

Actuarial Society of South Africa

EXAMINERS' REPORT

MAY 2017

Subject F201- South African Health and Care

Specialist Applications

Introduction

The Examiners' report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

General comments on the aims of this subject and how it is marked

1. The aim of the Health and Care Specialist Applications subject is to instil in the successful candidates the ability to apply knowledge of South African health and care environment and the principles of actuarial practice to the provision of health and care benefits in South Africa.
2. Candidates who approach the questions, especially the more substantial elements of each question, in a methodical and detailed manner are far more likely to pass the subject. Candidates will gain few marks if they do not address the question asked but merely write around the topic of the question. The mark allocation for each question part gives an indication of the relative length of answer or number of points to be made to gain full marks.
3. It is often helpful to use subheadings when answering long part questions.
4. Candidates who give well-reasoned points, not made in the marking schedule, are awarded marks for doing so.

General comments on student performance in this session of the examination.

The difficulty of the paper was consistent papers set for recent sessions. Well prepared candidates scored well across most of the paper. Questions that required an element of analysis or application of knowledge were less well answered than those that just involved repeating bookwork. The comments on the questions below concentrate on areas where candidates could have improved their performance.

QUESTION 1

i.

This easy bookwork question was reasonably well answered.

- Medical expense
- Direct income lost
- Loss of the ability to earn income or a level of income
- Long-term care
- Household expenses such as family care
- The costs associated with lifestyle changes
- Additional unforeseen expenses
- The additional burden of debt

ii.

This knowledge question was poorly answered.

Several candidates ignored the instruction given and listed only the fixed-amount insurance products that they were told to exclude.

- Medical scheme cover and bargaining council sick funds
- Insurance products with exemption from specified Medical Schemes Act requirements
- Benefits under the Compensation for Occupational Injuries and Diseases Act (COIDA)
- Benefits under the Occupational Diseases in Mines and Works Act (ODMWA)
- Benefits from the Road Accident Fund (RAF)
- Medical services provided by the state
- Private funds from family, friends, employers, non-governmental organisations, charities, etc.

iii.

This knowledge question was poorly answered. Candidates who used headings to indicate which product they were describing performed better than those who only produced a list of attributes or those who described non-related product such as medical schemes or critical illness, even though the question specified products where the event that must occur in order for the benefit to be paid is disability.

Accident and sickness cover

- Provides regular income,
- usually for a specified period or until retirement,
- following a deferred period,
- payable for as long as the claimant remains disabled.
- Disability is defined as being unable to perform one's own or any occupation, or specified activities of daily living (ADLs).
- The regular income could remain constant or increase in a pre-determined way.
- Benefits usually include a fixed lump sum (continental scale of cover) if the policyholder loses a limb (or the use thereof) through an accident.

Disability cover

- The benefit entails income replacement,
- on temporary or permanent disability,
- and/or on total or partial disability.
- The benefit is usually limited to a maximum of 100% of earnings,
- with most covers at 75% (dropping to 50% after two years).
- A lump sum cover is also usually available on permanent disability (instead of an annuity benefit).
- Disability can be defined on occupational basis (the ability to perform one's own occupation, a similar occupation or any occupation)
- or on a functional basis (i.e. the ability to perform one's own or any occupation or rating of physical ability such as Activities of Daily Living, i.e. ADLs)
- Benefit payments commence after a waiting period (usually three to six months).

- Benefit payments can be payable until retirement age, return to work or death.
- For a lump sum, there is a deferred period to give time to assess the permanence of the disability.

Long-term care

- The benefit is the funding of or services for continuing personal, nursing or associated domestic care to people who are unable to look after themselves without some degree of support. Benefits provide support for custodial care, not curative care.
- The care setting can be the beneficiary's home, a day centre, or state or private home.
- Care can be provided formally or informally (usually by the spouse, children or other relative).
- Benefits can be for future care (pre-funded cover) or immediate care (immediate cover).
- The benefit payment may be triggered by a single event (defined level of disability using ADLs and/or cognitive impairment) or a set of multiple events (e.g. disability event from a defined list, followed by hospitalisation or admission to a nursing home).
- Benefit payments can be a single lump sum, or one of a variety of annuity structures (annuity certain, a lifetime/maximum period annuity subject to ongoing disability).

iv.

This short knowledge question was reasonably well answered.

Several candidates incorrectly stated that the reimbursement model was fixed-fee based on the fallacious argument that the fee per consultation is fixed.

- A fixed amount per doctor visit implies a fee-for-service reimbursement model.
- Price risk is transferred to the doctors.

v.

This application question was answered very poorly.

Candidates who scored well in this question recognised that the method for calculating the salary increases was not explicitly defined and considered various alternative methods together with the implications of each approach. They also used the information that was provided to perform relevant calculations, generated points that were relevant to the situation presented and clearly stated their conclusions.

Several candidates failed to approach the question practically (often ignoring the context completely), did not attempt any calculations and ignored the instruction to ignore taxation and post-retirement medical aid liabilities.

Implications for Ostrich

- Ostrich would need to determine the increase to grant each affected employee in order not to leave any employee worse off, based on the previous year's benefit utilisation.
- The product would no longer be available. Therefore, Ostrich would have to renegotiate the remuneration package of affected employees, possibly through a union.
- One option is to grant every family an amount increase equal to that specific family's benefit usage in the previous year.
- This would mean different percentage and amount increases to each employee.
- The minimum increase would be zero, for a family that had no claims.
- The maximum salary increase would be R8 420 per family:

GP visits	$(1 + 2 + 4) \times 4 \times R240 = R6\ 720$
Specialist visits	$2 \times R450 = R\ 900$
Prescribed acute medicine	R 800
Total	R8 420

- The maximum increase of R8 420 equates to an 11.4% increase for the lowest-paid employee with maximum family size and full utilisation of benefits. The calculation is $8,420 / (6180 * 12) - 1$.
- With such a vast range of increases, Ostrich would be at risk of being perceived as engaging in discriminatory practices based on:

- health status, since increases are based on employees' actual utilisation history
- family size, since larger families would on average tend to have claimed more benefits under the product than smaller families
- age, since older employees would tend to have claimed more benefits than younger ones
- gender/sex, since the genders/sexes would on average tend to have claimed at different rates at different ages
- The perception of discrimination may lead to the risk of reputational damage and/or industrial action.
- To avoid these risks, Ostrich could decide to grant every employee the maximum benefits utilised by any family in the previous year, i.e. the maximum benefit entitlements of the maximum family size.
- The average premium per family equals approximately $(R259 \times 1) + (R189 \times 0.84) + (R99 \times 2.08) = R624$ per employee.
- This would lead to a net increase in Ostrich's expenses, after allowing for the premium saving, of $(R8\ 420 - R623.68 \times 12) \div R9\ 216 \approx 10.1\%$ for every employee.
- This increase would be higher if provision is made for inflation in the prices of the applicable medical services in the period following the once-off increase.
- Such an increase in Ostrich's salary expenses could be prohibitive because of the strain on Ostrich's cash flow and/or profits.
- Other options include granting each employee an increase equal to maximum benefit entitlements for his/her specific family composition under the product, or an increase based on a combination of his/her family's actual benefit utilisation and the maximum benefit entitlement for either his/her own family or the maximum family size.
- These options would still either be very costly to Ostrich, or leave the risk of perceived discriminatory practices, or both.
- The product premium could include an allowance for management expenses or explicit management fees for:
 - Administration of the product
 - Managing the networks, including:
 - Profiling of providers
 - Developing and enforcing referral requirements
 - Developing and enforcing other protocols and formularies

- Conducting rate negotiations
- The premium could also include allowance for
 - Brokerage and/or commission
 - Solvency margin
- The premium would also include Comfort's profit or loss.
- Ostrich could save on the cost of the above allowances and profit (assuming it is a net positive) if it bases the salary increases on benefit utilisation only and forgoes these services (i.e. shifts them to the employees where applicable).
- Another option may be to grant each employee an increase based on the average claims of all employees. This could be adjusted for family size. Such an increase would be closer to being cost-neutral for the employer.

Implications for affected employees

If increases were granted based on each family's actual benefit utilisation in the previous year:

- A family could face an increase in primary healthcare needs compared to the previous year for a variety of reasons:
 - The health care needs of a single family can be volatile from year to year as a result of random variation.
 - Family composition can change over time, with a concomitant change in primary health care needs, e.g. an increase in primary health care needs resulting from the birth of a new baby.
 - The burden of disease can increase for the entire population, e.g. a worse influenza season than the previous year.
- Families may not be able to acquire the same health services at the same cost to which they were available to Comfort because of:
 - Negotiated rates no longer being in place (possibly because of lack of negotiating power to obtain volume discounts).
 - Protocols and formularies, profiling mechanisms, etc., no longer being in place.
- Affected families would have to carry the risk of these increases in needs and costs through out-of-pocket payments or utilisation of state facilities.

- Given the salary levels these employees would not pass the means test and (theoretically) access to state facilities will not be free (though they may be partially subsidised).
- In the extreme case, employees whose families did not use any of the benefits under the product would not get any salary increase.
- Even if employees are not worse off in the year following the once-off increase, they may be worse off in the subsequent years, as inflation in prices for medical products and services may be higher than wage inflation.
- This does not seem consistent with the claim of no employee being any worse off after the salary increase than under the product.
- In addition, employees' expenses that reference their salary (e.g. pension contributions) will increase in because of a once-off salary increase.
- Some families would also experience a reduction in risk and cost because of a reduction in primary care needs, e.g. a family may have a specific primary care matter to address in one year that is not repeated in the next, the number of family members may reduce from one year to the next, etc. In such cases the once-off increase may be more than is needed to fund future primary care needs.

If salary increases equal to the benefit entitlement under the product for the maximum family size were granted:

- Families of maximum size that utilised their full benefit entitlements, or close to their full benefit entitlements, could still face increases in costs because of:
 - Negotiated rates no longer being in place (possibly because of lack of negotiating power to obtain volume discounts).
 - Protocols and formularies, profiling mechanisms, etc., no longer being in place.
- Affected families would have to carry the risk of these increases in needs and costs through out-of-pocket payments or utilisation of state facilities.
- This does not seem consistent with the claim of no employee being any worse off after the salary increase than under the product.
- However, many families could experience a reduction in risk and cost because of their needs not reaching the full benefit entitlement under the maximum family size under the product.

If the increase is based on the average claims of all families of a similar size:

- Some employees will be better off than in the scenario where increases are determined separately for each family based on past utilisation, particularly those who did not claim at all.
- On the other hand, families that utilised their full benefits would be worse off as they will now only receive the average.
- The amount would be equal to the risk premium of the insurance premiums...
- ...which would make sense if members had the option to buy insurance at similar prices. However, this is not the case.
- The fact that this product will no longer be exempt from the MSA means that it is unlikely that any products of this type will be available.

Other:

- In all the scenarios except the “maximum benefit entitlement” all risk (utilisation as well as price) is being transferred to the employees.
- Amounts such as GP consultation fees and SEP need to be adjusted for increases from one year to the next.

vi.

This question was answered very poorly.

Most candidates failed to think widely enough or to consider utilisation of primary healthcare services from the point of view of the affected members.

Reduced utilisation

- The risk of increased use of primary health care services is largely transferred from Comfort to the employees themselves under the salary increase scenario.
- Previously some employees might have considered the insurance product benefit entitlements as “targets” without taking care not to over-utilise.
- However, now they must pay for the services from their own disposable income (albeit higher than before).
- There might therefore be an overall reduction in their primary health care service utilisation because of more careful management by themselves.

Under-utilisation

- Under the salary increase scenario there is no enforced mechanism to ring-fence funds for employees' primary health care needs.
- Employees may consider other expenses they need to cover from their disposable income to take priority over private primary health care provision.
- They do not have an annual benefit entitlement available at the start of their policy year as was the case under the insurance product and will need to start to build up funds from their increase in disposable income to provide for their own private health care services utilisation –.
- This means they may not have enough disposable income or savings to pay for private primary care when the need arises, particularly if this occurs early in the year.
- Primary care providers may not have the same incentives to provide care at the same cost and quality levels as under the insurance product, e.g. profiling and negotiated rates, which could lead to further affordability constraints to the employees.
- This could increase the cost and hence reduce the affordability of these services to the affected employees.
- The abovementioned affordability constraints could lead to a situation where employees are not able to obtain private primary health care services when they need to.
- They may turn to the state for primary health care provision that would previously have been covered at private providers by the insurance product.
- Alternatively, they may not seek or be able to obtain necessary primary health care services at all.
- Such under-utilisation of clinically appropriate necessary primary care services could lead to increases in hospital utilisation and a generally worse disease burden.
- Previously members had access to an R800 acute medicine benefit. Doctors who were aware of this benefit may have been more likely to prescribe such medicine whereas now they will be aware that acute medicine will be paid out of pocket.

QUESTION 2

i.

This knowledge based question was reasonably well answered.

An employer can offer a restricted medical scheme to its employees as part of its employee benefits package.

Scheme membership is (typically) only available to employees of that specific employer and their dependents.

Many employers subsidise a proportion of their employees' contributions to medical schemes and will therefore have a vested interest in the performance of the scheme and its contribution increases.

Compulsory membership of a medical scheme may also be a condition of employment, particularly for middle/upper income employees.

The restricted medical scheme is a separate legal entity from the employer, and runs on a not-for-profit basis.

Medical schemes are managed on behalf of members by a board of trustees...

...who are held accountable to clear governance principles enshrined in legislation.

These trustees have a fiduciary duty to only act in the best interests of all members of the scheme, regardless of how they were elected.

At least 50% of the members of the board of trustees shall be elected by members.

In the case of corporate schemes the rules typically allow the employer to nominate the remaining trustees.

These employer-elected trustees give the employer a *limited* measure of control over the affairs of the scheme in the sense that employer nominated trustees will be aware of the needs and plans of the employer.

The interests of the corporate restricted scheme are more aligned to the interests of the employer compared to those of open medical schemes.

A corporate restricted scheme is primarily focused on providing healthcare coverage for its members in an equitable manner. Open (commercial) medical schemes need to be more focused on being competitive, managing anti-selection risks, attracting a younger age profile and growing/maintaining membership volumes.

Some employers would inject funds/provide grants to its associated medical scheme. These funds cannot be in the form of a loan – it needs to be added to members' funds to increase solvency. Therefore, such an increase will not give the employer influence over the scheme.

The corporate restricted scheme is dependent on the continuing support of the employer. If it isn't satisfied it could remove compulsory membership, reduce subsidies etc. which will have an impact on the sustainability of the scheme. The scheme's fortunes are also tied to those of the employer.

ii.

This question was poorly answered.

Candidates who performed well in this question could consider a wide range of relevant factors that influence choices and preferences in the medical schemes market and the relationships between various stakeholders.

Most employers are moving to a fixed cost-to-company approach, where the full cost of medical scheme membership is *included* in the package instead of an explicit subsidy.

{Many candidates misunderstood this point, even though cost-to-company remuneration is common and the concept is explained in the core reading.}

As they have moved to a cost-to-company approach, employers may have moved away from company based medical schemes to allow free choice of scheme by employees whose net pay is now more dependent on choosing a specific benefit option and scheme.

Corporate restricted schemes do not normally pay commissions...

... brokers therefore have an incentive to target restricted medical scheme members for whom commission is currently not being paid and move them to open medical schemes to generate commission income. Brokers may therefore have lobbied the employer to allow freedom of choice.

Employees will continuously compare the contributions and benefits of their corporate medical scheme to those available in the open market when their net pay is directly influenced by this choice.

This includes ancillary products such as loyalty and lifestyle programmes.

Open schemes and these ancillary products are marketed extensively whereas restricted medical schemes will have limited marketing.

Employees, perceiving that they were not getting value for money on their medical scheme or who want the loyalty programme benefits, may therefore also have lobbied their employer to allow them to join open medical schemes.

Open medical schemes with multiple options may serve the interests of some employees better than a restricted medical scheme with only a limited number of options.

Job applicants will not only consider the remuneration package offered by a new employer, but also the employee benefits, including the possibility of joining well known open medical schemes. If there is a strong preference amongst these prospective employees to become or remain members of specific open medical schemes, then this may have also been a factor in the decision as the company wants to be the employer of choice in its industry.

The introduction of accounting statement AC116 and IAS19 required that employers disclose their post-retirement medical scheme liability on their balance sheets.

Consequently, several companies have capped post-retirement subsidies to staff and/or altered contracts of employment for new employees to specifically state that the employer will not subsidise medical scheme contributions post-employment.

Since the employer is no longer subsidising medical scheme contributions it becomes more difficult to argue that the employer can prescribe which medical schemes employees must belong to (particularly if pre-retirement subsidies have been cut as well and do not exist in a cost-to-company arrangement).

If union based members were also required to belong to DMed before 2005 then the union could have put pressure on the employer to allow the union schemes to come in...

...this would have created a precedent that may have set the scene for freedom of choice for all employees.

Where membership had previously been compulsory for all non-union employees the decision to only make membership of a medical scheme compulsory to employees in higher job-grades would have been driven by the question of whether medical scheme membership is affordable to lower job-band employees.

Past corporate action may also have led to this arrangement. For example, the company may have acquired other businesses in the past and allowed those employees to remain on the medical schemes they belonged to at the time of the acquisition.

iii.

Performance in this simple calculation question was below expectations. These should be easy marks for a candidate at this level. Most candidates could calculate the weighted average ages and pensioner ratios.

Marks were often lost because candidates did not show their calculation steps and did not state their assumptions.

Assuming Holden stores left at the start of 2016:

Then the results for the scheme would change to:

- Average numbers of members = $4,000 + 500 = 4,500$
- Average number of beneficiaries = $8,120 + 1,260 = 9,380$
- Average age = $(8,120 * 47.1 + 1,260 * 38.4) / 9,380 = 45.9$
- Pensioner ratio = $(8,120 * 28.4\% + 1,260 * 8.8\%) / 9,380 = 25.8\%$

In 2016 gross contribution income including Holden Stores would be $137.58 / 0.398 =$
R345.68 million.

If average contributions **per beneficiary** are the same across all companies, then the gross contribution income without Holden Stores would be $R345.68m * 9,380 / 17,150 =$
R189.07million.

*Alternatively, if average contributions **per member** are the same across all companies then the gross contribution income without Holden Stores would be $R345.68 * 4,500 / 7,500 =$
R207.41million.*

Which means that the solvency ratio without Holden Stores would change from 39.8% to
 $137.58 / 189.07 = 72.8\%$

*Alternatively, using **per member** numbers: the solvency ratio without Holden Stores would be
 $137.58 / 207.41 = 66.3\%$.*

{Note that the calculates above assume no change in the net underwriting result – see the comment below.}

When Holden Stores leave DMed's average age will instantly increase by $45.9 - 39.6 = 6.3$ years.

Assuming that average claims per beneficiary increase by 2.5% for each year the average beneficiary age increases... *{marks given for reasonable assumptions}*

...we estimate that average claims per beneficiary per month will increase by $6.3 * 2.5\% = 15.75\%$ above tariff increases and estimated utilisation increases.

Marks were given for any reasonable attempt to estimate the effect of Holden Stores leaving on operational results.

{Additional assumptions, such as the percentage of expenditure that is attributable to non-healthcare expenditure, would be required to calculate the total healthcare expenditure. The average derived claims and non-healthcare expenditure would then have to be adjusted based on the calculations above to estimate the new net underwriting result in 2016 and the resulting solvency.}

Several candidates stated that the Holden Store members will take a proportional share of the reserves when exiting the scheme and based their solvency calculations on this. While such a transfer of reserves is theoretically possible within the scope of the Medical Schemes Act it is by no means common.

iv.

This question was very poorly answered.

Most candidates could not list the implicit assumptions inherent in their calculations and limited their responses to numerical assumption values, meaning that they struggled to generate points.

Better candidates could explain why an assumption may or may not be reasonable and in what circumstances they would be invalid.

1. Average contributions per beneficiary/member is unlikely to be the same across all three companies for the following reasons:
 - a. The distribution of members across benefit options may not be the same...
 - b. ...with older members tending to belong to more expensive comprehensive benefit options and younger families tending to choose less comprehensive, more affordable benefit options.
 - c. It assumes that the composition of the average family (adult dependant ratio and child dependant ratio) is the same for all members...
 - d. ...when these also vary by the age of the principal member (amongst other things).
 - e. The distribution of members across income bands are assumed to be the same for the three companies, which may not be the case for different industries, geography, etc.
2. The assumption that, in Holden's absence, the claims and non-healthcare expenditure would not have changed (as above) or would have changed as per the proportional assumptions made in the previous questions may not be realistic.
3. The assumption that average claims costs in a beneficiary pool increases by 2.5% for every 1 year increase in the average age assumes that the relationship between age and claims is linear and that claims are only a function of age. This is not the case.
4. The shape of the "claims curve" is not the same for males and females. At childbearing ages females claim more than males but at the higher (pensioner) ages males claim more on average than females.

5. Using age bands that reflect how claiming patterns change by age (and other relevant factors such as gender) would result in more accurate estimates of the resulting change in average age.
6. Despite this the average age approximation results in useful estimates, so long as the underlying risk profile does not change too much.
7. If Holden Stores would leave at the start of the year is reasonable: moving employees from one scheme to another in the middle of the year would expose them to complications such as pro-rated benefits, disruptions cause by having to use a new network of providers and so forth. Moving members at the start of the year is therefore the preferred strategy.

v.

This question was poorly answered.

Performing well in this question required that candidates consider a range of factors including the relationship between the employers, representation on the Board of Trustees and the inherent cross-subsidies within DMed.

The two other employers participating on the scheme can do so because DMed's rules (specifically the eligibility criteria) allow this.

DraperCorp disposed of these companies. This means that it no longer has direct control over these companies and the decisions they make.

These decisions include:

- whether they wish to continue to offer DMed to their employees and
- whether DMed is compulsory for employees of these companies.

In addition, if the rules allow these other companies to nominate some of the employer trustees then the representation of DraperCorp employees on the Board of Trustees is somewhat diluted.

DraperCorp represents 53.3% of members (4000/7500). Thus, depending on how active the members are (in practice not very) the election of member trustees would also be proportional.

If membership of DMed is not compulsory for employees of these other companies, then it exposes the scheme to individual anti-selection risks that will lead to higher claims than would otherwise have been the case

Since these companies do not have a PRMA liability that is directly linked to DMed (due to the conditions of sale) they have much less incentive to continue participating on DMed or managing anti-selective risks.

The beneficiaries associated with DraperCorp have a very poor risk profile, particularly when compared to the other two employers. Thus, their average claims are expected to be higher than those of the other employers

This means that there is a cross-subsidy from the beneficiaries associated with the other employers to the DraperCorp members.

In other words, if these other employers withdrew from DMed then contributions would have to increase significantly compared to their current levels (as shown in the results in part (iii))

The impact of Holden Stores leaving the scheme will be far greater than if Miller Electronics leave.

Without these members DMed would become a smaller scheme. This will result in its experience becoming more volatile and unpredictable.

Even though statutory solvency levels will temporarily increase if these employers withdrew the scheme will now be in an (even more) unsustainable financial situation.

It can be argued that the other employers are also subsidising DraperCorp's PRMA liability by keeping contributions lower than they would have been if these companies were not participating on DMed.

It is in the interest of both DMed and DraperCorp that the other employers continue to participate on the scheme and continue to offer the scheme to new employees.

vi.

This higher order reasoning question was answered extremely poorly.

Candidates who did perform well in this question considered the wider implications of the proposed cash injections in the long term. They based their arguments on objective criteria (i.e. whether the proposed payments and the resulting change in the PRMA liability would have a positive net present value) and considered how a (rational) board of trustees would alter their management of the scheme in response to such payments.

The scheme's net result will improve by the amount paid each year, as will the amount of member funds, which is the numerator in the solvency ratio calculation.

These amounts would be reflected in DMed's income statement under "Investment and other income" as opposed to the contribution income line.

Gross contribution income will remain unchanged (or be lower depending on how these payments affect contribution increase decisions). Since this is the denominator in the solvency ratio calculation the solvency ratio will be higher than it would have been if contribution income had been increased by the same amount.

{For this reason, direct cash injections are a much more efficient way to increase solvency levels than contribution increases.}

However, the scheme's net healthcare result will be unchanged.

The scheme recorded a net deficit after investment income of R17.7 million. If the scheme had positive investment income, then we can infer that the net healthcare deficit would be greater than this amount.

After five years, the cash donations will cease and DMed must reach a sustainable financial position by then (if it wants to achieve long term sustainability).

To remain sustainable, it is advised that medical schemes should achieve a break-even result before investment income.

The only way for DMed to achieve breakeven results would be to do the following:

- Increase contribution income,
- Reduce healthcare expenditure, or
- Reduce non-healthcare expenditure, or
- Increase investment returns

It is now 2016/2017. To control expenditure most medical schemes will already have put in place the controls that would have resulted in the greatest cost/benefit. It is unlikely that there is much scope to reduce healthcare expenditure without significantly cutting benefits or to reduce non-healthcare expenditure without affecting service.

Since the cash grants do not help DMed to achieve break-even results before investment and other income it follows that DMed will still require high contribution increases over the medium term to reduce the losses. (The stated intention of the strategy is to decrease contribution increases).

Increases will also be required to compensate for DMed's worsening demographic profile, a trend that is likely to continue.

The cash grants will improve the solvency ratio of the scheme, removing the need for a reserving margin, which means that contribution increases can be lower than they would have been without the grant.

However, it is unlikely that the required contribution increases will be significantly lower than they are in the status quo scenario.

A possible exception to this would be the case where the scheme has a very high solvency ratio after receiving the grants and is generating significant investment income. This would require a massive increase in DMed's current reserves (i.e. the payment of very large annual grants), given the current solvency level.

The PRMA liability is a long-term liability (calculated over the remaining lifetimes of the individuals who are eligible for the subsidy).

Discounting means that lower contribution increases in the next five years will have a greater impact on the size of the liability than contribution increases after that period will have.

Several candidates incorrectly stated that the payment of the proposed cash grants would result in DraperCorp's PRMA liability being valued on a claims basis, which would substantially increase the valuation of this liability. There is absolutely no basis for this.

"Grant" means a payment with no further obligation. It does not imply any subsidy, which is an obligation that results in a PRMA liability if it is related to post-employment contributions. Furthermore, it was clearly stated that the five annual payments would all be of equal amount, although the size of these payments was not specified, meaning that it is not linked to contribution levels or claims in any way, nor is it ring fenced for any specific group of members. The examiners believe that these candidates based their statements on a question in the May 2015 examination without an appreciation of the different circumstances.

Ultimately the impact of this strategy on future contribution increases will depend on the magnitude of the cash grants.

Objectively speaking, for this strategy to be feasible, the net present value of the cash grants over five years must be less than the resulting reduction in the PRMA liability (i.e. the NPV of the total transaction must be positive.

The opportunity cost of not using this money elsewhere in the business also needs to be considered and would inform the discount rate used in the NPV calculation.

Conclusion: While this strategy will temporarily improve DMed's solvency, the amounts that DMed would have to pay to reduce long-term contribution increases significantly are very likely to be too large to be worth the reduction in the PRMA liability.

vii.

This application question was answered extremely poorly.

Many candidates did not perform the assigned task, which was to describe how they would construct the projection model and populate it with the necessary data and assumptions.

Some candidates reproduced the theory of constructing medical scheme projection models contained in the core reading, which attracted some basic marks.

A few candidates distinguished themselves by considering the situation presented and the functionality and output that would be required from a long-term projection model that will be used in the manner described in the question.

Data required for constructing the long-term projection model for DMed

- Membership data including
 - Date of birth (age)
 - Gender
 - Chronic conditions
 - Benefit option
 - Income band
 - Beneficiary type (principal member, adult or child dependant)
 - When they joined the medical scheme
 - When they withdrew from the scheme

- Claims data including:
 - Date of service
 - In or out of hospital indicator
 - Discipline code of the provider
 - Claim type and/or benefit category
 - Amounts claimed, paid as risk benefits and paid from medical savings accounts

- Allowance needs to be made for claims that have been incurred but not reported, or reported but not paid, if the claims for the service dates used are not fully run off.

- We must be able to link the claims data to the membership data over a relevant period (at least one full calendar year).

- Annual financial statements and management accounts
- Information regarding the Scheme's investments including the asset classes that are invested in as well as the expected long-term rate of return on those asset classes
- Information regarding the scheme's reserving and pricing strategy
- Information regarding the scheme's capitation fees, administration fees/expenses, managed care fees/expenses and the anticipated increases in these.

Constructing the model

{Credit was given for other valid approaches such as using GLMs instead of the risk cell approach adopted in the solution below.

In practice, the application of GLMs is very similar the risk cell approach because these models often only use categorical prediction variables. Applying exposure data to produce predictions using the fitted GLM coefficients would result in a medical scheme projection model that is very similar to a risk cell based one. In such a case, the use of the GLM simply means that the average expected costs per cell is calculated based on a statistical regression model, rather than using crude averages. Candidates who wish to propose alternatives such as GLM based models need to be able to describe how they would apply it in the construction of their model. Simply stating that you will use a GLM or stochastic modelling is not sufficient.}

- Divide the population into homogenous risk cells based on their claims propensity
- Age must be an explicit risk factor as we will need to model ageing explicitly, either by modelling ageing in bands or modelling per beneficiary or using a model point approach.
- Divide the claims into categories since the distribution of claims by age and gender differ for various claims categories.
- Address outliers by setting a suitable definition for an outlier, excluding claims falling under this definition from the cells in which they occurred and spreading the amounts over a number of cells (or by using another reasonable approach).

- Divide claims by the corresponding exposure to get per life per month (best) or per member per month (less ideal) amounts.
- Project each demographic cell into the next year, allowing for assumptions regarding:
 - Mortality rates
 - Withdrawal rates from the scheme
 - New entrants joining the scheme
 - The demographic profile of these new members
 - Which benefit options these members are likely to join
 - Movements between benefit options (buying up or down)
 - The change in distribution over income bands if applicable

Adjust claims in each claim group each year to allow for different:

- Price/tariff increases
- Trends in utilisation (over and above ageing)

Multiply the adjusted claim amounts by exposure to get the total claim amounts

Calculate non-healthcare expenditure, allowing for:

- Fixed and variable costs
- Expense inflation

Project investment income...

...using appropriate rates of return.

Calculate contributions

In the first year (2017) multiply exposure by the known contributions to get contribution income.

In the following years contribution increases, should be set consistently with the scheme's reserving/pricing strategy.

Project the model into the future to see what the necessary contribution increases will be.

Such models become unreliable when the experience of the scheme is being projected more than 5 to 10 years into the future.

We may therefore not want to project beyond that time and make a general assumption to project the experience into the longer term.

Try to include historical years in the model and check if it can reproduce the experience recorded in the financial accounts to ensure that the model was accurate.

viii.

This was another application question where candidates performed very poorly.

The candidates who performed well in this question approached the problem practically. The most valuable marks were available for describing how the output of the long term medical scheme projection model would be used in the PRMA valuation model and how the amount calculated by the PRMA model would be used to calculate the impact of the compulsory membership proposal on the liability.

For this exercise, we will need to calculate the PRMA liability in two scenarios:

- Scenario A: a status quo scenario (the existing state of affairs will continue)
- Scenario B where membership is made compulsory for some employees

Variations on Scenario B are possible as we may want to model different numbers of new employees in future years, as well as other variations such as the profile of these members.

We may also want to make assumptions regarding the proportion of new employees who will join DMed. For example, depending on the definition of “compulsory membership” some new employees may not join DMed if they can show that they are already registered as dependents on another medical scheme (for example as dependents of their spouses or parents).

We will then compare the results to determine the impact of the new members

Calculating the PRMA

*{We already have functional PRMA model so we do not need to construct one. Therefore, there are no marks available for describing how to **construct** such a model or how to perform a projected unit credit calculation.}*

We only need to populate the model and set the relevant assumptions.

- Obtain data for all the pensioners and active employees and their dependents who are entitled to a post-employment subsidy of their contributions, including
 - Date of birth
 - Gender
 - Benefit option
 - Date of service for active employees

- We already know that the subsidy is 75% of DMed contributions. However, we must find out exactly what the subsidy policy is in terms of
 - How future dependants will be subsidised (e.g. if the member remarries)
 - Whether dependants will continue to receive a subsidy after the death of the main member
 - Whether active employees will be eligible for the subsidy if they take early retirement due to ill-health, for example.
 - To which option's contribution the subsidy applies (e.g. the chosen option during retirement, the option at the member's retirement date, etc.)
 - In case of income rated options, which income is used (e.g. income at retirement date, income during retirement, etc.)

- We will need to choose a suitable discount rate

- The discount rate may be derived from the yields on bonds with an appropriate duration or by using a zero-coupon bond yield curve, if one is available

- We will need to populate the model with appropriate assumptions regarding:
 - Pre-retirement mortality
 - Post-retirement mortality
 - Income in retirement
 - Rates of withdrawal from employment
 - Withdrawals from medical scheme membership
 - Retirements, normal and early
 - Marital status at death/retirement
 - Spouse's age difference

- Medical scheme option in retirement
 - Past service for active employees, if the actual values are not available
 - The age of independence of child dependants
- To maintain consistency, we may choose to use the same assumptions that were used by the actuary to perform the most recent PRMA valuation that was performed for accounting purposes.
 - DraperCorp's liability is unfunded so we don't require an assumption regarding the expected rate of return on plan assets.
 - The last input into the PRMA valuation model will be the future rate of contribution increases on DMed in Scenarios A and B.
 - The most appropriate way to do this would be to construct a long-term projection model for DMed (which we have already done) and use the contribution increases in each scenario as input into the PRMA model.
 - This will change the net discount rate in each scenario

Data required for setting assumptions regarding the new members that will join due to compulsory membership

- We will need employee information from DraperCorp including:
 - The rate of staff turnover
 - The demographic profile of new employees (age, gender etc.)
 - Projections of future employee numbers, based on DraperCorp's long term business plans.
- We will need to have this data by job-grade (for obvious reasons)
- Perform sensitivity analysis