# Optimizing Healthcare Delivery in SingHealth

## Population Health Dashboard for Strategic Capitation Budget Planning and Utilization

**SingHealth**

Singapore Healthcare Management 2024

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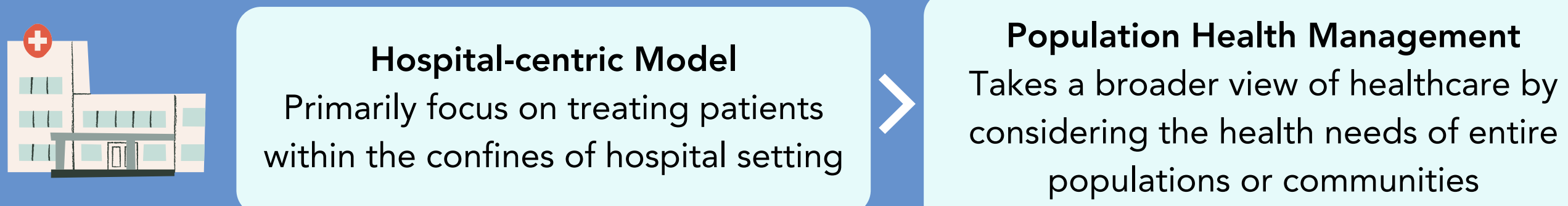
# Background

## Population Health

Population Health encompasses the health outcomes and distribution within a group, along with the policies and interventions linking these outcomes to health determinants.

Care Model Transition: There is a fundamental transformation in healthcare delivery from a hospital-centric care to a population health management care model.

**Hospital-centric Model**
Primarily focus on treating patients within the confines of hospital setting

> **Population Health Management**
Takes a broader view of healthcare by considering the health needs of entire populations or communities

**Transition Goals**
- Emphasis on early detection and intervention
- Educate on prevention
- Coordinated care delivery

## Segmentation of Population

Our population is not homogenous. It is made up of groups with *different healthcare needs*, using *different bundles of healthcare services* that transition between health states. By segmenting the population based on their specific conditions, we can manage healthcare more effectively.
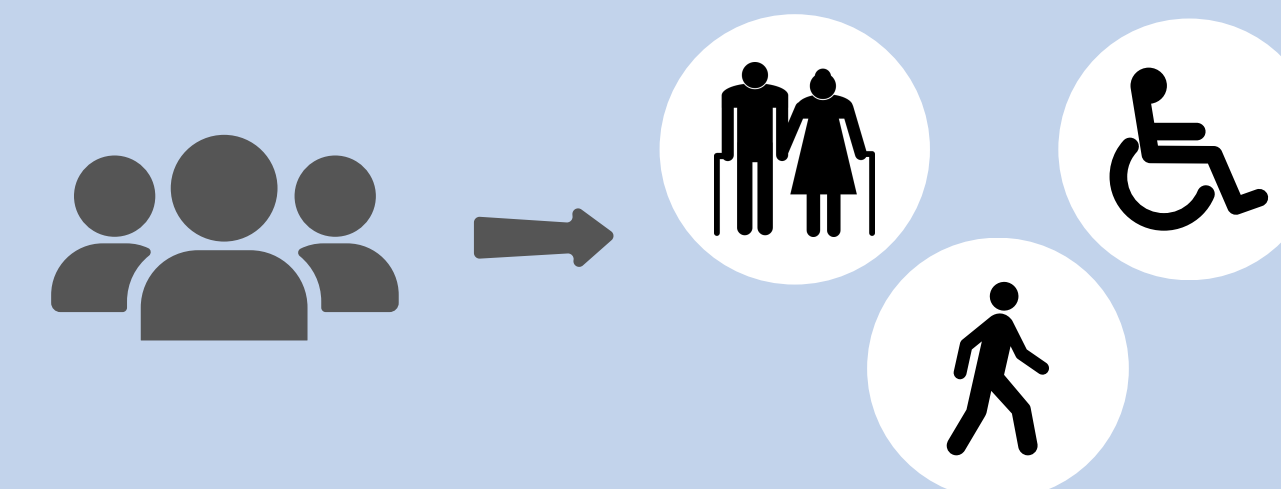
- Facilitate the rational customization of integrated healthcare programmes around each patient segment
- Effective healthcare resource planning including risk models and adjustment

## Dashboard Goals

Facilitate the segmentation of the target population, allowing for a nuanced understanding of *different demographic groups* and their respective health needs

Dashboard enables various groups within SingHealth to delve deeper into each segment, examining factors such as the patient journey, *healthcare utilization patterns and cost*

## Changing Financial Landscape towards Population Health

The dashboard can pinpoint populations at higher risk for specific chronic diseases

> By identifying **key drivers of costs** for these conditions, we can develop cost-effective interventions and care pathways to improve financial sustainability.

By analyzing historical data and emerging patterns, the dashboard helps *estimate future healthcare needs and costs*, enabling proactive planning and budgeting.

# Methodology

## 1 Our Segmentation Approach

We have decided to adopt a segmentation approach that aligns with the SingHealth Population Health strategy. In doing so, we have chosen to reference the *British Columbia Framework* and modified it to Singapore's context.

Emphasizes actionable insights for effective program planning and clinical team support

## 2 Data Processing

Integrating data from various sources, including SingHealth's electronic health records and financial databases

Data is then processed through the Modified BC Framework to sort patients into different segments according to their state of health. Some of the criteria to segment patients are:
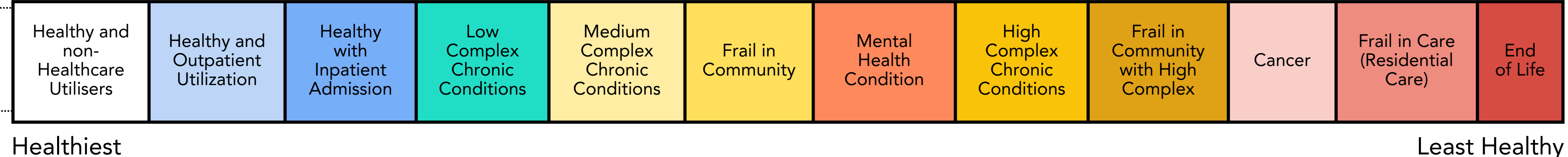
Any touchpoints with SHS institutions in current Year of Assessment

Conditions within the past 4 years + current YA

Based on these criteria, patient will be assigned *only* to the Highest Segment first. Chronic diseases are associated with higher utilization of resources and financial burden.

**Modified BC Framework**

| Healthy and non-Healthcare Utilisers | Healthy and Outpatient Utilization | Healthy with Inpatient Admission | Low Complex Chronic Conditions | Medium Complex Chronic Conditions | Frail in Community | Mental Health Condition | High Complex Chronic Conditions | Frail in Community with High Complex | Cancer | Frail in Care (Residential Care) | End of Life |
|---|---|---|---|---|---|---|---|---|---|---|---|

Healthiest ← → Least Healthy

# Results

## Five sections in dashboard:

With the data prepared, it is divided into 5 sections of the dashboard, each aiming for users to easily achieve their intended analysis:
1. Demographics and disease/conditions
2. Utilisation by care settings, institutions and specialties
3. Segmentation analysis by disease/conditions, touchpoints
4. Individual patient-level utilisation patterns
5. Geospatial analysis

This tool empowers policymakers and healthcare providers to monitor health trends, and its interactive features enable detailed analysis of specific indicators.

### Impacts

- Promoting cross-institutional and cross-specialty collaboration
- Optimizing patient healthcare utilization e.g. reduce no. of A&E
- Right siting to primary care and community e.g. decant appropriate cases to GPs
- Refining healthcare approaches and ensuring optimal resource distribution
- Adding targeted preventive care in the patient care journey e.g. creation of health programmes

## Use Case

This dashboard enables users to analyze the **patient journey** and **demographic patterns** of each segment to better plan services based on target segments


Asthma (Segment 4) — Mod BC Segment Overview dashboard
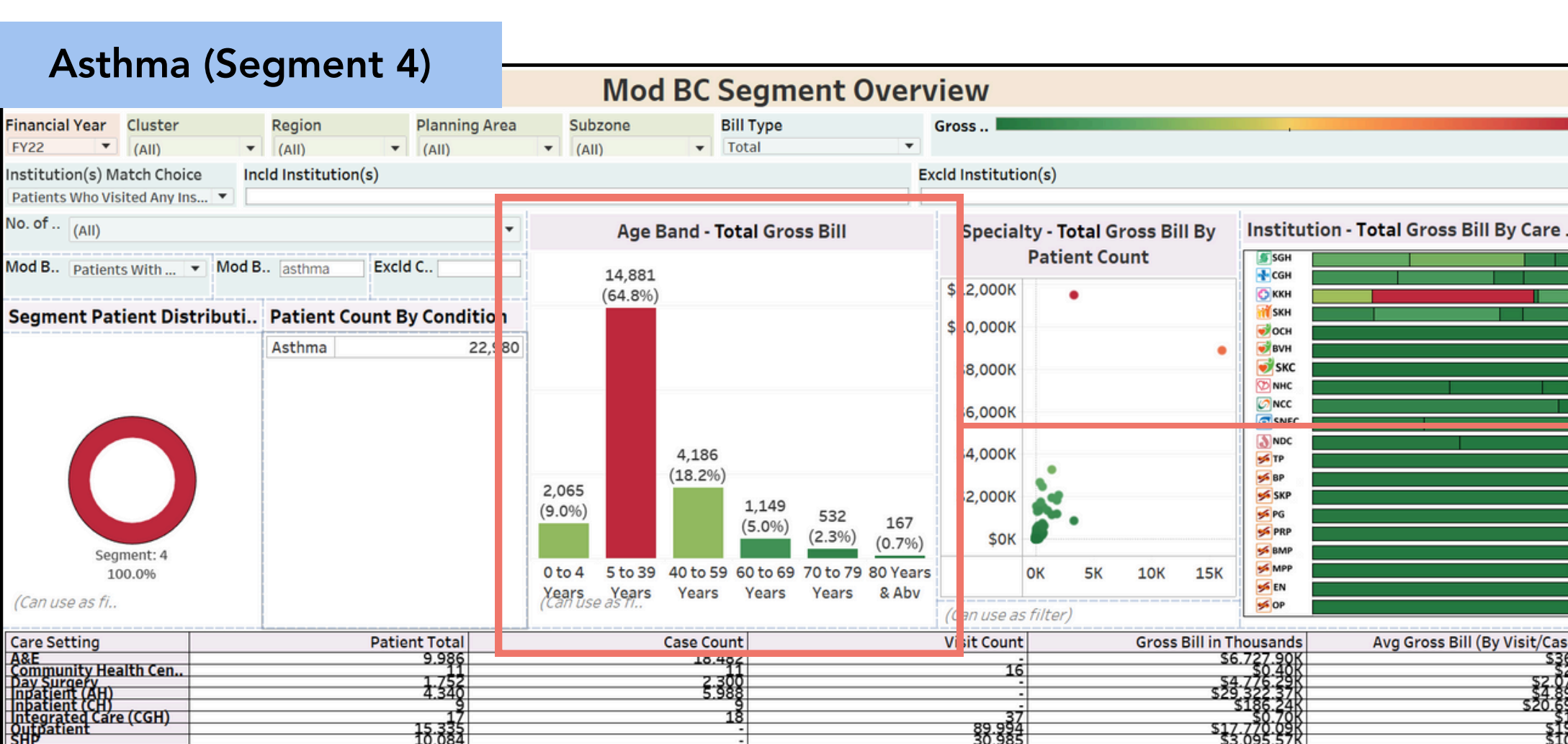
COPD (Segment 5)
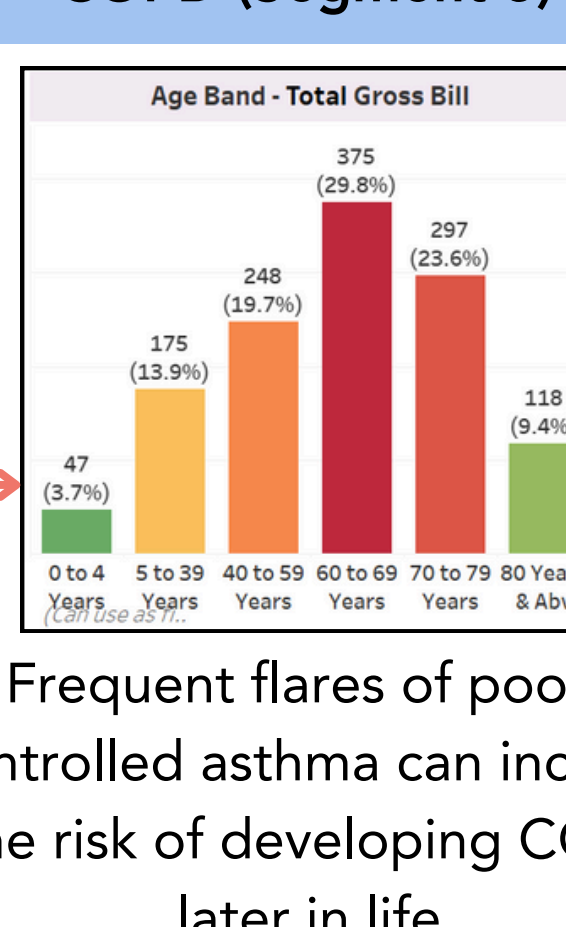
### Observations

These two views reveal that most asthma patients are within the *5 to 39 age band*, while COPD patients are *predominantly above 60*. Therefore, it is crucial to provide targeted care from a young age to prevent future complications.

Frequent flares of poorly controlled asthma can increase the risk of developing COPD later in life.

Health programs can be designed to *prevent the worsening of chronic conditions*, thereby reducing the progression from segment 4 (low complex chronic conditions) to segment 5 (medium complex chronic conditions). Here are some examples of existing health programs.

**The Singapore National Asthma Program (SNAP)**
Directed at improving asthma control in the community by promoting better long-term preventive treatment with inhaled corticosteroids.

**Smoking Cessation Programs**
Asthma patients exposed to irritants like tobacco smoke are at a higher risk of developing COPD. Therefore, it is crucial to help smokers quit and reduce this risk.

### Impacts

Estimated **$14.5M** Cost Avoidance

Based on the dashboard display of patient's bills, the average spending for a COPD patient is higher than that for an asthma patient.

Therefore, by preventing the worsening of asthma conditions, we can estimate cost savings of approximately $14.5 million over time.

Improvements in Other Clinical Quality Indicators:
- HealthierSG - Indicators for patients with asthma as a principal diagnosis, such as *ACSC hospitalisation rate, readmission rate* etc.
- Value-Driven Care - Indicators such as *Prescribed regular inhalers, receive asthma education.*

# Conclusion

The dashboard empowers the SingHealth Regional Health System to enhance strategies for preventive medicine and optimize costs more effectively.

Hospital can identify patient segments within their patient population, allowing for targeted interventions and tailored care based on their unique profiles and patient journey.