Institute of Actuaries of India

Subject SA1 – Health and Care Insurance

May 2014 Examinations

INDICATIVE SOLUTIONS

Solution 1:

i. "Combi Product" is the combination of Pure Term Life Insurance product offered by life insurance companies and Health Insurance Cover offered by non-life insurance companies/ standalone health insurance companies. **[1]**

ii. a] Scope of Combi product class:

Main points covered in the regulations are:

1. This product may be promoted by life insurance or non-life insurance/ stand-alone health insurance company.
2. Products offered under "Combi Product" shall be individually cleared under the "File and Use" procedure of the regulator.
3. Riders/Add-ons can be offered subject to File & Use clearance.
4. The premium components of both risks are separately identifiable and disclosed to the policyholders at both pre sale stage and post-sale stage and in all documents like policy document, sales literature.
5. Commissions and claim payouts in respect of "Combi Products" shall be by respective insurers only.
6. The Health portion of "Combi Product" shall entitle its renewability at the option of policyholder from the respective non-life/ standalone health insurance Company.
7. The product may be offered both as individual insurance policy and on group insurance basis. However, in respect of health insurance floater policies, the pure term life insurance coverage is allowed on the life of one of the earnings members of the family who is also the proposer on health insurance policy subject to insurable interest and other applicable underwriting norms of respective insurers.
8. Free look option is applied to "Combi Product" as a whole. **[3]**

b] Tie up between insurers :

Main points covered in the regulations are:

1. It is mandatory that insurance companies offering the "Combi Product" shall have in place Memorandum of Understanding (MOU) covering the modus operandi of marketing, policy service and sharing of common expenses.
2. A tie up is permitted between one life insurer and one non-life insurer only.
3. Between these two insurers any number of "Combi Product" may be promoted.

4. Insurance companies shall carry out appropriate due diligence before establishing the business relationship for the purpose of promoting "Combi Product".

5. Modus operandi of proposed policy service at various stages of policy viz proposal stage, policy servicing, premium collection arrangements and claim service etc.

6. There shall be specific time frames/ Turn Around Times (TATs) to be agreed between the insurance companies as part of Memorandum of Understanding (MOU) for effective policy service, transmission of premiums received etc. at various stages of policy, i.e., at pre-sale stage and at post-sale stage.

7. Filing the advertisements in accordance with IRDA (Insurance, Advertisement and Disclosure) Regulations-2000 within 30 days from the date of issuing the advertisement with Authority.

8. Proposed procedures for obtaining the prior approval of regulator for issuing Joint Sales Advertisement (subject to the condition that this shall be restricted to the features, terms and conditions of the "Combi Product" along with the common corporate agents.

9. The information technology systems put in place for supporting the sale and policy service of the "Combi Product".

10. Agreement on reimbursement of expenses in consideration of common services rendered by each other of insurance companies.

11. Distribution Channel wise maximum commission allowed under "Combi Product".

12. The procedures put in place for expeditious transfer of the portion of premium that pertains to the other insurer of the product.

13. Operational procedures put in place for updating premium on policy data base on a real time basis.

14. Options available to policyholders of "Combi Product" to discontinue either portion of risk coverage while continuing with the other portion, subject to the extant law, regulations, guidelines etc. **[5]**

c] Lead insurer :

1. As two insurers are involved in offering "Combi Product", one of the insurers may be mutually agreed to act as lead insurer in respect of each "Combi Product" marketed with agreed terms, conditions and considerations.

2. Lead insurer plays a critical role in facilitating underwriting and policy service.

3. Role of lead insurer shall not deter in relying upon the existing operational infrastructure of the partner insurance company for effective policy servicing of "Combi Product". **[1]**

d] Underwriting :

Under the "Combi Product", underwriting of respective portion of risk shall be carried out by respective insurance companies, i.e. life insurance risk shall be underwritten by Life Insurance Company and health insurance portion of risk shall be underwritten by non-life/ standalone health insurance Company. **[1]**

e] File and Use :

Main points covered in the regulations are:

1. The life insurance product and the health insurance product to be offered as "Combi Product" shall have prior approval under File and Use procedure.

2. Both the independent approved products shall be integrated as a single product and shall be filed with the common brand name.

3. The single product ("Combi Product") shall be offered without any modifications to the cleared products.

4. "Combi Product" is to be filed at the stage of integrating for getting "File and Use" approval irrespective of the earlier approval of either of products.

5. File and Use application shall specify the following:

    - Lead Insurer
    - Demarcation of functions between insurers for carrying out activities
    - Procedures proposed for issuance of premium notices and lapse notices
    - Lead insurer as single nodal point of contact for receiving the servicing request, fulfilling the services and issuing the acknowledgements
    - Results of feasibility study if any , in giving a limited access to the policy data base of policies for effecting over the counter policy service requests to the lead insurer
    - The results of cost benefit analysis carried out by both the insurers any possibility of offering any discounts on the premium in the "Combi Product".

[5]

f] Distribution Channel :

1. The sale of "Combi Product" shall be solicited through

a. Direct Marketing Channel

b. Brokers

c. Composite Individual and Corporate Agents , common to both insurers

2. "Combi Product" shall not be marketed through bank referral arrangements.

3. Insurers shall ensure that the "Combi Product" is not marketed by those insurance intermediaries who are not authorized to market either of the products of either of the insurers.

[2]

g] Mandatory Minimum Disclosures :

Main points covered in the regulations are:

The mandatory minimum disclosure of "Combi Product" shall be:

1. The product is jointly offered by "ABC insurance company" (specify name of non-life/ health insurance company) and "XYZ insurance company" (specify name of life insurance company)

2. The risks of this "Combi Product" are distinct and are assumed/ accepted by respective insurance companies.

3. The liability to settle the claim vests with respective insurers.

4. The legal/ quasi legal disputes, if any, shall be dealt with respective insurers for respective benefits.

5. Policyholders of "Combi Product" shall be eligible to continue with either part of the policy, discontinuing the other during the policy term.

6. Where guaranteed renewability of the health insurance plan is allowed, the health insurance product of this "Combi Product" is entitled to that facility.

7. Specific disclosures on available premium payment option on these "Combi Product".

8. Specific disclosures about the available policy servicing facilities of these "Combi Product".

9. Specific disclosures about the proposed claims service of these policies under both the risks.

10. Specific disclosures on the availability of services of TPA for health insurance portion of risk, if available.

11. Specific disclosures on the available Grievance Redressal Options including particulars of Ombudsman under these "Combi Product".

12. Policyholders are to be advised to familiarize themselves with the policy benefits and policy service structure of the "Combi Product" before deciding to purchase the policy.

[5]

iii. Risks Involved:

- **Operational Risks:** Challenges in issuance of the policy in view of different underwriting rules and policy conditions of two separate products. Moreover there is also operational risk while servicing the combo product.
- **Reputational Risk-**
    - At the point of sale: There could be very high morbidity risk and health cover may be declined by underwriter of health insurer and underwriter of life insurer may accept the mortality risk and vice versa. It will lead to cancellation of policy application, leading to dissonance at customer's end.
    - At servicing level: Servicing of the policies of combo products may be more complex than individual products. This may lead to reputational risks to both insurers-life and health.
- **IT risks:** Risks of inadequate IT infrastructure and integration between systems of both insurers.
- **Pricing Risk:**
    - Lapse rate assumption in pricing (more important for the Life Insurance product) could be significantly different than pricing assumption.
    - Expense Risk- Harder to predict additional costs involved in servicing the "Combi Product".
- There may be challenges in arriving at the formula for sharing the actual costs incurred by both insurers pertaining to underwriting, fixed administration and servicing costs of the policy and hence may pose challenges in pricing such types of combi plans.
- Compliance Risk: Actual practice followed may be different from Regulatory requirement.

[4]

[Total Marks-27]

Solution 2 :

i. Quality Adjusted Life Years (QALYs) :

QALYs provide a single health state measure combining quantity and quality of life; a generic measure that sums years spent in different health states using weights, on a scale of 0 (dead) to 1 (perfectly healthy) for each health state.

[2]

ii. Uses of QALYs :

● to help allocate resources to the most cost-effective treatments

● to help decide what treatment option will be best for a particular patient.

For many national healthcare systems, the cost effectiveness of healthcare treatment is becoming increasingly important as these systems come under increasing pressure to be efficient.

One of the most useful aspects of QALYs is that they allow the 'value for money' provided by different interventions to be measured in a common unit- 'cost per QALY'. This method is often used to rank different types of medical interventions, including drugs, to determine the best use of resources. This can provide information on the comparative effectiveness of interventions within the same disease area (for example, conventional versus keyhole surgery for uterine fibroids), but more importantly it allows comparisons of the relative effectiveness of interventions from different therapy areas (for example, keyhole surgery for uterine fibroids versus screening for breast cancer). This information can help to inform both treatment decision making within a therapy area and resource allocation decisions across therapy areas. **[4]**

iii. Advantages of QALYs :

- QALY is a summary measure that combines both mortality and morbidity in a single figure
- Can be used to assist health care providers in making decisions such as prioritising treatments
- QALYs can help the *long-term* effectiveness of treatments. For example, the results of QALYs may indicate that a more expensive operation will actually be cheaper in the long run, due to requiring less follow-up treatment or there being a lower risk of recurrence.
- Provide a framework for valuing the health gains associated with interventions
- Combine estimates of both the extra length of life gained from an intervention and the quality of the extra life gained
- Allow comparisons of the effectiveness of one intervention for a problem with the effectiveness of another intervention for the same problem

- Allow comparisons across disease areas to help show which programmes provide the greatest allocative efficiency

Disadvantages :

- Quality of life being expressed in terms of numbers
- Value assigned to life varies with the health state of the person
- All emphasis is placed on the size of health improvement, ignoring the starting point.
- Values assigned to the quality of life component of the QALY may not reflect the values of patients receiving the intervention
- May lack sensitivity within a disease area
- Can over-simplify complex healthcare issues and suggest 'quick and easy' resource allocation decisions
- Focus on quality of life in life years rather than quality of life in a person's daily function.

[6]

iv. a] Quality Adjusted Life Years (QALYs) under Drug-1, Drug-2 and Drug-3

For Drug-1:

QALY = 1*23.47%+1*50%

QALY= 0.7347

For Drug-2:

QALY = 1*25%+1*39.85%

QALY= 0.6485

For Drug-3:

QALY =0.5*10%+1*25%+0.5*36.44%

QALY= 0.4822

Chemotherapy Drug->	Drug-1	Drug-2	Drug-3
QALY	0.7347	0.6485	0.4822

[3]

b] Cost per Quality Adjusted Life Years (QALYs) per patient under Drug-1, Drug-2 and Drug-3

Chemotherapy Drug->	Drug-1	Drug-2	Drug-3
Treatment Cost per patient (in Rs) (a)	7,81,700	7,64,500	4,26,800
QALY (b)	0.7347	0.6485	0.4822
Cost per QALY ((a)/(b))	10,63,972	11,78,874	8,85,110

[3]

c] Incremental cost per Quality Adjusted Life Years (QALYs) of Drug-1 versus Drug-2

Chemotherapy Drug->	Drug-1	Drug-2	Increment between Drug-1 and Drug-2
Treatment Cost per patient (in Rs)	781,700	764,500	17,200 (x)
QALY	0.7347	0.6485	0.0862 (y)
Cost per QALY	1,063,972	1,178,874	
Incremental cost per QALY of Drug-1 vs Drug-2 ((x)/(y))			**199,536**

[2]

d] Incremental cost per Quality Adjusted Life Years (QALYs) of Drug-1 versus Drug-3

Chemotherapy Drug->	Drug-1	Drug-3	Increment between Drug-1 and Drug-3
Treatment Cost per patient (in Rs)	781,700	426,800	354,900 (x)
QALY	0.7347	0.4822	0.2525 (y)
Cost per QALY	1,063,972	885,110	
Incremental cost per QALY of Drug-1 vs Drug-3 ((x)/ (y))			**1,405,545**

[2]

e] Interpret above numerical results in a non-technical way.

1. Drug-1 costs Rs 17,200 more than Drug-2 but results in an extra 0.0862 QALYs, which is equivalent to an extra 31 days (0.0862*365 days) of perfect health. The incremental cost per QALY for Drug-1 vs Drug-2 is Rs. 199,536. In other words, the extra cost to gain one additional QALY (ie. One year of perfect health) by using Drug-1 instead of Drug-2 is Rs. 199,536.

2. Drug-1 costs Rs 354,900 more than Drug-3 but results in an extra 0.2525 QALYs, which is equivalent to an extra 92 days (0.2525*365 days) of perfect health. The incremental cost per QALY for Drug-1 vs Drug-3 is Rs. 1,405,545. In other words, the extra cost to gain one additional QALY (ie. One year of perfect health) by using Drug-1 instead of Drug-3 is Rs. Rs. 1,405,545.

3. Though cost per QALY suggests that Drug-3 may provide greater value for money than Drug-1 (ie Cost per QALY for Drug-3 is lower than Drug-1), whereas the incremental values (which most closely reflect the choices faced in healthcare decision making) show that Drug-1 can be considered good value for money compared with Drug-3 due to the extra QALYs it provides.

4. Though cost per QALY suggests that Drug-2 may provide lower value for money than Drug-1 (ie Cost per QALY for Drug-2 is higher than Drug-1), whereas the incremental values (which most closely reflect the choices faced in healthcare decision making) show that Drug-1 can be considered good value for money compared with Drug-2 due to the extra QALYs it provides.

5. Incremental cost per QALY of Drug-1 vs Drug-3 is higher compared to Drug-1 vs Drug-2.

[4]

[Total Marks-26]

Solution 3 :

i) Product Design:

- Find out details about the products offered by competitors catering to Senior Citizen segment
- Assess the needs for Senior Citizen, probably by a consumer survey
- Compare products offered by competitors against the needs for Senior citizen, find out the gaps (if any) and try to bridge the gap through product design
- Get a good understanding of company strategy/selling process, proposed underwriting guideline and claim philosophy from respective departments with regard to the proposed product
- Discuss with IT, Operation and Accounts department regarding Product set up and administration part.
- Accordingly, assess the risks associated with the product offering and fine tune product offering to mitigate the risks
- Ensure product design is compliant with Health Regulation

Pricing:

- Collect internal claim data and conduct pricing analysis to arrive at risk premium
- Assess external factors like Competitors pricing, Medical inflation, potential impact of advancement of medical technology in future, Regulatory & legal requirement if any, Tax etc,
- Consider affordability level of senior citizen (demand elasticity)
- Collect claim data from external source (e.g. IIB). Interpret the results keeping in mind the issues and challenges associated with external source of data
- Ascertain all associated expenses (Direct and Indirect)
- In consultation with Sales team, need to project realistic business volume for next few years in order to spread initial fixed expenses (eg. Promotional cost, initial set up cost) over the projected number of policies in next few years (eg. three years) and Capital requirement.
- Consider the financial position of the Company against the Capital requirement and discuss with senior management if case of major mismatch.
- Consider cost of Capital/profit margin.
- Do sensitivity testing on important pricing assumptions to assess the impact on Capital requirement. Fine tune pricing if required.

Other considerations:

- In absence of market information/data limitation (or credibility), help from Reinsurer / Consultant may be sought for. In addition, also decide on whether Reinsurance support is required for the product depending on parameters like uncertainty regarding pricing assumptions, company's risk appetite, company's financial strength etc.
- Take feedback from other stake holders, mainly Sales team. It is important to get their buying.

[6]

ii) Main needs:

- Chance of Pre-existing condition/disease is very high in senior citizen segment.
  Hence it is expected that product has minimum waiting period with regard to Pre-existing condition

- Low premium
- No sub-limits
- Simple product design/wording
- Product should offer OPD (doctor's consultancy fee), medicine cost and diagnostic charges. It is one area where senior citizens spend a significant amount of money from their saving
- Product must offer cashless facility
- Life time renewal
- Higher entry age

[3]

iii) Pre-existing condition:

Absence of ''**PED/defined illness waiting period''** in a voluntary offer scheme can be a very dangerous proposition as it may attract high anti-selection.

Option like '' **With Medical Underwriting** '' and **''Without Medical underwriting''** can be offered. Customers who opt for Medical underwriting (and accepted), can be given waiver of waiting period (or reduced waiting period). Customers who opt for "**No Medical Underwriting''** will be subject to a minimum waiting period (in addition, some of the cases may not be accepted at the outset).

Or else, high co-pay/deductible can be applied on PED related claims.

Or family floater policy only, which is expected to reduce the anti -selection part.

Premium:

In anticipation of high claim frequency and high claim cost, premium is expected to be high for senior citizen segment.

In order to ensure that premium is not high, co-pay/deductible on claim or cap on surgery may be proposed.

Acceptance only through medical underwriting or waiting period in absence of medical underwriting (as proposed under pre-existing condition above) may be proposed which is expected to control the claim experience, hence a relatively lower price.

No Sub-limits:

Given the target segment, it is a very risky proposition as expected claim severity is relatively much higher than that of younger segment.

Some form of limit is required for this product in the form of disease/surgery cap or room rent cap which will also control behaviour of the policyholder and ensure a reasonable premium.

Co-pay on claim or lower sum insured coverage can be another option.

Simple product design:

It is a big challenge considering the likely inclusion of deductible/co-pay/sum-limit restriction in the product.

Post sale, a welcome call (or probably a visit at customer's address) may be made to customer to verify whether he/she has understood the important terms and conditions. If he/she has not understood it properly, company representative must ensure that customer understands the terms and conditions and get a final confirmation from customer with regard to his/her understanding.

If customer is still not happy, policy should be cancelled with customer's consent and entire premium should be refunded back.

OPD/Medicine/diagnostic cost coverage:

It is difficult to price as expected utilization rate is not very certain (could be quite high).

Given the need and associated uncertainty, instead of OPD coverage, service offering (health care package) can be added to the product in the form of giving some free consultancy charges, discount in medicine and diagnostic test charges in networking centres which can be done by partnering with a third party who can offer the service network.

OPD coverage may be provided only at network clinic, probably with a co-pay.

Higher entry age

At higher age, pricing risk becomes higher due to limited data availability and health related complication.

Higher entry age can be allowed with pre acceptance medical underwriting.

[12]

iv) Special Provisions for Senior Citizens in Health Regulation, 2013:

1) The premium charged for health insurance products offered to senior citizens shall be fair, justified, transparent and duly disclosed upfront. The insured shall be informed in writing of any underwriting loading charged over and above the premium and the specific consent of the policyholder for such loadings shall be obtained before issuance of a policy.

2) All health insurers and TPAs, as the case may be, shall establish a separate channel to address the health insurance related claims and grievances of senior citizens.

[2]

v) Life-time renewal:

Availability of data (morbidity rate and claim severity) at higher age is limited. Pricing becomes a challenge.

In future, when new business growth reduces due to market saturation and competition, renewal business will become the biggest contributor in the portfolio. Pricing risk will be very high due to two main factors:

i) Average age of portfolio will be quite high and ability to price correctly at higher age may impose a huge challenge.

ii) Selective lapsing can be a bigger problem at a higher age. Premium affordability becomes a very important point here.

Portability:

Customer coming under portability will be getting due credit of the waiting period served with previous insurer(s). Correct disclosure in proposal form becomes very important here. If customer fails to disclose medical history (PED) and claims shortly due to pre-existing related health condition,

Insurer will have to pay the claim due to waiver of PED waiting period (presuming PED and time bound waiting period for defined illnesses/surgeries is completely waived off in that particular case).

It will impact pricing assumptions as generally they do not recognize PED related claim during the initial years of a fresh policy due to PED waiting period (and time bound waiting period of defined illnesses)restriction. It is a bigger risk for a start-up company where fresh business (with PED waiting period) contributes the most and pricing assumptions recognize the same.

It may also lead to reputational risk due to potential dispute at the time of claim settlement, if Insurer decides to repudiate PED related claim on the basis of non-disclosure of material fact in the proposal form at the time of applying for the policy (where customer fails to disclose PED condition in proposal form).

[5]

vi) Life time renewal:

- A pool can be formed for senior citizens where every insurer will participate and share the risks together.
- Reinsurance support. Availability may be a challenge although.
- Diversify into other regions, product categories.
- Product related restriction at higher age like co-payment; surgery cap can help to control the cost.
- Preventive healthcare related service: Health care service is one area which insurers can explore. Through this area, they can explore two important aspects:
  - **i)** They can manage the entire life cycle of policyholder, hence a better control on policyholder's health status
  - **ii)** It can give them another source of revenue

- Probably investing some small portion of yearly premium in long term assets to meet liabilities in later part of the policy life cycle? Pricing model, accounting principles and Regulatory guidelines need to be considered accordingly.

Portability:

- Accept cases with Medical underwriting only, irrespective of age profile
- Post sale, make a welcome call to customer to explain policy terms and conditions clearly and take a re-confirmation from customer that he/she is not suffering from any PED condition (in cases where he/she did not disclose medical history in proposal form)

Have a margin in pricing recognizing the effect of portability. However, it may impact the competitive position of the product. **[5]**

[Total Marks-33]

Solution 4 : i.

- Considering the size of group, 100% weight may be given to Client's claim experience
- Data needs to be adjusted by IBNR estimate
- Claim experience may not represent complete one year's experience(Generally 10-11 months)
- In that case, claim experience needs to be adjusted to represent complete year experience(Proportional should be an acceptable approach)
- The overall claim estimate needs to be adjusted if number of lives at renewal is different from that of current year
- It then needs to be adjusted by Medical inflation
- Claim experience needs to be modified if there are changes in policy features at renewal as compared to current year
- Calculated Risk premium is to be adjusted by acquisition cost, management expenses (contribution towards fixed expenses of insurer), policy processing cost, claim handling expenses (e.g. TPA fee) & Profit margin. Accordingly, final premium is calculated.
- Commercial consideration needs to be taken. **[4]**

ii. For a small group, it may not be credible to use Client's prior claim experience as that may be expected to vary significantly from year to year.

Hence, better approach could be to use Insurer's own internal rate (claim related cost) without relying much on Client's past claim experience. The approach should be to price all such quotes with internal rate, associated expenses and same profit margin (as a % of Premium).

With this approach, insurer is expected to make profits in some cases and may incur losses in some other cases. However, at portfolio level comprising all such small clients, insurer should be able to achieve the set profit margin, used in each case. Here the assumption is internal rate should match the claim experience at portfolio level.
If competitors are not using the same approach, with all likelihood they will be quoting lower premiums in those cases where the actual past claim experience is very faurable. Hence quote conversion could be a real challenge. **[4]**

iii. In Corporate scheme (Employer's employee), generally PEDs (Pre Existing Diseases) are covered from day one without employees or his/her dependents being subject to medical underwriting. If the scheme is on voluntary basis, anti-selection risk could be very high.
Actual volume may be lower than assumed in pricing. Insurer may not be able to recoup its set up cost.

Ways to mitigate it:

- *Minimum participation commitment from Client*
- *Offering family floater policy only (no individual offering)*

Above two approaches, will ensure that insurer gains both the good risks and poor risks and not just a selection of poor risks.

- *A prescribed benefit formula: It can be linked to employee's salary by means of a simple formula.*

  This will prevent poor risks over-insuring and good risks choosing to under insure with a consequence adverse impact on the actual claims cost.

- *Need to ensure that premium rate charged is relatively lower which can be achieved through various forms of restrictions in the policy design, e.g. deductible, co-pay in all claims/co-pay in PED related claims, room rent choice restrictions, cap on surgeries etc*

  Lower premium rate will attract good risks in the portfolio. It will also help to control the overall claim cost.

- *Enrolment period should have a closed window. No participation will be allowed once the enrolment period gets over.*

  It will ensure that people don't get a chance to enter the portfolio when they actually feel the need (e.g. post doctor's advice).

- *A minimum waiting period, e.g. 3 months for PED cases.*

  It will avoid all those cases where employees have enrolled with the objective of immediately utilizing the policy. It should have a positive impact on claim experience.

- *Free cover concept: Anybody opting for higher sum insured than the free cover, will be subject to medical underwriting.*

  Presence of medical underwriting for higher sum insured cases will help the insurer to keep a control on large claim risk.

[6]
[Total Marks-14]

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