Value-Based Healthcare → Population Health

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NUHS: Value-Based Healthcare effort

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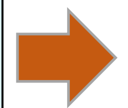
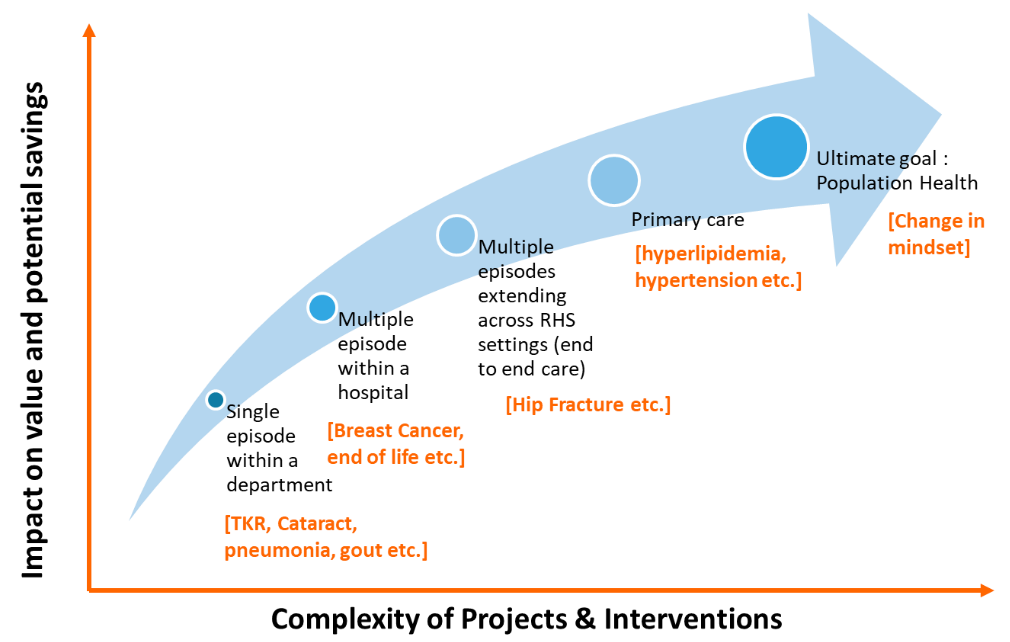
Implementation of the **"Value"** equation across NUHS Cluster

Value	Health outcomes / Costs of delivering the outcomes

V (Value) = [**Q** (Quality) + **PROM** (Patient Reported Outcomes) + **PE** (Patient Experience)] / **C** (Cost)

Since inception of Value Driven Outcomes Program at NUHS, we have implemented more than 60 projects across various Healthcare settings





What’s next: Population Health

Essential elements of **‘Population Health’**

1. Use of **data and analytics** to identify at-risk patients and target services that reduce their use of expensive and low-value care

2. In a population health model, health providers manage care—**from preventive and primary care to acute care and long-term care**–for a defined population.

3. Health providers implement **innovative delivery models**; analyzing data and trends in a population's health, quality, and cost burden.

4. The **value-based payment model** rewards health providers for high value care delivery

Moving away from episodic care to end-to-end care and ultimately preventive care

A case study: End-to-end Diabetes Care

Diabetes Care across healthcare settings*

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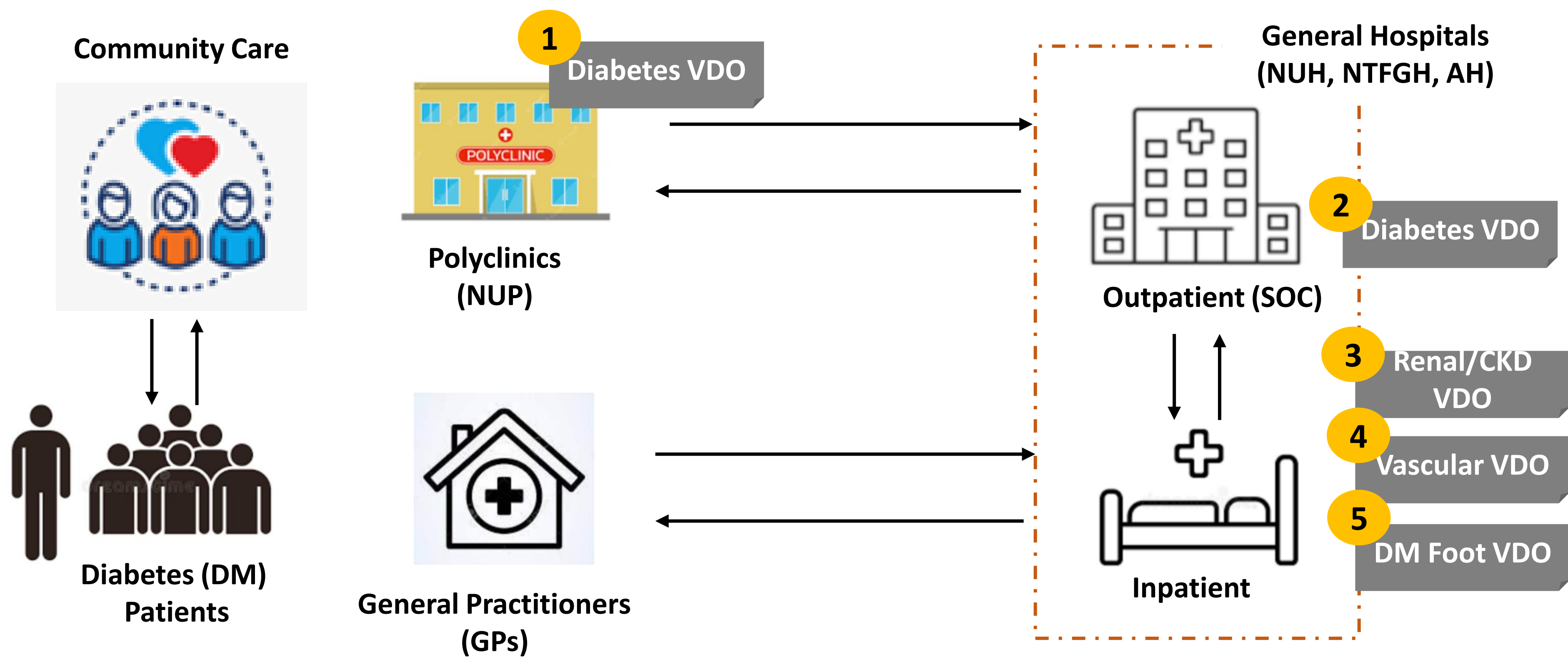
Episodic Value driven outcomes projects



Current Challenges:

1. Quality measurements per episode
2. Little to no longitudinal quality of care assessment at patient level
3. Tracking of disease progression
4. Cost burden

** For illustration purposes, non exhaustive list*

Quality Measurement at the point of care

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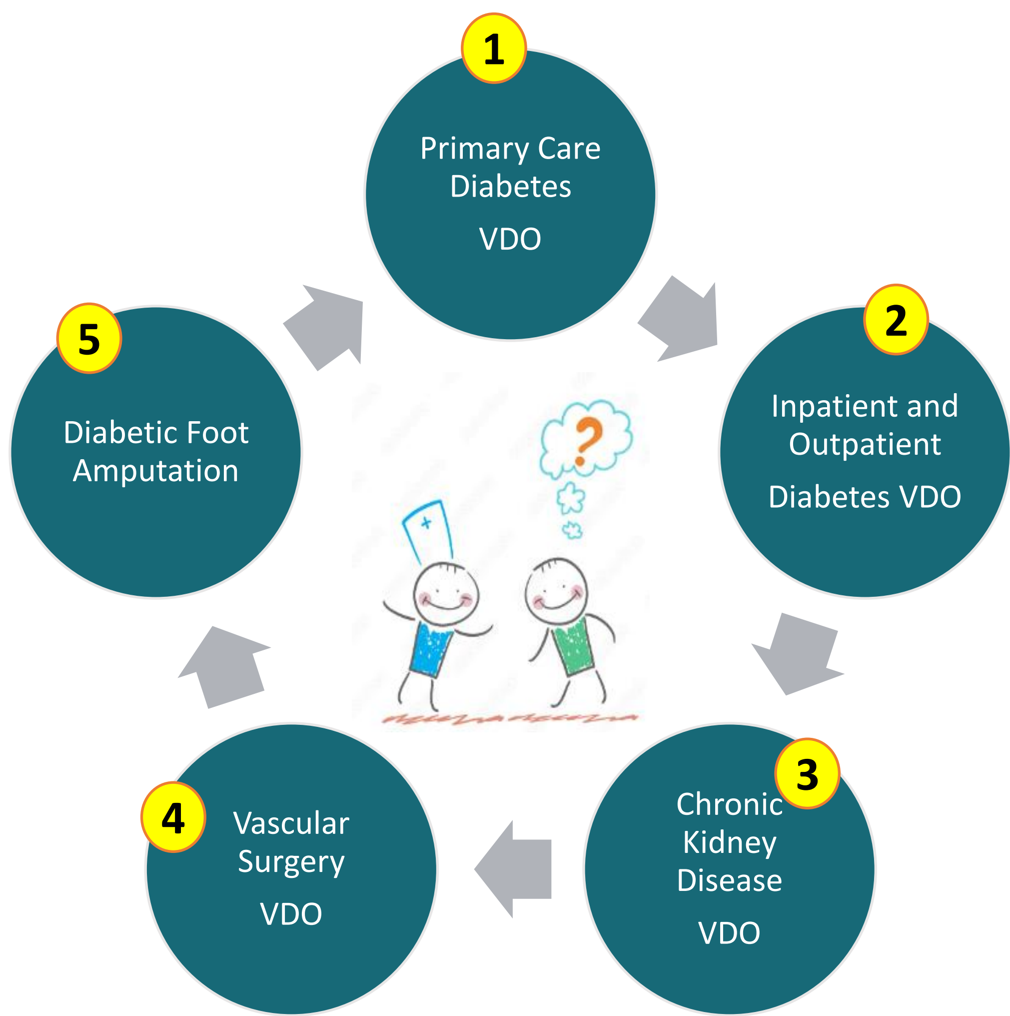
Episodic Value driven outcomes projects



1

1. HbA1c <= 7% (0 to 75 years old)
2. HbA1c <= 8% (Above 75 years old –elderly)
3. HbA1c test done at least twice a year
4. Blood pressure done at least twice a year
5. BMI done at least twice a year
6. Lipid profile done annually
7. Smoking Assessment done annually
8. Eye Assessment done annually
9. Foot Assessment done annually
10. Nephropathy assessment done annually

2

1. HbA1c test done in last 18 months
2. LDL test done in last 18 months
3. Blood pressure done in last 18 months
4. BMI done in last 18 months
5. Eye Assessment done in last 18 months
6. Foot Assessment done in last 18 months
7. Nephropathy assessment done in last 18 months
8. HbA1c =<7%, <=8%, <=9% (Stratified by age)
9. Last HbA1c >10%
10. Last LDL-C at < 2.6 mmol/L
11. Last BP =< 140/ =< 90
12. Last BMI =<25, =<30

3

1. Prescription of RAS blockade drugs
2. Prescription of SGLT2i drugs
3. Prescription of statins
4. Inpatient cases with serum CO2 < 22 mmol/L patients are on oral bicarbonate supplementation
5. iPTH check at least annually in patients with CKD Stage 4 (GFR 15-29 ml/min per 1.73 m2) and 6 monthly from Stage 5 (GFR <15 ml/min per 1.73 m2)
6. Systolic BP < 140mmHg, or, Diastolic BP < 90mmHg
7. Improve Year-on-Year for Recalibrated pooled KFRE Southeast Asia (SEA) equation
8. Urinary albumin : creatinine ratio to be performed at least 6-monthly for those with >A2 albuminuria (defined as uACR > 3 mg/mmol), and annually for normoalbuminuria (defined as uACR < 3mg/mmol

4

1. 30 days mortality of AAA (abdominal aortic aneurysm)
2. 30 days post-op Stroke rate of carotid disease surgery
3. 30 days Full amputation rate after PVD (peripheral vascular disease) surgery

5

1. LOS <= 15days for non-ESRF , LOS <= 26days for ESRF patients (End Stage Renal Failure)
2. No Inpatient Mortality
3. No 30-day DFU-related Readmission
4. No Major Amputation &
5. No 30 Days return to OT
6. No of DFU surgery sitting <=2

Quality Measurement at the point of care

Episodic Value driven outcomes projects- Illustrations

Individual Quality by Year (2023 up till Q2)

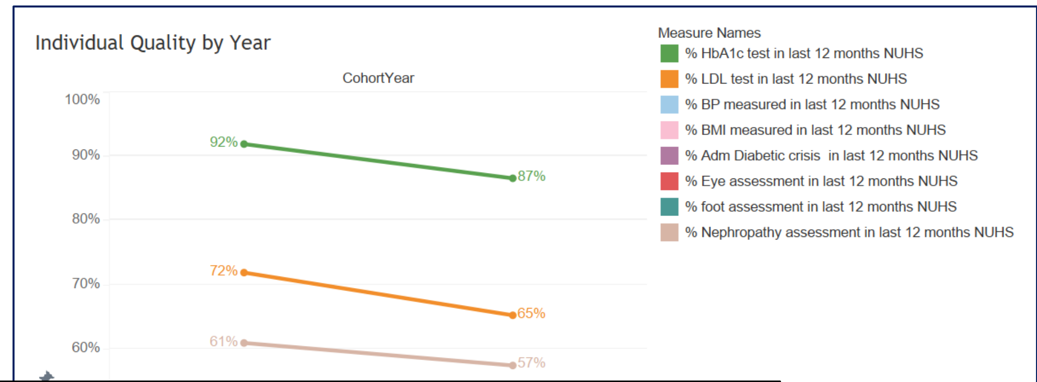
Polyclinic Name / Visit Date Time

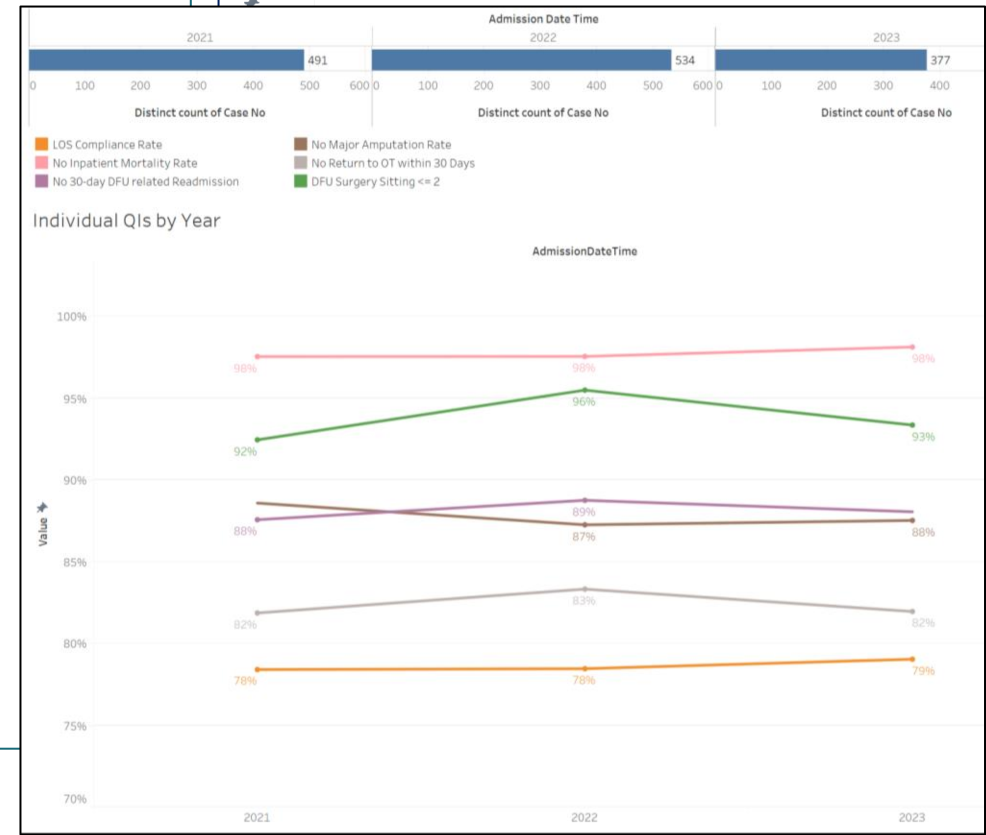
BUKIT BATOK POLYCLINIC | BUKIT PANJANG POLYCLINIC | CHOA CHU KANG POLYCLINIC | CLEMENTI POLYCLINIC | JURONG POLYCLINIC | PIONEER POLYCLINIC | QUEENSTOWN POLYCLINIC

110% 100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

2021 2022 2023

Quality Indicators
- Lipid Profile done
- HbA1c <= 8%
- HbA1c <= 7%
- % of HbA1c test done at least twice a year
- % of eye assessment done annually (NUP)
- % of foot assessment done annually (NUP)
- % of Nephropathy assessment done annually (NUP)
- % of blood pressure done at least twice a year



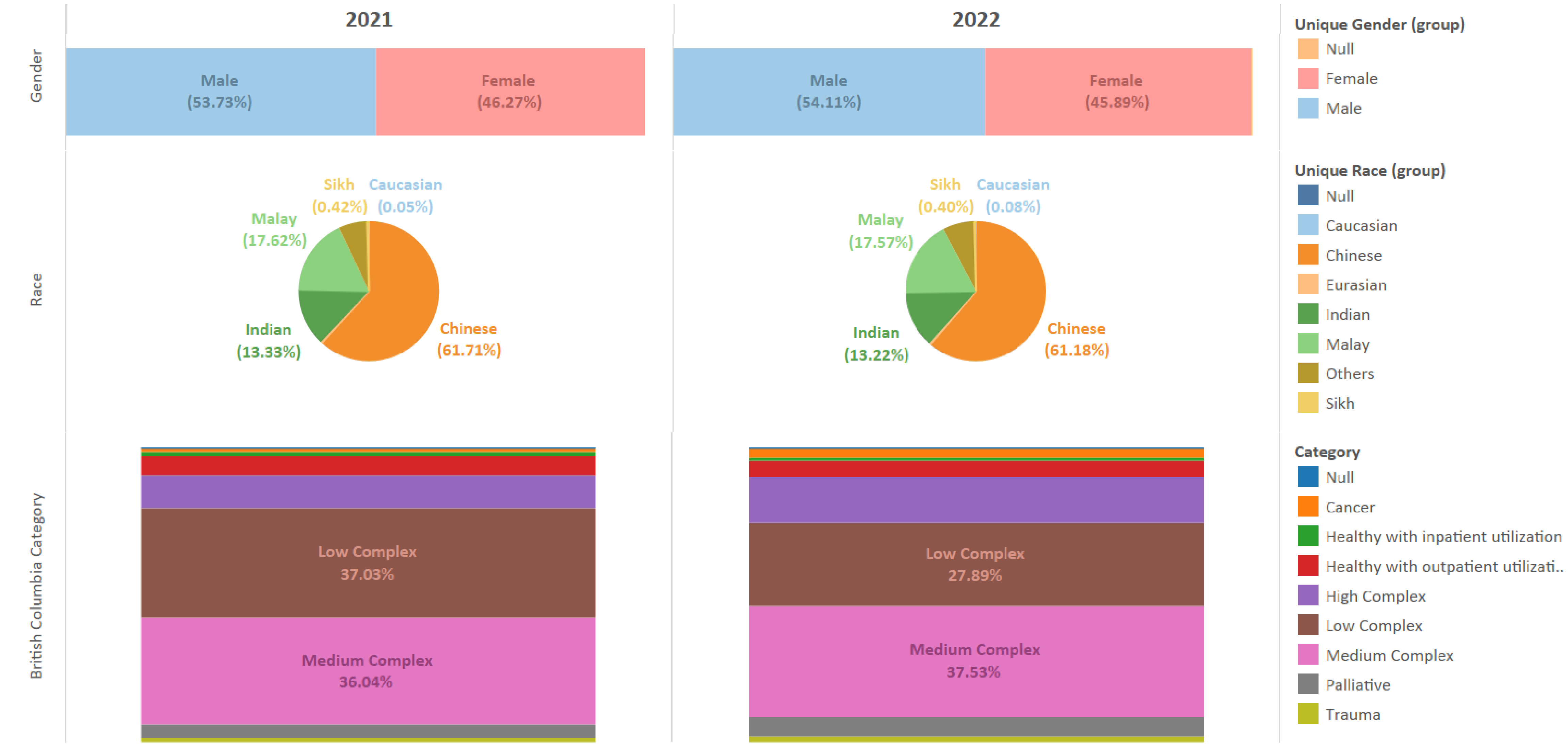


Current challenge: Ability to track disease progression of the patients across settings

Population level: Measurement of disease progression

MOH's version of British Columbia (BC) Population Segmentation Framework

How does the segmentation work : Implementation



Disease Progression tracking at NUHS

Evaluated Year
2021

Disease Progression Status
Deteriorate | Improve | No Change

British Columbia Disease Progression for Previous Year (2020) vs. Evaluated Year (2021)

Previous Year Category	Evaluated Year Category: Passed Away	Trauma	Palliative	Cancer	High Complex	Medium Complex	Low Complex	Healthy with inpatient utiliza..	Healthy with outpatient utili..	Healthy with no hospital utilizat..
Trauma	Deteriorate	No Change	Improve	Improve	Improve	Improve	Improve	Improve		Improve
Palliative	Deteriorate	Deteriorate	No Change							Improve
Cancer	Deteriorate	Deteriorate	Deteriorate	No Change	Improve	Improve	Improve	Improve		Improve
High Complex	Deteriorate	Deteriorate	Deteriorate	Deteriorate	No Change	Improve	Improve	Improve		Improve
Medium Complex	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	No Change	Improve	Improve		Improve
Low Complex	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	No Change	Improve		Improve
Healthy with inpatient utilization	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	No Change		Improve
Healthy with no hospital utilization	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	Deteriorate	No Change

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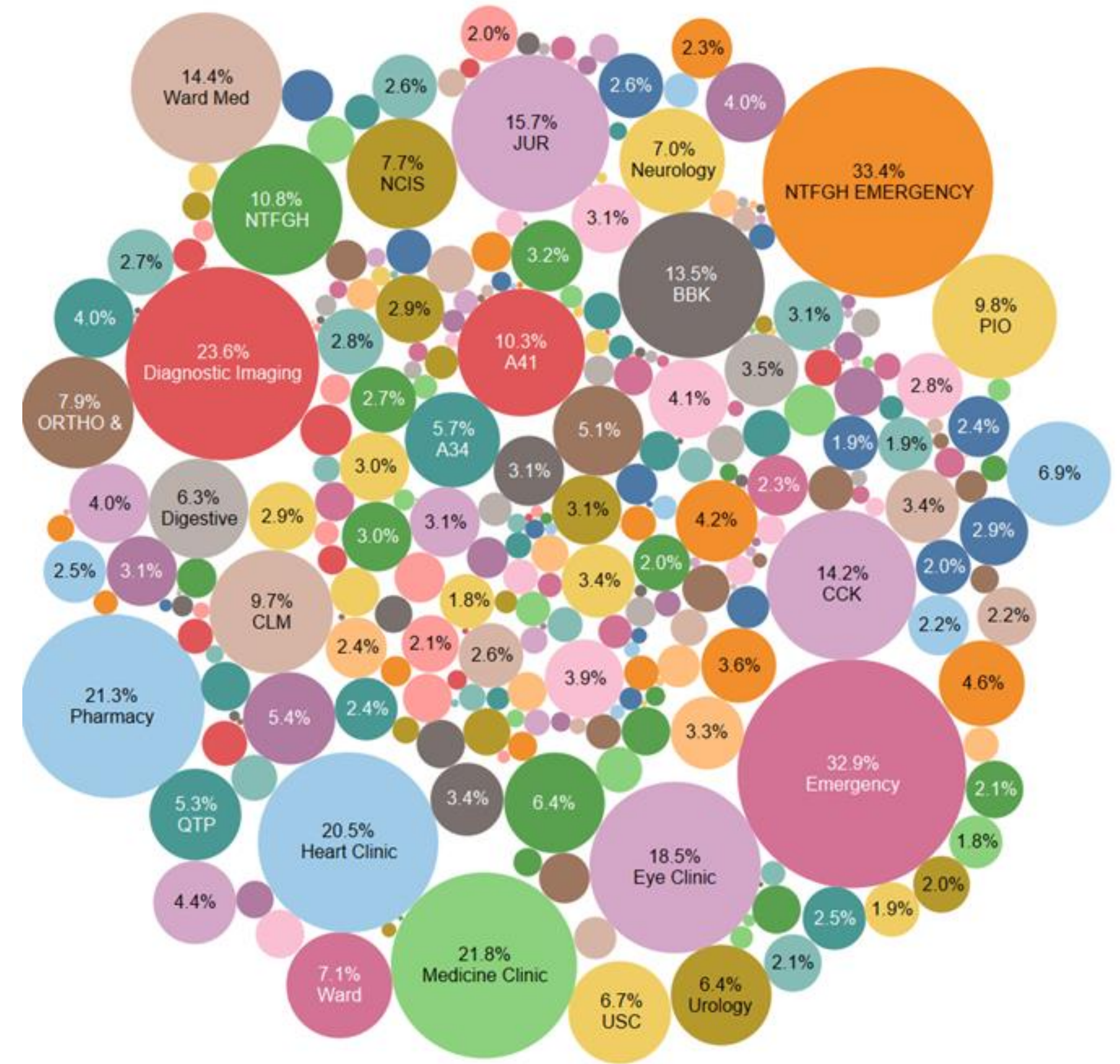
Tracking of patient movement across settings, resource utilization and quality indicators

Patient Category -patient level

Patient Type	Admission Date Time Or Visit Date Time 2021	2022
IP_DS_OP_AE_PRICARE	68.8%	69.1%
IP_DS_OP_AE	30.3%	30.4%
IP_DS_ONLY	0.7%	0.5%
IP_DS_PRICARE	0.1%	0.0%

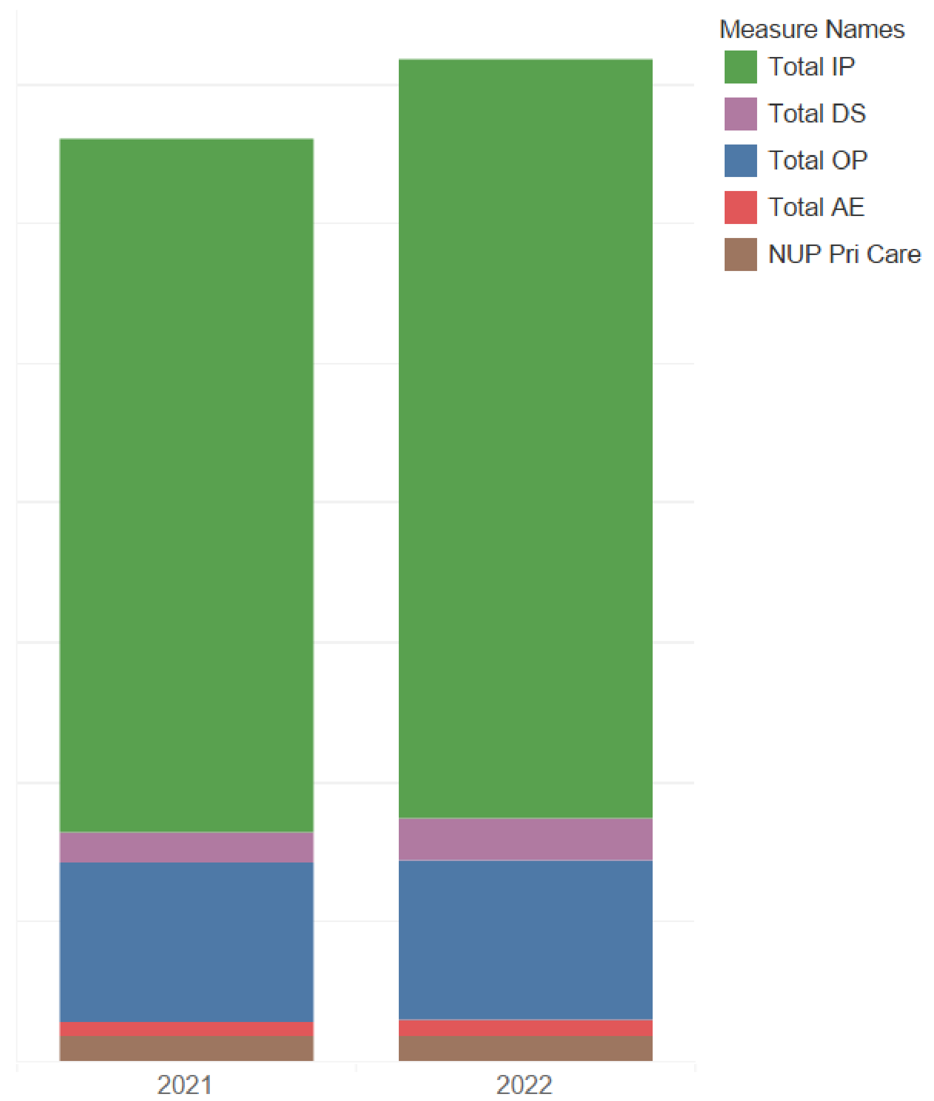
No of patients by patient category

Patient Categ..	Admission Date Time .. 2021	2022
AE	62.6%	67.6%
DS	20.1%	21.3%
IP	64.1%	68.2%
NUP	63.2%	61.3%
OP	81.2%	83.5%

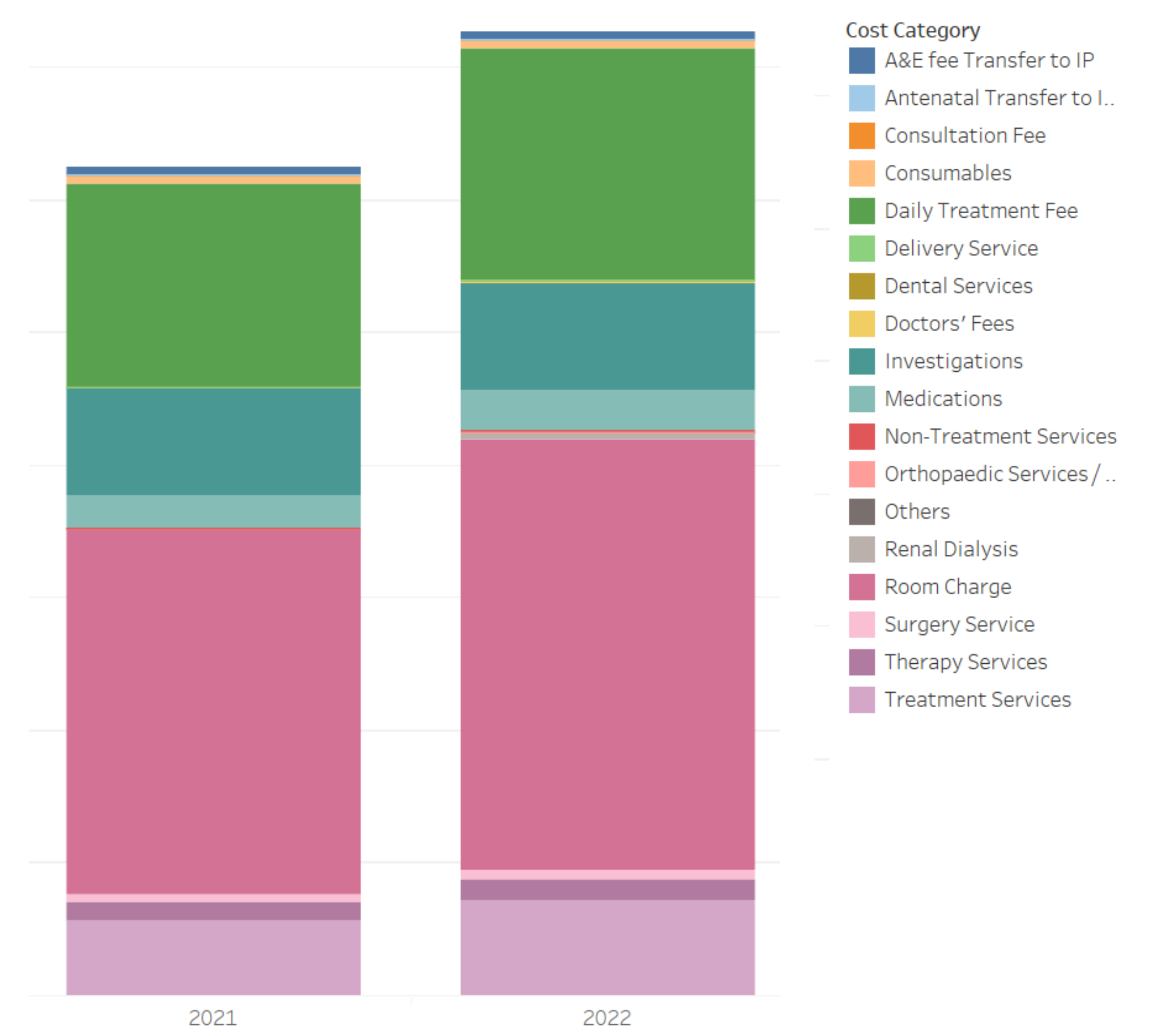


Tracking of patient movement across settings, resource utilization and quality indicators

By Patient Category: Cost utilization across settings



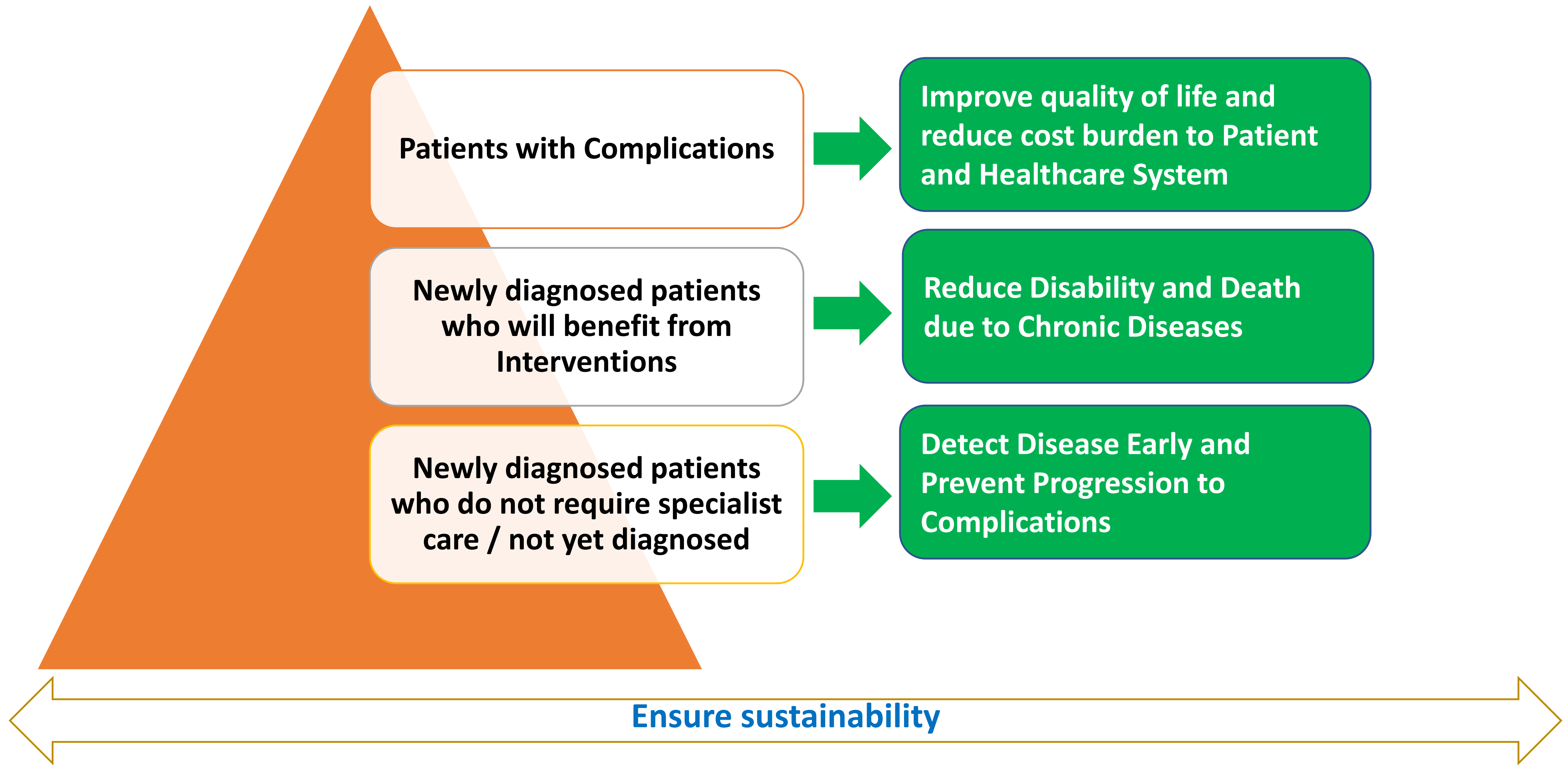
By Cost Category (Within IP only)



The end-to-end management

Clinical Pathway: point of interventions

The GOAL of population health for Diabetes Patients



Community care

Primary care

Acute care

Prevent Diabetes Mellitus (DM) and Obesity

NORMAL → **Increased Risk** → **Vascular Damage** → **Complication** → **Death**

SCREENING

Control DM & Blood Pressure to reduce DM complications

Diagnose, prevent and treat complications

Hyper-tension

Kidney Failure

Retino-pathy

Peripheral Vascular Disease

Heart Failure

Stroke

Limb Amput ation

Hpt Heart Disease

Ischemic Heart Disease

The Progression and management of Diabetes across settings

Thank you

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