

# MEDISHIELD LIFE 2020 REVIEW: SAS COMMENTS

Prepared by the Singapore Actuarial Society



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## Introduction

This brief discussion paper lays out the preliminary comments from the Singapore Actuarial Society (SAS) in response to the Public Consultation on MediShield Life Review (MSHL 2020) dated 29-Sep-2020<sup>1</sup>. MSHL 2020 sets out the recommendations for enhancements to the MediShield Life scheme by the MediShield Life Council as appointed by the Ministry of Health (MOH). The MOH has invited the SAS Health Insurance Committee and Retirement Committee to respond to this Consultation. The SAS MSHL 2020 Working Group was formed to do so.

As the Government strives to achieve enhanced universal healthcare coverage by covering 9 out of 10 subsidised public hospital bills for all Singapore Citizens and Permanent Residents (also referred as Singapore Residents in this paper), we would like to highlight the importance of sustainable affordability of MediShield Life (MSHL) for the same Singapore residents, and of enhanced decision-making by policymakers using data.

We can comment in broad terms only as we only have access to information in the public domain, allowing us to discern broad trends from this data and make broad observations. To be able to comment and recommend more meaningfully and definitively, we would require access to the work of actuaries engaged by the MOH, their brief from MOH and anonymised claims and treatment information held by MOH (via Mediclaim<sup>2</sup>). Access to such information would serve the public interest better.

This paper does not represent the official response of the SAS to these proposed changes, but it is meant to contribute to the public discussion of these reforms. While the members of the SAS MSHL 2020 working group have been mindful of presenting a balanced view of the enhancements, it is acknowledged that the comments may not represent the views of the general membership. In addition, these comments by the working group are made in their personal capacity as members of the profession and do not represent the views of their employers.

The detailed comments have been grouped into the following areas:

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Prepared by SAS MSHL 2020 Working Group:

Tien Yung Lim	Kay Ying Shong
Hitesh Shah	Marcus Kok
Keerti Sethia	Yi Jun Ng
Siao Wearn Leong	

# 1 Universal Healthcare – Coverage vs Affordability

## 1.1 Impact on those covered by MediShield Life only

“Better Protection” and “For All, For Life” are good philosophies to strive for in policy setting especially when it comes to a universal health insurance plan like the MediShield Life (MSHL) Plan which is intended to cover 9 in 10 subsidised public hospital bills. The enhancements proposed in MSHL 2020 are in line with these philosophies but will result in a sizeable increase in premiums before subsidies.

“Affordable Premiums” is another principle underpinning MSHL. One key issue regarding the proposed changes in MSHL 2020 is the size of the premium increases. As presented in the tables in the Consultation Paper, the premium increases are substantial (ranging from 11.5% - 35.4%, before subsidies). The most significant premium increases impact those beyond age 65; hitting at a time when they are likely to be decumulating their Medisave balances, and may be at risk of depleting their balances. Adjusting for age, the aggregate impact is approximately 29% (Refer to Table A1: Indicative Medishield Life Premium Schedule in 2021 vs Singapore Residents by Age Group in the Resources and Data Tables section below).

A 29% aggregate increase in premiums is significant. The recommendation to provide additional Covid-19 transitional subsidies, which, when added to existing premium subsidies, amount to total support of S\$2.2 billion over a period of three years, will soften the impact of the premium hike. The transitional subsidies provided by the Government will see the net premium increase capped at 10% in the first year for Singaporeans. If, at the next review, there is another round of large premium increases, the Government may have to provide further subsidies to soften the impact again. The question will arise as to whether this is a viable long-term strategy.

In the parliamentary Q&A of 2 Nov 2020, MOH shared some data<sup>3</sup> that provides better clarity on the largest contributors to the premium hike.

*There are three key drivers of the premium increases*

1. *Growth in utilisation and payout accounts for about two-third of the premium increases.*
2. *One-quarter of the premium increases is from refreshing the claim limits.*
3. *About 10% supports the benefit enhancements including those implemented since 2018*

We have also derived the 2013 to 2019 performance of the MSHL Fund based on public data. The 2013 – 2019 data suggests that the premiums collected (and hefty subsidies given) were slightly insufficient (101% incurred loss ratio) to pay for claims and to reserve for future liabilities (e.g. Premium Rebates, and others).

Summary of Table A2: Incurred Loss Ratio of MediShield Life **and Estimated Number of Insured** in the Resources and Data Tables section below

Year	Premiums Collected [A]	Claims Paid [B]	Change in Required Reserves [C]	Incurred Loss Ratio ([B] + [C]) / [A]
2019	\$1,923m	\$1,030m	\$1,166m	114%
2016 - 2019	\$7,578m*	\$3,533m	\$4,314m	104%
'16-'19 CAGR#	1.1%	11.4%		101%

*\*This comprised \$4.4 billion in premiums collected from policyholders and \$3.1 billion in premium subsidies*  
# Compound Annual Growth Rate -CAGR

The total premiums have increased by 1.1% annually due to the increase in the number of insured and the aging of existing insured members (paying higher premiums as they move to the next age band).

In comparison, claims have increased by 11.4% annually (largely due to the increase in the number of claimants).

Separately, it was also noted that, *“Between 2001 and 2019, the average hospitalisation bill size in public healthcare institutions have increased by about 6% a year on average, and this is affected by medical cost inflation, demographics and medical advancements over the years.”*<sup>3</sup>

While the premium increase relative to claims is not unreasonable, the continued rate of increases outruns the rate of GDP growth (approximately 3%) or median income growth (approximately 4% - refer to **Table A3: GDP and Median Income Growth** in the Resources and Data Tables section below) which is a cause for concern. As such, there is urgency to have a cost management model in place.

## 1.2 Impact on those with Integrated Shield Plans

As at 30-Sep-2020, 69% of Singapore residents (2.81 million) own Integrated Shield Plans (IPs)<sup>4</sup>; it is estimated that half<sup>5</sup> of the 69% also own complementary IP riders.

MSHL 2020 recommends the pro-ration factor of hospital bills of private insurers to be reduced from 35% to 25% to better reflect the actual bill differences between private hospitals and subsidised wards at public hospitals. According to MOH statistics, private hospital claims for day surgery and inpatient claims are 18% of all MSHL inpatient and day surgery claims<sup>6</sup>. Additionally, the MSHL paid “\$95 million for 60,000 private hospital bills” in 2019<sup>7</sup>.

The change of pro-ration factor from 35% to 25% is expected to reduce the MSHL inpatient and day surgery claim payout at private hospitals. Applied to 2019 claims, this change of pro-ration factor would have resulted in a reduction of \$27m ( $\$95m \times ((35\% - 25\%) / 35\%)$ ) or 3% ( $\$27m / \$1,030m$ ). Applied to future claims, the change is likely to have a smaller impact in proportion to total claims, due to the impact of claim limits.

Lowering the pro-ration factor will reduce the claims payout by MSHL (by a maximum of 3%) and improve its claim experience on claims incurred at private hospitals. While we agree on the need to maintain equity between public and private hospital claims payouts, this reduction is unlikely to offset the trend of increasing claim payout from MSHL. Given that the amount of claims paid by MediShield Life rose by \$108 million in 2019 (or 12% vs 2018). Other measures will be needed to rein in the rising claims costs being incurred at public hospitals. We also note that we have not accounted for any utilization “drift” between private and public hospitals – i.e. a potential shift in utilization of private hospitals towards public hospitals as a result of the reduced pro-ration factor.

In addition to the expected impact on MSHL claims payouts, we note that there is a knock-on effect on the 2.81 million Singapore residents owning IPs only or those owning IPs with complementary IP riders. The reduction of the pro-ration factor applied to private hospital bills is expected to increase the claims amounts payable by IPs for private hospital claims due to reduction in MSHL payouts. An offsetting factor is the reduction in the claims amounts payable by IPs due to the increased limits in MSHL. We note that the number of claims affected by the reduced pro-ration will likely be greater than the number of claims benefiting from the increased limits. To be more specific, all private hospital claims will receive reduced payout from MSHL due to the reduced pro-ration, but only a proportion of private hospital claims that would exceed the current limits (and within the increased MSHL limits) will benefit from the increased claims payable by MSHL.

Coupled with the existing underwriting losses of IP (see **Table A4: Combined Profit and Loss of 7 Integrated Shield Plan Insurers** in the Resources and Data Tables section below) IP premiums will likely increase for those with private hospital IPs, adversely impacting “1.75 million insured lives with private hospital IPs”<sup>7</sup>.

We would also expect that significant increases in the premiums for IPs and riders to IPs may lead to some IP policy holders ceasing to renew IP and / or IP rider coverage. This would likely result in a subsequent effect of the utilization “drift” from private to public hospitals described earlier in this section.

<p align="center"><b>69% or 2.81 million Singapore residents own IP and maybe riders to IPs</b></p>	<p align="center"><b>31% or 1.26 million Singapore residents own only MSHL</b></p>
<p>We suggest that the MOH consider a postponement of the implementation of the new MSHL benefits and premiums to the end of 2021. This will likely delay the premium increases for IPs. It will give IP insurers more time to review and revise their products, processes and systems, to adjust to MSHL 2020. Given the uncertainty around employment (income to pay premiums) due to the COVID-19 situation, this delay will be welcomed by the IP policyholders.</p>	<p>On the other hand, it is important to note that there are 1.26 million Singapore residents who only own MSHL and are not able to benefit from enhanced MSHL 2020 benefits until MSHL 2020 is implemented. We suggest that MOH consider the specific groups of people who are expected to benefit from MSHL 2020 benefit enhancements and explore meeting their healthcare needs by using short-term healthcare support schemes (such as MediFund) to tide them through the interim period before MSHL 2020 benefits take effect. The amount to be funded will likely be less than the premium subsidies intended for MSHL 2020.</p>

### 1.3 Inclusivity

The removal of exclusions for

- i. treatments arising from attempted suicide or intentional self-injury, and
- ii. treatments arising from drug addiction, alcoholism or the person being under the influence of drugs or alcohol

is to be applauded for supporting individuals requiring such treatment in their recovery process.

It is noted that many insurers already offer some limited mental health treatment in an inpatient setting via a benefit extension called “Inpatient Psychiatric Care”, and some also cover pre- and post-hospitalisation (outpatient) mental health treatment.

However, given the industry’s lack of experience in dealing with claims arising from such treatment, we suggest that the MOH share with them the appropriate clinical standards which will be applied in assessing MSHL claims, including the licensing and accreditation of mental health professionals, and relevant statistics. This will allow assessment of claims with a high degree of consistency among insurers and by the MSHL (of claims by insured persons without IPs), and price these benefits with more confidence.

### 1.4 Premium rebates

We acknowledge that pre-funding is a critical design element of MSHL, and it is intended to ensure the long term sustainability of MSHL by making premiums “affordable” throughout a person’s life span, especially during later life stages (after retirement).

In the parliamentary Q&A of 2 Nov 2020, MOH shared factors<sup>3</sup> used to set premiums in the actuarial model

<i>Premiums collected have to cover</i>
-----------------------------------------

- *potential current and*
- *future payouts, including*
- *amounts set aside to support future commitments as well as*
- *provide a buffer against unforeseen contingencies such as unexpected spikes in hospitalizations due to disease outbreaks.*

*Part of the premiums paid by policyholders during their working ages are set aside to provide for future premium rebates... This constitutes the bulk of future commitments...in the reserves.*

*Other commitments include future payouts for diseases currently under treatment that will require multi-year care, such as renal failure and cancer.*

Specific to MSHL, there is a Premium Rebate<sup>8</sup> to reduce the premium costs after age 65. The pre-funded actuarial reserves (or policy liability) are set up in order to meet the “targeted” amount of rebates. We do note that the rebates may be “...adjusted from time to time in line with the experience of the scheme...”<sup>8</sup>.

Under MSHL, each age group / band is meant to be self-sustaining, i.e. it does not subsidise other age groups. The rationale for pre-funding is simple: as people age and enter the elderly age bands, they will be the group in the community with the least ability to pay high premiums, at a time when the cost of claims and hence premium is at its highest.

The pre-funding approach has been adopted for MSHL to fund for future claim liability and to allow for premium rebates which are distributed at old ages to alleviate the burden of high premium payments during post-retirement. Such an approach is beneficial because the pre-funded amount is invested, and with compounding interest income, will help offset MSHL premiums during retirement when one is no longer receiving an income.

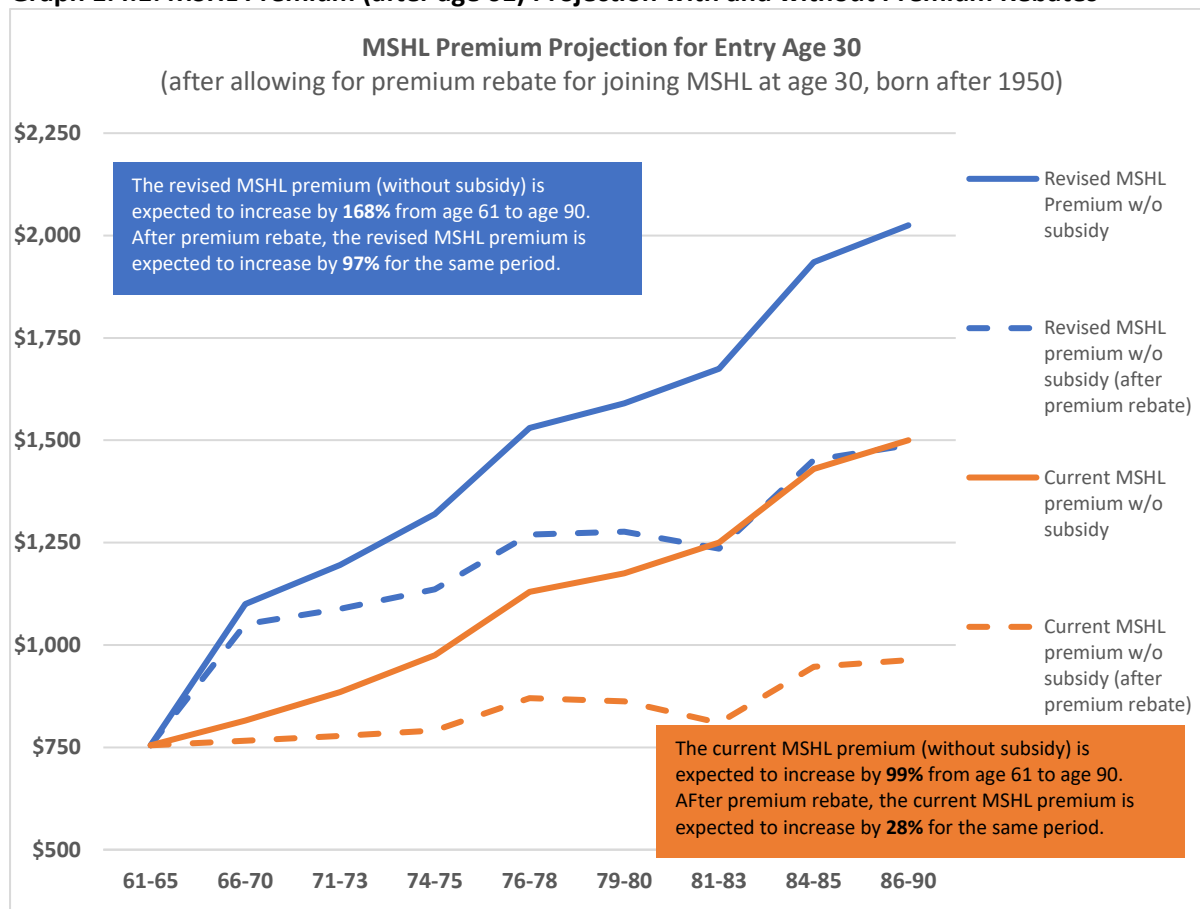
**However, we note that there is low public awareness of these premium rebates and the beneficial impact on premiums at older ages.**

In Graph 1.4.1: MSHL Premium (after age 61) Projection with and without Premium Rebates below we show the progression of the age-banded MSHL premium rates for a Singaporean for joining MSHL at age 30 (born after 1950) and his/her premium rates from age 61 onwards, if there were no rebates and what happens when premium rebates are applied.

Premium rates are shown for both the current MSHL benefits design and for that after the proposed 2020 benefits enhancements. Premium subsidies have been ignored to make the comparison simpler.

Excluding premium rebates, age-banded premium rates increase by 99% from age 61 to age 90 for the current MSHL benefits; and by 168% for the proposed new 2020 benefits. Allowing for premium rebates, the corresponding increases are more manageable at 28% and 99% respectively. Even if the compounded investment returns from the pre-funded reserves are significantly less than the increase in premiums, pre-funding provides the benefit of smoothing increases in premiums at older ages, thereby enabling greater (perceived) affordability.

As illustrated, the impact of premium rebates is substantial at older ages. As such, we believe it will be both informative and useful for MOH to provide the public with a comprehensive (and balanced) view by providing salient communication of both premium rebates and premium increases at the same time.

**Graph 1.4.1: MSHL Premium (after age 61) Projection with and without Premium Rebates**

### 1.5 Increased claim limits

The increase in the annual claim limit to \$150,000 will make it the same as that of the Standard Integrated Shield Plan for Public Hospital Class B1 coverage (Standard B1 Plan). Under the Standard B1 Plan, which was launched by the IP insurers in consultation with the MOH and the Central Provident Fund (CPF) Board in 2016, the benefits are standardised across all the IP insurers. This IP offers Singapore Residents an opportunity to upgrade to a higher class ward in a public hospital, with higher coverage limits compared to basic MSHL benefits; and at not too high a cost.

The proposed increase in the annual claim limit, together with the other benefit improvements, narrow the difference between the MSHL and the Standard B1 Plan.

We recommend a review be conducted into the Standard B1 Plan in light of the enhancement of the MSHL, so that it continues to provide a meaningful upgrade from MSHL.

The Standard B1 Plan should also be promoted on <https://www.comparefirst.sg/> (informational portal by the Consumers Association of Singapore (CASE), the Monetary Authority of Singapore (MAS), the Life Insurance Association Singapore (LIA) and MoneySENSE)<sup>9</sup>. This will help enhance efficiency of distribution in health insurance, and also reduce to some degree the public over-purchasing health insurance.



## 2 Data-driven Decision-making

Rising claims costs (in their broadest sense) remain a major concern for all health insurers as well as for MSHL, and the reasons behind these are not comprehensively addressed in the MSHL Review 2020.

### 2.1 Health Claim Analytics

The following MSHL statistics show that the average payout per claim of MSHL has remained stable at around \$1,500 during 2016-2019. The stability may be attributed to the sub-limited design of MSHL where \$ caps are imposed on all types of benefits, including hospital ward daily charges, extending to each type of approved medical treatment.

**Table 2.1.1: Key MediShield Life Statistics during 2016 to 2019<sup>10</sup>**

Year	Amount of Payout [A]	Number of Claimants [B]	Average Payout per Claim* [C]	% of Claims from Private Hospitals <sup>#</sup>
2016	\$758M	173k	\$1,500	17%
2017	\$845M	190k	\$1,520	17%
2018	\$929M	204k	\$1,540	18%
2019	\$1,038M	221k	\$1,520	18%
<b>CAGR</b>	<b>11%</b>	<b>9%</b>	<b>0%</b>	<b>&lt;1% point increase</b>

\* Note: Each claimant could have made one or more claims in the year. These figures may vary from year to year due to the profile of claimants and type of treatments.

# Note: This only includes inpatient and day surgery claims. We opine that this is in relation to incidence of claim, not claims payout, as MOH quoted separately that 15% of claims payout in 2019 is at private hospitals<sup>11</sup>

**Table 2.1.2: Derived Statistics on MediShield Life (estimated from Table 2.1.1)**

Year	Number of Insured (i) [D]	Est. Number of Claims [E] = [A]/[C]	Claims Incidence (%) [E]/[D]	Claimants/Insured (%) [B]/[D]
2016	3,934k	505k	13%	4.4%
2017	3,966k	556k	14%	4.8%
2018	3,994k	603k	15%	5.1%
2019	4,026k	683k	17%	5.5%
<b>CAGR</b>	<b>0.8%</b>	<b>11%</b>	<b>10%</b>	<b>7.7%</b>

(i) From M810011 - Singapore Residents By Age Group, End June 2020, Annual  
<https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refid=14911>

The rise in MSHL claims cost arose largely from increased utilisation, as shown in the table by the increase in claims incidence rates of about 10% p.a. in the period 2016 – 2019.

For IPs, we extracted claims data from the IP insurers' annual returns to the Monetary Authority of Singapore (MAS). Note that these returns contain other long term health products, but the majority is IPs, as the 2018 publicly available data point we have is that 77% of long term health lives insured belong to IPs (refer to Table A5: No. Of Policyholders with IPs vs Total Number of Lives of IP Insurers)

**Table 2.1.3 Claim Statistics from IP Insurers - Long Term Health Portfolio Claim Experience**

Year	Gross Claims [A]	Number of Claims Registered [B]	No. of Lives Covered [C]	Est. Average Payout per Claim [A]/[B]	% Clams incidence [B]/[C]
2016	\$1,190m	616,335	3,406,607	\$1,930	18.1%
2017	\$1,390m	727,279	3,461,147	\$1,911	21.0%
2018	\$1,399m	792,804	3,557,822	\$1,764	22.3%
2019	\$1,617m	852,558	3,658,910	\$1,897	23.3%
<b>CAGR</b>	<b>11%</b>	<b>11%</b>	<b>2%</b>	<b>-1%</b>	<b>9%</b>

Refer to Sources for Table A4 & Table A5: in the Resources and Data Tables section below

The cost per IP claim (Table 2.1.3 Claim Statistics from IP Insurers - Long Term Health Portfolio Claim Experience above) appears to have been well managed and has remained stable over the period of 2016 - 2019. However, the claim incidence has risen by 9% p.a. from 2016 to 2019. Similarly, the MSHL claims incidence rates (Table 2.2) increased by about 10% p.a. over the same period.

The above is just the broad picture. Detailed data analysis is required to get an understanding of the root causes of the increased utilisation rates. The same applies to claim payments in order to discern trends in types of claims, by age group and costs of treatment.

## 2.2 Source Data for Analytics

We note that there are excellent resources available to conduct the necessary data analytics:

1. The nationwide Medicaid system which is used to settle MediShield Life and Integrated Shield policy claims can provide detailed utilisation costs
2. National Electronic Health Record (NEHR) and other EMR implementations can provide clinical data
3. CareShield Life / ElderShield and other government databases on death provide some proxy of outcome data

These resources will enable the analysis of medical providers in relation to the utilisation costs (item 1 above) vs the treatment given (item 2 above) vs the outcomes (item 3 above).

The MOH will be able to ascertain those medical providers with the highest propensity to recommend high cost procedures (resulting not necessarily in better outcomes) vs the population of their peers. We believe these analyses can be conducted offline (once-off) to determine the scale of the issue.

*B.8.v. While most doctors charge appropriately, MOH is monitoring doctors who charge excessive fees and will take action against doctors who over-charge or over-service.<sup>12</sup>*

## 2.3 Generalised Linear Models (GLM)

GLM is widely used whenever there are huge data sets available. So far, it is widely used for motor insurance. In the health domain, where data (especially hospitalisation costs) is very skewed, it is more common among big insurers and reinsurers who have access to large data sets. GLM is used for provider profiling, fraud detection, and analysis of medical inflation for health schemes.

Example 1: There is a Hospital A and a Hospital B. In one-way analysis, we see that average Bill size in Hospital A is 10% higher than Hospital B. The conclusion would be that Hospital B is cheaper and we can arrive at conclusions like steering all customers to Hospital B. But then we look at the diagnosis, we observe that more complicated/complex treatments have taken place at Hospital A as compared to Hospital B which means we are not comparing apple to apple while coming up with a conclusion. How to know the real difference between cost of Hospital A and Hospital B? Ideally, we need to compare the same diagnosis and procedure and room cost and other items of the bill between A and B. This is where GLM can help. GLM will identify these dependencies and separate out their impact. In this case, when we run the GLM, the result is that Hospital B is more expensive than Hospital A for the same procedure and diagnosis. A very different conclusion as compared to the one-way analysis.

Example 2: Studying the frequency of medical claims, if we use one-way analysis to check the frequency variation by member age, we usually see a J curve for the health inpatient claims. Another very important factor that impacts the claim frequency is the number of years of being insured. In one-way analysis, the frequency will increase as the number of years of being insured increases. If a GLM is run to differentiate the impact of age of member and numbers of years being insured, the age curve would change and we would see that it is less or more steep depending on which age groups started early. It is also important to study an insured's tendency to go to a private or public hospital along with the overall frequency because that will impact the cost of treatment. GLM can be used in this case as well with dependent variable being Public or Private and independent variables being demographics of an insured, health status, socio-economic status, insurance status etc and can be used in predictive modelling to predict the future expected costs of the portfolio more accurately.

## 2.4 Potential Actionable Insights

1. Data should be analysed as to whether the rise in claim incidence rates and claim costs was due to the ageing of the insured population or due to other factors. Apart from analysing the factors that drive claim incidence and severity, it would be useful to observe the distribution of claims and severity and consider if interventions (in pricing and benefit design as well as in health care delivery) should be targeted across the entire portfolio of insured lives or at segments who disproportionately drive claim costs.
2. The change in chronic disease burden (e.g. diabetes, hypertension and hyperlipidaemia) should also be studied. As premium increases are derived based on projected trends into the future, we recommend considering and projecting each cost driving factor on its own merits in order to assess its likely trajectory.
3. Another area could be the coverage of serious pre-existing conditions (PEC) at additional 30% loading on MSHL premiums in the first 10 years<sup>13</sup>. Out of total costs, there is 75% subsidy by the government for this group in the first 5 years. The MOH can assess whether the relative risk of this group from the claims incurred relative to the rest without serious PEC is in line with pricing.
4. A Generalised Linear Model (GLM)<sup>14</sup> or derivative can be considered to better understand the drivers of claim costs, by using claim frequency or burning cost as the dependent (outcome) variable with various different independent variables, e.g. age of the insured, ownership of IP

plan, type of IP, years of insurance, resident status, number of visits to private hospitals, number of visits to public hospitals, etc. Under a GLM model, if type of IP is identified as the top dependent variable to claim frequency (independently of other factors like age), the MOH and IP insurers can devise targeted strategies on type of IP to control claim costs more efficiently.

5. Conduct detailed provider profiling, starting with a comparison of the average cost for the same treatment and similar tiered doctor and/or hospital to identify potential over consumption and over treatment.

The Singapore Medical Council reminded doctors that:

*"...a doctor must not subject a patient to unnecessary tests or procedures "simply because (he or she) stands to benefit from the fees". Such conduct could constitute over-servicing and may be a breach of a doctor's ethical obligations even if the patient agreed to undergo the test or procedure, the SMC pointed out..."<sup>15</sup>*

We note that such analysis can only serve to highlight deviations from the statistical average based on the historic distribution of costs or utilisation. A meaningful discussion of what constitutes an "ideal" or "regular" level of consumption and treatment, in order to define "over" consumption and "over" treatment, lies beyond such analysis, and must certainly involve the medical profession as well as payors and analysts.

Better explain premium changes (generally increases) by showing the detailed analysis that led to the changes: for example, the results of investigations into actual versus expected claims by age bands, gender, and private vs public hospitals; top causes of claims by age bands and other risk factors.

### 3 Management of Rising Claims Costs

As IP forms the complementary layer of health care financing above MSHL, it is equally important to understand the factors driving the IP claim experience and for the MOH to ensure “Affordable Premium” of MSHL as well as IPs owned by 2.81 million Singapore residents.

#### 3.1 Insured Behaviour

The first factor, is healthy people claim less, and unhealthy people claim more. It is enlightening (and credit to public policy and individual and community efforts) that in the recent Global Burden of Disease 2019 study<sup>16</sup>, “Singapore was ranked first globally for life expectancy (LE) at birth and healthy life expectancy (HALE) at birth, with the lowest Disability-Adjusted Life Years (DALYs) per 100,000 population in the world.” and “approximately 35% of the DALY burden in Singapore can potentially be reduced by early intervention on modifiable risk factors.” This suggests that we have excellent outcomes (on a global scale) in relation to life expectancy, and overall good health. 35% of the number of years lost due to ill-health, disability or early death (i.e. DALY) and to some degree the claims costs involved can be avoided by controlling “*smoking, poor diet, low physical activity, high blood pressure, high fasting plasma glucose level, high body-mass index and high low-density lipoprotein (cholesterol) level.*”

We understand that the Health Promotion Board (HPB) has a range of excellent programmes (Healthy 365<sup>17</sup>, Lumihealth<sup>18</sup>, etc). If appropriate investments, outcomes and claims results (in relation MSHL) are shared more widely, the MOH can catalyse private investments by insurers to encourage healthy behaviour among their insured lives.

Another factor driving IP cost is insured behaviour. Moral hazard (in other words, overconsumption) occurs when the insured utilises his or her insurance to consume more health care services that he or she would not have otherwise done so without health insurance. We note that IP insurers have adopted different approaches to minimise moral hazard, from claim-based pricing<sup>19</sup>, preferred panel of private hospitals/doctors, to pre-authorisation prior to treatment<sup>20</sup> and removal of 100% coverage for deductibles and coinsurance.

IP cost management measures are scheduled to take effect in April 2021, namely the transitioning of full coverage IP riders to coverage with 5% co-payment ; and increased use of standardised pre authorisations by the Life Insurance Association of Singapore (LIA) insurers. These actions are expected to reduce the ‘buffet’ syndrome effect, reduce moral hazard and thereby help in mitigating the inexorable rise in medical claims payouts. However, as the renewal of IP only takes effect on policy anniversary and claimant behavior is expected to change only after the renewal, the effect of the change could take time to be seen in the claims.

These measures adopted by IP insurers may not be the answer to managing healthcare costs under MSHL, whose key objectives are “Affordable” and “For All, For Life”. Without key information on MSHL to understand the key drivers of costs, it is challenging for us to identify the issues (e.g. if moral hazard exists) and therefore providing corresponding comments.

#### 3.2 Value-Driven Care

We note that the level of bill subsidy is means tested and varies by ward class. The benchmark is that 9 in 10 Singaporeans who use C class wards will have their bills met by MSHL. We would suggest more transparency in this benchmark, as there are gaps between claimable amounts and actual fees. If the public hospitals are charging subsidised fees far higher than what MSHL allows for claims, there needs to be a review either of the charges or the limits or both.

It is noted that the MOH has a unique perspective, as 83% of acute care hospital beds are managed by the MOH<sup>21</sup> and 82% of MediShield Life (MSHL) claims are incurred at public hospitals. Therefore, the question would arise on whether more can be done on the cost management via “*Value-driven care (VDC) – defined as achieving the best possible outcome relative to cost*”<sup>22</sup> to mitigate the impact on claims increases, and therefore dampen the premium increases. MOH’s existing efforts of “... *looking into treatment protocols that provide the best value for patients... optimisation of healthcare outcomes through the introduction of Value-Driven Care (VDC) programme*”<sup>23</sup> should be better communicated, especially in relation to successful case studies, where medical outcomes are better with less variability (or reduction) in costs.

In the US, the CMS (Centers for Medicare & Medicaid Services) administers the national insurance programs for older adults (Medicare, typically for those aged 65 and above) and the poor and needy (Medicaid). Since 2012, CMS has implemented a number of value-based programs which link provider performance of quality measures, to provider payments<sup>24</sup>. The hospital value-based purchasing program (HVBP) essentially modifies the payment to providers that is calculated in the Inpatient Prospective Payment System according to the providers’ quality scores. The quality scores aim to measure outcomes in terms of patient experience, adverse events, adoption of evidence-based protocols and transparency of care data. This incentivizes providers to invest in tools for managing population health:

- analytics infrastructure to assess risk profiles of patients;
- prevention and wellness programs;
- care coordination and care management teams to support patients after discharge and enable care transitions into the community and home settings.

Other examples in the private domain include Iora Health which charges a recurring membership fee for its care delivery for one person, with access to a co-ordinated care team comprising physician, nurse and health coach. By considering the total costs of care over time rather than based on one single episode, this approach can create an incentive for the provider to proactively intervene and manage patient’s health<sup>25</sup>. This is an example of VDC-based insurance payout, of which the insurers can consider to drive better outcomes for both insurers and insured/patients.

In view of the above, there exists an opportunity for MOH to consider linking MSHL payout to payor-driven VDC. The MOH can refer to successful VDC case studies across the globe and explore its applicability to MSHL in Singapore.

## 4 Actuarial Value Add

We have made broad observations based on publicly available information on MSHL in this paper. To be able to comment on actuarial-related matters better, we suggest that the MOH provide more detailed information on actuarial reserving methodology of MSHL and anonymised claim information with breakdown by age bands, claim causes, hospitals etc. We would also suggest access to the work of actuaries engaged by the MOH on MSHL, their brief from MOH and detailed claims and treatment information held by health providers.

With data we can bring actuarial expertise to bear and explore the following critical areas in depth:

- Over-utilisation of healthcare - assessment and impact
- Claim incidence rates - key drivers
- Deductibles and Co-insurance - extent of mitigation, appropriateness of levels set
- Use of riders – to mitigate impact of deductibles and co-insurance
- How companies are handling these issues - what is working, what isn’t working, why

Examples of collaboration involving improved access to government data include, the 2013 report by the Society of Actuaries and Canadian Institute of Actuaries, “Sustainability of the Canadian Health Care System and Impact of the 2014 Revision to the Canada Health Transfer,” that takes an actuarial look at the state of the Canadian health care system<sup>26</sup>. We look forward to further discussions between SAS and MOH on this.

## 5 Resources and Data Tables

### 5.1 Universal Healthcare Financing Resources

The issue of healthcare financing and sustainability is not unique to Singapore, but a problem faced by all healthcare systems in the world. Solutions to address these issues vary between countries as illustrated in the [International Health Care Funding Report](#)<sup>27</sup>, which is jointly published by the International Actuarial Association Health Section (IAAHS), Society of Actuaries International Section and the American Academy of Actuaries Health Practice International Committee. The SAS Health Committee contributed to the illustration of a number of Asian countries (including Singapore) in this report.

This report acknowledges that many historical, social, economic and political factors may influence a country's healthcare financing arrangement. Consequently, it is difficult to replicate and adopt another country's healthcare financing model especially when they have differing cultural and socioeconomic backgrounds. However, a closer examination of different healthcare systems around the world may provide insights to potential healthcare reforms.

The SAS Health Committee recently shared details about the universal healthcare systems in Indonesia and Singapore, and peer-to-peer healthcare in China, in a SAS Afternoon Forum in May 2020. The presentation outlines the challenges faced by Indonesia's national healthcare scheme (BPJS) and compares BPJS against MSHL. The presentation deck and recording can be found [here](#)<sup>28</sup>.



## 5.2 Data Tables

**Table A1: Indicative Medishield Life Premium Schedule in 2021 vs Singapore Residents by Age Group**

Age Next Birthday (i)	Current Premiums Before Subsidy	Revised Premiums Before Subsidy	Age Group (ii)	Singapore Residents	%
1 – 20	\$ 130	\$ 145	0 - 19	803,440	19.9%
21 – 30	\$ 195	\$ 250	20 - 29	531,534	13.1%
31 – 40	\$ 310	\$ 390	30 - 39	597,313	14.8%
41 – 50	\$ 435	\$ 525	40 - 49	611,031	15.1%
51 – 60	\$ 630	\$ 800	50 - 59	601,898	14.9%
61 – 65	\$ 755	\$ 1020	60 - 64	284,626	7.0%
66 – 70	\$ 815	\$ 1100	65 - 69	229,396	5.7%
71 – 73	\$ 885	\$ 1195	70 – 72 (iii)	113,339	2.8%
74 – 75	\$ 975	\$ 1320	73 – 74 (iii)	56,669	1.4%
76 – 78	\$ 1130	\$ 1530	75 – 77 (iii)	60,660	1.5%
79 – 80	\$ 1175	\$ 1590	78 – 79 (iii)	30,330	0.7%
81 – 83	\$ 1250	\$ 1675	80 – 82 (iii)	44,342	1.1%
84 – 85	\$ 1430	\$ 1935	83 – 84 (iii)	22,171	0.5%
86 – 90	\$ 1500	\$ 2025	85 - 89	36,586	0.9%
> 90	\$ 1530	\$ 2055	90 Years & Over	20,875	0.5%
<b>Weighted Average (iv)</b>	<b>\$ 463</b>	<b>\$ 597</b>	<b>Total</b>	<b>4,044,210</b>	<b>100.0%</b>

## Notes:

- (i) from Table C1: Indicative Revised MediShield Life Premium Schedule in 2021  
<https://www.moh.gov.sg/docs/librariesprovider5/mshl-econsult/mshl-2020-consultation-paper>
- (ii) From M810011 - Singapore Residents By Age Group, End June 2020, Annual  
<https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=14911>
- (iii) assume 2/3 of respective age band in first 3 years band and remainder in last 2 years
- (iv) weighted by Singapore Residents by Age Group from (ii) above

Table A1 indicates a weighted average increase of \$597 from \$463, which is 29% increase in premiums on population age adjusted basis.

**Table A2: Incurred Loss Ratio of MediShield Life and Estimated Number of Insured**

Year	Premiums Collected [A]	Claims Paid [B]	Change in Required Reserves (i) [C]	Incurred Loss Ratio ([B] + [C]) / [A]	Number of insured (ii)
2013	\$770m	\$335m	\$366m	91%	3,576k
2014	\$723m	\$381m	\$331m	98%	3,600k
2015	\$1,099m	\$437m	\$569m (iii)	92%	3,630k
2016	\$1,859m	\$745m	\$1,182m	104%	3,934k
2017	\$1,882m	\$836m	\$969m	96%	3,966k
2018	\$1,914m	\$922m	\$998m	100%	3,994k
2019	\$1,923m	\$1,030m	\$1,166m	114%	4,026k
2016 - 2019	<b>\$7,578m (iv)</b>	<b>\$3,533m</b>	<b>\$4,314m</b>	<b>104%</b>	
2013 - 2019	<b>\$10,170m</b>	<b>\$4,686m</b>	<b>\$5,581m</b>	<b>101%</b>	
'16-'19 CAGR	<b>1.1%</b>	<b>11.4%</b>			<b>0.8%</b>
'13-'19 CAGR	<b>16.5%</b>	<b>20.6%</b>			<b>2.0%</b>

**Notes:**

- (i) The change in required reserves reflects the amounts that need to be set aside to support future commitments, such as long-term treatments and future premium rebates.
- (ii) Estimated using statistics on Singapore residents (M810011 - Singapore Residents By Age Group, End June, Annual) <https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=315> and the Medishield Life Review Committee Report 2014 estimate of 93% insured under the old Medishield scheme as at end 2013. [https://www.moh.gov.sg/docs/librariesprovider5/medishield-life-documents/medishield\\_life\\_review\\_committee\\_report\\_final.pdf](https://www.moh.gov.sg/docs/librariesprovider5/medishield-life-documents/medishield_life_review_committee_report_final.pdf)
- (iii) The change in required reserves in 2015 was adjusted to remove the effect of the one-off significant change in valuation basis mainly arising from the shift of MediShield to MediShield Life in Nov 2015 (e.g. universal coverage for all Singapore Residents, support for the Fund's capital needs).
- (iv) This \$7.5 billion comprised \$4.4 billion in premiums collected from policyholders and \$3.1 billion in premium subsidies and other forms of premium support from the Government to help keep premiums affordable.

**Sources:**

Above Table A2 is combination of data from two sources below.

2016 to 2019: Yearly Loss Ratio of Medishield Life (basic) In Last Five Years

[https://www.moh.gov.sg/news-highlights/details/yearly-loss-ratio-of-medishield-life-\(basic\)-in-last-five-years](https://www.moh.gov.sg/news-highlights/details/yearly-loss-ratio-of-medishield-life-(basic)-in-last-five-years)

2013 to 2015: MediShield Life Fund, Item 1. What were the premiums and claims in recent years? What is the Fund's incurred loss ratio?

<https://www.moh.gov.sg/cost-financing/healthcare-schemes-subsidies/medishield-life/medishield-life-faqs>

**Table A3: GDP and Median Income Growth**

<b>Billion Dollars</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>CAGR '16-'19</b>	<b>CAGR '13-'19</b>
<b>GDP In Chained (2015) Dollars</b>	395.6	411.2	423.4	437.2	456.1	471.8	475.3		
<b>% increase</b>		3.9%	3.0%	3.2%	4.3%	3.4%	0.7%	<b>2.8%</b>	<b>3.1%</b>
<b>Median Monthly Household Income From Work Per Household Member (Including Employer CPF Contributions)</b>	2,247	2,380	2,500	2,584	2,699	2,792	2,925		
<b>% increase</b>		5.9%	5.0%	3.4%	4.5%	3.4%	4.8%	<b>4.2%</b>	<b>4.5%</b>

**Source:**

M015231 - Gross Domestic Product In Chained (2015) Dollars, Annual

<https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=16034>

M810361 - Key Indicators On Household Income From Work Among Resident Employed Households

<https://www.tablebuilder.singstat.gov.sg/publicfacing/createDataTable.action?refId=12307>

**Table A4: Combined Profit and Loss of 7 Integrated Shield Plan Insurers (i)**

Year	Gross premiums [A]	Gross claims [B]	Management Expenses [C]	Commission [D]	Change in Reserves and Other expenses [(A)-(B)-(C)-(D)-(E)]	Underwriting Gain/ (Loss)[E]
2016	\$1,608m	\$1,190m	\$106m	\$131m	\$279m	(\$98m)
2017 (ii)	\$1,859m	\$1,390m	\$126m	\$160m	\$329m	(\$146m)
2018	\$1,836m	\$1,399m	\$140m	\$182m	\$153m	(\$38m)
2019	\$2,143m	\$1,617m	\$166m	\$197m	\$206m	(\$43m)
<b>2016 -2019</b>	<b>\$7,447m</b>	<b>\$5,596m</b>	<b>\$538m</b>	<b>\$670m</b>	<b>\$967m</b>	<b>(\$325m)</b>
<b>% of Gross premiums</b>		<b>75%</b>	<b>7%</b>	<b>9%</b>	<b>13%</b>	<b>(4%)</b>

**Table A5: No. Of Policyholders with IPs vs Total Number of Lives of IP Insurers**

	Number of lives covered under policies in force (i)	Number of policyholders with IPs (iii)	% of IPs vs total lives
<b>2018</b>	3.558 million	2.749million	<b>77%</b>

**Sources for Table A4 & Table A5:**

- (i) MAS Annual Returns for 7 Integrated Shield Plan Insurers (AIA, Aviva, AXA, Great Eastern Life, NTUC Income, Prudential and Raffles)  
2019: MAS Annual Returns Form A5 – Long Term Health only  
2016-2018: MAS Annual Returns Form 7 – Long Term Health only  
<https://www.mas.gov.sg/statistics/insurance-statistics/insurance-company-returns>
- (ii) adjusted for the one-off effect of reinsurance from one insurer.  
<https://www.tnp.sg/news/business/insurers-suffer-losses-intergrated-shield-plans-premiums-may-rise>
- (iii) No. of Policyholders with Private Integrated Shield plans in 2018 = 2.749million  
<https://www.moh.gov.sg/resources-statistics/singapore-health-facts/government-health-expenditure-and-healthcare-financing>

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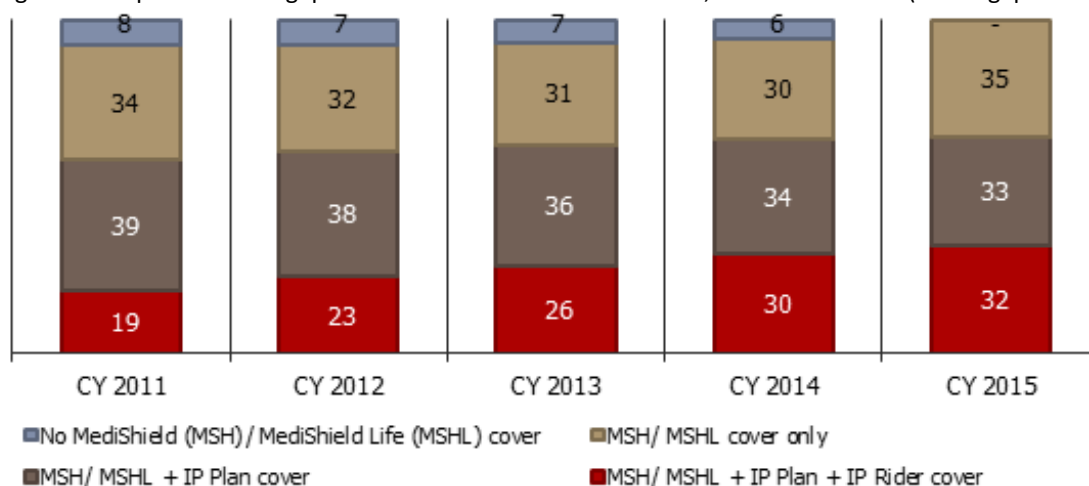
<sup>1</sup> <https://www.moh.gov.sg/news-highlights/details/public-consultation-on-medishield-life-review>

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<sup>3</sup> <https://www.moh.gov.sg/news-highlights/details/medishield-life-premiums>

<sup>4</sup> <https://www.lia.org.sg/news-room/industry-performance/2020/life-insurance-industry-sees-increase-in-new-business-in-3q-2020-compared-to-2q-2020/>

<sup>5</sup> Figure 3: Proportion of Singapore Residents with MediShield Life, IPs and IP Riders (LIA Singapore and MOH)



[https://www.lia.org.sg/media/1521/managingsingaporehealthinsurancecost\\_hitf\\_20161013.pdf](https://www.lia.org.sg/media/1521/managingsingaporehealthinsurancecost_hitf_20161013.pdf)

<sup>6</sup> <https://www.moh.gov.sg/news-highlights/details/statistics-on-annual-medishield-life-payouts-and-claims-over-last-five-years>

<sup>7</sup> <https://www.straitstimes.com/opinion/steep-medishield-premium-hikes-and-what-they-signal-about-affordable-healthcare>

<sup>8</sup> <https://www.moh.gov.sg/cost-financing/healthcare-schemes-subsidies/medishield-life/medishield-life-premiums-and-subsidies/premium-rebates>

<sup>9</sup> <https://www.comparefirst.sg/wap/webAggregatorEvent.action>

<sup>10</sup> <https://www.moh.gov.sg/news-highlights/details/statistics-on-annual-medishield-life-payouts-and-claims-over-last-five-years>

<sup>11</sup> <https://www.moh.gov.sg/news-highlights/details/premiums-collected-to-cover-potential-current-and-future-payouts>

<sup>12</sup> <https://www.moh.gov.sg/docs/librariesprovider5/pressroom/current-issues/cos-2018-media-factsheet-beyond-healthcare-to-health.pdf>

<sup>13</sup> MediShield Life Review Committee's Recommendations At a Glance (Jun 2014)

[https://www.moh.gov.sg/docs/librariesprovider5/medishield-life-documents/all\\_languages\\_aag.pdf](https://www.moh.gov.sg/docs/librariesprovider5/medishield-life-documents/all_languages_aag.pdf)

<sup>14</sup> Modeling Health Care Expenditures and Use,

Partha Deb and Edward C. Norton, Annual Review of Public Health 2018 39:1, 489-505

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