

# F201 May 2016 – Examiner's report

## **Examiner's report**

*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.*

*Prospective candidates reviewing this paper are reminded that the solutions below are written to provide clarity and therefore are more verbose than the responses expected in examination conditions.*

## Question 1

*Question 1 involved solvency requirements. The question presented candidates with two hypothetical solvency requirements*

- (i) Discuss the appropriateness of Requirement 1 in the context of the current medical schemes environment in South Africa.**

*This question was poorly answered. Common reasons for losing marks included:*

- *Candidates lost time explaining the current solvency requirement and expounding on its shortcomings.*
- *Candidates also wasted time discussing whether Requirement 1 was better than the current solvency requirement. The examiners expected candidates to evaluate Requirement 1, in its own right, in terms of the purpose and qualities of a good solvency requirement*
- *Most candidates did not write down a conclusion regarding the appropriateness of Requirement 1 and lost valuable marks.*

The purpose of holding capital is to ensure that a scheme can meet its short-term liabilities and have a buffer against adverse experience.

However, the amount calculated by Requirement 1 amounts to the pre-funding of future healthcare and non-health expenditure to the extent that the future contributions won't cover these.

This implies that there is a long-term liability that results from these deficits...

...which is not true in the case of the medical scheme (membership is renewable on a monthly basis and contributions are adjusted on an annual basis) which do not have such long-term liabilities in respect of their members.

Requirement 1 calculates the amount of money the scheme needs to hold now in order to cover any current and future operating deficits, offset by any surpluses.

It is based on

- Current contribution levels, claims and non-healthcare expenditure.
- Assumptions regarding future contribution increases and claim and non-healthcare expenditure inflation.
- Assumptions regarding the mortality and exit rates of existing members in future years.
- Changes in the average claim amount per member in response to changes in the demographic risk profile.

It therefore does take the scheme's specific circumstances into account.

Consider a scheme that is currently achieving a breakeven result. If we assume that future contribution increases will be such that the scheme will achieve a break-even result in every year until the last member passes away, then the amount under Requirement 1 would be zero...

...which is not appropriate as schemes should always be holding some solvency capital.

It also means that the solvency requirement does not necessarily take the size of the scheme into account.

*{ Many candidates missed this point }*

However, in reality such contribution increases (needed to break even) would be higher in later years due to the ageing population which would prompt members to leave. These would generally be the younger and/or healthier members who claim less and can more easily move to other schemes. This would ultimately lead to an actuarial death spiral.

Such exits will also be likely to be anti-selective in nature.

There is no risk equalisation in South Africa.

The older and sicker members of a medical scheme are cross-subsidised by the younger and healthier members of that scheme, within a community rated environment.

If a scheme closed its doors to new business, its source of younger and healthier beneficiaries needed for the cross-subsidisation would dry up.

As the remaining scheme membership ages the average cost of claims will increase, over and above healthcare cost inflation.

Contributions will have to be competitive compared to those of other medical schemes if the assumption that all members will remain on the scheme until they die is going to be realistic. Contributions that are not competitive will accelerate the selective withdrawals.

*{This is true even for a restricted scheme. If its contributions become significantly more expensive than those available in the open market, there will be pressure to amalgamate or allow members to join open medical schemes.}*

As claims and contributions are projected on a best estimate basis, these dynamics need to be incorporated in the projection.

As a result, we can expect that operating losses, expressed as a percentage of contribution income, will increase in time. Or the scheme will need to price for the higher selective lapse rates, exacerbating the problem and resulting in a projected actuarial death spiral and the last member leaving due to affordability issues.

The amount produced by Requirement 1 in such a scenario would be unreasonably high, specifically compared to a scenario where the scheme is open to new members.

Such a large amount raises the issue of schemes being able to meet a requirement of this magnitude.

Furthermore, Requirement 1 ignores a number of important risks such as:

- Claim volatility
- Asset risk
- Operational risk

The projection term will have to be very long (several decades). As such, it will not be possible to model the dynamics with a reasonable degree of accuracy. (To be fair the same problem arises in the valuation of solvency requirements in long-term insurance.)

The scheme is also in fact open to new members and the requirement to set contributions on a closed basis is unnecessarily onerous.

In conclusion, Requirement 1 is not appropriate.

**[Max 10]**

**(ii) Briefly discuss the use of the covariance adjustment in the formula for T and whether it is appropriate in this case.**

*This question was poorly answered. The most common reason for lost marks was that many candidates failed to conclude with a comment on whether the covariance adjustment is appropriate or not. Some candidates clearly didn't understand the theory involved.*

The covariance adjustment could have the effect of reducing the solvency capital requirement by up to a half, depending on how the risk is distributed between C, M and A.

Underlying the covariance adjustment is the assumption that the different risk categories are independent of each other.

It reduces the aggregate solvency requirement in recognition of the fact that the risk is very remote that operating results will be simultaneously reduced by adverse experience in all of the three risk categories.

A large drop in asset values may impact the economy in general (or be as a result of economic circumstances), and consequently the affordability of medical scheme membership. In such cases members with lower incomes may terminate membership, leaving older membership behind.

In addition, it could be argued that an economic downturn as members' mental health may be adversely affected by their concerns about their financial wellbeing. In addition, there may be more incentive to partake in fraudulent activity.

This implies asset risk is not completely independent from membership risk and claims risk.

However, the effect should not be significant enough to invalidate a covariance adjustment.

The claims risk capital requirement considers a scenario where claims experience is higher than expected *because of random variation in claims*.

The membership capital risk requirement considers a scenario where claims experience is higher than expected because members are older than expected.

While older membership implies higher claims, the two scenarios can be considered independent in the sense that adverse random variation in claims can occur in the absence of higher-than-estimated membership age, and vice versa.

*{Candidates often failed to see the above three points and concluded that C and M are highly correlated.}*

B is correlated with C and M and should not be included in the covariance adjustment.

Therefore, the covariance adjustment is considered appropriate in this case.

**[Max 4]**

**(iii) Explain how you would calculate the base level capital amount (B) under Requirement 2. State which assumptions are necessary and explain how you would derive each assumption.**

*This part of Question 1 required candidates to explain, step by step, how they would calculate the base capital requirement of the second solvency requirement, which involved making a two-year projection of the scheme's financial results. Candidates should be quite familiar with such an exercise and many performed well here.*

*There appeared to be some confusion regarding the meaning of the term “operating result”, which is the same as “net healthcare result”. Candidates were not penalised for this.*

*This was the part question in the paper with the highest number of available marks and candidates had to perform well here in order to get a good overall mark. However, some candidates appeared to spend so much time on this question that they neglected the rest of the paper.*

The operating result in year  $y$ , denoted by  $R_y$ , is calculated as

$$R_y = C_y - H_y - N_y$$

where

- $C_y$  is the total risk contribution income in year  $y$
- $H_y$  is the total relevant healthcare expenditure in year  $y$
- $N_y$  is the total non-healthcare expenditure in year  $y$

Then

$$B = \sum_{y=1}^2 (-R_y) \times \text{Ind}(R_y < 0) \times v^y$$

where  $v$  is the discount factor based on the **prescribed** discount rate.

Projections will be made separately for each benefit option.

An estimate is needed for membership volumes per option.

New business can be estimated from targets, “pipeline” and/or specific campaigns from the sales department.

Terminations and option changes can be estimated by using recent experience.

Factors affecting terminations and option changes, such as the market conditions (e.g. contributions of competitor schemes, the availability of alternative cover, reputational issues, etc.) and factors such as economic conditions need to be taken into account with actuarial judgement in order to increase or reduce the termination assumption.

The demographic projections should also allow for changes in family sizes and beneficiary types. (For example, the average number of children per family has been steadily declining for a number of years.)

### **Relevant healthcare expenditure**

An assumption is needed for claims expenditure.

The starting point for claims is the most recent year’s claim amounts per option.

The claims need to be allocated to homogeneous categories. This is because the rates of increase in the cost and frequency of claims may be different for various categories and need to be projected separately.

This includes paid claims...

...as well as outstanding claims.

Outstanding claims include incurred but not reported claims (IBNR)...

...as well as reported but not paid claims.

Outstanding reported claims can be allocated to different options by means of case estimates per case if available, which should be available on an option level...

...or by pragmatically apportioning the IBNR and/or reported-but-not-paid amounts to options, e.g. in proportion to claims paid.

The total claim amount for each option is divided by the membership months of the option to arrive at average claim amount per member per month (pmpm).

Price inflation needs to incorporate the following for direct claims:

- increase in hospital-related tariffs
- change in medicine prices
- increases in doctors' and specialists' consultation fees
- changes in other day-to-day providers' fees

These can be incorporated by applying a relevant increase factor to the proportion of the pmpm claims represented by each of the above categories.

For medicines, it entails estimating the Single Exit Price (SEP) increases.

We need to consider future expected levels of consumer price index inflation (headline CPI inflation) ...

...as well as expected future movements in currency exchange rates.

Preliminary indications from bodies that are responsible for negotiating these prices, such as SAMA and HASA, may also be taken into account.

Most increases are reviewed on an annual basis, so most of the increases for the first year will have been finalised at this stage of the year.

*{Several candidates missed the detail given in the question that indicated that the two-year projection is to be calculated at the start of the first year, i.e. January or February, which would be after contribution and budgets for year 1 will have been decided.}*

For the categories for which price increases have not been finalised, the assumptions used for contribution setting can be used where applicable.

For the increases in the second year, the estimation of the new prices will use current prices as a base.

New developments in medical technology and medicine emerge continuously and have a direct impact on the price at which medical care is delivered. While these developments and their impact are impossible to anticipate, the impact in previous years can be estimated and used as a basis for estimating the impact on claims.

Increases in utilisation *unrelated* to demographic profile need to be estimated.

Look at past experience to identify relevant trends in utilisation (such as increasing admission rates or greater utilisation of pathology during hospital admissions).

Increases in utilisation include an increase in the frequency with which specific medical services are utilised by beneficiaries as a result of increasing awareness regarding access to benefits, changes in referral patterns by doctors and changes in the definition of diseases.

Utilisation is also affected by the impact of new managed care initiatives (including capitation)

...

...and changing disease patterns.

A single “utilisation increase” factor assumption can be used for incorporating increased frequency, technological developments (where this has not been explicitly addressed), managed care impact and changing disease patterns. This can be obtained by assessing past utilisation increase not related to the factors addressed explicitly.

Changes made to the benefit structure for the new benefit year will have an impact on expected claims experience for that year, and need to be estimated and applied to the pmpm costs.

For the first year of the projection the assumptions used for contribution setting and budgeting, *updated for any known changes*, should be sufficient.

For the second year of the projection, to the extent that increases in benefit limits are in line with medical inflation assumptions, the impact of these benefit changes can be assumed to be neutral compared to the assumed claim inflation assumptions.

To the extent that there is, at the time of the projection, expected to be a real increase or decrease in the benefit limits, or a structural change to benefits in the second year, appropriate adjustments will need to be made to the projected claims experience. There are two possible elements to these adjustments:

- A real reduction or real increase in the benefits offered on an option will be likely to result in a corresponding reduction or increase in claims. This can be estimated by applying the benefit changes to the past year’s data and quantifying the difference from the actual experience to find the change, and then adjusting for inflation.

- A change in the nature of the benefits offered, or a change in the real level of benefits, may also attract new beneficiaries to the option, or result in significant resignations, either outcome having the potential to change the risk profile of the beneficiaries.

Changes in the risk profile of beneficiaries and its effect on direct claims need to be estimated.

The most important risk factors to consider are the age profile, gender and the proportion of beneficiaries suffering from chronic conditions.

These can be estimated by applying recent trends in these quantities per option. This entails measuring the proportion of new members and terminations on each option for the most recent year, including over the year end, and the distribution of beneficiaries by age band, gender and chronic proportion in each band.

Option changes need to be taken into account in projecting the demographic profile.

The effect of the change in beneficiary age can pragmatically be estimated by finding the percentage increase in claims age band from the most recent year's data. This can be done by finding the average claims pmpm for groups of members of the same age band and fitting curves to the average costs by age band, where there is a credible amount of data (smoothing may be necessary). The impact of the changes in the distribution of beneficiaries by age band can then be estimated.

It usually amounts to 2-3% (compound) per year of age.

The effect of chronic proportion can be estimated by finding the average claims pmpm separately for chronic and non-chronic families, in age bands per option if there is a credible amount of data. A factor relating claims pmpm between chronic and non-chronic families can be estimated per age band and applied to the projected claims in the projected chronic status proportions.

Pragmatic assumptions need to be made for changes in beneficiary profile per option resulting from benefit changes, using past experience where available, as well as actuarial judgement.

Estimates of other demographic features, e.g. gender, geographic area, income, etc. need to be obtained if they are expected to change significantly and have a significant impact on claims experience. These can be estimated in a way analogous to finding estimates for chronic proportions mentioned above.

We are projecting on an annual basis. Seasonality therefore does not need to be allowed for in the projection, *unless* membership and risk profile is expected to change substantially during the course of the year.

An assumption needs to be made for any changes in capitation fees.

The starting point will be analogous to that for direct claim price increase above.

Additionally, the impact of changes in risk profile of the covered population also needs to be taken into account for capitation fee increase assumptions.

This may apply in cases where a change in risk profile affects the price negotiations for a coming year, in which case the increase applies to a new financial year...

...or where capitation fee agreements contain an element of risk adjustment, in which case the timing of price adjustments will be as allowed for in the agreement.

Also consider other risk transfer arrangements, such as reinsurance and make an estimate of expected recoveries.

Multiply the pmpm figures projected for healthcare expenditure with the exposure projected in the membership projection to calculate the total Rand amounts.

## **Non-healthcare expenditure**

Fixed and variable expenses will ideally be estimated separately.

Variable expense estimates will ideally be split between acquisition expenses and maintenance expenses in order to take new business into account properly.

For expenses that are already known for the year (e.g. where administration fees payable to a third-party administrator have already been negotiated) no inflation assumption for the first year is needed.

For expenses not yet known, the starting point will be the most recent known expenses.

Future staff remuneration will be estimated by applying wage inflation, typically a margin above CPI inflation, after having taken cognisance of the historic differential.

Inflation on other expense items can be estimated by CPI inflation where more relevant estimates are not available.

CPI may be estimated from bond-yield differentials or economic forecasts.

Timing of inflationary increases on expenses need to be projected in a way consistent with how they will apply in reality (e.g. administration fees negotiated for a calendar year change each January, set salary increase dates, etc.).

Commission needs to be estimated.

Commission can be assumed to be as per regulation, i.e. 3% of contribution, plus VAT, with a maximum amount per family.

An estimate is also needed regarding the proportion of business on which commission is payable. (Not all medical scheme business is conducted via brokers. For example, an individual member may apply directly to a medical scheme for membership.)

Inflation on the maximum regulatory commission amount can be assumed to be CPI inflation.

Make an allowance for bad debt, based on historic experience, economic conditions and the types of members (for example individual paying members can be expected to have higher rates of bad debt than members who form part of a corporate group).

### **Contribution income**

The starting level of contributions is the most recent known contribution rates per option. As it is the start of the financial year, the first year's contributions are known.

A contribution increase assumption for the second year is needed.

We also need to make an assumption regarding future changes to income rated contribution table categories.

The contribution increase philosophy needs to be taken into account, e.g. aiming for a specific operational result, desired relativities between contributions of different options, desired relativities between the contributions for different beneficiary types on the same option, etc.

Where contribution setting is determined by a desired operational result, the desired result will usually also depend on the projected members' funds for investment income.

*{In other words we need to consider how contribution increases may be influenced by solvency, even if the calculation of B is based on operating results (i.e. before investment and other income).}*

To find the projected members' funds an assumption for investment returns will be needed.

As it is a short-term projection, the expected underlying asset returns over the short term, combined with the actual asset composition and known changes in the asset composition can be used.

It is important that all assumptions regarding investment returns are consistent with other related assumptions such as exchange rate movements and the various forms of inflation.

For best estimate assumptions, no margins for uncertainty should be incorporated in any assumptions apart from the prescribed margins in the risk discount rate.

However, the best estimate contribution rate will incorporate margins in other assumptions where these would be applied during contribution setting. A separate projection for estimating future contributions will therefore be needed.

We also need to consider the impact of late joiner penalties that will affect the total risk contribution income.

**[Max 25]**

**(iv) Discuss what the Board of Trustees of Endeavour Health needs to consider when making a change from the current solvency requirement for medical schemes to Requirement 2 above.**

*This question was poorly answered. Candidates failed to think widely enough, particularly in relation to decisions taken by the Board of Trustees that may actually alter the solvency requirement, how these may be used to manage solvency and what the secondary implications may be. As was the case in previous papers candidates fail to demonstrate the ability to think strategically.*

The solvency measure is now risk based and Boards of Trustees will be forced to be more cognisant of these risks.

The first thing any Board of Trustees will need to consider is whether it will be solvent under the new Requirement B.

The Base capital amount will be greater if the scheme is projected to incur operating deficits and increase the larger those deficits are.

This means that the scheme is incentivised to price contributions appropriately (i.e. not under price) and target break-even or surplus operating results.

The asset risk capital requirement will essentially depend on the distribution of assets between cash and bonds as well as equities and other assets such as property.

The component related to assets with volatile market prices such as equity will be much larger than those for cash and bonds.

The more the scheme invests in assets with volatile market prices the greater the solvency requirement.

*{Some candidates stated that schemes are rewarded with a lower solvency requirement if they diversify their investments. This is not the case here. The basis for calculating A means that the avoidance of investment risk by means of choosing low risk (but also low expected return) asset classes is rewarded.}*

If the scheme doesn't meet the solvency requirement it might reduce the requirement by switching from real/high risk assets to bonds and cash.

However, bonds and cash are expected to yield lower investment returns than equity, in the long term.

The scheme may then forego future investment income for a short-term improvement in solvency. In the long term it will then require higher contribution increases to compensate for the loss of investment income.

One of the decisions the Board of Trustees of a scheme will take (or approve) will be the assumption base used in the solvency calculation.

If the factors by which asset values in different classes are adjusted are not prescribed or the method for deriving them is not prescribed, then schemes with solvency problems may choose the most optimistic factors that they can get away with.

The claim risk component, C, is based on the pre-defined distribution of claims, not specific to the scheme. Schemes with higher levels of claim *variation* will be required to hold higher reserves.

Schemes may therefore reduce their solvency requirement by transferring risk to other parties. They would trade higher expected healthcare costs for less variability in claims and smaller differences between the average and the 95<sup>th</sup> percentile.

The statistical distributions and their parameters used to calculate the claim risk capital requirement are prescribed and the scheme cannot influence this calculation.

The stochastic claims projection does take membership size into account. This would incentivise Endeavour to maintain its size or to grow since larger schemes will have lower solvency margins (expressed as a proportion of contribution income) than smaller schemes, all other things being equal.

The membership risk component is based on the membership ageing by two years. There is little that the scheme can change - the age adjustment will remain the same.

However, if it is not specified the scheme may want to make very optimistic assumptions regarding the impact of age on claims.

The first requirement is to comply with regulation and therefore the scheme must strive to meet the minimum solvency requirement. Another aspect that a Board of Trustees should consider is whether this statutory solvency requirement is actually a good reflection of the capital that it should hold and whether it should not consider alternative risk based capital calculation methods in its decision making.

**[Max 6]**  
**(Question 1 Max 45)**

## Question 2

*Question 2 dealt with regulation and the comparison of benefits between different benefit options. The examiners expected this to be the most difficult of the questions because of the new concepts that candidates had to take in and analyse (for example the concept of an actuarial value) but were pleasantly surprised by candidates' performance.*

- (i) **List the relevant aspects of Medical Assistance Society business which may be addressed by legislation and regulation.**

*{The language here is intentionally generic since it is invalid to assume that Cativa's regulations will precisely mirror that of South Africa. This is based on Section 1, chapter 4 in the core reading. This question required that candidates take a step back from the details of regulation and take a "30,000-foot view" of regulation. }*

### **Areas that may be regulated include:**

Definition of the business of a Medical Assistance Society (MAS).

A prohibition on any entity that is not a registered MAS on doing this business.

A prohibition on any MAS performing business which does not fall within this definition.

Establishment or appointment of a regulator including

- A description of the powers of the regulator.
- Complaints, appeals and other dispute resolution processes.

Rules and requirements for the registration of a MAS.

Provision regarding the cancellation and suspension of registration of a MAS.

Rules regarding membership of MAS's including

- Prohibitions on membership of more than one MAS.
- Rules governing the eligibility criteria for membership of a MAS.

Rules regarding the use of reinsurance by a MAS.

Rules regarding the marketing of a MAS.

Requirements that the rules of the MAS must comply with.

Items that the rules must provide for.

Underwriting rules including

- Limits on waiting periods.
- Premium penalties.
- Rules for declining cover.

A prescribed process for making rule amendments

Provisions regarding benefits, including

- Minimum benefit requirements
- Limits that may be placed on benefits
- Prescriptions regarding the structuring on benefits
- Rules regarding the accumulation of benefits
- Medical savings accounts

Limitation on incentives to members based on claims experience

Structure of contribution tables or what factors may be used to determine contributions. The level of risk rating allowable – community rating only, limited multiples in risk rating to unlimited risk rating using any factors including age and health status

If different benefit options are allowed, then rules regarding self-sustainability requirements for each benefit option, or on a scheme level.

#### Financial matters

- Rules regarding the holding of assets (for example cash deposits must be placed with institutions that are registered banks in terms of the country's financial regulation)
- The prescribed method for determining Solvency.
- Appointment of auditor.
- Annual financial statements.

#### Governance

- Selection of governing body of MAS (such as a Board of Trustees).
- Duties of the governing body.

Rules regarding amalgamation and transfer.

Rules regarding voluntary dissolution of a MAS.

Definition of undesirable business practices.

Regulation of sales of MAS products including:

- Rules regarding commission or other sales incentives.
- Rules regarding accreditation of sellers (tied agents or brokers).
- Conditions that sellers such as brokers must comply with.

Administrative requirements of MASs, defining procedural requirements.

Offences and penalties.

Transition arrangements for existing community funding arrangements and short-term group insurance to be transferred to Medical Assistance Societies.

Provisions for an industry wide risk equalisation mechanism

Possible provisions for mandatory membership

Taxation of MAS entities and of MAS members

Rules for contracting with third parties that a MAS must adhere to (for example that they must be accredited, that contracts must contain a 90-day notice period and so forth).

Possible pricing level regulation provisions (of MAS contributions) including limits on price increases.

**[Max 10]**

**(ii) List the ways benefits can differ between South African medical scheme benefit options.**

*{Taken from p57 of the core reading.}*

**Benefits under different benefit options will differ according to:**

- The categories included (for example dental, optometry, specialist consultations)
- The benefit limits per category which may be defined according to
  - The rand amount or
  - The number of claims (number of visits or number of days or number of devices)
  - Benefit limits per family or per beneficiary
- Overall benefit limits
  - Except for Prescribed Minimum Benefits
- Coinsurance
- Deductibles
- Co-payments and levies
- Provisions for member savings
- Tariff scale used for reimbursement including the underlying scheme rate and the multiple covered in different settings.
- Service providers included in the network
- Exclusions

- Cover for benefits outside of South Africa.

**[Max 3]**

**(iii) Discuss the reasons why consumers struggle to compare the value-for-money of different benefit options in the South African environment.**

*Several candidates lost mark in this part because they didn't answer the question being asked and instead listed possible reasons why consumers may purchase a benefit option that isn't appropriate to their needs, including factors such as broker incentives. What the question actually required was that that candidates adopt the perspective of a consumer trying to work out which benefit option would offer the best value for money.*

Medical care is a complex issue and benefit design reflects that.

The CMS must approve all benefits and rule changes. Other than the prescribed minimum benefits and medical savings account **there is no other mechanism or systemic regulation of medical scheme benefit structures in South Africa.**

Whether a claim will be paid and in what proportion is determined by benefit design aspects such as co-payments and limits and the use of DSPs to ration by provider efficiency.

Along with the description of these items is usually a statement that they will not apply in the case of PMB claims.

Most consumers are not equipped to understand the PMB entitlements, particularly the DTP part and whether their condition and its treatment is a PMB.

The same will be true of aspects of benefit design such as formularies and protocols which are clinically complex and may not even be readily available unless it is specifically requested.

While it is relatively easy for consumers to place a value on discretionary benefits such as optometry or dentistry it **is far more difficult for them to place a value on the more insurable, low frequency but high cost benefits** such as hospitalisation. As with all insurance products the

insured cannot predict future need and the question then becomes one of “the value of having cover” as opposed to “what I will get out of it”...

...unless they already plan or expect to use such as benefit in the foreseeable future when they are making the evaluation.

It is also difficult to assess value in cases of combined limits and overall limits for different benefit categories. For example, is a R2,000 combined limit for radiology and pathology the same as two separate limits of R1,000 for pathology and radiology each?

In truth the extensive nature of PMBs mean that the benefit richness of various options varies less than marketing would suggest, with most of the differentiation limited to the non-PMB benefits (such as chronic conditions not on the CDL or dentistry, which is not a PMB) and discretionary day-to-day benefits including primary care and supportive therapies from allied and auxiliary providers such as physiotherapists.

Furthermore, the average cost of benefits greatly depends on the risk profile of the beneficiaries in the benefit option's risk pool.

Medical schemes may therefore be incentivised to differentiate their products by benefit design, which will lead to greater variety in benefit design.

Rationing due to benefit complexity may also occur as members may not be aware of the possibility of claiming in certain instances.

All schemes may not use the same terminology for benefits. For example, one scheme may use the term “day to day benefits” whereas another scheme may define it as “routine benefits”.

Consumers don't know what the actual costs of treatment are in many cases, making it difficult to frame the question of value in monetary terms.

This is compounded by the fact that different medical schemes can have different tariff structures which also affect the amount that will be paid by the scheme.

Part of value-for-money is related to quality. Consumers cannot incorporate quality into their value assessment since very little quality information is available.

The value for-money-assessment may be influenced by related products which have nothing to do with medical scheme cover such as loyalty and wellness products.

**[Max 5]**

**(iv) Discuss the advantages and disadvantages of each of these two approaches.**

*{Note that prescribe benefit design templates are not the same as prescribed minimum benefits.}*

**The prescribed benefits approach:**

**Advantages:**

- Is theoretically simple to implement as well as to monitor and enforce.
- Depending on how much scope for variation the templates allow it could make comparison easy.
- Could also simplify education regarding benefit entitlements.
- A consumer may have to weigh poor benefits in one category against better benefits in others to suit his own need.

**Disadvantages**

- Despite the simplicity and standardisation consumers will still have to compare benefit options on multiple points.
- If the designs are over-prescriptive it could stifle innovation.
- Regulated prescribed benefit structures may not keep up with new developments. For example, if a certain type of benefit is being abused and this could be managed by introducing a co-payment but the template may prohibit this. This would generally limit risk management and mitigation strategies.
- Comparison may not be like-for-like if benefits are provided based on different clinical protocols (assuming these are not prescribed as well).

- Depending on how comprehensive the minimum benefits are the value for money comparison may be based on differences in benefits provided over and above this minimum.
- If there is only a small number of benefit design templates available, then there may exist a proportion of MAS members who find that none of these plan types meet their needs.

### **The actuarial value approach:**

#### **Advantages**

- Allows more freedom in terms of benefit design, which allows for innovation.
- There is a single point of comparison in the form of the actuarial value percentage which will make comparison significantly easier.
- According to the definition a consumer can expect the same actuarial value percentage for each of the listed benefit categories. There is then no need for the consumer to weigh benefit richness in different categories against each other.

#### **Disadvantages**

- Technically speaking calculating the actuarial values will be a complex technical exercise.
- If improperly designed this measure may be “gamed” by medical assistance societies to make their products look better without making any real enhancements to benefits.
- The actuarial values are proportional. On the Jade option with a 60% actuarial value this means that the average beneficiary can expect to have to pay 40% of the costs themselves. In the case of high claiming beneficiaries this can result in a large

financial burden, unless there are some other measures in place to protect members from financially ruinous healthcare costs.

*{Note that the actuarial value percentage does not mean that all claims will attract a co-payment. Thus a 90% actuarial value does not mean that all claims will attract a 10% co-payment. The expected unpaid proportion of 10% may also be due to limits being reached or certain treatments being excluded.}*

- A single value can fail to capture the differences in value for money from the point of view of consumers. For example, benefit richness on the same benefit option may vary according to family size, depending on how the limits are specified.
- The actuarial value is an abstract concept. If the actuarial value is 60% then the average member can expect that 60% of his claims will be paid by the MAS. From the point of view of a member the actual proportion is going to vary around this expected value. A member who ends up having 50% of his claims paid may then be unhappy with his choice.
- The question of whether the actuarial value reflects actual claim payment patterns arises. If the regulator retrospectively calculated benefits paid divided by claims received (for all members on an option) and finds that this turns out to be substantially lower than the “published” actuarial value that consumers based their purchasing decision on, then this would need to be addressed. The regulator will not want to penalise schemes if this was due to random variation but it would want to remedy situations where incorrect values caused consumers to purchase products that didn’t provide the advertised level of cover.

**[Max 5]**

- (v) **Discuss the merits of the two methodologies to calculating the actuarial value described above.**

### **The statistical methodology**

*Many candidates missed the point of the exercise, which is to compare or measure **benefit richness**, expressed as an actuarial value, on a consistent basis across the industry.*

*Several candidates made the strong assumption that MAS regulation in Cativa will be exactly the same as South African, which was incorrect.*

The statistical method seems to be conceptually simple and easy to implement.

Fitting a statistical distribution will “smooth” the basis on which actuarial values are applied.

In the case of more complex benefit design (such as above threshold benefits) deriving the result analytically may not be possible (or will become mathematically difficult) and other methods such as bootstrapping or Monte Carlo simulation will need to be applied. These will be more complex to implement.

The most important shortcoming of the statistical approach is that it ignores the correlation between claims in different benefit categories because it assumes that the distribution of claims in each benefit category is independent from the others. In reality we know that someone with high chronic benefit use is more likely to be admitted to hospital, for example.

Implementation of the method requires someone with a good understanding of mathematical statistics, which is a scarce resource.

The distribution fitting will be done using the MAS’s own data. In the case of a small MAS the data may not be sufficient to achieve a good distribution fitting and may be affected by outliers.

The volume of data may also not be sufficient to be representative of an “average member”.

Random variation and differences in experience between medical schemes may result in the actuarial values calculated by different schemes not being consistent across the industry.

The statistical parameters derived from each MAS’s data will implicitly allow for other factors of the MAS’s experience such as managed care interventions and demographic profile. **This is not ideal** since this means that a consistent comparison of benefit richness across the industry is less likely.

*{Some candidates seem to think that the statistical distributions **should** reflect the scheme's own data and experience. If that were true we could simply look at the financial results retrospectively and save ourselves a lot of effort.}*

By only considering claims on a benefit category level some detail is not taken into account, which may be a problem depending on the complexity of the benefit design. For example, if there are specific co-payments for different procedures or other finer details to the benefit design.

If the regulator does not specify some standard approaches to statistical issues such as how outliers should be dealt with, MASs may try a variety of different approaches and choose the one that gives them the best result. Once again actuarial values across the industry may not be consistent.

The use of the standard parameters in the first year may be to the advantage of some schemes and the disadvantage of other schemes. This depends on the appropriateness of these default parameters.

### **The virtual administration methodology**

Under this approach data is taken from across the industry, meaning that it will be more representative (depending on how the sample is drawn).

*{The question stated that this data would be drawn from industry data. A number of candidates incorrectly assumed that this would mean that the calculation would be based on all of the industry's data.}*

In particular, the relationship between claim patterns in different benefit categories will be implicit in the data and will therefore be allowed for, in contrast with the statistical methodology.

The same set of data will also be used to calculate the actuarial value of each benefit option which will ensure consistency of actuarial values across the industry.

The use of real world data means that the claims used to calculate actuarial values may be “lumpy” due to random variation, as opposed to the smooth mathematically described distributions used in the statistical approach.

This may result in this approach not yielding a representative actuarial value, particularly in the case of benefit categories with low utilisation rates and highly variable claim costs, such as oncology.

Implementing the virtual administration system approach may not be as technical as the statistical approach but it may still involve a significant amount of work and complexity, depending on the range of variation in benefit design and the level of detail in the data being used.

Given sufficiently detailed claim data the virtual administration system may be able to apply complex benefit rules such as formularies, protocols and network restrictions.

This is true if each administrator in the MAS industry can take the “standard population” data and run it through its own administration system.

This does however create the possibility of variation in actuarial values attributable to the idiosyncrasies of each administration system.

There will be a problem with the VAS approach in the first year since there won't be any data to use for the calculation. It isn't stated how this will be dealt with.

### **Both approaches**

Neither approach explicitly deals with how claiming patterns may change in response to benefit design. For example, if a member has run out of GP consultation benefits he/she may be less likely to visit a GP again, depending on the reason for the visit.

**[Max 8]**

**(vi) State, with reasons, which approach you would recommend**

Mark given for recommendation.

*Note that “both” is not an acceptable answer unless it is very well motivated and it is explained in which circumstances different approaches should be applied.*

Mark for appropriate motivation of recommendation

*Example:*

*I would recommend using the virtual administration approach for the following reasons:  
The use of real-world data means that hidden complexities such as the correlation between different claim types is allowed for, which it is not in the statistical approach. In addition, the use of the same standard set means that actuarial values can be consistently measured across the industry.*

**[Max 2]**

**(Question 2 Max 33)**

### Question 3

- (i) Explain what an efficiency discounted option (EDO) is.

*This question is based on bookwork.*

EDOs are benefit sub-options with network arrangements for healthcare provision. For example, Option A may provide complete freedom of choice of providers. The EDO sub-option will offer the same benefits but will restrict members to using network providers.

They were introduced in 2008 and allow monthly medical scheme contributions to be differentiated on the basis of the healthcare providers that are utilised to provide benefits.

This practice is in conflict with the statutory principle that contributions may be differentiated only on the basis of income or family size, or both.

Schemes must therefore be exempted from Section 29(1)(n) of the Medical Schemes Act before they can operate EDOs.

**[Max 2]**

- (ii) **Discuss the implications of retaining the EDO options, with their current hospital network, in the absence of discounts currently offered by Alpha group.**

*Performance on this question was very poor.*

*Even though the preamble clearly stated that the scheme had resolved to retain the EDO options and the question asked candidates to discuss the implications of retaining the EDO options with no changes to the hospital network an alarming number of candidates answered an entirely different question, namely “Discuss the implications of all Alpha group hospitals being removed from the hospital network.”*

*Several candidates did not read the question properly and treated Alpha, Beta, Gamma and Delta as benefit options and not as hospital groups.*

The contribution discount is based on the price discounts provided by the hospitals...

...of which Alpha represents the largest proportion (remember that the hospital network will remain unchanged).

Therefore, the loss of Alpha’s discount would result in a substantial increase in the average hospitalisation costs on the EDO options, regardless of what happens to the arrangements with the other hospital groups.

A rough calculation shows that hospital costs can be expected to increase by 13.65%.

*{Credit given for reasonable attempts to quantify the increase.}*

*The 13.65% is derived as follows:*

*With the Alpha discount the hospital costs =  $0.78 + 0.22$*

*Without the Alpha discount the hospital costs are  $0.78*(1.175) + 0.22$ .*

*Then the increase = [Amount without discount] ÷ [Amount with discount] - 1*

This will only apply to the tariff proportion of the hospital bill, which typically comprises around 70% of the hospital bill for fee-for-service claims.

This in turn means that the efficiency savings that can be passed on to members of the EDO options is significantly reduced.

If the EDO contribution discounts remain unchanged then the financial performance of these options will degrade, all other things being equal.

Not changing the contribution discount will make the option as attractive in the market as it always has been. However, selling large volumes of loss-making business is not sustainable.

The scheme may attempt to “soft-channel” members towards other hospitals in the network. Its ability to do so to any meaningful degree is questionable.

If, on the other hand, the scheme wishes to maintain the same financial results it will have to decrease the EDO contribution discount...

...which in turn means that the contributions on the EDO versions of the benefit options will increase by a larger percentage than on their non-EDO counterparts...

...this large increase may drive away new business and/or existing members who were attracted by the discount in the first place.

Such a large increase may not be approved by the regulator.

Continuing with the financial losses by not passing on high contribution increases on these EDO sub-options without the discount will therefore place the viability of these options (EDO + non-EDO combined) and the scheme as a whole in jeopardy.

**[Max 5]**

- (iii) Describe what data you would use for the analysis and what adjustments are necessary. You may assume that the 2015 data is fully run-off for the purposes of this exercise.**

*Performance on this question was disappointing for a standard application question. Although most candidates got the mark for question 3(iv) by correctly identifying a Diagnosis Related Grouper (DRG) as the correct tool to use many clearly didn't actually understand what the function of a DRG is, what output it produces and how this output is used. (Note that the 2016 version of the core reading contains an excellent example of the use of DRG output to perform case-mix adjustment.)*

*Even though this question was about the preparation and adjustment of the data that will be input into the DRG many candidates lost time by unnecessarily discussing how they would perform the risk adjustment, including discussions of using exposure data, calculating average per-life-per-month costs and construction of GLM models, which would only be relevant if we needed to perform demographic risk adjustment, which we do not.*

*The length of most responses indicated that candidates struggled to generate sufficient points for a 10-mark question. Many candidates failed to include "standard" data preparation points such as validating the data or dealing with outliers.*

*Candidates also failed to follow instructions. The question clearly instructed them to use 2015 claims data and to assume that this data is fully run-off but candidates stated that data from multiple years should be used and explained how the data needs to allow for IBNR claims. Furthermore, the definition of efficiency provided in the question indicated that the analysis would only be concerned with cost based efficiency. Discussions of other efficiency measures such as length of stay or quality of care were not relevant to this part of Question 3 and should have been discussed in responses to part (v) of the question.*

The definition of efficiency provided indicates that we need data that tells us what the total cost will be per admission (or case). We therefore require data regarding hospital admissions. The final dataset should contain a record for each hospital admission which identifies the hospital where the admission took place, contains the relevant ICD and CPT codes, the date of admission, the benefit option the patient was on at the time and some basic demographic information such as age and gender that may be required by the clinical software tool.

Readmissions should be combined with the original admission to get a true reflection of the cost of the case and whether there were complications or not.

### **Scope of the data**

Firstly, we should use hospital claims from all of the scheme's data, if possible.

Using only the hospital claims from the EDO options would mean ignoring a wealth of data.

Secondly members on the EDO option will naturally tend to be admitted to the hospitals on the network and we want to consider every hospital in South Africa when selecting our hospital network.

Only a small proportion (less than 30%) of these beneficiaries would have been admitted to hospital during 2015 which is another reason for using as large a data set as possible.

If possible, we may even want to use the data of other schemes administered by FoxHealth (you are working for the administrator).

If we break down the analysis by hospital, we will have a lot of cells which may not be credible for analysis purposes.

For this reason, we will need to exclude hospitals that only had a small number of admissions during 2015.

Part of the data preparation would also include doing checks on the data such as comparing total hospital admissions to what is reported to the CMS or were reported through some independent reporting (that doesn't rely on the same data we are using).

The analysis may only include the direct hospital tariff expenditure. However, to get a true measure of efficiency the analysis should be done on the total costs including non-tariff hospital costs and related costs such as pathology and radiology as well as specialist costs. It makes no sense to select a hospital that is efficient on a hospital tariff level but which is inefficient on a total cost basis.

### **Adjust for the impact of discounted fees**

The data will also have to be adjusted to remove the EDO discounts or any other discounts so that we can make a consistent comparison across admissions for different options.

For example, an admission to an Alpha group hospital in 2015 came with a 17.5% discount for a patient on the EDO option, whereas the same will not be true of admissions on other benefit options.

We need to base the analysis on any discounts that we expect to (not) receive in 2017, since we are evaluating hospitals to build a network for that year.

### **Adjust for benefit richness**

If the analysis is based on the amounts paid by the scheme, then we will need to adjust for different benefit levels on various options.

For example, if a procedure on a comprehensive option is covered in full while there is a co-payment for the same procedure on a less comprehensive option we need to adjust for this to remove the effect of benefit design.

The easiest way to bypass the benefit adjustment problem is to use the amounts invoiced (claimed) by the hospitals rather than the amounts paid by the scheme.

In the case of hospital costs, we would need to adjust for the increases negotiated with each hospital group from one year to the next.

For example, if from 2015 to 2016 Alpha group negotiated an 8% increase whereas Beta group negotiated a 7.5% increase.

### **Adjust for Delta group's global fees**

We need to make adjustments to the claim costs for Delta group to adjust for the fact that it charges global fees.

For example, in the case of a procedure such as a gastroscopy the Delta global fee would include the gastroenterologist and anaesthetist fees whereas the claims for the other hospital groups exclude these.

We will need to apportion part of the global fee to the hospital part for Delta group (or exclude the other parts of the fee).

It may be that this information was shared as part of the process of negotiating the global fees, in which case we can base the apportionment on this information.

An assumption will also be necessary regarding the number of cases that will be performed in Delta hospitals in future since the discount is dependent on volumes.

**Adjust for outliers**

We need to remove any outlier admissions which may skew the results.

Alternatively, we may “censor” outlier admissions by only recognising a portion of the costs. For example, a R1 million case may be censored to R300 000, based on the distribution of costs for that type of admission. (*Truncation is also a valid response for this mark.*)

There may also be cases that cost too little, such as a full day in a high care ward that cost less than R1 000, which is not realistic.

The trim points may be determined by using measures such as multiples of inter-quartile range with quartiles or using percentiles.

Some cases may be excluded entirely. For example, organ transplants vary significantly in terms of complexity and cost, which makes comparison problematic.

**[Max 10]**

- (iv) **State what type of clinical grouper should be used for risk adjustment in this exercise.**

*Most candidates got this mark.*

The appropriate clinical grouper to use in this case is a Diagnosis Related Grouper (DRG) because the exercise is focused on inpatient admissions.

**[Max 1]**

- (v) **Briefly describe the potential problems, from a member's perspective, that may arise due to the change from the existing network to the one based on the most cost efficient hospitals.**

*This question was reasonably well answered. Where candidates performed poorly it was because they failed to frame the problems from the member's perspective (as opposed to those of the scheme or healthcare providers).*

### **Problems arising from the change in networks**

- Members may not be aware of changes to network and plan a procedure in a hospital that is not on the network
- ...which should be caught at the pre-authorisation stage...
- ...but the member will be inconvenienced by being told to use a different hospital.
- The scheme may also have to deal with a greater volume of enquiries and complaints meaning that lower customer service levels are possible.
- Furthermore, patients will have built relationships with specialists who may not have admitting privileges in the hospitals on the new network.
- Patients will then have to be referred to specialists who have admitting privileges in network hospitals, which causes inconvenience for the patients and additional costs for the scheme.
- On the other hand, if the patient chooses to remain with their (out of network) specialist they will now face a co-payment.
- The new network could potentially look very different from the old network, which can have an impact on geographic accessibility.

- This is a problem because we are not starting brand new options but altering benefit options that already have 11,000 members on them, who presumably based their purchasing decision partially on the network.
- An example would be a case where an existing EDO member is currently living close to a network hospital which won't be included in the new network and the nearest hospital on the new network is not within easy reach.
- Existing members may therefore move out of the EDO options to the non-EDO versions of their options, other benefit options or other schemes.
- If the network is not accessible to the target market this may have an impact on the volumes of new business as members find it less appealing.
- Relationships with hospital groups may be changed if the network change results in an increase/decrease in the volume of business that comes their way.
- If the network is continuously changed to reflect the latest efficiency measurement results, it will cause a lot of disruption for members who will never be sure exactly which hospitals are on the network at a given moment in time.
- The selection of hospitals may not have sufficient capacity to handle the demand from the members or may not be able to treat all cases. Even though this may result in co-payments being waived if the result is involuntary use of a non-network provider for a PMB there will still be uncertainty and inconvenience for the member as it may take time to prove that this use is involuntary.

#### **Problems arising from only using cost-effectiveness as a selection criterion**

- We are ignoring other factors related to quality of outcomes.

- This may result in post-admission complications and re-admissions, poorer quality of life and higher mortality for patients in the long run.
- Efficient hospitals are not necessarily the “nicest” in terms of the non-healthcare services (the “hotel stay” part of the experience) or in terms of facilities. Even though this is not directly related to clinical quality (but do impact on costs) members may perceive that they are being forced to use low quality facilities.

**[Max 4]**

**(Question 3 Max 22)**