as different countries have different billing systems and practices
5) Policy wording – covers may be defined ambiguously leading to more claims than priced for
6) Reputational Risk – Target segment is HNIs, who are influential, and any disputes could result in reputational damage
7) Renewals and Expenses – short term Health indemnity products' renewals may not occur as expected while pricing hence Insurer may not be able to recoup initial expenses.
8) High cost of reinsurance – if volume is lower than anticipated, the cost of reinsurance could turn out to be a high % of premium collected making the portfolio unviable

(1/2 mark for each point and Maximum 3 Marks)

iii)

1) Initial acquisition costs are likely to be high to reach the target market (for eg. initial commission and other marketing and sales costs) (1/2)
2) Initial medical underwriting costs are likely to be high given the risk of anti-selection (1/2)
3) Due to lower renewal rate, risk of not recouping expenses in the first year of sale is higher (1/2)
4) Investment expenses will be high to accommodate requirement to match currencies (1/2)
5) Higher cost due to:
   a. Complexity of claim verification (provider verification, emergencies),
   b. Manual claim processing (differences in tariffs, clinical codes), negotiation with hospitals
   c. Claim dispute resolution High service levels and turnaround times required 24- hour call centre (time differences) (1.5)
6) Cost of medical evacuation arrangements in place in every country in the world or tie up with service provider for this (1/2)
7) Setting up new offices and administration branches in foreign countries where insurer does not have footprint – normally an indirect expense but if specifically for this product, then would be incorporated into direct per policy expenses. (1)

8) Per policy expenses are likely to be higher due to the small target market. Hence, expenses related to the product such as development etc will be allocated over fewer number of policies (1)

[Max 6]

iv)

a) Reinsurance will be particularly attractive for this product given:

1) New product hence lack of data (global nature of claims experience) to price the product
2) High level of uncertainty associated with claim severity (this makes risk Excess of Loss covers that protect against large claims and aggregation of claims attractive)
3) Access to reinsurer underwriting manual and claims adjudication guidelines
4) Reinsurer may have international partnerships/ offices that will assist in claims administration hence reduction in volatility

(1 mark for each point and Maximum 3 Marks)

b)

1) Eligibility Criteria and initial underwriting important because of substantial anti-selection risk.
2) The insurer will want to identify pre-existing conditions for the covered major illness
3) Limited scope to do comprehensive claims underwriting, therefore initial underwriting is important
    - Nature of evacuation benefits
    - HNIs (target market) will demand quick turn around on claims
4) Eligibility will need to be restricted to HNIs (this will need to be verified from Income-Tax Return, CIBIL Score etc, and will require details of nature of activity- Service or business)
5) Initial underwriting and eligibility criteria will ensure that mix of business taken on matches that assumed in pricing of the product.
6) It also helps to Identify substandard risks and price them accordingly
7) Feedback into pricing model/ actuarial control cycle given small size of target market along with the fact that it is a new product

(1/2 mark for each point and Maximum 3 Marks)

Solution 2:

i) Regular premium conventional stand-alone critical illness policy

- Income: premiums, interest earned on the investment of the other net cashflows during the year: it does **not** include interest that may be earned on the supervisory reserves held.
- Outgo: Initial & renewal expenses, Initial & renewal commission, expected claim costs, tax.

(Max 2)

ii) Unit-linked stand-alone critical illness policy

- Income: premiums less bid value of units bought by premiums (*ie* premiums less allocation), monetary administration charges, charges to pay for cost of benefits, fund management charges, interest (earned during year on non-unit cashflows).
- Outgo: Initial & renewal expenses, Initial & renewal commission, expected cost of paying claims in excess of unit fund value at date of claim, tax.

(Max 2)

[4 Marks]

Solution 3:

i)

1) Volatility of claims with heterogeneous risks (need for Cat XoL)
2) Significance of impact of extreme claims on financials
3) Free assets available to absorb volatility, and the cost of such capital

4) Availability of XoL reinsurance in the market
5) Costs of reinsurance, as well as legal risk and credit risk taken on
6) Predictability of experience / Credibility and Stability of the past experience
7) Expertise in reinsurer's claims management 8. any scope for solvency/tax arbitrage

(1/2 mark for each point and Maximum 3 Marks)

ii)

1) Use the cedant's own experience to the extent that this is available. As expected only few claims at this high-level, may consider experience from the reinsurer's entire portfolio.
2) Consider claims over the last 3-5 years. Choose a duration such that the number of claims above the retention limit is credible. Given the low number of claims above this point, splitting these claims by risk-cells might produce poor credibility.
3) Trend the claims up to the projection year accounting for medical trend and utilisation, changes in risk profile mix, any significant changes in benefits/limits
4) Determine the incidence of claims larger than 5 lakhs based on the past claims experience.
5) Look at claims from below 5 lakhs for prior years to allow for those claims breaching the attachment point once adjusted for medical trend
6) Once the claims have been trended, cap all claims at 15 lakhs when determining the severity. External trends impacting medical inflation like post Covid impact on cost, morbidity trends must be allowed for.
7) Determine what claims have been incurred but not reported (IBNR) for the current year. This may be minimal as the insurer would be well notified of such large claims. If an IBNR is calculated, one needs to consider whether to apply this to existing claims, or to increase the claim counts.
8) Determine the trended cost of claims per life between the retention limit and reinsurance limit over the last 3-5 years
9) Blend the burning cost per life over the last 3-5 years, accounting for the completeness and relevance of each year
10) If the data used is not credible, one may consider fitting a stochastic distribution to the claims available and using this to estimate an expected cost. **OR** if an underlying basis is available, the experience rate can be merged with the rack rate.
11) Once the burning cost per life has been assessed for the projected year, load the burning costs with reinsurer expenses, profit margins and reinsurance broker commission.
12) Check the rates are competitive and perform sensitivity/ scenario testing for the assumptions to ensure the premium is reasonable.

(1/2 mark for each point and Maximum 6 Marks)

iii) The following factors should be analysed for the reinsurance treaty performance review:

1) Calculation of ceded premium, earned premium, incurred claims, surplus or deficit and ultimate loss ratios on various splits:

   a) By Treaty: This will indicate the surplus or loss on the reinsurance treaties to help in correction of loss-making treaties and changing terms and conditions like retention limit, share of reinsurer, structure of treaty and renegotiate rates where possible.

   b) By Product: This will help to identify products that should be reinsured which are currently only covered under different type of treaties for e.g. Obligatory treaty and non-obligatory treaty. Additionally, any products where the reinsurance arrangement is not cost effective can be identified and dealt with in an appropriate manner as mentioned in point 1 (a) above.

   c) By Type of treaty: Proportional and non-proportional arrangements have very different loss ratios when compared to the portfolio as a whole. Under a quota share arrangement, treaty loss ratios are generally in line with that of the portfolio. However, under excess of loss reinsurance treaties, loss ratios are dependent on the retention limit and sum insured mix.

Include the comparison of loss ratio of reinsured portfolio and total portfolio including retained portfolio. If treaty loss ratios are considerably lower than the portfolio loss ratios, the retention limit should be reduced so that a higher proportion of risk is transferred to the reinsurer subject to cost/ benefit analysis.

d) Reinsurance period wise: This will help to identify any trends visible in the data and make a case for reduced costs of reinsurance basis comparison of treaty performance with previous years. Present performance for 2-3 years including and excluding outliers and pandemic claims.

e) Reinsurer wise: This will help to identify any concentration of risk with reinsurers and location of reinsurers. Additionally, if any reinsurer is particularly expensive, cost negotiations can be undertaken to attain a lower price with a better diversification of risk. Also, include credit rating of all reinsurers to cover potential counter party risk. (2)

2) The actual experience of the product on a net of reinsurance basis needs to be compared with that expected at the time of pricing.

A cost benefit analysis can be conducted on the following levels:
a) Age mix of policies above and below the retention limit
b) Gender mix of policies above and below the retention limit
c) Sum insured mix of policies above and below the retention limit
d) Disease mix, by peril/ cause of loss above and below the retention limit
e) Any differences identified indicate a need to adjust the retention limits. (1)

3) Portfolio monitoring should be conducted to ascertain the impact of reinsurance on pricing and reserving.
a) The actual cost of reinsurance needs to be compared with that expected at the time of pricing. Any differences identified highlight a need to reprice the products.
b) While estimating reserves, the difference between gross and net results depicts the efficacy of reinsurance arrangements and should be in line with the cost of reinsurance incurred.
c) Any changes in the treaty terms and conditions or product benefits available over the years will help in determination of the optimal reinsurance structure and product benefits to be provided to policyholders. For example, a reduction in initial waiting period from 90 days to 30 days will increase the number and amount of claims incurred by the company for Critical illness portfolio. If the reinsurance rates have been increased by say 5% to incorporate the expected effect of this change, the actual impact needs to be compared and rates adjusted accordingly.
d) A check and review process should be adhered to for ensuring that reinsurance operations are exactly as per treaty. (2)

4) In addition to the monetary impact of reinsurance arrangements, the following non-quantifiable benefits of reinsurance should also be considered:
a) Availability of data from reinsurers for pricing new products including data on emerging trends and results of various research undertaken by them. This is required where cedent has no own credible experience or for new products even for large cedent.
b) Assistance in designing new products
c) Improvement in risk acceptance guidelines, claims adjudication guidelines, underwriting guidelines and providing training to the underwriting team (1)

5) The probability of Catastrophic (CAT) events and expected losses due to it to the cedent should be considered to ascertain the required level of CAT cover for the next year. This will help in finalising the retention limits, additional requirement of CAT layers due to pandemics, business mix, etc. and products covered. (1)

6) The latest reinsurance regulations need to be adhered. Hence, at the time of reinsurance performance review, the following should be checked:
   a) Reinsurers credit ratings (from A.M. Best / S&P/ any other rating agency) compared to internal and regulatory requirement
   b) Order of seeking terms for reinsurance has been followed
   c) Cession to reinsurers within regulatory limit
   d) There is a retention and reinsurance policy in place and is being adhered to. (1)

(Max 8)

iv)

1) Keep a larger portion of the risk and hence profit
2) Might be able to increase its market share overall as well as diversify its core business for the group.
3) There may be larger profit margins in the Insurer's rates. (e.g. the direct market may be underdeveloped with better margins)
4) Reduce transactional costs (reinsurance broker commission, can set up multi-year contracts)
5) Will require investment in administration, distribution channels and setting up capital reserves
6) More control over risk management in accordance with its policies (underwriting, claims and pricing)
7) May want to launch its own Health products (whereas if launched a Health product with a cedant, the business may go to a competitor in the following year).
8) Results in more stable results as their exposure will now include larger quantity of smaller benefit amounts.
9) Possible advantage over other direct insurers if they have the capacity to self-insure large risks and thus benefit from minimal reinsurance premium costs, and thus potentially offer lower premiums.
10) Might have the expertise and opportunity, perhaps through a partnership, to access the market directly

(1 mark for each point and Maximum 6 Marks)

[23 Marks]

Solution 4:

i)

1) It is a condition perceived by the public to be serious (i.e. life threatening or at least lifestyle threatening) and to occur frequently (not so rare as to not add value for the cover)
2) Each condition covered can be defined clearly so that there is no ambiguity at time of claim
3) Sufficient data is available to price the benefit (in real life such data may not be available if the condition selected is rare)
4) The condition should not significantly increase the risk of anti-selection

(1 mark for each point and Maximum 3 Marks)

ii)

1) The impact on claims would depend on the popularity of the street food amongst the target market (likely to depend on age, location and socio-economic status).
2) The impact on claims would also be affected by differences in benefit design (impact will depend, for example, on type of cancers covered, condition definitions, whether the benefit is tiered or lumpsum)

3) The impact on claims will differ between group and individual business (differential scope for anti-selection going forward).
4) Given the long-term impact of the street food, the duration of the portfolio will affect the impact.

(1 mark for each point and Maximum 4 Marks)

iii)

1) Underwriting: There is scope for anti-selection from those who have been having this street food, who now anticipate that there may be health risks associated with this diet. For example, there is potential to add underwriting questions relating to the food habits.
2) Change in distribution and marketing strategy: change in target market, change from individual to group business may reduce Incidence rate
3) Conduct awareness campaigns about the long-term impact of street food on health to reduce future claims
4) Offer wellness programs and nutritional coaching in the product
5) Take reinsurance for the product, for e.g. aggregate XL for cancers, Stop Loss for the product
6) Benefit exclusions: change policy wording to exclude particular type of cancers that have a positive correlation with the street food consumption
7) Cancer screenings: The insurer can pay for early screenings to reduce claim severity on tiered products
8) Reserving for the additional risk
9) Increasing price (if premiums are reviewable) to account for additional risk

(1/2 mark for each point and Maximum 4 Marks)
[11 Marks]

Solution 5:

Benefit design – Within Network

1) Competitiveness & Market Practice: what are competitors doing? what are patients used to doing?
2) Spread of network and ease of accessibility
3) Marketability: impact on reducing price –lower price will improve marketability, but trade-off is reduced choice.
4) Need to assess whether the product meets policyholder needs for example, the accessibility of the network
5) Value for credibility of network basis the Insurer's brand

Benefit design –Free Choice with Co-payment

1) Free choice benefit design - Pricing this product design is more difficult
2) Increased uncertainty over the proportion of beneficiaries that will utilise the network (effectively an option for beneficiaries)
    a. Co-payment can be set at a level that reflects the discount obtained via the network to reduce the uncertainty associated with the pricing
    b. Or co-payment can be set high enough to discourage use of non-network providers
3) The insurer's ability to offer the network guaranteed volumes will be reduced which will reduce their negotiating ability with the network
4) The additional complexity may have systems implications
5) It will reduce any efficiencies in claims processes
6) This product design is less simple

[1/2 mark for each point Maximum 6 marks]

Solution 6:

i) Definition

a) Continuation option: It is an option provided under an insurance policy to continue the cover without providing the evidence of good health. This option is popular under Income

Protection Insurance policy, where the individual has left their place of work and is no longer covered by an employer sponsored scheme or where an individual policy has expired. The terms under which the option is effected are those applicable to a healthy life for the age at the date when the option arises. (2.5)

b) Guaranteed Insurability option: This is an option where the policyholder can increase the sum assured at the insurer's standard rates for the then current age when a particular life- event occurs, without providing any medical evidence. E.g. It is possible to offer an option that allows the policyholder to increase the benefit on marriage or buying a new house. This option is normally available if the policy was issued at standard rates.

(2.5)

ii) Ways for valuation of option

- These options can be valued using the cash-flow approach, either through deterministic or stochastic approach
- The expected cost of option depends on health status of those individuals that choose to exercise the option and proportion of lives that choose to exercise the option.
  It also requires following additional assumptions:
  - The probability that the option will be exercised at each possible exercise date
  - The additional benefit level that will be chosen, if this is at the discretion of policyholder
  - The expected morbidity of lives who choose to exercise the option
  - Expenses related to the option
- The choice whether to exercise the option depends on the self-perceived health of the policyholder
- A policyholder who perceives themselves in poor health is more likely to exercise the option, thus selecting against the insurer
- If prudence is required, the proportion choosing to extend would be overstated
- Therefore, the model may assume that all eligible policyholders will take up the option and the maximum additional benefit will always be taken
- If there are many possible dates on which option may be exercised, the model may assume the worst option from the financial impact point of view
- The model may use more sophisticated claims take-up rate assumptions, which vary by exercise date or by alternative options. These would be based on the past experience
- Alternatively, the cost of option can be established through stochastic modelling
- The future experience is projected and the proportion taking up various options and their subsequent claim propensities are investigated
- A large number of simulations will be tested and the cost of option will be calculated with a particular statistical degree of adequacy that is acceptable for the stated risk appetite

(0.5 mark for each point Maximum 5 marks)

iii) List of points that industry will cover in the report

- Industry practice covering
  - Details of disease included under critical illness and the specified terms & conditions for each disease
  - Details of Pre-existing conditions/waiting period/survival period etc.
- Amount and number of claims paid for critical illness, post the onset of pandemic
- Categorization of claims by diseases covered under critical illness
- Amount and number of claims rejected/repudiated, post the onset of pandemic
- Comparative study of rejected/repudiated claims against the previous years, along with different diseases covered under critical illness

- The report shall cover both Individual and Group claims
- It shall also capture the details of retained and reinsured claims rejected by the insurer
- The report shall also cover the Actual Vs Expected (A/E) on the overall level and across different disease covered under critical illness. This needs to be further bifurcated on YTD basis to show the latest emerging experience across the industry. The report shall also cover the experience of the retained and reinsured part separately.
- The report shall include the number of ex-gratia claims paid by the industry on different grounds
- Industry should focus on the points that only those claims are rejected, that don't meet all the terms and conditions of the product
- Claims are only rejected when the underlying medical conditions falls under the exclusions listed in terms and conditions of the policy
- Claims are rejected only for those individuals which falls under the pre-existing conditions
- Claims have been rejected for those policyholders who have provided incorrect information at the time of issuance of policy i.e. medical non-disclosure
- Claims have rejected for those cases that falls under the waiting period conditions for different diseases
- Also, all the insurers have complaints procedures to deal with any cases, where individuals feel that claims have been declined unfairly.
- Summary of grievances and resolution by major head pre and post pandemic
- Policyholders are also given the details of ombudsman if they are not satisfied with the response of the company, where they can appeal against the company
- These claims have been rejected to protect the interest of other policyholders and to ensure that the premium remains affordable
- The industry shall also focus on the number of campaigns taken during the period to help the policyholders understand about the terms and conditions of critical illness
- It should also focus on the training provided to distributors to ensure that customers understand the policies at the time of purchase.

(0.5 mark for each point Maximum 10 marks)
[20 Marks]

Solution 7:

i) List of information that shall be captured in the underwriting manual

- Product Description
- Plan Variants (if any) along with list of diseases covered in each variant
- Distribution Channel
- Age, Policy term, Sum assured applicable for each variant
- Minimum Qualification
- Age proof
- Income proof
- Medical Grid
- Cooling Off Period
- Survival Period
- Conditions for each disease included in the product
- Financial Underwriting Guidelines
- MSUC (Medical Sum under Consideration) for deciding medical underwriting

- HABITS
- Medical Grid
- Criteria for Housewife, Non -Earning Majors, Widows, Retirees, Student
- Residential Guidelines
- Reinstatement Guidelines
- Any special conditions applicable for NRIs, PIOs or foreign nationals of Indian Origin
- Underwriting/Reinsurer Limits

(0.25 mark for each point Maximum 5 marks)

ii) Reason for asking family history in proposal form

- Insurer's normally ask for medical history of those diseases which are transferred genetically from one generation to other
- As genetic testing may not be allowed for the purpose of insurance cover, this is a preferred approach used for the purpose of taking the underwriting decision
- Applicants with history of certain disease in close family have a higher probability of suffering from these diseases
- Also, it is important for the insurer to identify these lives who have risk of critical illness at relatively younger ages where chance of incurring the claims within the policy term is more
- The late onset illnesses are far less likely to occur within the term of the policy and so are unlikely to lead to claims
- Therefore, by asking about family incidence of early-onset diseases, the company should be able to identify the individuals that are at higher claims risk for CI policy
- This helps the insurer to decide whether the risk shall be accepted as standard or as substandard risk
- This also helps the insurer to charge appropriate premium as per the risk categorization
- This also helps the insurer to decide whether any option available under the product shall be extended to these lives, where chances of claims are higher
- This information also helps the insurer for the purpose of machine learning/artificial intelligence to automate the underwriting system and for the purpose of experience study.

(0.5 mark for each point Maximum 5 marks)

iii) The following points shall be covered in response to Chief Distribution Officer

- The volume of business sold by the company is not enough to decide whether the experience of the portfolio is credible
- Majority of the business sold by the company is concentrated to similar target segment, sum assured and age and hence not credible for rate revision
- The portfolio has run only for three years and hence there is always selection effect of underwriting during initial years leading to very few claims
- There is pre-existing condition waiting period in the terms & conditions, as a consequence claims are not getting reported
- The rate offered by the company is comparable to the rates offered for similar products by other players in the industry and hence there is no need for the revision of rates
- The reinsurer rate is competitive and very much aligned with the rates offered to other companies in the market.
- Although, the company has received very few claims in the first three years, however the emerging claim experience of CI in industry is very much comparable against the pricing assumption and hence any rate revision is not sustainable in medium to long term.
- Actuary may suggest CDO other ways of increasing the new business:
    - Suggest other target market, where penetration is very low

- Cross sell/Up-sell to the existing customers
- Use telemarketing to enhance sell
- May engage selling to the customers visiting branches
- May change the marketing strategy to drive the new business

(0.5 mark for each point Maximum 5 marks)

iv) The following reserves need to be hold to meet the liabilities:

- Reserve for in-force policies: This is determined using the discounted value of future net cash flows i.e., expected present value of future claims Plus expenses Less Premiums. This forms a major part of reserves as this will be used for payment of benefits in future.
- Reserve for claims: This includes
  - Claims that have been diagnosed, but not yet reported (IBNR). This could be substantial if claims take time to be reported.
  - Claims that have been reported but not yet settled. This is small amount unless there are significant delays in payment of claims due to claim verification process
- Option reserves: This is additional reserves that are kept aside if any option is provided under the product i.e., option to increase the sum assured or extend the policy term

(1 mark for each type Maximum 3 marks)
[18 Marks]

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