

EXAMINERS' REPORT

November 2020 examinations

Subject F101 — Health & Care Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principal Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners, and should not be taken as model solutions.

QUESTION 1

Part (i) was a standard bookwork question but not many students achieved full marks. The majority of attempts understood what a FCL is but did not mention that it is affected by scheme size and average cover amount. A disappointing number of students stated that the FCL cover amount is offered to everyone in the scheme when in fact each individual cover amount is calculated as 3x salary as stated in the question.

Part (ii) relied on students to apply higher order thinking to a practical setting with many students doing well and scoring most if not all the marks. There seemed to be some confusion with a few students thinking that setting the FCL to zero means no-one gets underwritten when in fact the complete opposite is true.

Part (iii) was a standard bookwork question with many students achieving full marks. A disappointing number of students confused anti-selection with non-disclosure. The latter being intentionally withholding information the insurer has requested – this is different to the insurer being open to anti-selection (which is legal).

Most students scored well on part (iv) of the question if they were able to think through measures to reduce anti-selection.

(i)

Free cover limit refers to the sum assured level in a group risk arrangement below which a member is not subject to individual underwriting. Free cover limit is usually a function of the number of members in the scheme or the aggregate level of benefits provided.

(ii)

Groups of 5 or less members cannot be deemed statistically credible enough to offer a FCL as one high risk member could result in a significant loss for the insurer on such a small group. By setting the FCL to zero the insurer will subject everyone to underwriting, thus reducing the anti-selection risk.

(iii)

People will be more likely to take out insurance contracts if they believe their risk to be greater than that allowed for in the insurer's premium i.e. the benefits are worth more than the premiums payable. This is known as anti-selection.

(iv)

- Use of FCL above which individual underwriting applies– which it is currently doing
- Could also require the business owner to automatically go for underwriting (since usually the decision maker of taking up the insurance or not)
- Compulsory membership of the scheme – all members need to take up the cover
- And within a set time frame, say 3 months of starting work if new member
- Alternatively, high voluntary membership take-up, say above 75% of members
- Using waiting periods during which no claims are payable (or only accidental claims are payable)
- Limiting the amount of cover available for an initial period (to say 50%)
- Requiring an actively at work clause – the member needs to have been actively working during the last 12 months say

- Having pre-existing conditions exclusions in the policy wording

QUESTION 2

Part (i) was relatively poorly answered in terms of the candidates being able to identify the key elements of determining reserves - namely knowing the proportion of policyholders in each state and discounting the expected cashflows attributable to each state.

Part (ii) was generally well answered with the majority of candidates scoring at least 50%.

Part (iii) was fairly well answered by the majority of candidates. A number of candidates strayed outside the core question of improving profitability and suggested changing the underlying valuation assumptions. This would not have an effect on the profitability of the product and does not address the question related to transition intensities. Similarly, no marks were awarded for suggesting reinsurance arrangements as these do not address the core issue of claims/ transitions into the claiming state being higher than initially priced for.

(i)

- The insurer would need to specify the states:
 - Paying premiums
 - Claiming
 - Dead
- The product does not allow for return to a premium paying state
- The death state is absorbing
- The reserving requirements would be calculated on the basis on the proportion of claimants in any given state and the NPV of net cashflows for each state.

(ii)

- Dressing
 - Washing
 - Mobility
 - Transfer
 - Toileting
 - Feeding
- (Mark only the first 4)

(iii)

- Need to consider in-force and new business separately
- NB for all interventions to consider fairness between “generations” of policyholders
- And to consider the impact on marketability, competitiveness
- Potential of reputational risk
- Watch out for any selective withdrawals as a result of any intervention
- Stricter underwriting for new policies
- The insurer could increase the premium levels for new policies
- Where premiums are reviewable for in-force business,

- Can increase premiums
- A lower level of benefits for new policies being taken out
- Where benefits are reviewable for existing business:
 - The insurer could remove or reduce the benefits offered under the contract.
 - Shorter guaranteed period
 - Lower increases in benefits (if they are linked to an index of sorts)
 - Make claiming criteria stricter
 - Longer waiting periods
- A different distribution channel could be used to market the product for new business:
 - Either to attract a better profile
 - Or to reduce the commission associated with the product.
 - The expenses under the product could be reduced where possible.
 - Including marketing the product to a larger target market in order to spread fixed expenses across a larger pool of policies.
- The insurer could invest the non-solvency reserves in a more aggressive manner in order to increase the investment return.

QUESTION 3

Many of the candidates were familiar with the concept being tested in this question. Some were able to identify a suitable framework from the course material to use for generating points. The candidates who scored well demonstrated a very good understanding of how a public system like the one proposed operates as well as how the current system operates. Good candidates were able to identify the key stakeholders and the impact of the proposed change on them.

Advantages

- The system has 100% coverage
- And provides a safety net to those who are most vulnerable.
- The system seems fair as every legal citizen of Actuarial has access to the healthcare services provided by the government and there is no exception. 1
- Those who cannot afford healthcare or will be rejected treatments owing to financial incapacity will now get treated.
- Similarly, those who were uninsurable will also be covered.
- Universal coverage will meet the objective of protecting the health of its population.
- This system will help the government safeguard a healthy and productive workforce.
- Increased productivity could lead to greater competitiveness with other countries
- And also lead to higher tax revenues helping fund the healthcare system in the future, or fund other government schemes.
- It also helps safeguard those who are not currently in the work force, such as children and pensioners.
- There may be a wide variation in the level of healthcare between different area/socio-economic groups, the new system would remove these disparities and help with social integration between the different groups.

- The new system may help prevent illnesses which could ultimately be cheaper than curing them once they have arisen and reduce e.g. incapacity payments.
- This seems to be a generous and ethical system.
- Implementing this system enables the government to meet its political promises.
- This system will ensure that the poorest have access to primary medical assistance (doctors and medicines) and hospitalisation where necessary.
- Priorities in health services are often extended also to children and the aged.
- Funding by general taxation helps redistribute wealth
- Since, in general, the wealthier will pay more
- Although poorer citizens may use the services more.
- This will also help protect individual savings, reducing the burden on the state elsewhere (e.g. pensions).
- It may be a more efficient way of funding healthcare.
- Government run healthcare providers are non-profit making organisations which helps to

Disadvantages

- This system is likely to discourage citizens from getting private insurance and thus they cannot choose the physician or the kind of treatment that they would ideally want.
- The healthcare system of the government may not be as good as what private healthcare providers offer.
- The government-run healthcare organisations might have poorer facilities e.g. older technology, shared bathrooms etc.
- The scope of the universal healthcare policy may not be as diverse and comprehensive as private insurance.
- People who have private insurance will be much better placed to get appropriate medical intervention.
- There is the lack of options where the luxury to choose is not available for those under this system.
- There may also likely to be long waiting times for consultation.
- People may often end up waiting for months for treatment.
- This system might be unpopular amongst healthy tax payers if the increase in tax rates are quite high.
- Government run healthcare providers may not operate as efficiently as privately owned companies
- Or provide services more cheaply than privately owned companies.
- This may be because of lack of competition, so there is no reason to provide high quality care.
- This may be the result of better quality staff being attracted by working for profit making organisations.
- The limited budget could result in rationing
- e.g. expensive drugs not available.
- The budgeting issues could mean that patients may not receive the best treatment and medication.
- If the working population is in decline the government might not be able to meet the increased healthcare cost.

- Funding by general taxation is unlikely to provide the citizens with a clear idea of the actual costs of this system.
- They are therefore less likely to compare the price (through taxation) they paid against the cover they received.
- This is likely to lead to increased demand for health care, not all of which may really be required.
- It is unclear whether the burden on public finances caused by this funding method is affordable
- particularly if it is the intention to build new hospitals and other infrastructure etc.
- It may take a long time to set up the new organisations etc.
- Nationalisation can be a costly and complex process
- This could have significant adverse implications on the insurers who are currently writing health insurance business in Actuarial.
- This may lead to uncertainty in the PMI market, even before any change is implemented,
- e.g. it would lead to lower NB volumes and therefore higher premiums or lower profits.
- It is not clear what happens to those with PMI insurance – would they receive a refund?
- Also, those with PMI insurance may effectively be paying twice for the same services.
- There could be a loss of tax revenue if less PMI business written.
- It is unclear what will happen to the existing privately owned healthcare providers and their assets.

QUESTION 4

Most students performed poorly on this question overall, with only a few candidates scoring well.

Part (i) required students to apply the concept of multivariate modelling benefits to healthcare. Students scored reasonably well on this part, those who did very well explained both the reasoning and provided some examples.

For part (ii) students who discuss the mapping of policyholders based on benefits and premium levels were able to score well. Students scoring poorly seemed to have misread the question. Some of these students also discussed points relevant to other parts of Q4.

Part (iii) was very poorly answered. Most students listed generic modelling aspects without applying their answers to the question at all. Students who did score marks on this question demonstrated that they were able to think about the application of what model is needed and how this model would be used in practice, rather than purely listing the detail behind a GLM model and its components.

Part (iv) was a bookwork question. It was worrying that a few students were not able to distinguish between sensitivity testing, scenario testing and stress testing. Some students struggled with clear distinctions in some parts but most students were able to score well here.

(i)

Multivariate modelling using is necessary when modelling multiple factors that are likely to be related or correlated to a certain extent. If these interdependencies are not taken into account, there is a risk of over- or understating claims. Examples of factors used in modelling health insurance claims that are likely to be correlated:

- age and family size
- age and chronic conditions
- maternity and gender

(ii)

- Policyholders of StarMed would need to be offered the choice of options on Target Health
- ...although this choice could be limited to prevent anti-selection especially if choosing to upgrade cover
- StarMed policies may be able to move across without waiting periods and/or underwriting
- ...unless they choose to upgrade their option at which point a waiting period may apply to avoid anti-selection
- Need to minimize lapses by mapping to appropriate options based on benefits and price
- Map the benefit options to determine which benefit option maps from StarMed to Target Health.
- This is based on whether the coverage for different types of claims (as well as allowing for any network arrangements) is consistent/similar
- If there is only one option under each option this would make the mapping more straight forward.
- Base on the above, there may need to be a default option for policyholders who fail to choose an option if they are given the choice
- Could map options based on benefits or premium levels. Premium levels may be more realistic when capturing affordability – this is how policyholders are likely to make their choice
- May also consider the differences in premium frequency and timing between StarMed and Target Health
- Benefit choice may be influence by chronic proportion on StarMed's existing options.
- Need to understand the claims patterns for the existing members on Target Health by group characteristics (i.e. Age; Gender; Chronic status). This will assist with risk-adjusted estimated claims.
- StarMed policyholders will need to receive clear communication about the transfer to Target Health and what they will move to or can choose from. This will also need to include the date of transfer.
- Financial intermediaries may be able to assist with advising policyholders
- Be mindful of regulatory requirements surrounding the transfer

(iii)

- If there is an existing GLM built off of Target Health claims data, then this model can be used alternatively a GLM model for Target Health claims data will need to be built.
- To do this:
- Collect claims data for Target Health policies based on historical claims costs per benefit type and per benefit option.
- Need to ensure the credibility of data per cell
- Claims will need to be determined on a per life per month (PLPM) basis per benefit option.
- This is done by taken the total claims per cell and dividing by the exposure in that cell.
- If using historical claims data, may need to adjust claims costs for inflation, run-off and any benefit changes.
- Identify the risk factors that need to be accounted for (usually the ones to influence claims behaviour) such as age, gender and chronic status
- The choice of GLM and link function needs to be reasonable and appropriate.
- A gamma model may be a good option for claim amounts.
- Running the GLM will give a set of factors per risk factor (age, gender, chronic status), benefit amount type and benefit option type
- These factors can then be used to score StarMed members based on their risk factors and the option they have been mapped to.
- This will yield claims estimates for the StarMed members if they were on Target Health's benefit options.
- These costs can be compared to the existing Target Health polices on that benefit option as well as compared to the expected premium income to determine the extent of a surplus/deficit.
- For accuracy sensitivity testing should be done, as well as a variety of scenarios determined.

(iv)

- (a) Sensitivity testing refers to the testing of movement in a single variable at a time and seeing the impact on the result/output.
- (b) Scenario testing refers to the testing of movement in multiple variables at the same time to simulate a defined scenario. The impact of the result/output is then assessed.
- (c) Stress testing refers to testing the extremes of the parameter values or the combination of parameters that yield the most damaging result. The impact of the result/output is then assessed.

QUESTION 5

This question was reasonably answered, with some students scoring very well.

Part (i) required students to apply their bookwork knowledge on risks transfer under managed care to the specifics of the question. Students who performed poorly appeared to have misread the question or discussed risk mitigation rather than describing the types of risks transferred. Students were required to state the risk and to describe the risk to score well.

Part (ii) was looking for students to think about the arrangement from both a qualitative and quantitative point of view. Students scoring well were able to adequately describe how they would calculate any cost savings as well as how they would assess policyholder satisfaction and improvement in quality of life. Marks were not awarded to students who just listed measures such as cost-benefit analysis or cost-utility analysis without application to the question. Most students were able to score reasonably well on part (ii).

Part (iii) again required students to apply their bookwork to the specifics of the question, clearly indicating which risk would be reduced/mitigated and how. Students who performed poorly simply produced a generic list of risk mitigation options or they provided solutions that were not linked to mitigating risks identified in part (i). Most students performed well on this part of the question.

(i)

Under the arrangement between KuhleHealth and IsifoCo the following risks are transferred from KuhleHealth to IsifoCo:

- Price risk – this relates to the cost of the treatments such as steroids and bronchodilators. If these costs increase beyond what was priced for, this will not impact KuhleHealth . They may have also already locked-in future annual increases.
- Frequency risk – this relates to the number of times a policyholder needs steroids, bronchodilators or other treatment. If this utilization is above the average thus driving up utilization to be higher than expected, this would impact IsifoCo and not directly impact KuhleHealth .
- Intensity/severity risk – some Asthma cases may be more resource intensive, if it does not fall within the scope of any carve outs and/or has not been priced for in the fee, then again this is a risk transferred to KuhleHealth.
- Profile risk – this risk relates to the mix of lives covered with and without an Asthma condition. Given that the fee is likely to be paid per person, if there is a higher proportion requiring treatment than assumed in the pricing of the fee then this risk is borne by IsifoCo and not KuhleHealth.

(ii)

- KuhleHealth would need to gather information on the costs of treating Asthma on a fee-for-service basis
- Will need data on:
 - Number of lives claiming for each treatment type
 - Cost of each treatment type
 - May need to adjust costs with medical inflation

- ...the data collected should be from before the arrangement with IsifoCo
- Calculate a claims cost per life per month by taking the total cost and dividing it by the lives registered with Asthma.
- Then compare these costs to the fee being paid to IsifoCo ...
- ...and to the equivalent per life per month cost under the management with IsifoCo.
- If the fee-for-service cost is great than the fee paid to IsifoCo, the arrangement is likely benefiting the policyholders on a cost-basis.
- It must be noted that the fee will also include an allowance for a profit margin
- ...but it should be checked that this profit margin is commensurate with the service provided and the degree of risk taken by IsifoCo.
- ...costs should be lower than fee-for-service costs as IsifoCo should be utilizing efficiencies given their expertise in treating Asthma and their arrangements with providers
- ...an investigation into the quality of treatment will also need to be done to ensure that the lower costs is not due to lower quality and inappropriateness of care provided
- ...may need to send out surveys to the policyholders to assess quality and policyholder sentiment about the programme with IsifoCo
- ...compare treatment protocols and formularies to international/industry guidelines
- ...could also pull data on the treatment policyholders were receiving prior to the managed care arrangement and compare this to current treatment
- ...may only receive high level utilization data from IsifoCo which will limit the degree of analysis that can be performed
- Elements such as medicine adherence, hospital admission rates and readmission or complication rates could be assessed from these reports.
- Could also consider fees charged by other managed care providers to see how competitive the fee is
- Consider if the providers used by IsifoCo are accessible to the majority of policyholders

(iii)

- IsifoCo could use the following measures to help manage their risk:
- IsifoCo could look at offering a formulary for Asthma related medicines
- ...the formulary could include more generics that would help lower the costs of care but still be appropriate
- IsifoCo could make use of provider networks where they will be able to have negotiated fees to help control costs as well as ensure the quality of care.
- Holding capital/reserves even beyond any statutory requirements...
- ...as this will act as an additional buffer against unexpected poor experience/claims
- IsifoCo could also reach out to a variety of insurers offering the same service...
- ...thus pooling the risk with many books of business and diversifying their risk
- ...they could also offer managed care services for other conditions such as diabetes to also help diversify their risk pool
- IsifoCo could price in an additional margin if the book of business is high risk or if there is a large degree of uncertainty

- IsifoCo could consider reinsurance for things such as excess of loss for complex/server cases of asthma that requires special treatment this would help provide less volatility in claims and lower chance of blow-out from a few claims
- IsifoCo should ensure clear contracting terms and service level agreements to avoid any misunderstandings
- IsifoCo could consider carve outs for high-risk/abnormal/complex cases
- IsifoCo could also consider case management for high-risk/complex cases in order to ensure appropriate care is provided and there are no unnecessary or inappropriate treatment costs
- For certain hospital admissions that may occur with Asthmatic members, a global fee arrangement with hospitals and providers could be considered this would help cap the potential cost of admissions.
- IsifoCo could consider negotiating the premium so that it varies in line with basic risk factors such as age
- IsifoCo should ensure the fee is reviewable (annually) to allow for any pricing risk or adverse experience
- IsifoCo could negotiate a profit sharing arrangement to limit upside/downside risk for both them and KuhleHealth
- IsifoCo could provide communication to policyholders to educate them about their Asthmatic condition as well as how to look after their condition and prevent it worsening this would lead to lower costs down the line

QUESTION 6

Overall, the question was reasonably well-answered with better prepared candidates clearly outperforming the weaker candidates.

Part (i) was well-answered. Candidates who could identify a wide range of risks scored well. There were a wide range of key risks related to the venture that scored credit.

Part (ii) was fairly well-answered. Oftentimes candidates focused too narrowly on only, for example, reinsurance. As a result not enough distinct points were made to score well.

Part (iii) was fairly well-answered. Candidates tended to lose marks for very vague and very generic statements not applied to the scenario at hand. The question asked for a discussion on the data sources and not merely stating different data sources.

(i)

- Lack of expertise/experience
- Health-E has no operations in Actuarial currently exposing it to significant foreign territory risks
- Language problems
- Unknown regulations- design, distribution, pricing, reserving, etc. and changes to regulation
- Actuarians may be sceptic about foreign insurers
- Currency risks
- Health-E also sells no long-term care insurance, currently, exposing it to significant product design risks

- Long-term, high reserves, risky product completely different to current suite
- Lack of data
- It also has no own, reliable data on operations in this market
- All data will have to be derived from external sources (reinsurer, population statistics, etc.)
- May lack the level of detail/granularity required, be summarised data and not be relevant to product being designed
- Demographic risk
- New product in a new territory which is long-term, so significant risks if any guaranteed terms are offered.
- Risk of more claims than expected, lasting for longer than expected, esp. if lifetime benefits; further exacerbated if indemnity-related
- Terms and conditions – requirements to qualify for benefits – significant risk related to policy wording
- Persistency is a major risk – especially early on when the asset share is negative; may be driven by mis-selling
- Selective withdrawals may also be a problem leaving the insurer with a mix of lives in poorer health
- Research, product development costs and costs of setting up infrastructure, expanding into territory will be significant
- Risk of not recouping these costs – poor sales volumes
- The particular design or operation of the product/benefit may not be found attractive in Actuarialia
- Need to make product marketable, attract policyholders, e.g. offer guarantees, exposing them to the risk of guarantees biting.
- Or lower premiums, resulting in business potentially being loss-making
- There may already exist significant competition in the market or new competitors may also see the opportunity
- Owing to the large reserves on LTC policies, there is significant investment risk (especially if assets/liabilities are mismatched)
- Risk of fraud – care homes, policyholders, staff, distributors
- Market research may have over-estimated the need/potential demand for the product
- Reputational risk if venture fails that could spill over to its other operations in other countries
- Overall risk to the company depends on its size of free assets and the relative size of this new venture relative to the rest of its operations, and the amount of free assets this will require.

(ii)

- Significant effort spent on market research
- Demographics of the population – age/gender structure, current provisions of care
- Demand for product, affordability, appetite for purchasing insurance, attitudes
- Regulations, current and pending
- Engaging in customer education/marketing
- Data sources
- Investigate what publicly available data exists – quality and recency thereof
- Reinsurers in the territory; willing to work/partner with insurer?

- Can assist with policy wording, benefit design, underwriting, claims control, etc.
- Evaluate any Industry data; Other local/overseas data on LTC and trends/experience, etc. to better understand LTC/demographics
- Reinsure a significant proportion of the business, at least early on (albeit at an expected net cost)
- Product design measures
- Cash and not indemnity
- Waiting/deferred periods to reduce anti-selection
- Reviewable terms (premiums, benefits, conditions, etc.)
- Preferred providers/contracts with care homes – negotiated rates Partner with a local insurer – reciprocal arrangement to share exposure, risk, losses and gains
- Employ local professionals with local knowledge, expertise, insurance knowledge, medical specialists, etc. – training staff/distributors
- Regular review and updates to underwriting and claims management processes (with input from reinsurer where appropriate)
- Larger margins in pricing basis to allow for uncertainty
- Expanding into the new territory/product is a form of diversification from current business/territories which could reduce the company's overall risk exposure
- Having the venture start small (proportion of overall business/free assets) initially and building it up over time will reduce the risk to the overall organisation

(iii)

- Own data
- Health-E are unlikely to have any relevant own data (no presence in Actuarial and no LTC business)
- Reinsurance assistance/Data
- Health-E may have current relationships with reinsurers that have significant LTC business on their books, potentially even in Actuarial
- There may be other reinsurers that Health-E can partner with that have LTC business and may have LTC business in Actuarial
- Reinsurers may be able to assist with data on demographics, trends, aggregate LTC experience, etc.
- Bear in mind that the data are unlikely to be granular/detailed and need to be adjusted for relevance – form/type of benefits, distribution channels, underwriting and claims processes
- Quite likely to be credible and reliable
- Industry data
- There may be some industry data/published stats/returns available that the insurer may have access to
- Again, these may not be fully relevant and require adjustment for the intended product(s)
- Credibility depends on how many insurers contribute/participate in the industry collection scheme(s)
- Population statistics
- Credible census data may be available, indicating demographic structure of population
- May be out of date

- May not be relevant – insured population likely to be significantly different to general population
- Local consultants can be employed to assist with pricing and may have access to more local data
- Research, conferences, etc. are also likely to be useful in establishing trends, learning about the market and conditions, etc.

QUESTION 7

For part (i) students needed to demonstrate the application of risk adjustment techniques so statements such as “pricing” or “reserving” without any further explanation did not gain credit.

Part (ii) was well answered but many students struggled with the application in part (iii) and part (iv). It was also concerning to find that many students struggled to calculate the weighted average cost per admission per facility from the information provided.

For part (v) many students appear to have run out of time and did not provide sufficient commentary to support the mark allocation. Students needed to consider the implications per DRG as well as the overall results in order to perform well as well as to consider the quality aspects of evaluating the provision of hospital services.

(i)

- Budgeting (by the State to determine appropriate allocation of funds to segments of the population)
- Pricing and reserving (for PMI insurers who need to allow for variations in covered policyholders)
- Measuring efficiency for applications to:
 - Network selection
 - Managing facilities
 - insurance plans
 - Price negotiations
- Risk management
- Measuring healthcare outcomes
- Provider profiling

(ii)

Case weights

DRG	Case weight
1	= 5000/80000 = 0.0625
2	=0.1875
3	= 0.09375
4	= 2.25
5	= 1.5
Overall	=1

(iii)

= Sum{(Admissions per hospital per DRG)*(Case weight per DRG)}/#admissions

$$\text{CMAF}_A = (100 \cdot 0.0625 + 20 \cdot 0.1875 + 150 \cdot 0.09375 + 5 \cdot 2.25 + 75 \cdot 1.5) / (100 + 20 + 150 + 5 + 75)$$

$$= 0.422321428$$

$$\text{CMAF}_B = (500 \cdot 0.0625 + 150 \cdot 0.1875 + 300 \cdot 0.09375 + 40 \cdot 2.25 + 600 \cdot 1.5) / (500 + 150 + 300 + 40 + 600)$$

$$= 0.677672956$$

(iv)

Calculate average costs overall for A and B, respectively

$$\text{Ave}(A) = (100 \cdot 4000 + 20 \cdot 18000 + 150 \cdot 7000 + 5 \cdot 220000 + 75 \cdot 150000) / (100 + 20 + 150 + 5 + 75)$$

= 40 457.14 , then CMA average cost by dividing by CMAF

$$\Rightarrow 95\,797.04$$

$$\text{Ave}(B) = (500 \cdot 5500 + 150 \cdot 15000 + 300 \cdot 7500 + 40 \cdot 150000 + 600 \cdot 110000) / (500 + 150 + 300 + 40 + 600)$$

= 49 842.77 ,then CMA average cost by dividing by CMAF

$$\Rightarrow 73\,549.88$$

(v)

$$A: 95\,797.04 / 1.2 = 79\,830.87$$

$$B: 73\,549.88 / 0.89 = 82\,640.32$$

- B is a bigger hospital than A (more cases)
- Both hospitals have relatively 'good' admissions case mixes (CMAF < 1) - Hospital A more so than Hospital B
 - o High numbers of lower cost cases as compared to country average
- CMA (admissions-only) B appears cheaper/more efficient than A
 - o Perhaps due to economies of scale
 - o Lower rate of complications
- However, A has a significantly worse demographic profile (sicker people, on average) (Demographic factor of 1.2 vs 0.89 – larger than 1 means sicker, on average)
 - o So is expected to have higher average claims costs
 - o And a higher rate of complications
- Adjusting for the demographic profile, results in A being more efficient than B - ~3.4% more efficient (or B is ~3.5% less efficient - if taking the converse).
- Without looking at the demographic factor, A is better than B at managing DRG 1 and DRG 3
- Conversely for the other DRG's, bearing in mind very low numbers of DRG 4 for A
 - o Random fluctuation/abnormal cases can distort experience
- Quality of care NB – not measured here – outcomes NB when deciding on efficiency (not only cost)
- Various ways to measure quality/outcomes – mortality rate, questionnaires, rate of complications, incidence of bed sores, etc. (any 2)