

**Actuarial Society of South Africa**

**EXAMINER'S REPORT**

24 October 2016

**Subject F201 – Health and Care**

**Fellowship Applications**

General comments:

*This paper consisted of three questions that covered a wide range of topics from the syllabus.*

*Candidates who performed well were able to demonstrate their knowledge of the core reading material as well as the ability to apply the principles they have learned to the scenarios presented in each question, using a methodical problem solving approach.*

*Candidates who fail to pass typically exhibit poor exam technique. Common mistakes included not structuring their solutions to longer questions (which gives an indication of how they approached and thought about the problem), not answering the question that was asked and ignoring the contextual information provided in the question paper.*

*Candidates also lost marks or wasted time by not following instructions and discussing topics that were not relevant to the solution.*

*Some candidates did not number their questions correctly. While most candidates who turned in handwritten scripts have developed the discipline of starting their response to each part of the questions (for example question 2(ii)) on a new page, candidates submitting electronic scripts generally do not. Electronic candidates also do not highlight which part of the question is being answered.*

*Prospective candidates reviewing this paper are reminded that the solutions below are written to provide clarity, cover all possible relevant marks and therefore are more comprehensive and verbose than the responses expected in examination conditions.*

## QUESTION 1

You are an independent consulting actuary. The chairperson of the board of trustees of a medical scheme you have not previously worked with has contacted you. She has sent you a summarised version of the scheme's financial results for the first two quarters of 2016.

	R million				
	Rio Grande option	Danube option	Sabie option	Scheme Total	Scheme Budget
Accumulated funds as at 1 January 2016				949.30	1 064.80
Average members during period	18 684	12 772	3 487	34 943	35 000
Net contribution income	584.59	309.05	30.90	924.54	950.81
LESS Benefits paid	667.77	245.86	33.98	947.61	893.11
LESS Managed care	9.12	6.23	1.08	16.43	16.70
<b>Gross healthcare result</b>	<b>(92.30)</b>	<b>56.96</b>	<b>(4.16)</b>	<b>(39.50)</b>	<b>41.00</b>
LESS Non-Healthcare expenses	32.15	21.86	2.97	56.98	61.54
<b>Net healthcare result</b>	<b>(124.45)</b>	<b>35.10</b>	<b>(7.13)</b>	<b>(96.48)</b>	<b>(20.54)</b>
PLUS Investment income	18.20	9.62	0.96	28.78	26.33
<b>Surplus/(deficit) for the period</b>	<b>(106.25)</b>	<b>44.72</b>	<b>(6.17)</b>	<b>(67.70)</b>	<b>5.79</b>
Members' funds as at 30 June 2016				<b>862.95</b>	<b>1 070.59</b>
LESS Revaluation reserve as at 30 June 2016				<b>13.28</b>	<b>31.94</b>
Accumulated funds as at 30 June 2016				<b>849.67</b>	<b>1 038.65</b>

The board of trustees is extremely concerned about the scheme's poor financial performance for the first two quarters of 2016, particularly when compared to the budget that was submitted to the Council for Medical Schemes.

They want you to perform a comprehensive independent investigation to establish the reasons for the deviation in the gross healthcare result from the budgeted amount.

You will be given access to any data or information you require.

- i) *List the types of information that you may request from various sources in order to perform your investigation.* [10]

Examiner's comments:

*This was a relatively easy knowledge question. Marks were not given for points such as investment strategy or administration fee basis since the candidate was required to measure the reason for the budget variance at a gross healthcare result level -i.e. before non-healthcare expenditure and other income.*

*Successful candidates were able to come up with a wide variety of points. Some candidates wrote down detailed data specifications for claims and membership data and missed most of the other points.*

**Marking solution Q1(i)**

- Claims data/claims experience
- Membership data / membership distribution
  - Must show changes in membership over period, not just snapshot
- Registered scheme rules
- Benefit descriptions including membership guides and brochures, for this year as well as previous years.
- Communication documents including letters, annual benefit guides, communication sent to providers and so on.
- Financial statements
  - Audited financial statements for previous years
  - Management accounts for this year (latest)
- Information regarding the method used to calculate the IBNR provision in the YTD financials
- Management reports for the year to date (e.g. membership reports, health risk management reports, outlier claims report, option change reports, etc.)
- Documentation regarding administration processes and policy
- Information regarding disease management processes
- Information regarding the history of the scheme (including amalgamations, changes in employer subsidies, introduction/removal of benefit options etc.) i.e. “notable events”.
- Marketing strategy/plan and projections

- Information on reinsurance arrangements
- Managed care arrangements / fee basis
- Preferred provider contracts
- DSP contracts
- Broker contracts (specifically changes that may explain changes in membership)
- Emergency services evacuation contract
- Details of capitation arrangements
- Any other relevant contracts

Other (external sources)

- Detailed copy of budget spreadsheet (the summary does not contain budget on option level)
- Any documentation regarding budget model/spreadsheet
- Contracts with providers / outcome of negotiations w.r.t. 2016 prices/tariffs
- Copy of APN303 report on 2016 contribution rates that was submitted to CMS, which will also detail the assumptions that were used to prepare the budget
- Health economic policies for funding new technology / high cost treatments
- Prescribed Minimum Benefit application / authorisation processes
- Underwriting and non-disclosure processes
- Details of alternate reimbursement arrangements including fixed fees, global fees and risk sharing arrangements
- Preauthorisation and case management processes for hospital admissions and oncology treatments

**(Maximum 10)**

- ii) *Describe all of the investigations that you will perform to identify reasons for the difference between the recorded and budgeted gross healthcare results. It is not necessary to describe how you plan to perform the investigations.* [25]

Examiner's comments:

*In order to perform well on this question, which represented 25% of the paper, candidates had to show their understanding of:*

- *What information is used to prepare medical scheme management accounts*
- *How a budget is prepared (data used, assumptions etc.) and*
- *The factors influencing utilisation and price of healthcare as well as the amounts ultimately paid by the scheme.*

*Despite the instruction given in the question some candidates wasted time explaining how they would perform certain investigations, such as measuring case-mix.*

**Marking solution Q1(ii)**

Period to be investigated

- Investigate why accumulated funds on 1 Jan 2016 are lower than budget
  - Budget amount based on projections for full-year 2015...
  - ...which was completed part-way through 2015 (before CMS submission deadline, which is normally 1 October).
- So we need to investigate difference between actual experience in 2015 and the assumptions made in the 2015 projection because our budget basis may be wrong.
- As well as 2016 year-to-date experience

Budget spreadsheet

- Look for calculation errors in budget spreadsheet
- See if we can reconcile the data used in the budget spreadsheet to financial statements
- Check if the data used in the spreadsheet can be reproduced from independent sources or from raw data

June 2016 management accounts

- Benefits paid amount must include IBNR. Investigate if this IBNR is reasonable

- Check amounts in financial statement for reasonability, e.g. calculate total contributions using membership data and contribution table and compare to the accounts.
- Check if total amount in claims paid out for services during period (excluding IBNR) matches amounts in claims table in the admin system

### Contribution income

- Total membership (all options) close to budget – does not explain variance
- Need to compare number of beneficiaries in different groups to budget membership projections. These groups are determined by the factors used in contribution tables (i.e. option, beneficiary type, income band, family size)
- Investigate what made actual membership totals differ from budget projections
  - If the scheme is an open medical scheme or a restricted scheme with a large number of participating employers (such as Camaf or Profmed), then:
    - New business volumes?
    - Exits from scheme? (including individuals as well as large groups)
  - If the scheme is a restricted medical scheme there may be changes in membership numbers such as
    - New acquisitions by the company, retrenchments and so forth.
    - Changes (or a lack of changes such as inflationary adjustments) to contribution subsidies?
  - Movement between options?
  - Change in family size/composition?
  - Distribution between income bands?
  - Split between members on different EDO sub-options
- Are late joiner penalties the same as allowance in budget?

### Healthcare expenditure

- Need to investigate different claim categories because reasons for deviation from budget not necessarily the same for all categories
- Claims projections often based on historic experience with some adjustments so may need to investigate if actual experience is different
- Wherever a deviation in a specific claim type is identified investigate further to identify if deviation is related to any specific
  - Groups of members,

- Providers,
- Brokers,
- Diagnoses.
- Procedures, or
- Benefit, particularly recently changed/added benefits?
- Look at incidence of PMB claims (changes in coding behaviour, for example)
- Look at ex-gratia payments (if any). Were the approved amounts larger than in previous years?

#### Healthcare expenditure – demand side factors

- Investigate changes in factors affecting demand for healthcare and how they compare to budget
  - Ageing
  - Chronic prevalence
  - Geographic location
  - Split between group and individual business (if it is an open scheme)
  - Split between new and existing members
  - Changes in burden of disease (including but not limited to non-CDL diseases)
- Were there any events that could change demand such as a particularly harsh winter or hot summer, a more virulent flu strain than previous years, etc.?

#### Healthcare expenditure – supply side factors

- Look for changes in capacity such as
  - New hospital beds becoming available
  - New procedures or drugs becoming available

#### Healthcare expenditure – Hospital claims and hospital related claims

- Investigate changes in
  - Admission rates
  - Factors influencing cost per admission:
    - Length of stay
    - Level of care (ICU, High Care, General ward)
    - Tariffs / price measures such as cost per bed day
    - Non-tariff items such as hospital equipment
    - Utilisation of radiology/pathology per admission

- Case mix by diagnosis, procedure and severity
  - Rates charged by specialists and other providers
- Investigate incidence and cost of high cost hospital cases and how this compares to historic experience.
- How were the prices of non-tariff and non-regulated items affected by any exchange rate movements?

#### Healthcare expenditure – medicine

- Consider incidence of chronic diseases...
- ...look at changes in the prevalence of chronic conditions (say by CDL conditions)
- ...as well as changes in the proportion of beneficiaries with multiple chronic conditions.
- Investigate changes in utilisation
  - Number of scripts
  - Number of items per script
- Investigate changes in medicine prices
  - Increases not necessarily all at maximum set by SEP (and SEP may have been unknown when setting the budget)
  - Changes in the proportion of generic medicines used
  - Changes in formularies
  - New medicines, particularly high cost medicines such as biologicals
  - Changes in dispensing fees

#### Healthcare expenditure – other service providers

- Look for changes in utilisation rates (claimants per 1,000 beneficiaries, number of visits per beneficiary)
- Look for changes in volume and mix of services being charged for (e.g. more 30 minute consultations but fewer 15 minute consultations)
- Look at percentage of scheme tariff billed

#### Healthcare expenditure – impact of changes made by scheme

- Investigate if the impact of benefit changes were same as the estimates in the budget
- ... and the same for estimated savings from managed care interventions / impact of changes in processes

### Healthcare expenditure – managed care

- Investigate if managed care fees are different from budget. For example, if the fee is based on the number of beneficiaries enrolled and take up of this programme hasn't been the same as expected.

### Capitation arrangements

- If capitation fees are risk based, check if the underlying mix in factors used for capitation rates such as age bands has resulted in the total fees being different from budget.
- Check if underlying mix in family size has resulted in the total fees being different from budget (e.g. per-member basis with family size different to budget, or PAC basis with different mix of dependants than budget).

### Other investigations

- Investigate if benefit or managed care rules are being applied correctly
- Look for evidence of new forms of anti-selective behaviour or changes in anti-selective behaviour
- Look for any events such as staff working overtime to catch up on claims processing, which may invalidate assumptions underlying IBNR method.
- Look for any evidence of fraud, e.g. providers who have seen sudden and dramatic increases in utilisation.

### General

- Look for any changes that were not allowed for in the budget, such as changes in underwriting. Did they in fact have an impact?
- Wherever deviations from budget are identified, look for the underlying cause, e.g. sales in Western Cape are down because a broker who used to sell lots of business is no longer active?
- Look for any events that may invalidate the seasonality assumption in the budget such as Easter holidays being in March rather than in April this year.

**(Maximum 25)**

*After submitting your report, the board has asked you to prepare a list of recommendations regarding the scheme's rules, benefits and managed care processes to address any problems that have been identified.*

*iii) List the factors that you will typically need to consider before recommending any intervention. [8]*

### **Marking solution Q1(iii)**

- What is the expected benefit of the intervention? Can it be quantified?
- How certain are the assumptions underlying these expectations? (e.g. only 50/50 chance of having positive results is not good, or if the expected result is a 10% saving, but with a range between 5% and 15%). Have we performed sensitivity testing?
- Have we considered all the possible solutions and chosen the best one?
- Materiality. Spend our limited resources where they will have the most benefit.
- Is the intervention practically feasible?
  - Can the administration/IT systems accommodate the change?
  - How long will it take to be implemented?
  - What is the expected cost of implementing it? This could include system costs, staff training, new managed care arrangements etc.
- Does the intervention comply with any relevant...?
  - Legislation and regulation (MSA, POPI etc.)?
  - Any codes of conduct related to this area of business (e.g. PMB code of conduct)?
- Is this standard practice in the industry? If not, why not? It may be an innovation or just a discredited idea.
- How many members will be impacted by the change and to what extent?
- Is the intervention clinically appropriate based on evidence based medicine?
- Anticipate stakeholder reactions:
  - Members
  - Healthcare providers
  - Other third party service providers (such as administrators)
  - Intermediaries such as brokers
  - Competitors (medical schemes and health insurers)
- Does the intervention require co-operation of a third party? Will negotiations or legal action be required?

- Does this intervention create any new risks or change any existing risks to the scheme?
- Have I considered whether there is any conflict of interest (for me or my employer) in making this recommendation?
- Have I considered any potential unintended consequences?

**(Maximum 8)**

*For the 2016 benefit year day-to-day GP and specialist consultations, acute medicine, physiotherapy and clinical psychology services are subject to a combined annual family limit.*

*In 2017 this benefit will be amended to include*

- *a sub-limit on acute medicine and*
- *a co-payment on GP and specialist consultations.*

*iv) Explain how you would construct a model that will be used to estimate the impact of this benefit change for a range of limit and co-payment values. [12]*

*Examiner's comments:*

*Most candidates performed poorly in this question. The majority of candidates attempted to price the impact of introducing the co-payment and the sub-limit separately and ignored the other claim types that fall under the overall day-to-day limit. This approach is incorrect since these different claim types are all interrelated (see the solution below).*

*A few candidates also attempted to approach the problem by calculating average amounts per member/family per month and using this to calculate the impact of the benefit change. While this is a reasonable approach to take with the co-payments it is not a valid approach when calculating the impact of limit changes, since most families will not exhaust these limits and averages do not describe the distribution of claims.*

**Marking solution Q1(iv)**

- Need to perform range of scenarios, thus acute sub-limit amounts and co-payment must be parameters in our model.
- Establish what “impact” means, which may depend on the scheme’s goal:
  - Change in scheme’s healthcare expenditure?
  - Impact on members (e.g. out-of-pocket payments increasing)
  - How many/what proportion of members will be impacted?
- Prepare data in model
  - Gather day-to-day claims data for appropriate period
  - Data must include
    - Amount claimed
    - Amount paid as benefits

- Data must cover full benefit years as far as possible (because we are modelling *annual* benefit limits)
- Include all the claim types that accumulate to the family limit, not just GP and specialist consults and acute medicine...
- ...because reducing the expenditure on these services may “free up” benefits for other included services, particularly for members who previously exhausted this benefit.
- Not specified which option. Would have to model each relevant option separately.
- Adjust data
  - Adjust for price/tariff increases to get to 2017 values
  - Allow for changes in utilisation due to
    - General increases in utilisation (e.g. supplier driven demand)
    - Changes in risk profile (factors such as chronic status and age)
    - Historic benefit changes
    - Allow for the impact of the co-payment on the utilisation of consultations (depending on the size it may discourage consultations)
- Summarise the data at an appropriate level of detail
  - The smallest unit of measurement will be the combined claims of individual families but data can be aggregated at another level of detail
- Calculate total claims per family separately for
  - PMB/non-PMB
  - Each service type (or at least Consultations, Acute meds and other)
- Decide what to do with families who were only on for a partial benefit year
  - Exclude them from the analysis or allow for pro-rated benefits
- Assume PMB claims will continue to be funded as they are currently but will still accumulate to the limit (this is common practice in the market but some schemes may take a different approach). For claims that previously exceeded the family limit but are now payable due to the lower accumulation of consults and medicines we will need to estimate the payment amount based on agreed tariff and provider contracts.

- For all claims (including PMB claims, where relevant) we will need to consider any changes in
  - Formularies
  - Medicine reference pricing
  - Protocols
  - DSP arrangements.
- ...in which case we will need to add practice numbers, NAPPI codes, etc. to calculate the appropriate amount paid
- The recorded amounts of benefits paid are the “before” results i.e. without the sub-limit and co-payments
- Calculate what proportion of the amount **claimed** would be paid as benefits under the specified limit or co-payment – call this the “after” result.
- Obviously, we also need to allow for the combined day-to-day limit as all of these day-to-day claim types accumulate to the combined limit.
- Allow for uncertainty (through appropriate margins) and smoothing of the limits you derive (so that there is a logical progression of limits for increasing family size, for example).
- Estimated impact is the “after” result subtracted from the “before” result
- Aggregate this data for homogenous groups of families
- Divide the results by the appropriate exposure measures (typically member months, which gives impact per member per month)
- This is the impact that we can then apply to projections of future membership to see what the estimated impact will be.

*Alternative approaches are possible and received appropriate credit. For example, an analytical approach would be to fit distributions to claims and then calculate the expected impact using a conditional probability distribution to estimate what the impact of introducing a limit will be. Note that the examiners require a thorough explanation of any approach you choose.*

**(Maximum 12)**

***[QUESTION 1 TOTAL 55]***

## QUESTION 2

*Excelsior Health is a restricted corporate medical scheme with the following characteristics:*

- *The scheme has three traditional benefit options.*
- *The NX option is a low cost network option.*
- *Annual benefit limits are increased on 1 January of each year.*
- *Contribution increases occur on 1 October of each year.*

*The following monthly contribution rates came into effect on 1 October 2015:*

Family size	Galaxy option	Nebula option
	Total contribution per family	
M	R3,740	R2,220
M + 1	R5,760	R3,380
M + 2	R6,320	R3,700
M + 3	R6,860	R4,010
M + 4	R7,390	R4,310
Each additional dependant	R520	R290

Monthly income	NX option		
	Contribution for each beneficiary		
	Principal Member	Adult dependant	Child dependant
Less than 5,000	R500	R500	R160
5,000 to 6,999	R730	R730	R220
7,000 to 9,999	R870	R870	R260
10,000 to 13,999	R1,270	R1,270	R290
14,000 to 18,999	R1,520	R1,520	R300
Greater than 19,000	R1,880	R1,880	R310

*M+2 means a member with two dependants.*

*Ms. Troy, one of the scheme members, is the single parent of a toddler and claims that the manner in which the contribution rates on the Nebula option are calculated is unfair. She says that she would be better off on a specific benefit option on an open medical scheme.*

- i) *Discuss whether you agree with Ms. Troy's statements.* [7]

*Examiner's comments:*

*Candidates lost marks here by only addressing the question of fairness and not whether she would be better off on another scheme. Once again many candidates failed to conclude their arguments by stating that they agree or disagree.*

## Marking solution Q2(i)

### “Fairness”

- On the Nebula option her contribution (Nebula, M+1) = R3,380
- Can allocate this as follows:
  - R2,220 for Ms. Troy
  - R1,160 for her child
- So the child contribution is 52% ( $1160/2220$ ) of the principal member contribution in this case.
- A family of two adults (like a couple) would pay the same contribution
- It is also true that, the more children someone has, the less they will pay for each child on average.
- In practice the average child dependant claims less than the average adult dependant.
- Insurance principles state that price of cover should be proportional to the risk
- On the basis that Ms. Troy would be paying the same contribution as a member who is expected to claim more, there is an argument to be made that this is unfair.
- HOWEVER, medical scheme contributions are set in a community rating environment...
- ...which relies on cross-subsidies from lower claiming lives to higher claiming lives.
- The expected proportion of children compared to adults in the M+1 family size will indicate the extent of this cross-subsidy. If there is a high proportion of children expected in this family size, then the amount of cross-subsidy to higher costing adult dependants is reduced.
- It could be argued that such as cross-subsidy of adult dependants by child dependant contributions is perfectly consistent with the social solidarity principles underlying community rating.
- However, the social solidarity principle also states that contributions should be made according to ability to pay.
- So, the argument may hinge on whether the average single mother of a toddler is less able to contribute than a couple (e.g. what if the couple were pensioners?)
- It may also depend on how any employer subsidies are arranged. For example, if the subsidy for child dependants is less than the subsidy for adult dependants or if the subsidy.

### “Better off on an open scheme”

- Most open scheme benefit options have Principal, Adult and Child contribution tables like the one on the NX option.
- Child contribution rates on these options are typically a small proportion of the principal member or adult contribution rates, reflecting the lower expected claims for children, ...
- ...as well as open schemes trying to make themselves attractive to members with children, who tend to be younger and therefore to claim less.
- *If* the member has the option to move to this open medical scheme, she may move to the other medical scheme and will presumably pay a lower total monthly contribution.
- Her argument that the situation is unfair depends on whether she is compelled to belong to Excelsior. If she has freedom of choice of medical scheme, then she can make the choice that best suits her.
- If she can freely move to the other scheme, then the question of whether she will be better off depends on whether the other option offers similar benefits to Nebula for a lower price...
- ...or better benefits for the same price.
- Restricted medical schemes often have better risk profiles than open medical schemes and can generally provide similar benefits at lower costs due to the reduced risk of anti-selection and more control of entrants onto the scheme (through the employment process) and lower non healthcare expenditure.
- Depending on her benefit requirements she could select the low cost network option where even the highest contribution rate for a principal member with one child dependant is only R2,190 (based on the PAC rates for the maximum salary band). As a single person, as opposed to a two-income household, her monthly income may be lower.

### Conclusion

Mark for a well-motivated conclusion (agree or don't agree, because...) on both matters:

- Whether the arrangement is fair
- Whether she would be better off on another medical scheme

**(Maximum 7)**



- ii) *Explain the risks that the scheme faces due to the structure of the Galaxy and Nebula contribution tables.* [5]

Examiner's comments:

*Most candidates struggled with this question. Many candidates only focused on the fact that these two options do not have income bands like the NX option and completely ignored the risks generated by the difference between an M+ and PAC contribution table.*

*Too many candidates responded with a generic discussion of anti-selection, buy-downs and actuarial death spirals which did not address the question being asked. Note that the question included the wording "...due to the structure of the Galaxy and Nebula contribution tables."*

**Marking solution Q2(ii)**

- In a community rating environment, any contribution table will result in some cross-subsidisation.
- Not all families of the same size contain the same mix of adult and child dependants.
- The set contribution rate for an "M+2" family, for example, may have been based on the average claims for "M+2" families at the time.
- The composition of an "average family" may change over time because:
  - Family composition changes with age
  - Cultural and socio economic changes result in changes in average family sizes (higher rates of divorce, women having fewer children)
- Implicitly the "M+" contribution table makes an assumption regarding this average family size, e.g. that the average "M+1" family consists of a member, 0.8 adult dependants and 0.2 child dependants.
- This table also creates opportunity for anti-selective behaviour, particularly if:
  - membership of Excelsior is not compulsory
  - and/or the eligibility criteria for adult dependants in the rules are more flexible than is typical amongst medical schemes
  - less strict underwriting is applied for the scheme where additional beneficiaries can be added with no or few waiting periods or late joiner penalties.
- Consider the following table which shows the costs of adding an additional dependant to a family:

Family size	Galaxy option	Nebula option
	Cost per beneficiary	
Member	R 3 740	R 2 220
First dependant	R 2 020	R 1 160
Second dependant	R 560	R 320
Third dependant	R 540	R 310
Fouth dependant	R 530	R 300
Each additional dependent	R 520	R 290

- Marks given for any reasonable attempt to analyse the contribution tables
- The additional contribution for the first dependant will be based on a high proportion of adult dependants which indicates the expected additional cost of an adult dependant (slightly reduced due to the cross-subsidy from child dependants but offset by requirement to cross-subsidise other family sizes).
- The additional cost of adding a dependant decreases as more dependants are added, (up to the fifth beneficiary) regardless of whether the beneficiaries are adults or children.
- So there is a cross-subsidy from single members and small families to large families as well
- This will make Excelsior attractive to members with many adult dependants since they are likely to pay lower contributions than they would have on another scheme that uses PAC contribution tables. i.e. significantly less than the R 2,020 and R1,160 for the first dependant which is indicative of the additional cost of an adult dependant.
- On the other hand, some members such as Ms. Troy will be more attracted to other schemes that use PAC contribution tables, since they would pay lower contributions
- Such members who feel they pay too much may also move down to the NX option (which has lower benefits and more restrictions).
- This contribution table structure will therefore affect the demographic risk profile of the beneficiary pool which may change over time due to changes in anti-selection.
- If the underlying family structures have in fact changed as a result of this mismatch and the contribution rates were not adjusted to reflect this (so if contribution rates have been increased by the same percentage across all family sizes), then the relationship between average healthcare expenditure and contribution income will have changed and assumed cross-subsidies will be invalidated. As a result contribution income may not be sufficient to cover outgo...

- ...in which case contribution rates will have to be increased, triggering another round of member reaction.

**(Maximum 5)**

*The scheme's trustees have requested that you propose a contribution table, similar to that of the NX option, for the Galaxy and Nebula options.*

iii) *List the factors that you need to consider when developing this revised contribution table.* [4]

Examiner's comments:

*As in part(ii) above candidates focused too much on the subject of income bands. Most failed to discuss the impact that changing the contribution table from an M+ to a PAC table would have on members, which would potentially be far more disruptive. Candidates also did not consider the potential conflicts involved, such as the conflicting requirements to minimise the impact of the change on members while at the same time moving to a more market-related contribution table.*

**Marking solution Q2(iii)**

- What is the total contribution income that this new table will generate compared to the existing one?
- Should the Nebula and Galaxy contribution tables be income rated like the NX option contribution table? How many income bands should there be?
- Should we consider benefit changes? For example, if family limits were also calculated on an M+ basis it may make sense to do it on a PAC basis now.
- How may the changes affect membership? (i.e. families with lots of adult dependants may decide to leave)
- What will the distribution of principal members, adult dependants and child dependants look like? We may need to assume proportions within each family size if we do not have the actual beneficiary types in our data.
- What will the expected claims ratios for principal members, adult dependants and child dependants be?
- What proportion of principal member contributions will the adult and child contributions be? (e.g. adult dependant contributions = 90% of member contributions)
- How will members be affected by the change? How much more/less will they pay and how many families will be affected?
- How will the contribution rates compare to those of competing schemes?
- Balance conflicting objectives of:

- Having contribution rate structures consistent with the market (easier to assess competition, reduce opportunity for anti-selection)
- Price accurately for the risk involved with fewer cross-subsidies
- Minimise the impact of the change on members
- On some open schemes contributions are only payable for the first, say, three children.
- Should this be a feature of the table we are developing (for example, to lessen the contributions for larger families)?
- What will the Nebula PAC contribution rates look like particularly compared to the NX option, since we want them to be differentiated.
- Will the definition of a child and adult dependant in the rules need to be changed?

**(Maximum 4)**

*The scheme has been asked to consider aligning the contribution increase dates with the benefit year. One of the members campaigning for this change has proposed the following:*

- *Keep contribution rates unchanged on 1 October 2016 rather than passing the planned 10% contribution increase.*
- *Pass this 10% contribution increase on 1 January 2017.*
- *Thereafter increase contributions on 1 January of every year.*

*The member claims that the impact on the scheme will only amount to R3 million in contribution income forfeited during the last three months of 2016, which the scheme can easily afford to fund from reserves. He has based his calculations on a contribution increase of 10% and monthly contribution of R10 million in June 2016, according to the management accounts.*

*iv) Discuss whether you agree with the member's assessment. State any assumptions you make and show any calculations you perform. [6]*

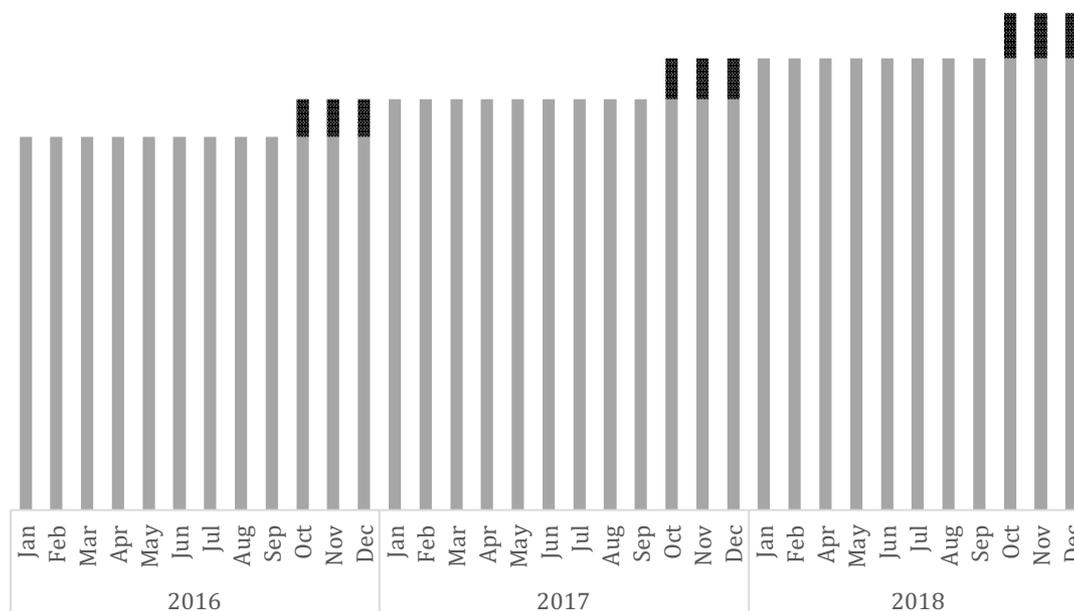
*Examiner's comments:*

*This was a higher order reasoning question which the majority of candidates struggled with.*

*A good approach to such questions is to ask "what happens if we do this" and "what happens if we don't" and then compare the results.*

## Marking solution Q2(iv)

The following chart illustrates the problem (candidates were not expected to reproduce it):



### Assumptions

- Membership has not changed between Jan 2016 and Jul 2016 and will remain unchanged in the future.
- If there were clear changes in membership during the year we can't make this assumption and would have to allow for those changes.
- Income bands are adjusted accordingly so that contribution rates do not change with the salary increase on the NX option (i.e. to avoid "bracket creep").
- Assume that the contribution increase that would have occurred on 1 October 2017 would also be 10%.

### Contributions under the status quo scenario

- Under the current arrangement contribution income in 2016 will be R10 million per month from January to September and R11 million from October to December.
- Under the current arrangement total 2016 contribution income will be R123 million =  $R10m \times 9 + R11m \times 3$ .
- Similarly, total contribution income in 2017 will be R135.3m =  $R11m \times 9 + R12.1m \times 3$ .

### Contributions if proposal is implemented

- If the proposal is implemented contribution income will be R10 million per month throughout 2016 so total contribution income will be R120m
- Total contribution income in 2017 will be R11m\*12 = R132m

We can summarise these calculations as follows:

<b>Year</b>	<b>Annual contribution increase</b>	<b>Status quo scenario</b>	<b>New proposal</b>	<b>Reduction in annual contribution income</b>
<b>2016</b>	10%	R123.00m	R120.00m	R3.00m
<b>2017</b>	10%	R135.30m	R132.00m	R3.30m
<b>2018</b>	10%	R136.73m	R133.10m	R3.63m

- The member is correct that the contribution income forfeited in 2016 will amount to R3 million.
- However, he has failed to consider the impact over the longer term.
- In fact, using the assumptions stated above the total contribution income lost would amount to R3 million increasing by 10% each year in perpetuity:

$$\text{Lost contribution income} = \sum_{y=0}^{\infty} R3m \times 1.1^y$$

- Which would have a significant impact on the scheme's long term financial trajectory since this is a far larger amount than just R3 million.
- There will also be an impact in terms of lost investment income, although this should be trivial.
- In fact, to get 2017 contribution income equal to what the scheme would collect in the status quo scenario the increase on 1 January 2017 would have to be  $R135.3m/R120m - 1 = 12.75\%$
- The trustees would have to consider the long-term impact of the proposal on the scheme since, as shown above, it may result in higher contribution increases, at least in the short term. This may have a significant impact on the membership profile due to selective lapses and increased anti-selection on joining (if membership is not compulsory)
- Aligning benefit years and contribution increases may not be worth the higher contribution increases to members.

- So no, we don't agree with the member's assessment regarding the amount OR the idea that the impact is trivial.

**(Maximum 6)**

***[QUESTION 2 TOTAL 22]***

### QUESTION 3

*Blue Sun is a South African financial services group. Its product offering includes long- and short-term insurance, investments and employee benefits.*

*i) Briefly list the health insurance products that Blue Sun may offer. [3]*

#### **Marking solution Q3(i)**

Health insurance products:

- Critical illness cover
- Major health event cover
- Hospital cash plans
- Accident and sickness cover
- Disability cover
- Long-term care
- Gap cover

**(Maximum 3)**

- ii) *Summarise the current demarcation between medical scheme and health insurance business in the relevant legislation.* [7]

Examiner's comments:

*The use of the wording "current demarcation" and "in the relevant legislation" indicated the scope of the response expected by the examiners. Many candidates wasted time by giving a history of the demarcation debate, explaining why demarcation is necessary or describing the tables proposals for future changes to the demarcation rules.*

**Marking solution Q3(ii)**

- Demarcation refers to the definition of the business of a medical scheme and of health insurance ...
- ... and which entities are allowed to practice this business.

The Long-term Insurance Act contains the following definitions:

- "Health event" refers to an event relating to the body and mind of a person or an unborn.
- "Health policy" means a contract in terms of which a person, in return for a premium, undertakes to provide policy benefits upon a health event, but excluding any contract
  - Of which the contemplated benefits –
    - Are something other than a stated sum of money
    - Are to be provided upon the person having incurred, and to defray, expenditure in respect of any health service obtained as a result of the health event concerned; and
    - Are to be provided to any provider of a health service in return for the provision of such service; or
  - of which the policyholder is a medical scheme registered under the Medical Schemes Act, 1967
    - which relates to a particular member of the scheme or the beneficiaries of such member; and
    - which is entered into by the scheme to fund in whole or part its liability to such member;
    - and includes a reinsurance policy in respect of such contract.

The Short-term Insurance Act states that an “accident and health policy” means a contract in terms of which a person, in return for a premium, undertakes to provide policy benefits for a:

- Disability event
- Health event
- Death event

but excluding any contract of which the contemplated benefits are:

- Something other than a stated sum of money
- To be provided upon a person having incurred, and to defray, expenditure in respect of any health event concerned.
- To be provided to any provider of a health service in return for the provision of such service

The definition of the business of a medical scheme as found in the Medical Schemes Act reads as follows:

“business of a medical scheme” means the business of undertaking liability in return for a premium or contribution -

- To make provision for the obtaining of any relevant health services;
- To grant assistance in defraying expenditure incurred in conjunction with the rendering of any health service; and
- Where applicable, to render a relevant health service, either by the medical scheme itself, or by any supplier or group of suppliers of a relevant health service or by any person, in association with or in terms of an agreement with a medical scheme.

The Medical Schemes Act also states that no person is allowed to carry on the business of a medical scheme unless the person is registered as a medical scheme in terms of the Act.

In addition, the Act contains the following provision (paragraph 26(11) of the Act):

“No medical scheme shall carry on any business other than the business of a medical scheme and no medical scheme shall enrol or admit any person as a member in respect of any business other than the business of a medical scheme.”

**(Maximum 7)**

*Mr Reynolds, the CEO of Blue Sun, has a vision of having an open medical scheme product aligned to Blue Sun's product range. He wants to start a new open medical scheme and grow organically to 100,000 members within five years.*

*His own research shows that no new open medical schemes have been registered during the past decade. He has asked you to explain why this may be the case.*

- iii) *Discuss the challenges involved in starting a new open medical scheme and organically growing it to 100,000 members within five years. [13]*

Examiner's comments:

*This question tested a range of syllabus topics and required candidates to show their understanding of the private healthcare funding market, regulations, marketing and distribution and the bases of competition in the market..*

**Marking solution Q3(iii)**

Sources of membership

- Open enrolment together with community rating, without mandatory membership and limits on underwriting, means that open schemes are exposed to high levels of anti-selection.
- The presence of health insurance products such as gap cover further fuels anti-selective behaviour in certain sections of the market.
- There has been a deterioration in the risk profile of the insured medical scheme population in South Africa.
- PMB regulations set a minimum cost for providing benefits.
- As a result of the above, contribution rates for medical schemes are high and have been steadily increasing at a faster rate than wage increases and consumer price inflation.
- This has caused affordability problems and the size of the medical scheme population as a proportion of the total population has not been increasing (much) over time as a result.
- The market consisting of the population not currently covered by medical schemes simply cannot afford it or don't see the value and are opting out of joining a medical scheme until such time that they perceive more value i.e. when they are

older and sicker or have a life changing event (marriage, child birth, supporting elderly parents etc.).

- This has two important implications:
  - There is no/limited “untapped” market for a new medical scheme to pursue.
  - It will need to grow by attracting members who currently belong to other medical schemes, in a fiercely contested market. This is no trivial task.
- Movement of members between medical schemes is also not completely free – factors such as employers only offering certain schemes to their employees or only subsidising members on specific schemes inhibits the free flow of members.

### Distribution

- A lot of medical scheme business is sold through intermediates such as brokers, who are paid commission.
- Regulation limits the amount of commission (or other incentives) that may be paid to brokers to reward new business.
- The Regulator is ever vigilant for evidence of these maximum remuneration regulations being breached and will punish those who are found guilty.
- A medical scheme will therefore not be able to use incentives to entice brokers into selling its product.
- Some medical schemes offer additional products such as loyalty and wellness programmes alongside their medical scheme that pay higher commission to brokers (it is actually not the medical scheme but the administrator who offers such products – see part (ii) above regarding the business of a medical scheme). Such programmes need a reasonable volume of business to operate, can be expensive to set up and are typically loss-making.
- There are many open medical schemes and many more medical scheme benefit options on the market.
- Brokers have a duty to recommend the best product for their clients.
- They will also find it difficult to convince members to purchase products from a medical scheme without an established brand or track record.
- Significant marketing costs may be incurred trying to establish such a brand
- The new scheme would therefore have to offer options that offer competitive value-for money if it is going to attract members.

## Financial and regulatory matters

- A medical scheme must be financially sound and comply with a solvency regime that requires that it maintains accumulated funds, expressed as a percentage of gross annual contributions, of not less than -
  - 10% during the first year after the scheme was registered;
  - 13.5% during the second year;
  - 17.5% during the third year;
  - 22% during the fourth year; and
  - 25% during the fifth and subsequent years.
- Since the scheme will have to grow organically it will have to add margins to its contribution rates to generate sufficient surpluses to build these reserves.
- Rapid growth also causes “new business strain” as a rapidly growing medical schemes needs to build reserves faster than a scheme with a fixed number of members.
- The complexity involved in administering medical scheme benefits may require significantly different systems to those currently used by the insurer which will have significant cost implications.
- Initially the scheme will need to spread its fixed costs over a small number of members. This would make its contribution rates even less competitive.
- Given the nature of competition in the market this may mean that the products will be uncompetitive if they include such margins, which would make it difficult to achieve the growth targets.
- On the other hand, if the scheme is growing rapidly it may be because it is offering excellent value for money. This may be an indication that it is under-priced.
- It is not enough to grow with members – the risk profile of those members must not be adverse compared to the assumptions underlying the scheme’s pricing or the average profile of its competitors.
- This would not be an issue if the scheme started with a high level of reserves.
- However, it is unlikely to find a benefactor who will be willing to donate the significant amounts involved. It is also questionable why anyone would be willing to provide such funds, given the fact that medical schemes are not-for-profit entities with independent member elected boards of trustees.

- Reinsurance contracts are generally not allowed in the medical scheme environment so spreading the losses over a number of years using such an arrangement to achieve short term competitiveness is not a viable option
- Profits for the insurer can only be generated by charging an administration fee to the scheme and surpluses generated by the not-for-profit scheme belong to the members. Development costs for the insurer cannot be recouped in later years when surpluses may be anticipated. In addition, the administration and managed care fees, as a proportion of total contributions, are closely monitored by the regulator and the market.

*Suppose the scheme grows with 2,000 members per month in its first year (to reach 6,000 within three months). In total it will have 24,000 members at the end of the year, with total member exposure equal to 156,000 member months for the year.*

*If the average monthly contribution is, say, R2,000 then the annual contribution income will be R312 million. Thus the required reserves at the end of year 1 is R31.2 million (10% in year 1). So either each average member is going to have to generate a R200 surplus each month (10% of contributions) or it will have to find the funds elsewhere.*

- The Registrar may demand financial guarantees from the persons who manage the medical scheme that is in the process of being established, to ensure the financial stability of the medical scheme. Blue Sun may have to provide these funds.
- These funds then become the property of the medical scheme, which is owned by the members.
- Regulation dictates that any funds that are used in the solvency calculation must be the sole property of the fund. Loaned funds are not included in the solvency calculation.
- If the funds are not loaned, then whoever provides these guarantees/funds will have no claim to the money if , which will be the property of the scheme, which in turn belongs to its members.
- There is significant uncertainty regarding the future of medical schemes due to:
  - Uncertainty regarding the role of medical schemes under NHI.

- Other regulatory or legislative changes that may (or may not) occur, for example as a result of recommendations made by the Health Market Inquiry.
- The Registrar may impose onerous terms and conditions with the registration of the new scheme as there is a trend for smaller schemes to amalgamate with larger schemes in this challenging and uncertain environment.
- The scheme will be small initially, which means that it will be exposed to claims volatility. If it does not have sufficient reserves, it may not be able to pay claims if experience is worse than expected.
- It is also unlikely that the scheme will be able to negotiate competitive prices from corporate providers (as large funds currently do) until it has achieved sufficient scale.

#### Other factors

- Lack of experience (though experience can be purchased, at a cost, from consultants, administrators, etc.).
- No price/utilisation data to start with. The scheme is exposed to significant risk if actual experience turns out differently from the pricing assumptions (e.g. if the risk profile of the members it retracts is worse than what was assumed in pricing or claims are higher than expected). There is also no guarantee that any data it can find will be relevant to the business it will attract.

**(Maximum 13)**

[GRAND TOTAL 100]

**END OF REPORT**