Institute of Actuaries of India

Subject SA1 – Health and Care Insurance

May 2013 Examinations

INDICATIVE SOLUTIONS

Solution 1 :-

IRDA has come up with recent guidelines covering various aspects of health insurance (i.e., product features, standardisation of forms and definition, TPA, etc.) The following are the main changes that have been introduced through these guidelines:

1. IRDA has prescribed standard definition of main terms used in health insurance; for instance, deductible, hospital, pre-existing disease, congenital anomaly, subrogation, portability, etc. which all insurance companies need to follow to will bring uniformity.

2. Standard definitions of major critical illness diseases have been provided by the regulator.

3. It has prescribed the disclosure that insurance companies need to incorporate in the prospectus and policy wording.

4. Regulator has also prescribed the declaration that prospect needs to sign in the proposal form.

5. Various forms such as cashless request and claim form, etc. have been standardized.

6. Premium Rates needs to be calculated based on the completed age of each policyholder as on the date of inception / renewal for individual policies. For FF policies it needs to be based on the incidence rates of all family members covered.

7. Loading / discount on renewal premiums can be based on the increase and decrease of premiums of the entire portfolio and not on individual claim experience.

8. Entry age of all health insurance products should be at least 65 years.

9. There shall not be any exit age beyond which renewal of health insurance policy is not available.

10. There should be a provision of free look period of 15 days in all products.

11. At least 50% of Cost of Pre Insurance Health Check Up should be borne by the insurance companies in case the policy is accepted.

12. If the claim event falls between two policy periods, the claims shall be paid taking into consideration the available sum insured in both the policies and in case premiums of second year not yet paid, the same shall be adjusted against the claim amount and balance money paid to the policy holder.

13. Cumulative bonus in case of claim will be reduced at the same rate at which it is accrued.

14. Change in Premium and TPA needs to be informed to existing policy holders 3 months and 30 days in advance.

15. Insurance companies are required to set up a separate channel for addressing health insurance related claims and grievances of senior citizens.

16. Claims to be settled within 30 days of receipt of all documentation of claims.

17. If a person has purchased more than one indemnity policy from the same or different insurance companies, policyholder shall have the right to get his claim settled under any policy of his choice where the claim is below the sum assured limit, and in case the claim is above sum insured limit, contribution clause will be applicable.

18. IRDA has prescribed a comprehensive list of items that can be disallowed by the insurance company while processing claims. However, insurer may choose not to disallow some of the items from the list but may not disallow any item which is not mentioned there.

19. Appointed Actuary is supposed to review all the products at least once in a year and take corrective actions if any.

20. After five years of product approval Appointed Actuary shall review the performance of the product in terms of morbidity, lapse, inflation, expenses, etc. and compare with the original assumptions made while pricing the product and seek fresh approval with suitable justifications or modifications of the earlier assumptions made.

The most important point is that all the changes will be applicable for all the existing and new products. Existing products are required to be re-filed within stipulated time to meet the requirements.

This will result in a level playing field unlike the past practice where the guidelines were applicable for only new products or at the time of re-filing of existing.

(Total 15 Marks)

Solution 2 :-

2.1

- **Ages of the members**
- **Annual Sum Insured limit**
- **Number of members in the family**
- **Type of product – indemnity or fixed benefit**
- **Other pricing assumptions**

2.2

(a) Positive selection or lack of anti-selection:

- Current portfolio may have shown experience of lower claim incidence rate in floater plans compared to similar individual plans.
- Possibility of existence of positive selection is expected to be higher at certain age bands and become more prominent after the PED waiting period is over.
- Individual vs. Group - comparisons of individual incidence rates and claim cost compared to group incidence and claims cost in other markets to draw conclusion about the selection effect and its possible impact on FF Discounts.
- Selection effect depends on the product coverage:
  - Lower for accident only products
  - Higher for indemnity products with comprehensive cover
  - Highest for CI only products which covers chronic diseases
- The lower incidence rate effect can be passed on to premium rates as 'discount on Individual premium rate.

(b) Higher propensity to 'burn out' the sum insured (SI) limit:

- Need to check the factors and probability of an individual claim above SI Limit?
  - It depends on product benefit e.g. room type allowed, benefits covered, On age, higher the age, more the chances of a claim above SI Limit
- Need to check the factors and probability of more than one member in a policy claim in the same policy year?
  - Again, it depends on age, for two lives in a policy, independent of each other with probability of claim P1 and P2, the probability of both claiming in the same year is P1 * P2
  - The higher the chances of multiple claims in a year, higher should be the discounts, so, the discount should be higher for higher ages.
- Need to check the overall probability of the total claim by all members in a family floater policy is more than SI limit?
  - The probability that total claims will go beyond SI Limit in a policy is more than the sum of probabilities (of total claim beyond SI Limit) of individual members.
  - The effect results into the discount due to sum insured capping effect.

(c) Lower expense loading:

Margin for operating expenses include:

- Policy administration expenses – issuance, query handling, endorsements etc, and these costs are linked to number of policies. Hence per member cost should be lower in a floater policy than in an individual policy.
- Claim handling expenses - these expenses per member may be lower due to lower claim incidence rate.

- Underwriting expenses - underwriting cost may be lower if the rejection ratio in floater policies is lower than in Individual policies. Do we have such an experience?

(d) Other Reasons:

- Better persistency
- Customer life time value
- Persistency increases as number of members in the family increase?
- Lesser frauds
- Discretionary discounts to make floater a better proposition for customers

2.3

(a) Solution approach using stochastic modeling:

- Simulate the gross claim amount for each member in the individual plan
- Calculate the net claim for each member for SI cap
- This gives the pure claim cost for each member for given SI
- For family floater plan, simulate the gross claim amount for each member.
- In step 1, summing the gross claim amounts for all members gives the gross claim amount for the family
- Get the net claim for the family by applying the SI cap
- This gives the pure claim cost for floater SI
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  Comparing the pure claim cost in step 3 with the total of step 7 gives the discount% applicable.

[Total 15 marks]

Solution 3 :-

3.1

Leveraged trend -

			Wkg 1			15%	Wkg 2		
Cumm Fre	**Freq (a)**	**Annual Claims**	**Member Cost (b)**	**Plan Cost (c)**	**Plan Cost × Freq (d)**	**Inflated Claims (e)**	**Member Cost (f)**	**Plan Cost (g)**	**Plan Cost × Freq (h)**
0.6	0.6	-	-	-	-	-	-	-	-
0.75	0.15	500	500	-	-	575	575	-	-
0.85	0.1	1,000	1,000	-	-	1,150	1,045	105	11
0.9	0.05	2,500	1,450	1,050	53	2,875	1,500	1,375	69
0.95	0.05	8,000	1,500	6,500	325	9,200	1,500	7,700	385
1	0.05	18,000	1,500	16,500	825	20,700	1,500	19,200	960
Total					1,203				1,424

Leveraged Trend = 1424 / 1203 = 118.4%

Wkg1, Member Cost:

- Deductible Cost: Rs. 1,000/-
- Min (Annual Claim, Deductible Cost) + Maximum (Annual Claims Less: Deductible i.e. Rs 1,000/-, 0) x Co payment (30%)

Wkg2, Member Cost:

- Deductible Cost: Rs. 1,000/-
- Min (Inflated Claims, Deductible Cost) + Maximum (Annual Claims Less: Deductible i.e. Rs 1,000/-, 0) x Co payment (30%)

3.2

- Anti-selection is the general effect of potential policyholders making use of information that is not available to the insurer, and so taking out cover on favourable terms. For example, people that think they are more likely to claim on an insurance contract tend to be the ones that take out those contracts.

- Anti-selection can be reasonable if, for example, the insurer does not ask for (or use) sufficient information required to accurately determine an applicant's risk of claiming.

- Non-disclosure occurs in the specific circumstance where the applicant is asked to give the insurer details of information relevant to the risk, but fails to disclose such information.

- Deliberate non-disclosure may result in claims not being paid. Negligent non-disclosure may result in the benefit being reduced.

3.3 There are two distinct purposes here:

- At the onset of a claim, an investigation should be made as to the cause of the claim. This may be, for example, to spot any trends, e.g. epidemics, early so that action can be taken if necessary.
- General monitoring at set intervals to see more gradual trends appearing, for example a decrease in claims costs due to medical advances.

The impact of anti-selection, non-disclosure and early claims is difficult to estimate. The actuary will first compare actual claims against those expected at early durations; this will not be entirely rigorous as the divergence may simply be the consequence of the inaccuracy or irrelevance of the data used to price the products in the first instance.

The actuary will next compare his office's experience with that of the market generally, where incidence data by duration is available; adjustment may be needed for differing policy conditions and target clientele. Statistics from overseas or the population may be helpful, but their relevance needs to be examined and results treated with due caution.

On non-disclosure and anti-selection, the actuary will examine the questions asked at the underwriting stage and the particular methods employed by the distributor and compare these with practices elsewhere in the marketplace. This will act as a guide to the potential for impact.

[Total 20 Marks]

Solution 4 :-

1.

Rating Factor: Rating factor refers to the factor that affects premium for an insurance coverage. In case of health insurance, rating factors are characteristics of an insured that determines the premium to be charged. For example, in most of the health insurance policies premium is determined by age of insured, therefore, age can be termed as a rating factor.

2. Following are the common rating factors that are prevalent in India for retail health inpatient indemnity product:

1. Age or Age-band: Age clearly has influence on both the frequency and severity of claim. Hence, age of insured is one of the important rating factors. In some of the products age is grouped in bands and premium remains same in a specific age band. Wider age bands make premium table look simpler but at the same time compromises on the impact of age as a rating factor.

2. Sum Insured: Sum insured signifies the amount up to which the insurer will cover claims in a period of one year. Since, in inpatient indemnity health insurance product prevalent in India the sum-insured varies quite widely, it becomes another important rating factor.

3. Location (Metro/ Non-metro): Although location is not widely used as a rating factor in India, some insurance companies do charge different rates based on residence of the insured. Generally, cities are grouped in few categories based on the health care cost and different premium is charged to policyholders residing in different group of cities.

4. Claim History: Some companies vary renewal premium based on the fact whether insured has claimed in the last policy year or not. Thus claim history becomes a rating factor in such cases.

3. Following are the potential rating factors that can be introduced for retail health inpatient indemnity product in India:

1. Gender: Gender is being used as a rating factor in some of the countries and known to have impact of health care cost. Therefore, it can be explored as an additional rating factor, especially, when used in conjunction with age.

2. Occupation/ Profession: Insured employed in different occupations may be exposed to different kind of risks. For example, those who are involved in white-collar jobs may have sedentary life-style and therefore more prone to disease related to specific lifestyle. On the other hand, people who are engaged in blue-collar jobs may be more exposed to hazardous activities and may show different morbidity behaviour. Thus, occupation of insured may have considerable influence on overall health care cost.

3. Medical History: Most of the products prevalent in India use medical history of the insured as a criterion for accepting or rejecting policy. However, it can be used for premium determination also equally effectively.

4. Region: India is a very vast country with varying climate and living conditions which have noteworthy impact on incidence of disease. Moreover, the cost of health care may differ in different states and zones. Therefore, region may be used as one of the rating factor. Please note that it is different from location (Metro/ Non-metro) mentioned above.

5. Habits: Habits can be healthy like, doing regular exercise, having nutritious diet, indulging in sports activities, etc. or people can have unhealthy habits, like, smoking, drinking, etc. In both the cases the impact on health care cost can be non-significant and it can be passed on to the policyholder in terms of using habits as a rating factor in some fashion.

6. Socio economic status: With socio-economic class is related many aspects that can affect health care cost and in turn premium, like, access to health care facilities, health consciousness, awareness towards fitness, etc.

4. Using more and more rating factors results in dividing the whole health portfolio in finer groups. This leads to charging premium in line with the health care cost produced by various segment of insured. This is as per the Principle of Equity. It is fair and just to charge the premium as per the claims experience of the sub groups of portfolio.

Moreover, not having enough number of rating factors leads to charging average premium to the different sub groups. This assumes a specific business mix. In case the business mix assumption does not fructify, it may result in different performance of the portfolio than assumed. The situation may exacerbate if one or more competitors start using more rating factors. As a result of this, those which are good risks (where insurer with more rating factors is charging lower premium) will go to them and bad risks (where insurer with more rating factors is charging higher premium) will come to insurer who is charging average premium. This is known as adverse selection and may lead to spiral effect.

5. The following are the challenges in introducing additional rating factors:

1. Data: There may not be sufficient statistical evidence to prove that the factors mentioned above are actually the risk factors affecting the cost of health care. This may be due to the fact that data is not captured around all these factors. For example, if insurer is not capturing information in proposal form about the profession, eating habits, social economic status, etc. of the insured it may not be able to conclude whether these have any bearing on claim cost or not.

2. Simplified Product: Many people advocate keeping the health insurance products simple. If more rating factors are introduced then the premium table may look a bit more complicated and this may not be seen favourably, especially by customer-facing teams, i.e., sales and marketing.

3. Challenging Status quo: Most often, when overall performance of the product is as expected in terms of volume and profitability, companies do not want to take risk of introducing additional rating factors. Maintaining status quo looks safest option unless some player comes in the fray with more refined risk pools with the help of additional rating factors. Then it becomes desirable for other insurers to follow the suit by having those additional rating factor in the product.

4. Regulatory Restrictions: Regulator may not allow some of the rating factors if these are considered discriminatory against a particular class of society.

5. Difficult to monitor: It may be difficult to collect and process information around some of the rating factors. For example, insured may have mix of healthy and unhealthy habits and these may keep on changing. It is not feasible to collect and keep latest information about such rating factors. Although in such cases some proxy can be found out, like gym membership, etc.

6. Cost Implications: In case of some of the rating factors, the cost of collecting information may outweigh the benefits derived from using it. For example, insured may be subjected to some medical screening in order to ascertain his exact medical status because he/ she may not disclose the medical history accurately. In such cases, the cost of medical tests may be prohibitive, especially, if coverage is not very high and renewal rate is low.

[Total 20 Marks]

Solution 5 :-

Frequency Trend = 2%

Severity Trend = 8%

Combined Trend = 1.02 X 1.08 – 1 = **10.16%**

Particulars	2010	2011	2012
Mid of experience period (1)	01-07-2010	01-07-2011	01-07-2012
Date of Filing (2)	01-04-2013	01-04-2013	01-04-2013
Product Approval Date (3)	01-07-2013	01-07-2013	01-07-2013
Product Launch Date (4)	01-10-2013	01-10-2013	01-10-2013
Last date of policy issue with revised prices (5)	30-09-2016	30-09-2016	30-09-2016
Effective date of last policy (6):			
For policies with one year tenure (6a)	30-09-2017	30-09-2017	30-09-2017
For policies with two years tenure (6b)	30-09-2018	30-09-2018	30-09-2018
Mid of Exposure period (7)			
For policies with one year tenure (7a)	30-09-2015	30-09-2015	30-09-2015
For policies with two years tenure (7b)	31-03-2016	31-03-2016	31-03-2016
Length of trend in years (8)			
For policies with one year tenure (8a)	5.25	4.25	3.25
For policies with two years tenure (8b)	5.75	4.75	3.75
Trend Factor to be applied (9)			
For policies with one year tenure (9a)	1.66	1.51	1.37
For policies with two years tenure (9b)	1.75	1.58	1.44

Notes and workings:

(1) Middle of respective loss years.
(2) Given in the question
(3) (2) + 3 months
(4) (3) + 3 months
(5) (4) + 3 years
(6) (5) + 1 year for one year policies and (5) + 2 years for two years policies
(7) Middle of (4) and 6(a) or 6(b) as the case may be
(8) (7) – (1)
(9) {1+ 10.16% (combined trend)} raised to the power respective factors in (8)

For example trend factor for policies for one year duration to be applied on experience of 2010 can be derived by formula $1.1016^{5.25} = 1.66$

(Total 12 Marks)

Solution 6 :-

i. Following are the various segments of bank customers who can be sold health insurance products.

1. Saving Bank Account Holder: This is the major customer base for many banks in terms of count and can be tapped to sell health insurance products.

2. Credit Card Holder: This is another customer base which can be huge in number, especially, for some banks which are active in this space.

3. Home Loan Customer: Some banks are having huge portfolio of home loans. Generally, home loan customers have long term relationship with banks and the same can be utilised to sell health insurance products.

4. Other Loan Customer: Banks provide loans for various purposes, like, car loan, personal loan, commercial loan, etc. This segment of bank customer may also be interested in buying health insurance products.

5. Deposit and Investment: Some of the customers invest their surplus funds in bank deposit or invest through banks in other schemes, like, mutual funds, bonds, precious metals (gold/ silver), etc. These customers have investible surplus and may easily be inclined to invest in health insurance products.

6. Current Account Holder: Current account holders may vary from a small entrepreneur to big corporate customers. Their requirement of health care insurance products may also vary significantly. This segment cannot be ignored to sell both group and retail health insurance products.

It is pertinent to note that the categories of customers are not mutually exclusive and there may be overlaps in the above categories, i.e., one customer may appear in more than one category. For example, one person can have both saving account and credit card with same bank or one person may be having home and car loans and may also have made some investment through bank.

Another important point is that we may have to further categorise customers in sub-categories by demographic and social factors like, age, income-band, occupation, etc. in order to meet their needs more appropriately.

ii. As we have seen above the customer base of a bank varies very widely and, therefore, any product can be sold to them. In particular, the following products can be easy to sell through bancassurance channel:

1. Retail Inpatient Health Indemnity Product: This has a wide market and can be sold to any segment mentioned above. The most useful feature of this product is that it can be designed and customised for different customer segments, viz., for HNI the sum insured limits can be very high and peripheral benefits, like, PED coverage, maternity, pre-post hospitalization cover, etc. can be doled out. For middle income segment it can be simple product with medium sum-insured and no freebies. For segment that may not be able to afford high premium, sub limits, co-pay and deductibles can be introduced.

2. Critical Illness: This is a product with relatively less premium and can be easily bundled with loans and credit card customers. The tenure and sum-insured of CI benefit can be dovetailed with that of outstanding loan to give extra protection to bank and relief to customer.

3. Group Health Insurance: This can be a good selling proposition for holder of current accounts to cover their employees. Since, the profile of corporate customers may vary to a great extent depending on size of company, industry, location, etc., the need for health insurance product for its employees may also vary. Group health policies can be customised to a great extent as per the requirements of the customers.

4. Personal Accident: This is a simple product, like Critical Illness (CI), with low premium and can be sold to any segment of customer, especially, those who have taken loans. Like CI its benefits and tenure can be adapted as per the customer's requirements.

5. Overseas Travel: Those customers who approach bank for foreign exchange may be target buyer for this cover.

6. Long Term Care: Although this product is not available in India. If available, this can be marketed to the annuity holders and pensioners. Those who buy pension products may also be interested in this product.

To sum up, it is important to identify the needs of different segment and sub-segment of the customers and offer them the health insurance solution which fulfils their needs completely.

iii. The following are the main challenges of bancassurance channel:

1. Strong bargaining power: Banks are very big entities and most often much bigger than size of insurance company. This puts them in strong position when it comes to negotiating for commercial considerations and other terms and conditions of agreement. Sometimes, this poses a challenge to come up with a mutually beneficial deal for insurance companies.

2. Concentration of business: Overdependence on this channel and ignoring other channels may prove disastrous for insurance companies because of very high concentration. Once a bank goes it takes away with it existing and potential customers which may have serious implication on both top-line and bottom-line of the insurance company.

3. Meeting customer expectation: It is important to note that in bancassurance arrangement banks and insurance companies share common customers. Sometimes, insurance companies may be compelled to relent to pressure by banks to honour claims even when this may not be strictly payable as per the terms and conditions of policy wording. This may be because banks may not like to displease their important customers. Hence, quite often the expectation of customers of bancassurance channel is much more and difficult to meet.

4. Promoter of own insurance company: In most of the cases in India banks have floated their own insurance companies or have stakes in some insurance companies. In such scenarios, banks would like to market and promote products on their own insurance companies and thus the scope of this channel is limited to other insurance companies. On the other hand banks-floated insurance companies may not be very welcomed by other banks also. This restrictive practice may pose a challenge for the growth and development of bancassurance channel.

5. Dual regulator: Banks are regulated by RBI while insurance companies by IRDA. This may sometime pose difficulty for the relationship and bancassurance as a channel.

6. Wide reach: Banks generally have wide reach in terms of branch network and customer base. They have branches in far flung areas while insurance companies may not have presence in those remote areas. This may pose challenge for insurance companies to serve the customers acquired through bancassurance channel. They may have to invest in developing operational capabilities and provider network in those remote areas to serve these customers which may not always be economical.

(Total 18 Marks)

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