



**SINGAPORE ACTUARIAL CONFERENCE 2024**  
26 - 29 August 2024

# Evolution of Critical Illness (CI) Products in Singapore

August 2024

## Agenda

01



Background

02



Pricing complexity

03



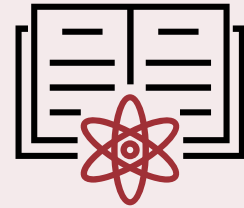
Status quo and future developments

04



Conclusions

# 01



## Background

## A journey through time



**1980s:** Basic CI covers introduced in Singapore

**2003:** Introduction of first standardised definitions by the LIA

**2014:**

- Changes in definitions were made to ensure that the definitions are up to date with advancement in medical technology and diagnosis, as well as to address definitions that presented issues due to lack of clarity
- Removal of maximum number of CI conditions

**2020:** Further revisions in definition and removal of angioplasty per claim limit

Further update on the definition is expected to be effective no later than **July 1, 2025**

## Evolution of CI Product



**Market has introduced many variations** in addition to the standard CI product, including the following:



Early & Intermediate CI product



Coverage for Special Benefit (e.g., Diabetic Complications) and Juvenile Conditions (e.g., Juvenile Rheumatoid Arthritis)



Coverage for Advance CI & its corresponding early CI beyond the standard 37 definitions (e.g., Severe Crohn's Disease)



Multi-Pay CI (started off with 4 – 6 buckets, but have since expanded to no buckets and covers recurrence of selected same conditions such as cancer and heart attack)



New benefits such as ICU cover, pre-malignant tumour, post-CI term option

# 02



## Pricing complexity

## Dramatic rise in cancer in people under 50.

By [Kira Sampson](#) | Brigham and Women's Hospital Communications  
8 September 2022



## What to know about the rise in cancer cases among younger people.

By [Amanda Torres](#)  
7 February 2024



## Why are so many young people getting cancer? What the data says.

Clues to modern mystery could be lurking in information collected generations ago

By [Heidi Ledford](#)  
13 March 2024



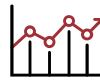
## Cancer cases in younger people are rising sharply.

Here are some preventive measures to take

By [Katia Hetter](#)  
18 April 2024



## Future trend



### Past trends

- |                           |   |
|---------------------------|---|
| + By claim condition      | + Population stats  |
| + Incidence vs prevalence | + Changes in underwriting and claim definitions over time |
| + Observed experience     | + Changes in healthcare and protocols                     |

### Future expectation

- |                                      |                        |
|--------------------------------------|------------------------|
| + By claim condition                 | + Medical advancements |
| + Where will trends stop (if ever)?  | + Access to healthcare |
| + Future risks, e.g., climate change |                        |



# Incidence rates

## Standardised (37) definitions

Credible experience for major conditions, e.g., cancer, stroke and heart attack at certain ages



Some conditions' experience will take years to emerge, e.g., old-age conditions



Certain conditions have some subjectivity in diagnoses



## Other definitions



Limited experience available for most conditions



Incidence rates based on research, population statistics and experience from other markets



We do find overlaps between conditions

## Incidence rates

Population vs Insured

**While it's tempting to use population incidence rates to price for conditions that we do not have insured experience, we should take note on the following:**



First incidence vs  
multiple incidence



Underwriting  
effect



Definition

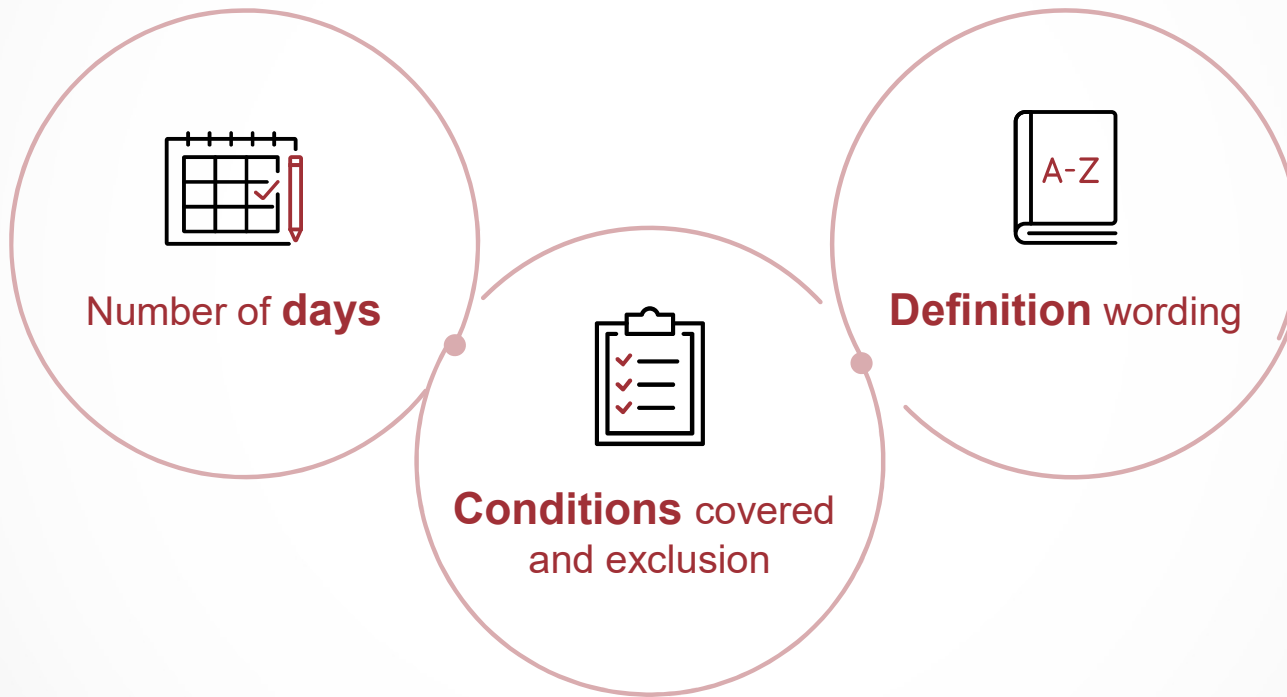


Affluence level  
& detection rate



Anti-selection

## ICU example



## Multi-Pay CI



No standardized definition for MPCl



Definitions and covered condition significantly affects pricing



E.g., cancer recurrence could be split into the following:

2<sup>nd</sup> independent cancer

Cancer relapse

Continuous cancer

Cancer metastasis

Products may include some or all the above



Some conditions, such as Terminal Illness and Loss of Independent Existence shouldn't be paid as 2<sup>nd</sup> payout

## Multi-Pay CI example



Consider a **MPCI product** that covers the following:

**37** standard CI



Recurrence of the same condition is allowed for **Cancer** (all 4 forms of cancer recurrence) , **Heart Attack, and Stroke**



Recurrence of up to **3x**



**TI** and **LOIE** can only be claimed as a first claim



**100%** SA per claim



**2 years** waiting period for recurrence of same condition,  
**1 year** waiting period for different condition



## Multi-Pay CI example (cont.)

To **price the product**, we need to determine the following:



- + First CI incidence rates
- + Post CI lapse rates
- + Post CI mortality rates
- + Trends
- + Second/subsequent CI incidence rates

## Multi-Pay CI: Reserving



In pricing, we can **convert subsequent CI incidence to a %** of first CI incidence rates

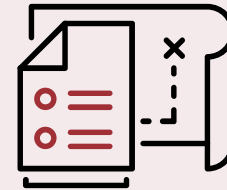


In reserving, we need to **set up impaired life reserves**. Some areas that we need to consider include:

- + Transition of impaired lives to a different state (i.e., subsequent CI, death, lapse)
- + Memory property of impaired lives (e.g., lives who has claimed cancer and heart attack. Would reserving consider only the latest state, or all previous state?)

# 03

---



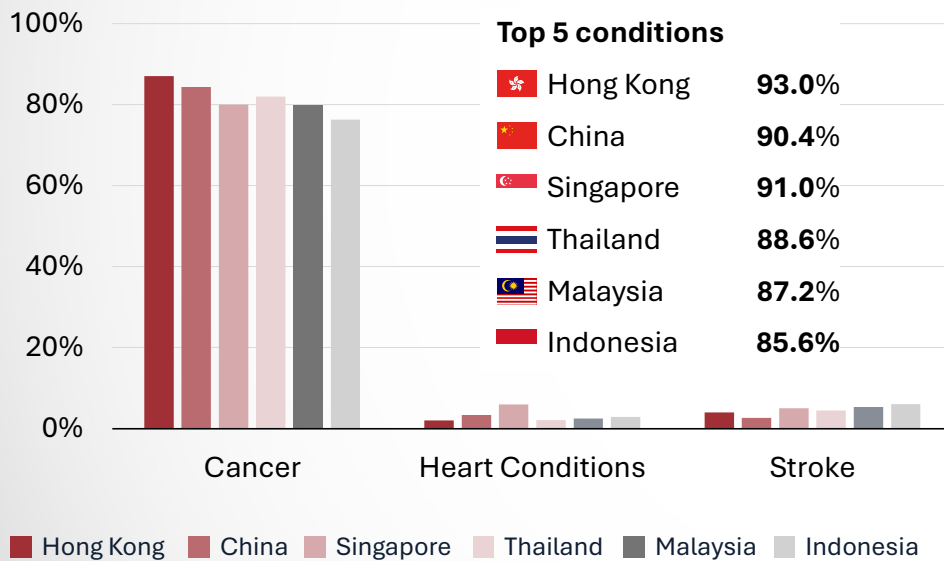
Status quo and future  
developments



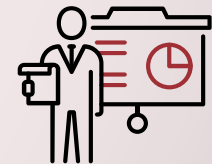
## Key causes of claim

### Relative contribution to claims incidence

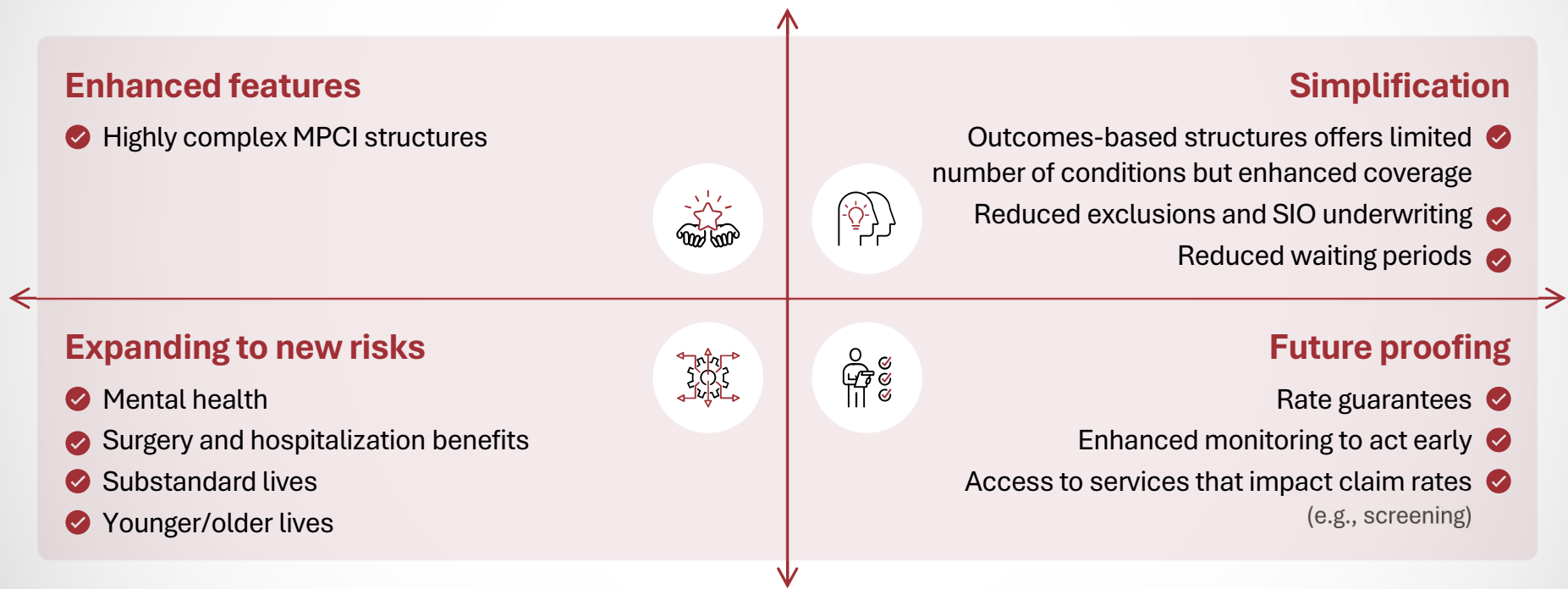
Females



- Cancer claims continue to make up a large component of overall claims cost
- This is despite products typically covering a very long list of conditions
- Claims where anti-selection is highly suspected keep popping up



## Recent trends



## Medical advances

### Expected medical advances worth following closely

#### Genetics

- Growth in access to and reducing cost of D2C genetic testing services
- **Liquid biopsy/Multi Cancer Early Detection (MCED)** solutions likely to significantly change landscape in years to come



#### AI and predictive analytics

- Expect more analyses on medical imaging by models. Likely to improve accuracy, increase TATs and accessibility
- Wearable devices, with AI applications are providing early warnings
- Welcome improvement in terms of prognosis, but earlier detection might worsen experience on existing product structures



#### Advances in therapy

- Significant investments in development of non-invasive immunotherapy/targeted therapy treatments
- Likely to improve outcomes, reduce long-term impacts of suffering a cancer.
- Products reflecting **severity post treatment** may have long-term savings.

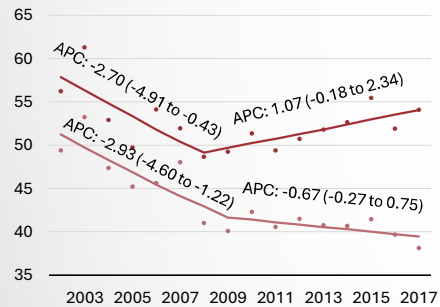


# Medical practices

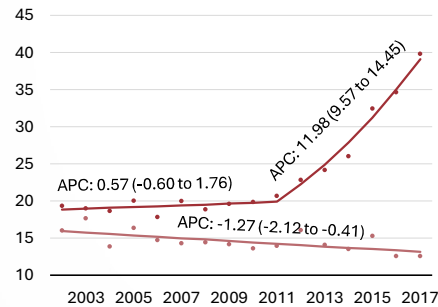
Seemingly minor conditions may have a very severe impact on long-term overall experience, especially where the severity of the condition is low relative to other conditions

Lung cancer incidence and mortality  
Shanghai (2002–2017)

Age-standardised rates per 100,000  
(men)



Age-standardised rates per 100,000  
(women)

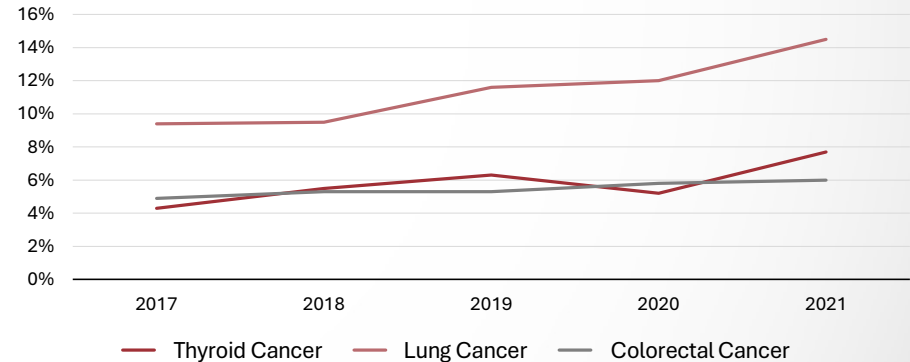


— Incidence — Mortality

Source: Thoracic Oncology: Original Research Volume 163, Issue 1, January 2023

Relative incidence for cancers with strong screening correlation  
Males

Lung Cancer Male deteriorating trend: **11.6% p.a.**  
Lung Cancer Female deteriorating trend: **20.8% p.a.**



— Thyroid Cancer — Lung Cancer — Colorectal Cancer

# 04

## Conclusions



## Conclusions

- ✓ The more complex the product, the more complex the pricing
- ✓ When designing products, always remember what the real client need is
- ✓ Expanding insurability comes with more uncertainty
- ✓ The future is very uncertain and there are many unknowns
- ✓ Think very carefully about any rate guarantees, whether explicit or implied as for WOP benefits





**SINGAPORE ACTUARIAL CONFERENCE 2024**  
26 - 29 August 2024

**Thank you for your attention!**