

# Engaging Physicians Using Value Management Tools - NUHS Experience

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Alexandra Hospital



National University Polyclinics

## Disclosures

- **Conflict of Interest Disclosure: Vivian Lee is an employee of Verily with equity.**
- **David B. Pryor, and John Wong today have no relevant financial or nonfinancial relationship(s) within the services described, reviewed, evaluated, or compared in this presentation.**

# Session Objective

- **Establish the :**
  - **“why” for value based healthcare**
  - **“what” is value based healthcare**
  - **“how” to implement value based healthcare**
- **Discuss challenges faced**

# The National University Health System, Singapore

Ministry of Health



Ministry of Education thru  
National University of Singapore



## NUHS

National University Health System

**3** National Centres

**3** Acute Hospitals

**2** Community Hospitals

Schools

*Medicine*

*Nursing*

*Dentistry*

*Public Health*

**6** Polyclinics

**3** Family Medicine Clinics

**3** Primary Care Networks

Primary Care Visits

≈1.7 million

Total Number of Beds

≈2,600

Students

≈ 5,000

Inpatient Discharges

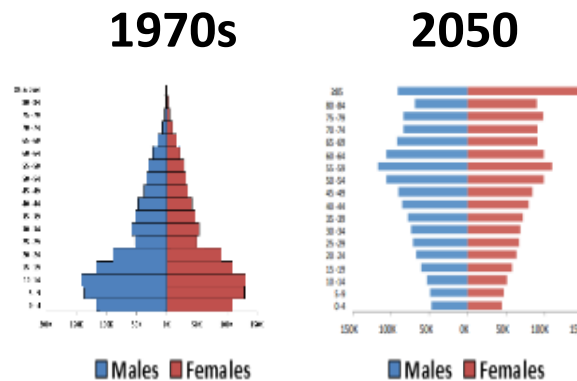
≈1.5million

# Value Based Healthcare: Singapore's "Why"?

## Singapore's current healthcare outcomes

- Life Expectancy – 2017 (M/F) : **80 / 86.1 yrs**
- Healthy Life Expectancy – 2017 (M/F) : **74.7 / 77.6 yrs**
- Bloomberg (2018) : **2/56**
- UN Sustainable Development Goals (2017) : **1/ 188**

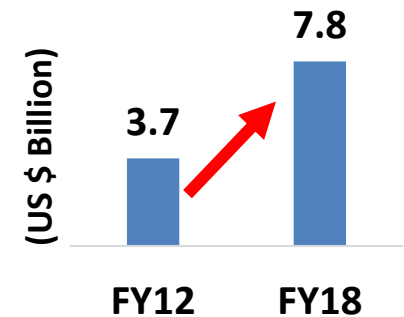
## Changing demographics



### Median Age

- 2018 : **40.8 yrs**
- 2030 : **47 yrs**

## Government healthcare expenditure



We currently spend about **5% of GDP** on health

- World Health Statistics 2017 : <http://apps.who.int/iris/bitstream/handle/10665/255336/9789241565486-eng.pdf;jsessionid=3C7BCC10074C570F49B0D5AE2BE8ACC7?sequence=1>
- World Health Organization. WHO Global Health Observatory data repository 2016 : <http://apps.who.int/gho/data/view.main.HALEXv?lang=en/>
- Bloomberg 2018 : <https://www.bloomberg.com/news/articles/2018-09-19/u-s-near-bottom-of-health-index-hong-kong-and-singapore-at-top>
- GBD 2016 SDG Collaborators, Lancet 2017; 390:1423-59
- Median Age 2018 Department of Statistics Singapore : <https://www.singstat.gov.sg/modules/infographics/population>
- Median Age 2030 UOB Global Economics & Markets Research Quarterly Global Outlook 1Q2018: [https://www.uobgroup.com/assets/pdfs/research/SG-Focus\\_1Q18.pdf](https://www.uobgroup.com/assets/pdfs/research/SG-Focus_1Q18.pdf)
- 1970s: Population SG : <https://www.population.sg/articles/hot-off-the-press-latest-population-figures-for-singapore>
- 2050 : Population White Paper : <https://www.strategygroup.gov.sg/docs/default-source/Population/population-white-paper.pdf>
- Singapore Budget 2018 : <http://www.businesstimes.com.sg/government-economy/singapore-budget-2018/singapore-budget-2018-spending-needs-to-grow-in-healthcare>
- Ministry of Health: [https://www.moh.gov.sg/content/moh\\_web/home/statistics/Health\\_Facts\\_Singapore/Healthcare\\_Financing.html](https://www.moh.gov.sg/content/moh_web/home/statistics/Health_Facts_Singapore/Healthcare_Financing.html)

# What is Value Based Healthcare?

- Michael Porter

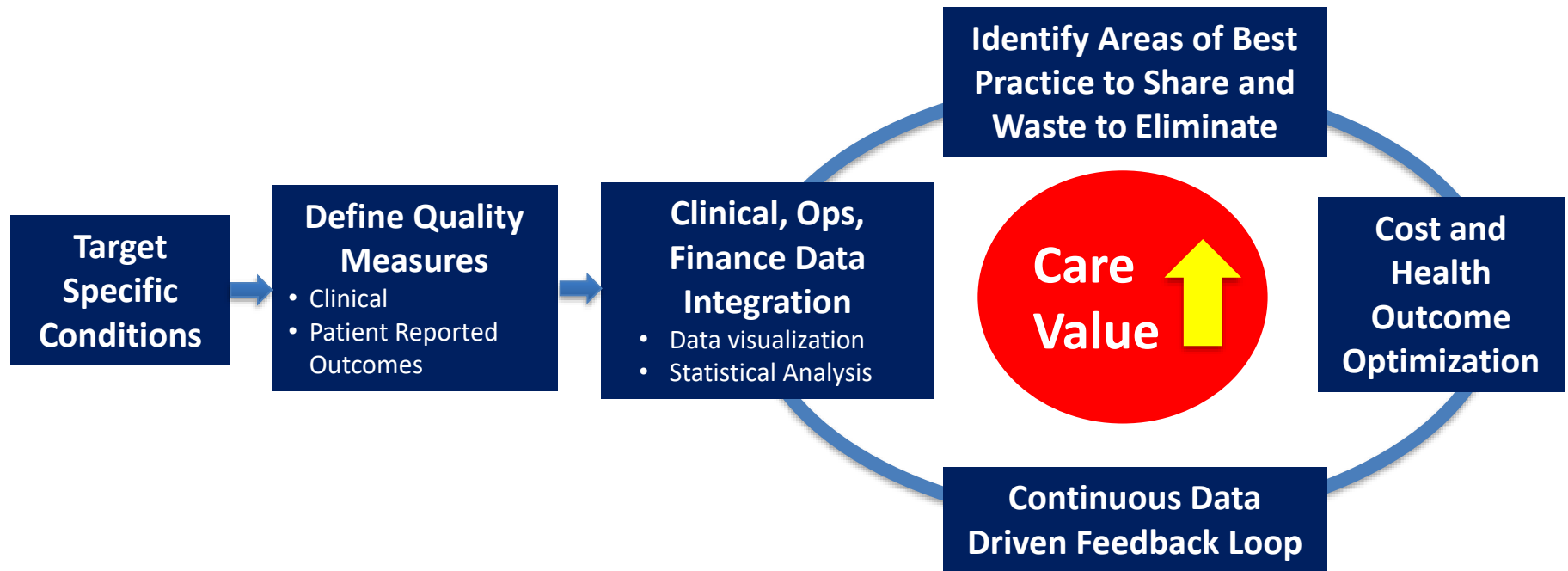
**Value: Patient health outcomes per dollar spent**

- University of Utah

$$\begin{array}{c} V \\ \text{(Value)} \end{array} = \frac{\begin{array}{c} Q \\ \text{(Quality)} \end{array} + \begin{array}{c} S \\ \text{(Service)} \end{array}}{\begin{array}{c} \$ \\ \text{(Cost)} \end{array}}$$

# NUHS: Value Based Healthcare

<b>Challenge</b>	<ul style="list-style-type: none"><li>• What outcomes are we achieving per dollar spent?</li><li>• How do we improve on this?</li></ul>
<b>Objective</b>	<ul style="list-style-type: none"><li>• Monthly objective feedback to staff on quality of care provided and cost incurred in doing so</li></ul>



# NUHS: Value Based Healthcare

## Quality: Outcome indicators that matter to the patient

- **Clinical quality & safety**  
e.g: Length of stay, readmission
- **Processes of care**  
e.g Door to balloon time, Surgery wait time
- **Patient-reported outcomes (PROMS)**  
e.g EQ5D, Oxford Knee Score
- **Patient feedback survey score**

**Perfect Care Only  
if ALL Indicators  
Met**

**V**

**Q**  
(Quality)

=

(Value)

**C**

(Cost)

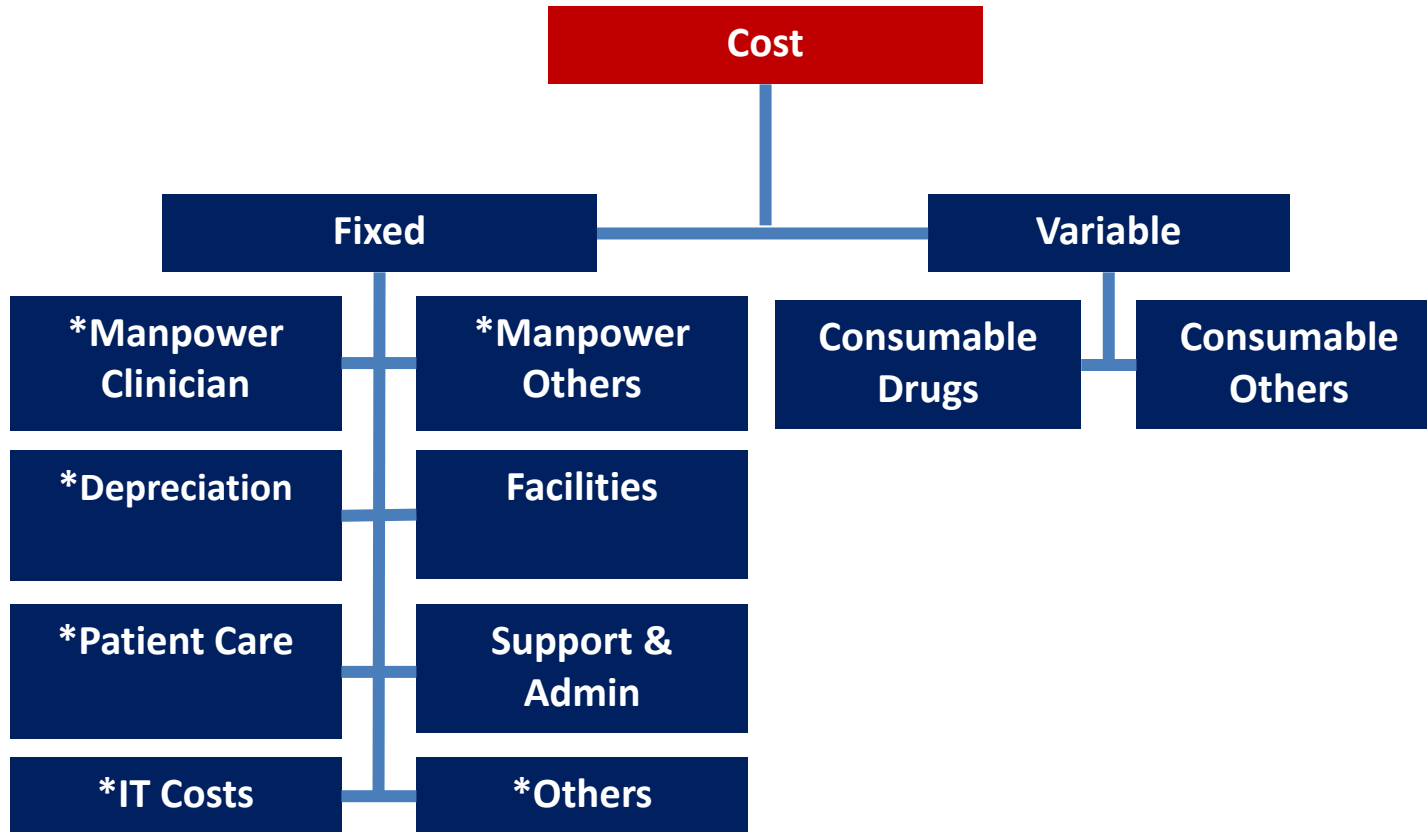
## Cost: Cost to deliver outcomes over full cycle of care

- **Measured around patient and by condition**
- **Requires mapping care process**
- **Actual resources used**



# Cost Bucket Hierarchy

- Costs are rebased yearly, based on the full year workload and expenses

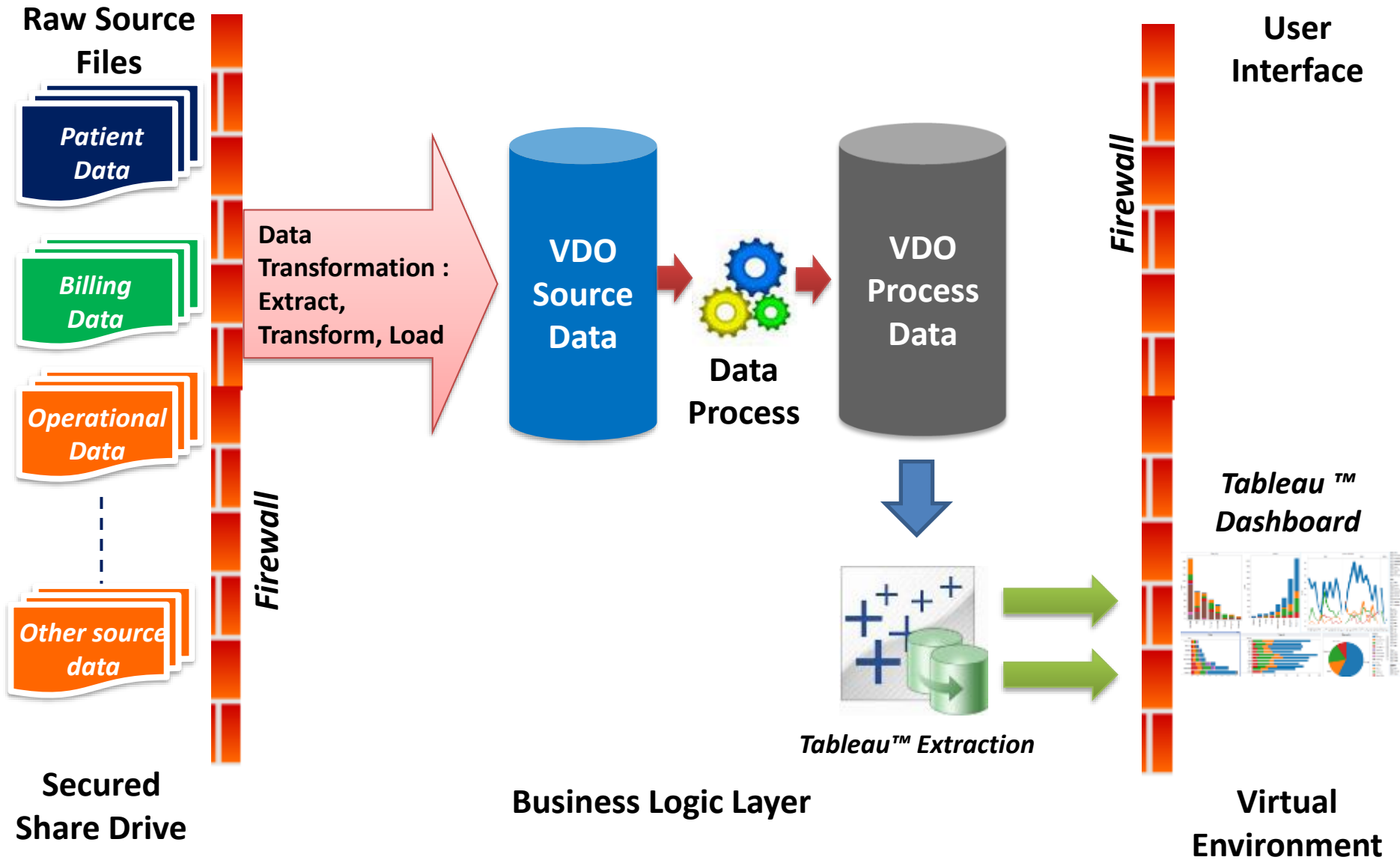


*\* Some element in the 6 cost buckets are indirect and allocated*

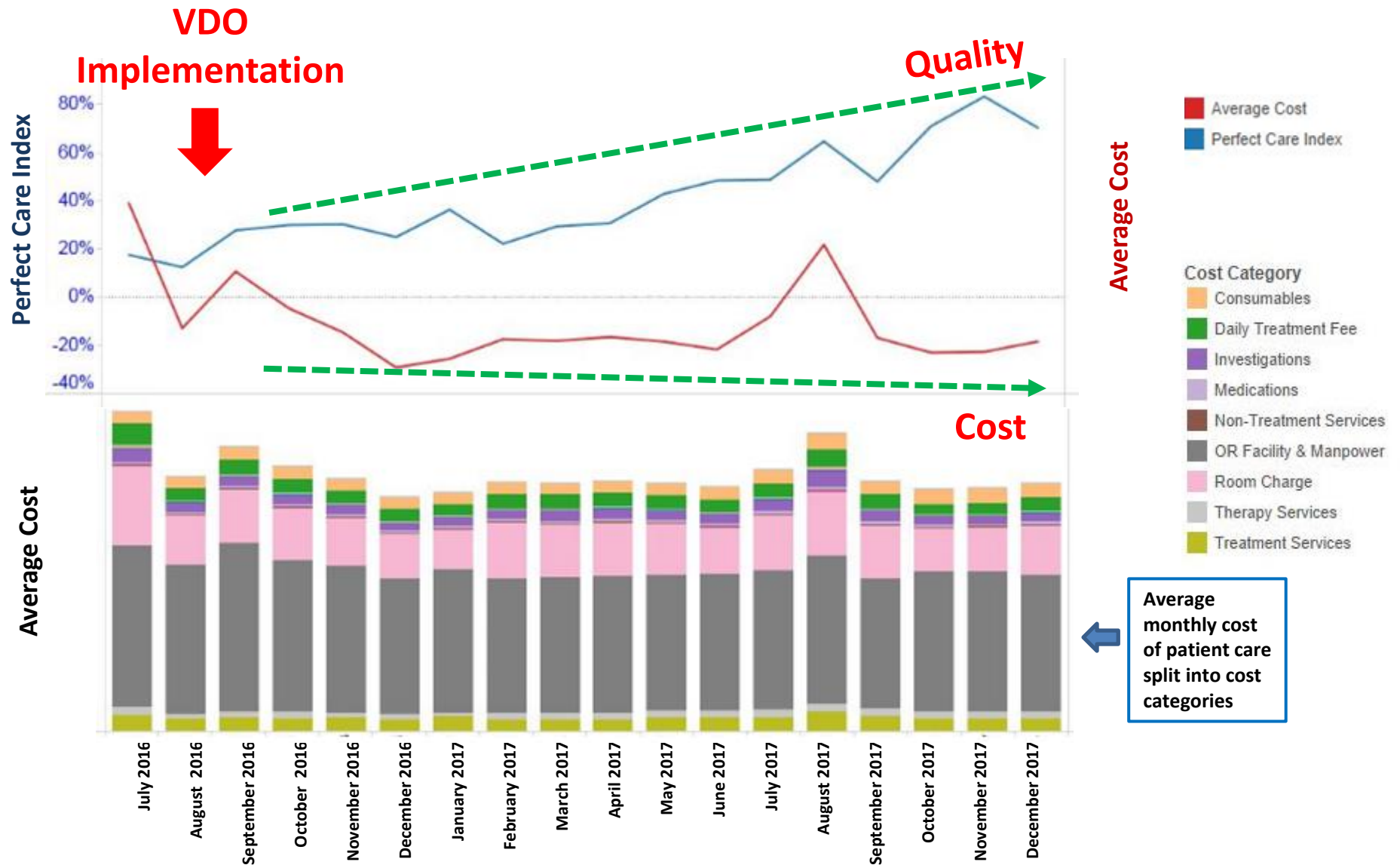
# VDO Data Roll Up & Alignment



# NUHS Values Based Healthcare: Informatics Platform

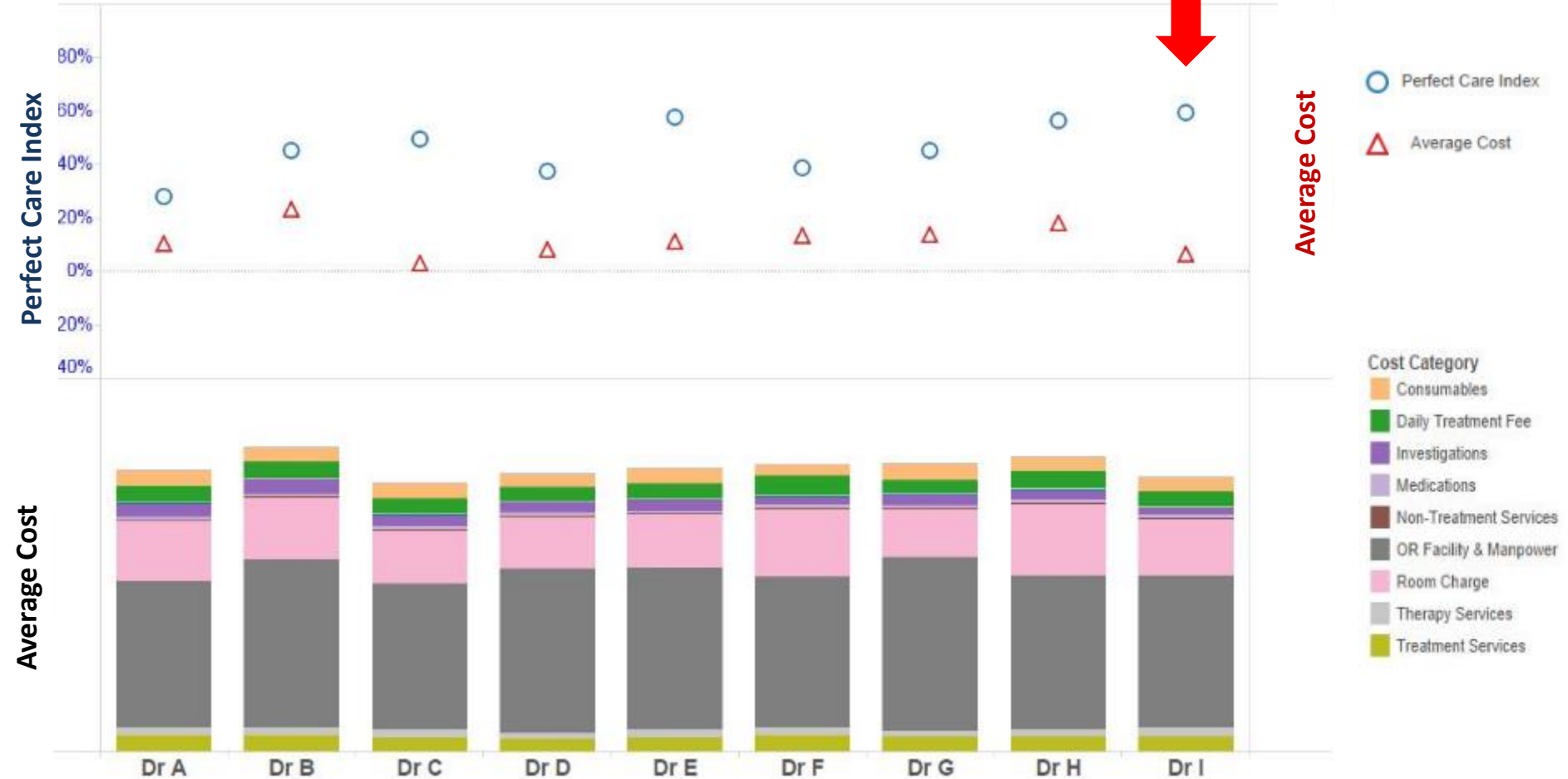


# Average Perfect Care Index and Cost at Department Level



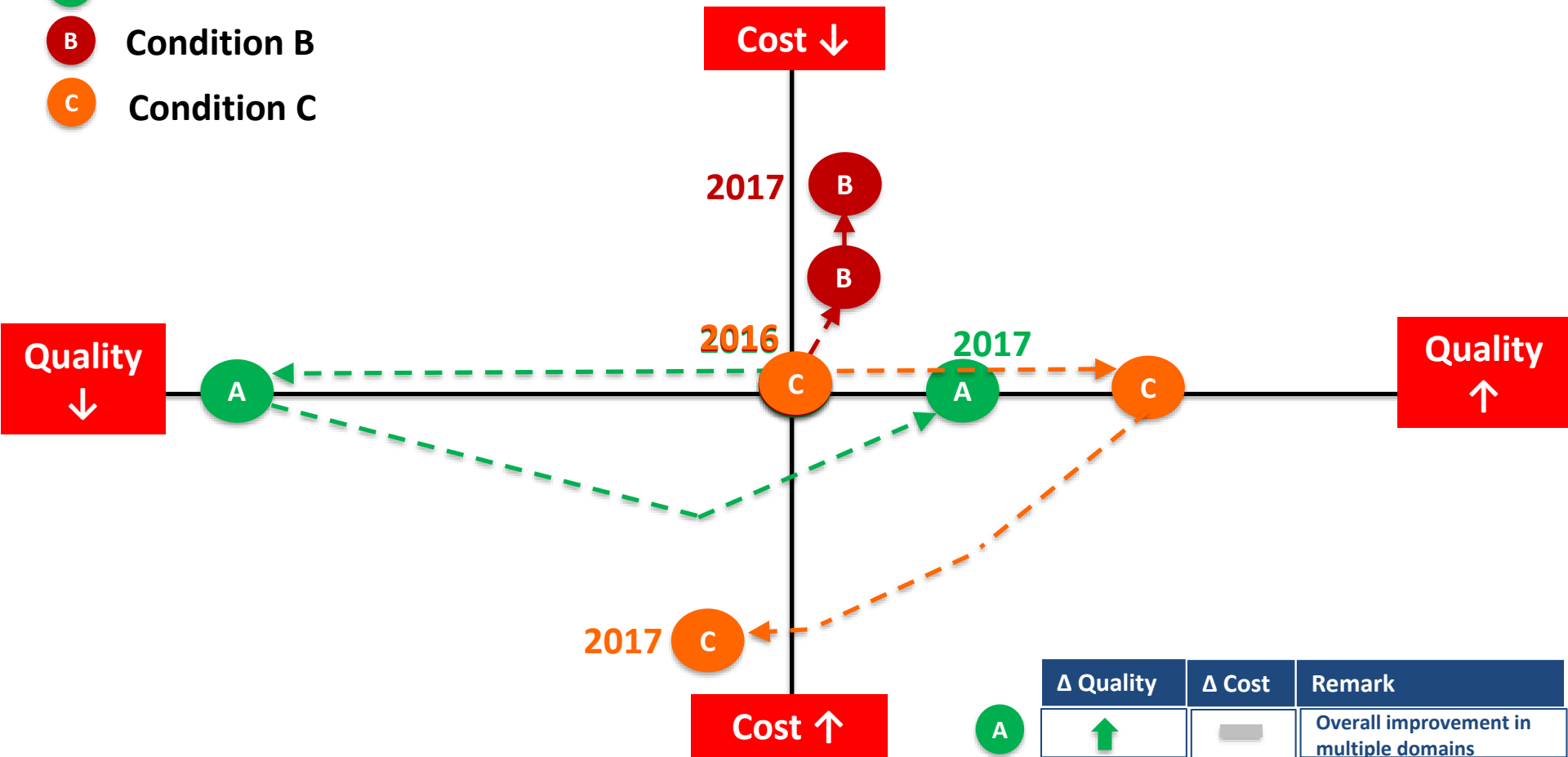
# Average Perfect Care Index and Cost by Attending Doctor

Identifies doctors providing best value  
i.e. high quality and low cost



# Hospital A : Quality and Cost 2016 vs 2017

- Condition A
- Condition B
- Condition C



	Δ Quality	Δ Cost	Remark
<span style="color: green;">●</span> A	↑	—	Overall improvement in multiple domains
<span style="color: red;">●</span> B	—	↓	Use of cost-effective stents
<span style="color: orange;">●</span> C	↓	↑	Increased length of stay

# Benchmarking Outcomes and Cost across Health System

Value across hospitals caring for same conditions of similar acuity

## HOSPITAL X



## HOSPITAL Y



# NUHS Value Driven Outcomes (VDO) Conditions

## 38 Unique Conditions To Date

### 2016 Series

1. Acute Myocardial Infarction
2. Cataract Surgery
3. Colorectal Surgery
4. Community Acquired Pneumonia
5. Improving the Value of Care of Gout
6. Hip Fracture
7. Total Knee Replacement

### 2017 Series

1. Hernia Surgery
2. Laparoscopic Cholecystectomy
3. Caesarean Section
4. Hysterectomy
5. Transcatheter aortic valve replacement
6. Coronary Artery Bypass Graft
7. Breast Cancer
8. End of Life Chemotherapy/ Care
9. Chronic Obstructive Pulmonary Disease
10. Stroke
11. Streamline Workflow for Intervention of Non-Functional or Thrombosed Dialysis Access (SWIFT)
12. Paediatric Bronchiolitis
13. Wisdom Teeth

### 2018 Series

1. Primary Care Management of Lipids
2. Primary Care Management in Hypertension
3. Total Hip Replacement
4. Spinal Fusion
5. Hand Fracture
6. Kidney Transplant
7. Liver Transplant
8. Haematopoietic Stem Cell Transplant
9. Lymphoma
10. Sepsis
11. Congestive Heart Failure
12. Haemorrhoidectomy
13. Tonsillectomy
14. Paediatric Circumcision
15. Paediatric Upper Respiratory Tract Infection
16. Optimizing Outcomes of Very Low Birth Weight Babies
17. Neonatal Hypoglycemia
18. Endoscopy



# NUHS : 2017 Value Driven Outcomes

## National University Hospital

- **13 out of 17** conditions showed an improvement in quality and/or cost
- **4** showed improvement in both quality and cost

## Ng Teng Fong General Hospital

- **3 out of 6** conditions showed an improvement in quality and/or cost
- **1** showed improvement in both quality and cost

**Total Cost Savings since implementation  
(January 2016 –July 2018) : ≈ US\$14 million**

# Next Steps :

## Prioritizing Interventions to Improve Value

Working with **NUS School of Computing** to identify which factors have the biggest impact on quality and cost

### Total Knee Replacement:

- Length of Stay
- Estimated Surgery Wait Time,
- Deep Vein Thrombosis prophylaxis

### From January 2017 – July 2018

- Clinical Quality Index improved from **33.56% to 67%**
- Cost improved by **5.7%**

cqi	READM	OT	LOS	ESWT	DVT	BT	PES	DE	POC	percent
0	0	1	0	0	0	0	1	1	1	0.10%
0	0	1	0	0	0	1	1	1	1	0.10%
0	0	1	0	1	1	1	0	1	1	0.10%
0	1	1	1	1	0	1	0	1	1	0.10%
0	0	1	0	1	0	1	1	1	1	0.10%
0	0	1	1	1	1	1	1	1	0	0.10%
0	0	1	1	0	0	1	1	1	1	0.10%
0	0	1	1	1	1	1	0	1	1	0.10%
0	1	1	0	1	0	1	1	0	1	0.10%
0	0	1	1	1	0	1	1	1	0	0.10%
0	0	1	0	0	0	0	1	1	1	0.10%
0	0	1	0	0	1	0	1	1	1	0.10%
0	1	1	1	1	1	1	0	1	1	0.10%
0	1	1	0	0	1	1	1	1	0	0.10%
0	1	1	0	0	0	0	1	1	0	0.10%
0	1	1	0	0	1	1	0	1	1	0.10%
0	1	1	1	0	1	1	1	1	0	0.10%
0	0	1	0	1	1	1	1	1	0	0.10%
0	0	1	0	0	0	1	1	1	1	0.10%
0	0	1	1	1	1	1	1	1	0	0.10%
0	0	1	1	0	0	1	1	1	1	0.10%
0	0	1	1	0	0	1	1	1	1	0.10%
0	0	1	1	1	1	1	1	1	0	0.19%
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0	0	1	1	0	0	1	1	1	1	0.19%
0	1	1	1	1	1	1	1	1	0	0.29%
0	0	1	1	1	1	1	1	1	0	0.29%
0	0	1	1	0	0	0	1	1	1	0.29%
0	0	1	1	1	1	1	1	1	1	0.38%
0	1	1	1	0	0	0	0	1	1	0.38%
0	1	1	1	1	1	0	0	1	1	0.67%
0	1	1	0	0	0	1	0	1	1	1.05%
0	1	1	1	0	0	1	0	1	1	1.25%
0	1	1	0	1	0	0	0	1	1	1.44%
0	1	1	1	1	1	1	0	1	1	1.63%
0	1	1	0	0	0	0	1	1	1	2.21%
0	1	1	0	0	0	0	0	1	1	2.59%
0	1	1	0	1	0	1	1	1	1	2.88%
0	1	1	0	0	0	1	1	1	1	5.75%
0	1	1	1	0	0	0	1	1	1	7.38%
0	1	1	0	1	1	1	1	1	1	9.59%
0	1	1	1	1	1	0	1	1	1	10.07%
0	1	1	1	0	0	1	1	1	1	14.29%
1	1	1	1	1	1	1	1	1	1	33.27%

# Key Challenges

- **Data: disparate sources, accuracy, ability to mine**
- **Change management; reward and recognition**
- **Chronic vs Acute Conditions: Over what period of time should value be assessed – acute episode only, 6 months, 1 year?**
- **Patient Experience Satisfaction Survey – 30% Return Rate**
- **Patient reported outcomes data: work in progress**

# Singapore's Healthcare Strategies

## Beyond Hospital to Community

- Managing regional health
- Transforming primary care
- Developing aged care in the community

## Beyond Quality to Value

- Ensuring appropriate care
- Making healthcare manpower more efficient through innovation

## Beyond Healthcare to Health

- Ageing actively
- Moving upstream to health; war on diabetes

# NUHS

## A Healthy Community

*Shaping medicine · Transforming care*

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Yong Loo Lin School of Medicine  
Faculty of Dentistry  
Saw Swee Hock School of Public Health



Alexandra Hospital



National University  
Centre for Oral Health, Singapore

National University Polyclinics