

Effects of a Flu Pandemic on a Health Insurer

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Introduction

This paper provides a brief overview of flu pandemics (for more detail please see Alexander Stitt's paper "Pandemic: What Risk Managers in Financial Services Organisations need to know") and then looks at the potentially significant effects on a health insurer, specifically Southern Cross Medical Care Society (Southern Cross). In New Zealand, health insurance covers private elective surgery plus primary care (for those with comprehensive plans), but not acute surgery. Other countries have different health systems and so the effects on non-New Zealand health insurers may be different. All opinions are my own and not those of my employer. Potential decisions are my own speculations. Errors and omissions are my own.

Flu Pandemic Overview

Influenza is a virus attacking the upper respiratory tract and annually affects 5-15% of people. Deaths are mainly elderly and those chronically ill. In temperate climate zones (like NZ) there is a very distinct seasonal pattern with a winter peak, relating to the virus' ability to live longer outside the body in cold and dry weather. There are 2 types of virus, type A and type B. Influenza A virus is further classified based on 2 different proteins – haemagglutinen (16 H subtypes) and neuraminidase (9 N subtypes).

Major changes in the haemagglutinen protein result in new viruses to which there may be little human immunity. At the time of writing H5N1 is an avian virus (mainly in farmed poultry but also found in wild waterbirds) with relatively limited numbers of human cases. This is a new strain, first evident in 1997 (limited to Hong Kong) and resurfacing in 2003.

Influenza viruses mutate and it is thought that eventually someone living or working with infected birds will be already infected with a human influenza virus which then mixes with the avian virus to make a virulent human H5N1 virus. Such mixing of human and avian flu viruses is thought to have caused some past pandemics, including the "Spanish flu" epidemic of 1918. There have been 3 pandemics in the 20th Century – 1918, 1957 "Asian influenza" and 1968 "Hong Kong influenza".

The effectiveness of any flu virus is related to the combined effects of transmissibility and mortality – a pandemic requires high morbidity and moderate to high mortality since viruses with extremely high mortality or low morbidity can be more easily contained. Once a flu virus has mutated enough to spread easily from a reasonable number of infected people, a tipping point is quickly reached and the virus can spread around the world in a matter of days.

For example, the SARS outbreak (a similar type of virus) in Canada was traced to a single infected person returning from Hong Kong, and the 1918 flu pandemic reached all countries within a few months.

Up to 31 October 2006, 256 cases of human H5N1 have been reported to the World Health Organisation (WHO) with 152 deaths. The 59% current mortality rate is likely to be heavily overstated since unusual deaths are far more likely to be investigated than non-fatal flu-like illnesses. The true current mortality rate is also likely to be a multiple of the mortality rate of H5N1 in the general population should a pandemic occur, since almost all current human cases are associated with very close contact with infected birds and thus higher transmission rates than influenza in the general population and a outbreak of human H5N1 influenza would not develop into a pandemic if mortality is extremely high (since most infected people die it would be easily contained).

Thus the world is at risk of a flu pandemic from the H5N1 influenza virus, but it is by no means certain that a flu pandemic will occur any time soon, or even at all from H5N1. Currently WHO reports an alert stage 3 on their scale, meaning there is limited human-to-human infection. At stage 5 there is significant human-to-human infection and an outbreak is unlikely to be contained. A pandemic is stage 6. Progression through categories 4 to 6 could occur very quickly – within a few weeks.

| | | |
|---|---|--------------------------------------|
| 1 | Low risk of human cases | Inter-pandemic phase |
| 2 | Higher risk of human cases | New virus in animals, no human cases |
| 3 | No or very limited human-to-human transmission | Pandemic alert |
| 4 | Evidence of increased human-to-human transmission | New virus causes human cases |
| 5 | Evidence of significant human-to-human transmission | |
| 6 | Efficient and sustained human-to-human transmission | Pandemic |

Source: http://www.who.int/csr/disease/avian_influenza/phase/en/index.html

Every flu pandemic is different in respect of severity, and there is no certainty on the effects. However, Ministry of Health (MOH) and WHO advice is to base planning on the 1918 flu pandemic, which was the most severe of 3 pandemics in the 20th century, and the milder 1957 flu pandemic. The analysis has used this as a basis and thus may represent a “pessimistic” scenario for illness and deaths. However, as this paper will show, operational risks are also potentially very significant.

Scenario for New Zealand

To assess the potential affect of a pandemic on Southern Cross Medical Care Society, it is valuable to first establish the scenarios facing New Zealand.

New Zealand mortality and morbidity data from 1918 flu pandemic is available overall and by locality, but with limited data by age. There is more detailed data from USA, which has been used in the analysis.

In the 1918 flu pandemic, the total rates of mortality due to influenza were highest for the elderly. However, the excess mortality (difference between total rate and normal rate) was highest for children and young adults (see middle column of the table below), with many times more deaths than normal in those ages. There is no assurance that a future pandemic will have the same age distribution of morbidity and mortality.

| Age | Extra Morbidity Rate per Population | Influenza per | Extra Mortality Rate per Population | Influenza per | Extra Mortality Rate per Infected | Influenza per |
|-------|-------------------------------------|---------------|-------------------------------------|---------------|-----------------------------------|---------------|
| <1 | 20% | | 1.00% | | 5.0% | |
| 1-4 | 32% | | 0.55% | | 1.7% | |
| 5-9 | 38% | | 0.18% | | 0.5% | |
| 10-14 | 37% | | 0.20% | | 0.5% | |
| 15-19 | 33% | | 0.35% | | 1.1% | |
| 20-24 | 30% | | 0.55% | | 1.8% | |
| 25-29 | 33% | | 1.00% | | 3.0% | |
| 30-34 | 32% | | 0.80% | | 2.5% | |
| 35-39 | 28% | | 0.65% | | 2.3% | |
| 40-44 | 21% | | 0.35% | | 1.7% | |
| 45-49 | 18% | | 0.30% | | 1.7% | |
| 50-54 | 16% | | 0.30% | | 1.9% | |
| 55-59 | 14% | | 0.20% | | 1.4% | |
| 60-64 | 13% | | 0.40% | | 3.1% | |
| 65-69 | 12% | | 0.55% | | 4.6% | |
| 70-74 | 10% | | 0.55% | | 5.5% | |

Source: Taubenberger & Morens (2006); 1918 Influenza: the Mother of All Pandemics, <http://www.cdc.gov/ncidod/EID/vol12no01/05-0979.htm>

The rates in the above table were then scaled because the US 1918 morbidity and mortality experience was significantly lower than the MOH and WHO preparedness planning advice. The MOH and WHO preparedness planning advice is to allow for 30-40% morbidity and 1% mortality. (eg see <http://www.moh.govt.nz/moh.nsf/indexmh/pandemicinfluenza-faqs>). Accordingly, mortality rates in the above table were increased by 1.8 and morbidity rates by 1.5.

A pandemic outbreak is expected to occur in one or more waves through the population. The advice is to plan for a peak proportion of sickness in the population in the range 20-40%. By comparison winter flu season typically has maximum sickness about 5-15%.

Due to the extent of global travel, most places will experience an outbreak at about the same time. New Zealand's distance from major population centres will not prevent an outbreak here in the event of a pandemic.

In line with MOH advice we assume businesses will experience staff absence rates higher than population morbidity. This is because some staff will be looking after children, partners, parents and neighbours. In a pandemic all schools will be closed, thus it may not be only those families with sickness that are impacted. Additionally, some staff may be reluctant to use public transport (or it may not be running) in the event of a pandemic. Some of these staff away from work premises may be able to work at home depending on infrastructure, support and the nature of their role. Accordingly, peak staff absences could be in the range 30-60% and may vary significantly by department.

In the event of a pandemic there may be severe short term disruption to the economy. Businesses highly dependent on the owner or key employees may shut down temporarily or fail altogether – this is particularly the case for small businesses. Many businesses may be unable to operate normally in order to keep employees safe or due to critical levels of absence. Staff may be sent home or take unpaid leave. Some businesses may be unable to pay wages or suppliers. Some people will struggle financially if their income is paid late or not at all.

It possible that infrastructure may be affected. For example a lengthy closure of NZ's borders may result in a fuel shortage.

The health system will be severely impacted in a pandemic. There will be a large increase in GP visits and hospitalisations, and the medical workforce can be expected to suffer higher than average rates of sickness due to increased exposure to the influenza. It is likely that private hospitals will be required to assist the public health sector under emergency powers, and additionally medically trained staff may also be required (or want to) assist the public health sector.

Scenario for Southern Cross

The 1918 experience had markedly varying impacts by age, with relatively low morbidity and mortality in middle ages. Southern Cross membership has a higher than average proportion who are middle aged. This means a similar pandemic would result in a lower percentage of members falling sick or dying than the general population.

A pandemic with similar overall levels of morbidity and mortality to the basic scenario, except with a more uniform effect by age, would result in rather higher costs for Southern Cross. Sensitivity analysis needs to consider differences in the severity of a pandemic as well as the age distribution of morbidity and mortality.

Applying the morbidity and mortality assumptions to the membership of Southern Cross we have 300,000 members becoming ill and 6,000 extra deaths. Plausible high and low scenarios result in 200,000 to 400,000 ill members and 3,500 to 10,000 deaths (on top of normal numbers of deaths). There may be as many as 800 members dying in a week at the peak of a pandemic.

Surgical Claims

During the peak of a pandemic wave surgical procedures for members will be postponed due to a lack of private surgical capacity. However, there is likely to be a significant deferral effect. Members will still need their surgery. As a result the overall level of claims may not reduce significantly, however the timing of those claims would be later, reflecting surgery postponement.

Assuming approximately one month worth of surgical claims is impacted during a pandemic, with two-thirds of those surgeries occurring later, the effect is a reduction in surgical claims costs of 3%. The assumptions have a high degree of uncertainty and thus a plausible range might be 2 to 5%.

Medical Claims

During a pandemic it is probable that the number of GP visits will increase significantly, not only because of influenza, but also those with colds or similar symptoms may be more likely to visit a GP as a precaution when they would not normally do so.

It is likely that in a pandemic nurses will provide a greater share of primary care than they do currently with more medical authority given. It is unclear how well the primary care system will cope in a pandemic and thus the level of additional medical claims is also uncertain. Assuming an extra 330,000 GP visits are claimed by members with comprehensive (ie surgical + medical) cover, this would result in an increase in medical claims costs of 15% or less than one extra visit per member with comprehensive cover. A plausible range might be 7% to 25%.

With some members facing financial difficulties, claim submissions may be advanced. Typically medical claims are held by the member until there is enough to make it worthwhile to claim – eg put in a claim once a year for all GP visits and pharmacy prescriptions for that year. This doesn't affect the level of claims but does affect claim payments. If this factor is significant care will be needed to allow for this one-off effect in analyses such as inflation analysis, deriving claim curves, etc.

Death Claims

Some policies have a small amount of death cover included. Based on the mortality assumptions and member age and plan profile, pandemic death claims could amount to about 2% of total annual claims.

There are also operational implications of increased death claims, because death claims take more effort to process than other types of claims.

Premium Waiver Claims

There is a further death benefit of a 2 year premium waiver on some plans, provided the death occurred before age 60. Allowing for deaths of older members, single person policies and where all members on a policy die, only a proportion of deaths will result in a premium waiver. The estimated cost in premiums foregone is less than 1% of annual premiums, with a plausible range of 0% to 1%. Note scenarios with a more virulent flu also have less survivors on policies to benefit from the premium waiver.

Flu Vaccination Claims

The majority of plans do not cover flu vaccinations and the cost of each vaccination is small, and so the exposure is small relative to other risks. However, there may be pressure on Southern Cross to provide cover for flu vaccinations. If this benefit is provided then the cost will be limited in the first influenza wave due to supplies being sufficient only for a small to moderate proportion of the population.

Summary of Effect on Claims

Overall claims are expected to increase, although with considerable uncertainty as to the level. One factor potentially affecting claims in general is if a shortage of skilled claims assessors results in less adjudication of claims than normal, claims costs may increase. Typically 20% of claims made are not paid for various reasons (benefit limits, exclusions, benefit claims is not covered under the policy, etc).

Southern Cross stops claim payments where the member is in premium arrears. If during a pandemic (with increased premium arrears) this rule is relaxed either deliberately or accidentally due to, for example, less skilled claims assessors, then there will be increased costs (in respect of members who don't subsequently pay their premium arrears).

| Claim type | Estimate | Plausible range |
|--------------------------|----------------------------|-----------------|
| Surgical claims reduce | -3% of surgical | -2% to -5% |
| Medical claims increase | +15% of medical | +7% to 25% |
| Death claims increase | +2% of total claims | +1% to 3% |
| Premium waivers increase | +<1% of premium | +0% to 1% |
| Less claims adjudication | +0% of total | +<1% |
| Total | +3% of total claims | +0 to 7% |

All figures expressed as % of annual \$ figure

Effects on Premium Income

There will be a large increase in premium arrears in a pandemic. Employer group schemes may not submit premiums on time due to either closure or absence of the person(s) who make the payments. Individuals in financial difficulty (eg due to late income payments) may also default on their insurance premiums.

Premium income may also reduce with members reducing cover, or cancelling. This will be compounded by reduced levels of new business – sales people won't be making face to face visits. Those impacted by sickness or in financial difficulties will generally not see taking up health insurance as a priority at that time. (Low levels of new business may ultimately result in higher claims per member and thus higher future premium rates.)

Some employer group renewals may be unable to be completed due to lack of face to face meetings to negotiate terms, or due to the unavailability of key people (either from Southern Cross or key decision makers of the group). This results in the loss of any expected premium increase until such time as the renewal can be completed. Under certain assumptions (not disclosed for commercial reasons) the premium loss could be a few million dollars.

Operational Effects

For most businesses in a pandemic there will be significant operational effects due to high levels of staff absence and Southern Cross will be no exception.

The member and internal demand in a pandemic will vary significantly by area.

| Business area | Impact | |
|--|------------------------------|---|
| Call Centre Membership | HIGH | <ul style="list-style-type: none"> • Members seeking advice • Changes – cancellations, change of cover for affordability reasons, change from group to private policy |
| Claims | HIGH | <ul style="list-style-type: none"> • More medical + death claims • Change in timing of surgical claims |
| Underwriting Prior Approval Credit Control | LOWER workload UNCLEAR | <ul style="list-style-type: none"> • Low sales • Less surgical claims • More arrears, but will these be actively managed during a pandemic? |
| Sales | UNCLEAR | <ul style="list-style-type: none"> • Low sales • More group scheme enquiries • How to manage group renewals when no face to face meetings? |

| Business area | Impact | |
|----------------|----------|---|
| Bus. Alliances | LOWER | <ul style="list-style-type: none"> No new products or affiliated providers More monitoring and analysis Information to assist decision-making |
| Product Mgmt | workload | |
| Risk Mgmt | MEDIUM | |
| IT | HIGH | <ul style="list-style-type: none"> Support staff working from home More use of phones – eg tele-conferences instead of meetings |
| Building | HIGH | <ul style="list-style-type: none"> Need for safe workplace External communications, especially website Internal communications |
| Marketing | HIGH | |
| Finance | HIGH | <ul style="list-style-type: none"> Much more leave to process Significant changes to cashflow |
| Payroll | HIGH | |
| HR | HIGH | <ul style="list-style-type: none"> Leave policies Ensure staff safety |
| H&S Reps | HIGH | |
| Senior Mgmt | HIGH | <ul style="list-style-type: none"> Possible big decisions (eg sending staff home) Business continuity After effects may require major change to business plans |

The effects will depend on demand, supply (staffing levels) and also nature of the roles. They will also be different during a pandemic wave and immediately afterwards. Each main business area was asked to complete the following grid by entering the criteria that would cause their area to have each level of impact, separately before, during and after phases.

| Severity | Changed outcome | Before | During | After |
|----------|---|--------|--------|-------|
| CRITICAL | Need to close <i>“we can’t cope”</i> | | | |
| HIGH | Drop in service levels <i>“we can just cope”</i> | | | |
| MODERATE | Changes in the way things are done <i>“almost business as usual”</i> | | | |

While there were differences by business areas and by phase, the responses can be summarised as follows. It will be important to identify leading indicators that can be used to help manage necessary operational changes in a pandemic.

| Severity | Changed outcome | |
|----------|---|--|
| CRITICAL | Need to close <i>"we can't cope"</i> | <ul style="list-style-type: none"> • 70% staff absent • computers down • all staff work from home |
| HIGH | Drop in service levels <i>"we can just cope"</i> | <ul style="list-style-type: none"> • 50% staff absent • loss of key people • all staff work from home |
| MODERATE | Changes in the way things are done <i>"almost business as usual"</i> | <ul style="list-style-type: none"> • 30% staff absent • loss of key people • social distancing |

The effect on workload during a pandemic varies by business area. Staffing levels will naturally vary - eg some business areas have a higher proportion of staff with families than other areas. Thus some business areas may be able to assist others, such as Underwriting helping to process claims. The extent this is possible will depend on sufficient cross-training and infrastructure (eg having user profiles available for the underwriters to process claims).

Investments

If a pandemic is declared there is expected to be an immediate short term effect on the financial markets on the news. This is partly due to uncertainty and partly due to an expected recessionary effect on the economy. Southern Cross invests in fixed interest investments and holds a significant proportion of these to maturity. There may be loss of investment value in the short term, reducing solvency. Some corporate bonds may lose value if the corporate gets into financial difficulties. Southern Cross investment policy limits the exposure to any one company. Losses may also be realised if the significantly changed cash flows during a pandemic results in a need to cash in investments with depressed values.

Longer Term Effects

In the event of a pandemic the health system will be severely disrupted. As a result there may be major changes in government health spending priorities in the aftermath, with unpredictable consequences. Additionally the public may view the private health system differently with increased awareness of its role in supporting the public health sector.

There may be need for an extensive promotional campaign after a pandemic to reassure members and potential members of the value of health insurance.

Management

During and immediately after a pandemic senior management may be called upon to make big decisions – eg whether to close down temporarily, whether to provide significant additional paid sick leave, whether a price increase is needed outside the normal business cycle, etc. Some of these decisions may have a large financial or business significance, the ramifications of which may last for a long time.

It will be important information most pertinent to the decisions are relayed timely and accurately. It will also be important to have a plan for how to deal with the probable absence or loss of one or more senior managers. If the person who normally is responsible for deciding an action in a particular area is not available, who then makes the decision?

Summary

The above analysis and discussion shows the impact of a flu pandemic may be very significant for a health insurer. For Southern Cross plausible scenarios result in losses exceeding 7% of annual premiums, an amount that while not a threat to solvency is not easy for a mutual to recoup.

Southern Cross is in the process of preparing a pandemic action plan. The MOH website contains useful information and templates for this.