DukeNUS Medical School | Centre for Ageing Research & Education

Enhancing Primary Care Services for Older Adults in Singapore

Professor David Matchar

29 September 2021

9am – 10.30am

SingHealth DukeNUS ACADEMIC MEDICAL CENTRE

DukeNUS Medical School

Centre for Ageing Research & Education

Enhancing Primary Care Services for Older Adults in Singapore

Funded by Ministry of Health – National Medical Research Council Singapore

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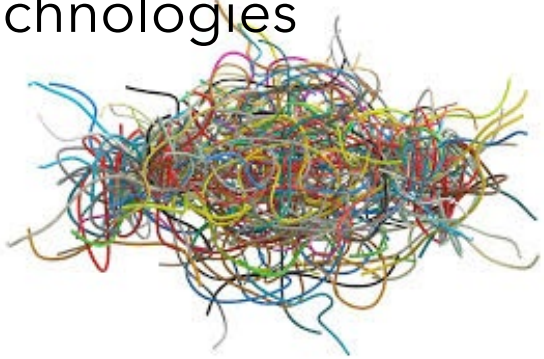
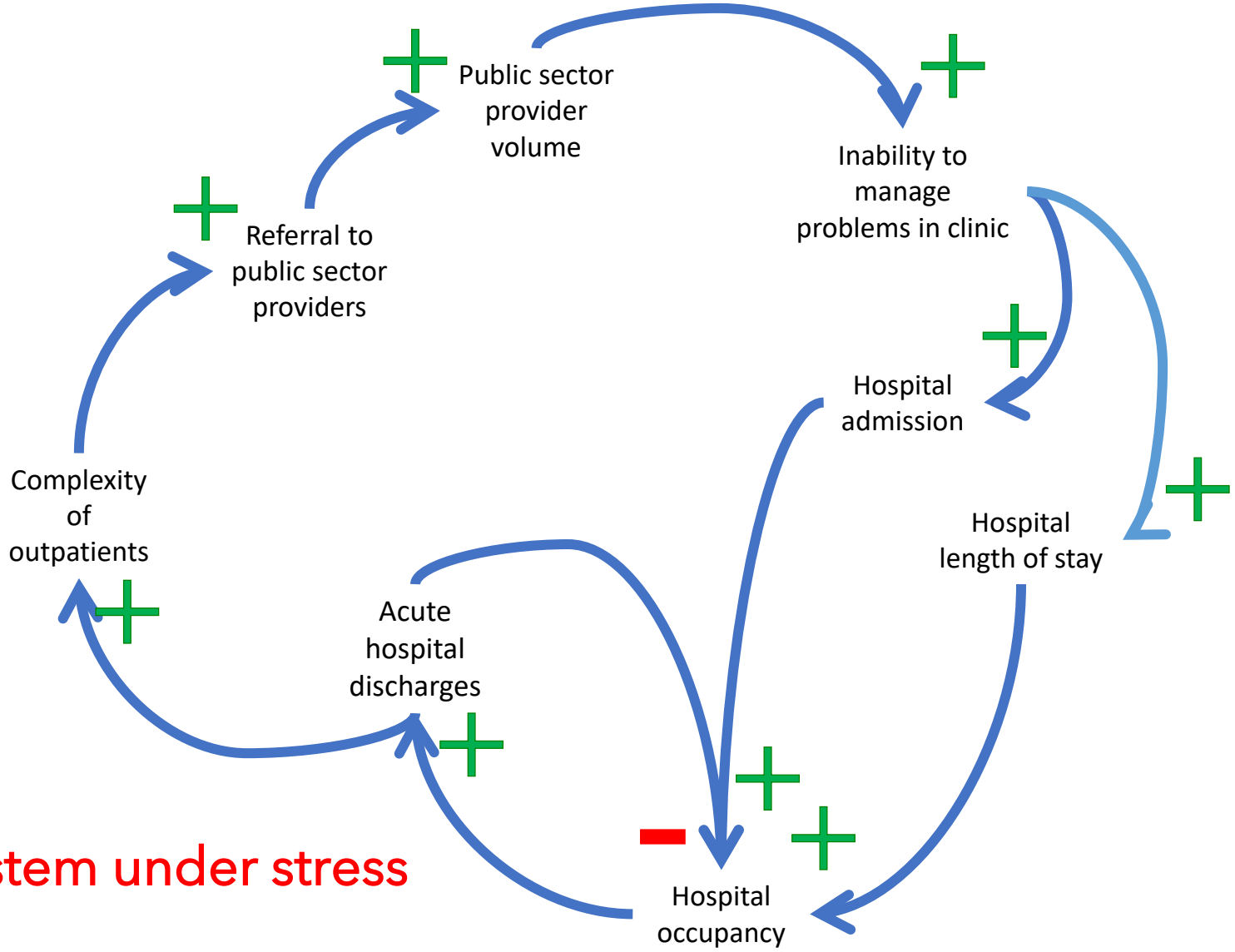
Motivation

Accelerating Complexity of Healthcare in Singapore:

- Demographic shift - rapidly ageing population with complex needs
- Limited availability of providers
- Increased public expectations
- New and expensive technologies





A system under stress

Our Target

A mix of services that achieves a desirable balance of:

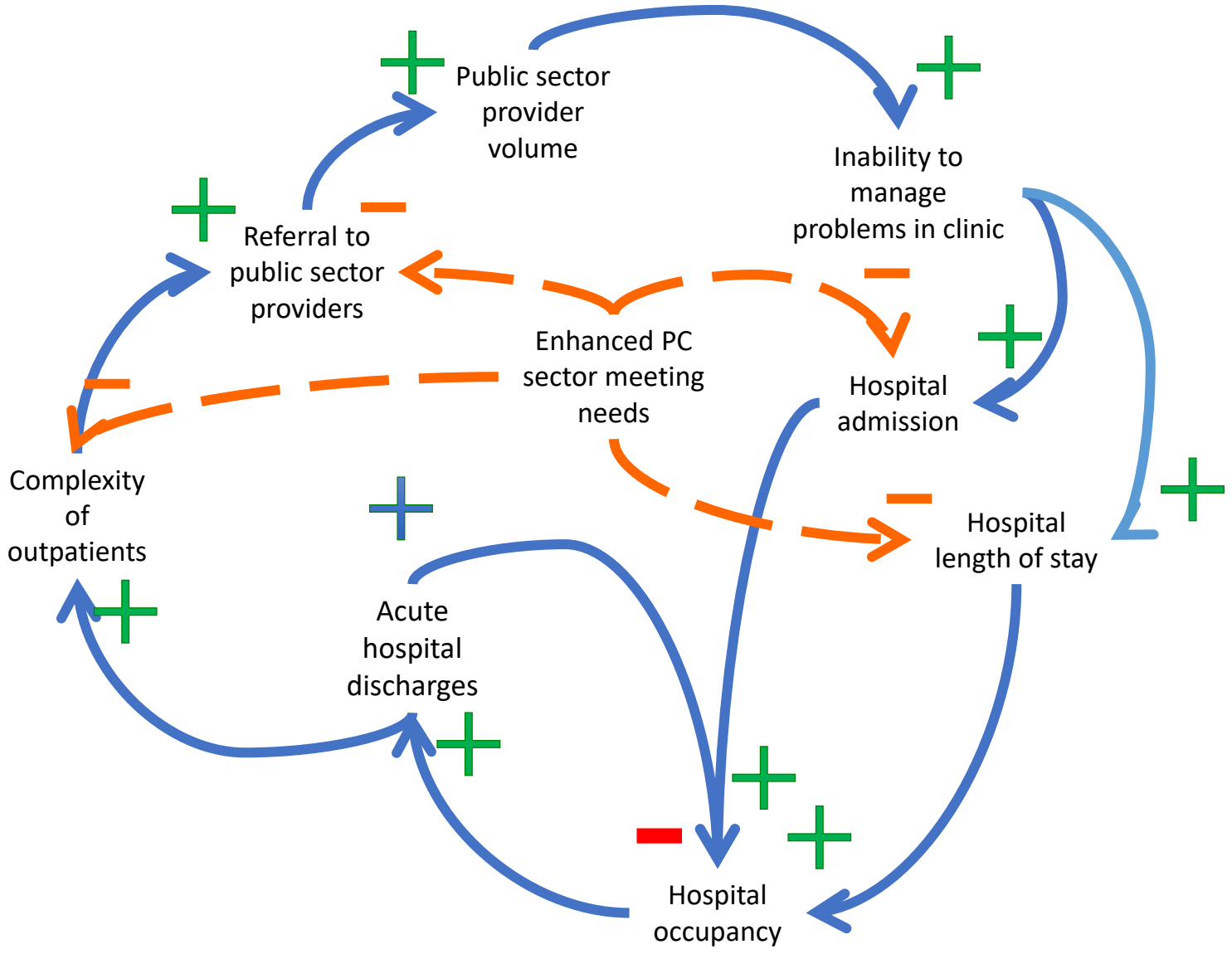
- Population health
- Sustainable cost
- Satisfied patients
- Good provider work-life

} The Quadruple Aim

Core Questions

1. What to change?
2. What to change to?
3. How to change?

Core Question 1 – What to change?

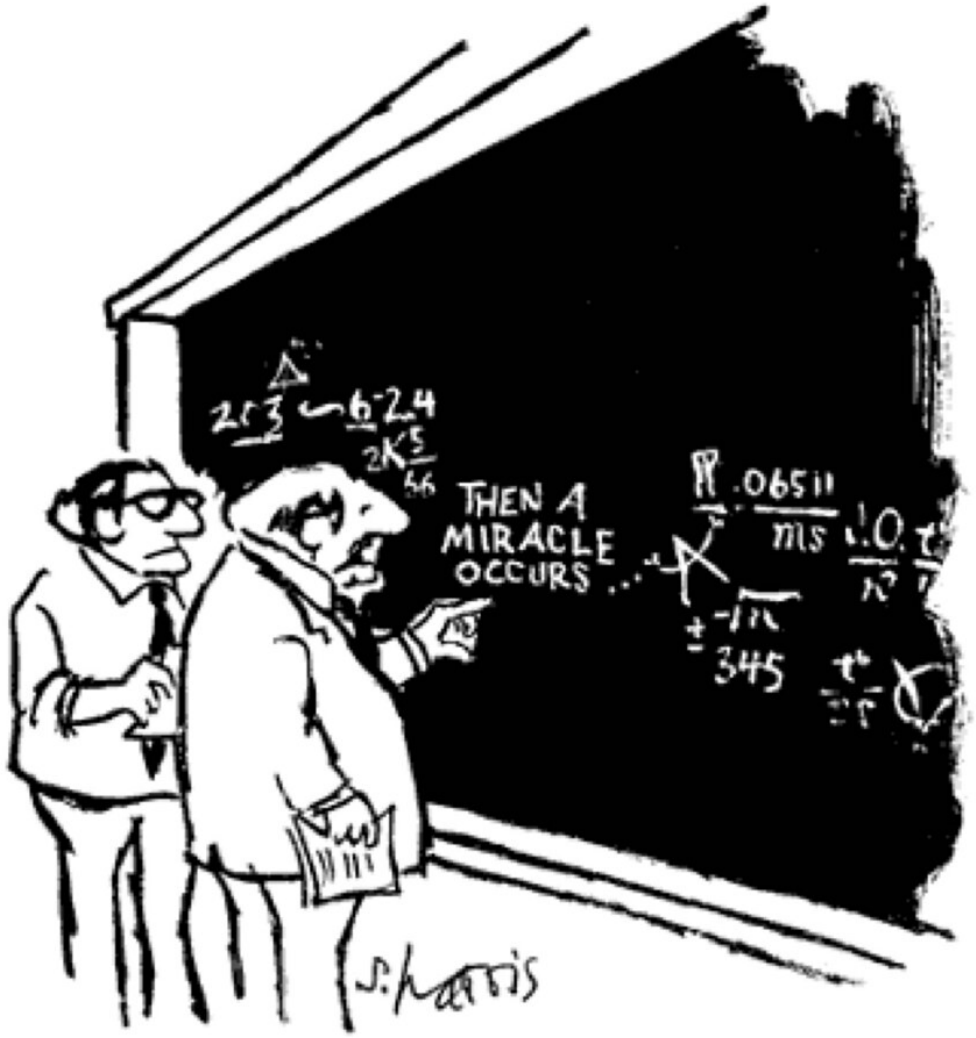


Core Question 2 – What to change to?

1. **Business as Usual**
   = expanding services in proportion to demand

2. **Enhanced Primary Care (EPC)**
   = Increase the capacity and capabilities of public polyclinics and engage willing private sector providers in caring for more complex patients

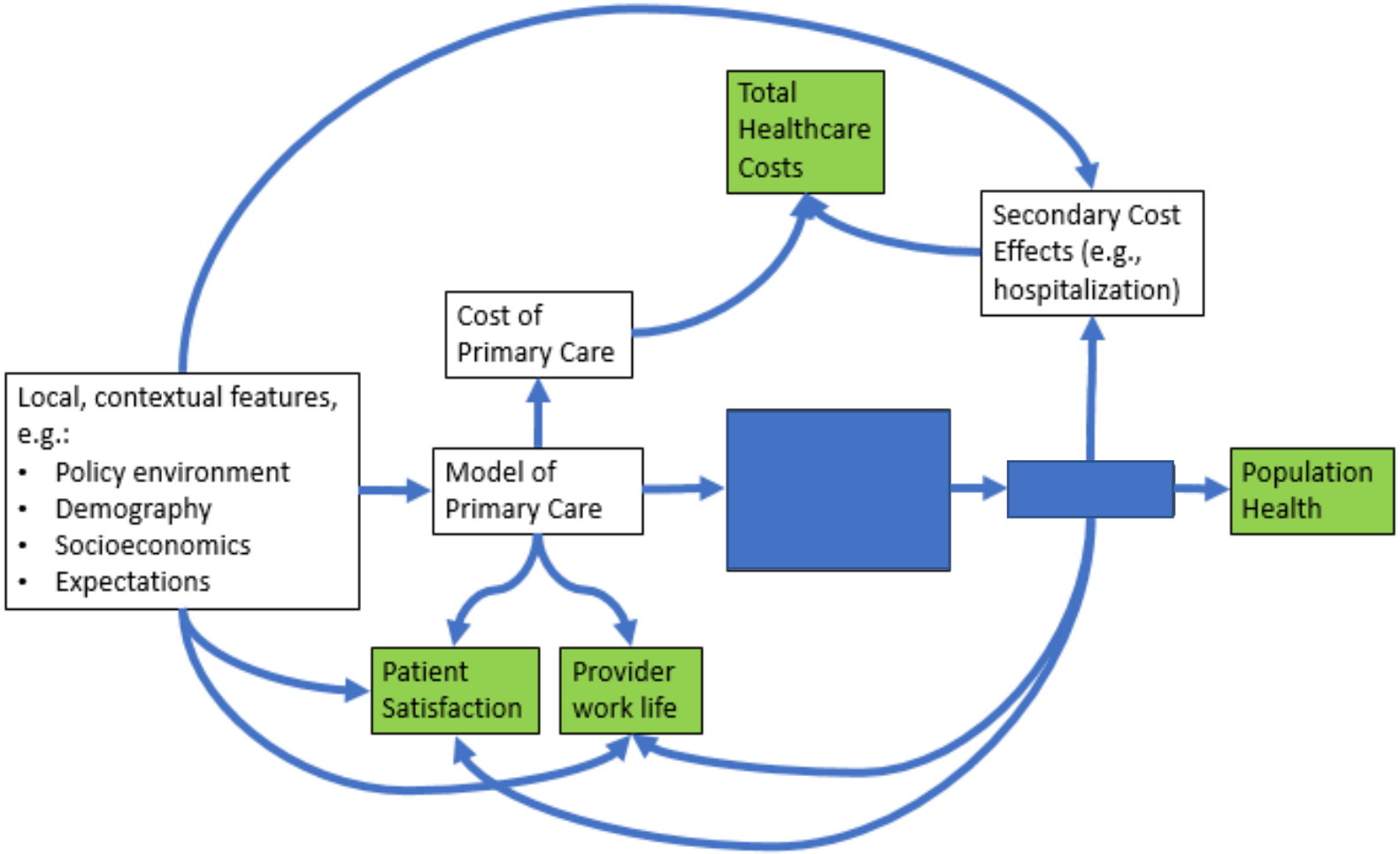
What's "Enhanced Primary Care"?

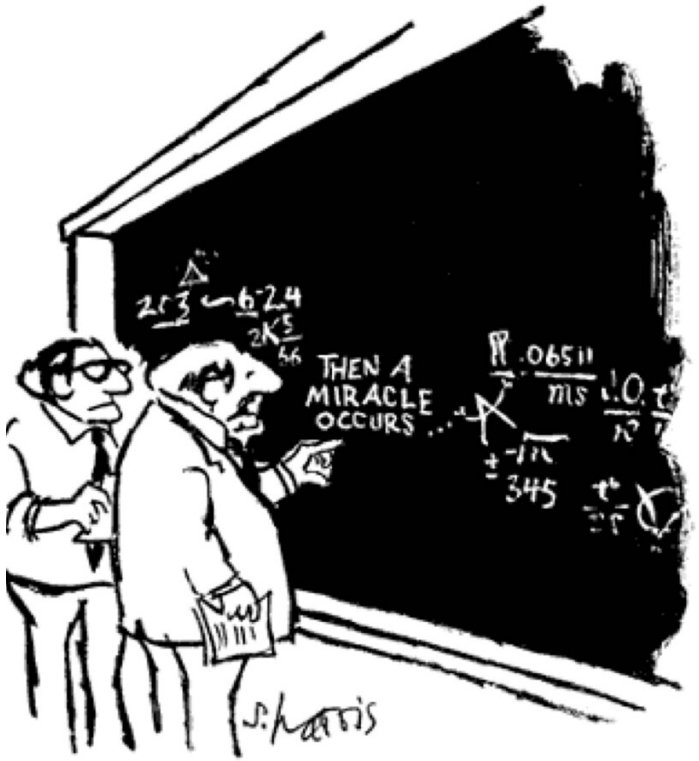


"I think you should be more explicit here in step two."

Enhanced Primary Care is a model of care that promotes optimal health system performance, i.e., the Quadruple Aim

How do "primary care entities" impact the quadruple aim?



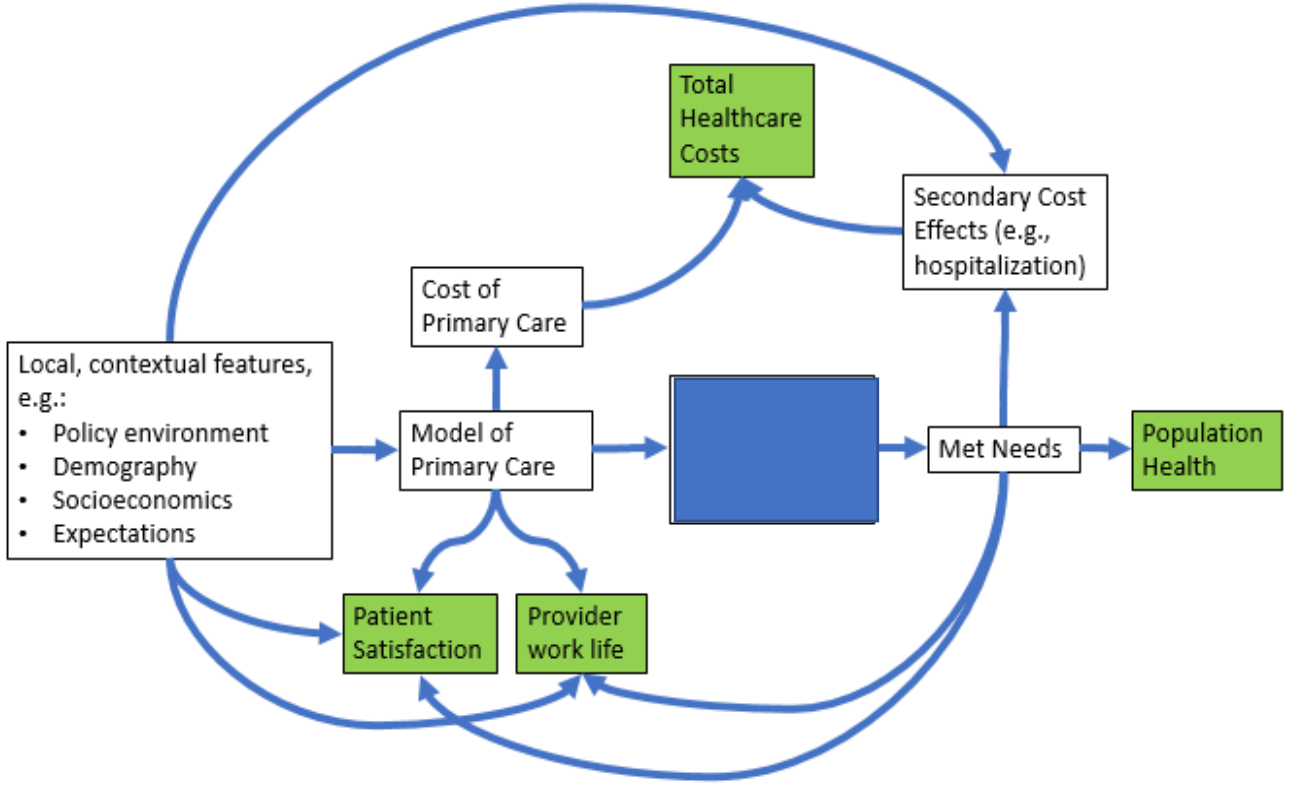


"I think you should be more explicit here in step two."

Core Question 2 – What to change to? (Cont.)

So, what does it take for primary care to most effectively meet needs?

- Assessed by the Starfield's 4 Cs:
  - Primary and accessible site of contact
  - Capacity to address a range of problems
  - Offers services over the continuum of health needs
  - Coordinates amongst medical and other health-related providers
- The ability of the entity to meet needs depends on the degree to which the entity fulfils the 4 Cs



Prototypical needs

	HASS need
1	Non-skilled home services
2	Social support
3	Care coordination
4	Physiological monitoring & prompt follow-up
5	Regular physician services
6	Medication management
7	Supervisory care
8	Patient skills education
9	Caregiver skills education
10	End-of-life care
11	Nursing type skilled services
12	Rehabilitation type skilled services

Having unmet HASS needs is associated with worse outcomes
ED use, hospitalization, nursing home placement, mortality

No. of subjects =	808	Number of obs =	808
No. of failures =	464		
Time at risk =	182179		
		LR chi2(9) =	62.75
Log likelihood =	-2905.812	Prob > chi2 =	0.0000

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w0_age	1.001215	.0052082	0.23	0.815	.9910587	1.011475
pt_sex						
Female	.8151356	.0764359	-2.18	0.029	.6782848	.9795975
a1_race1						
Malay	.973048	.1450211	-0.18	0.855	.7265624	1.303154
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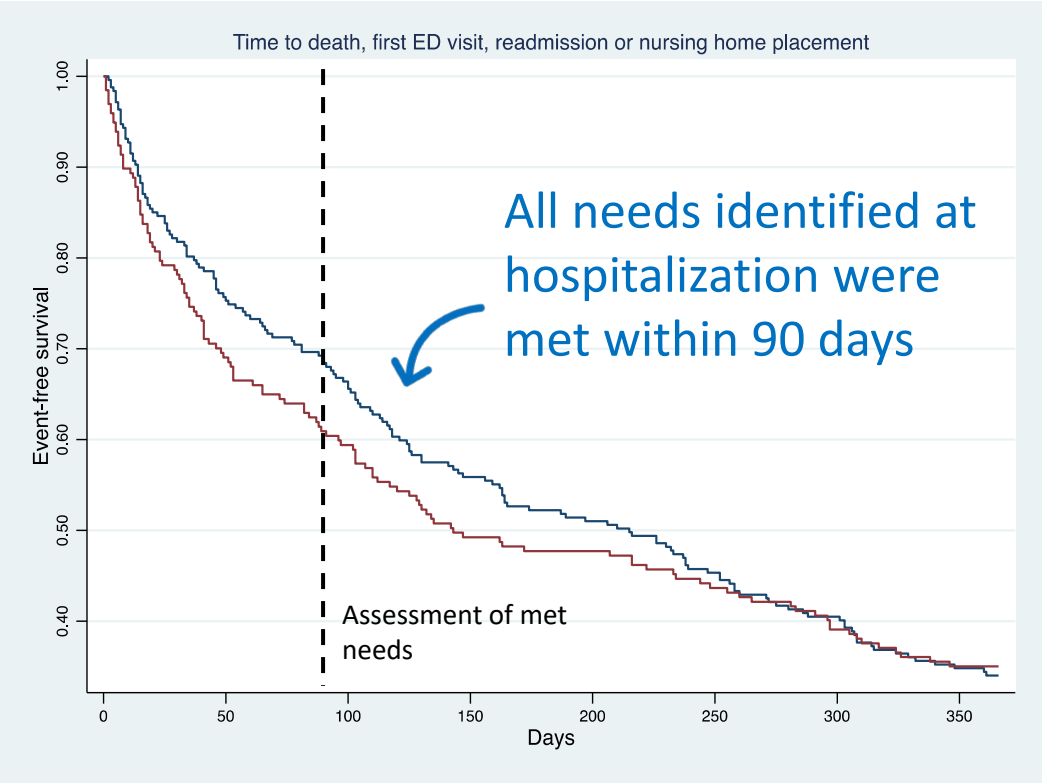
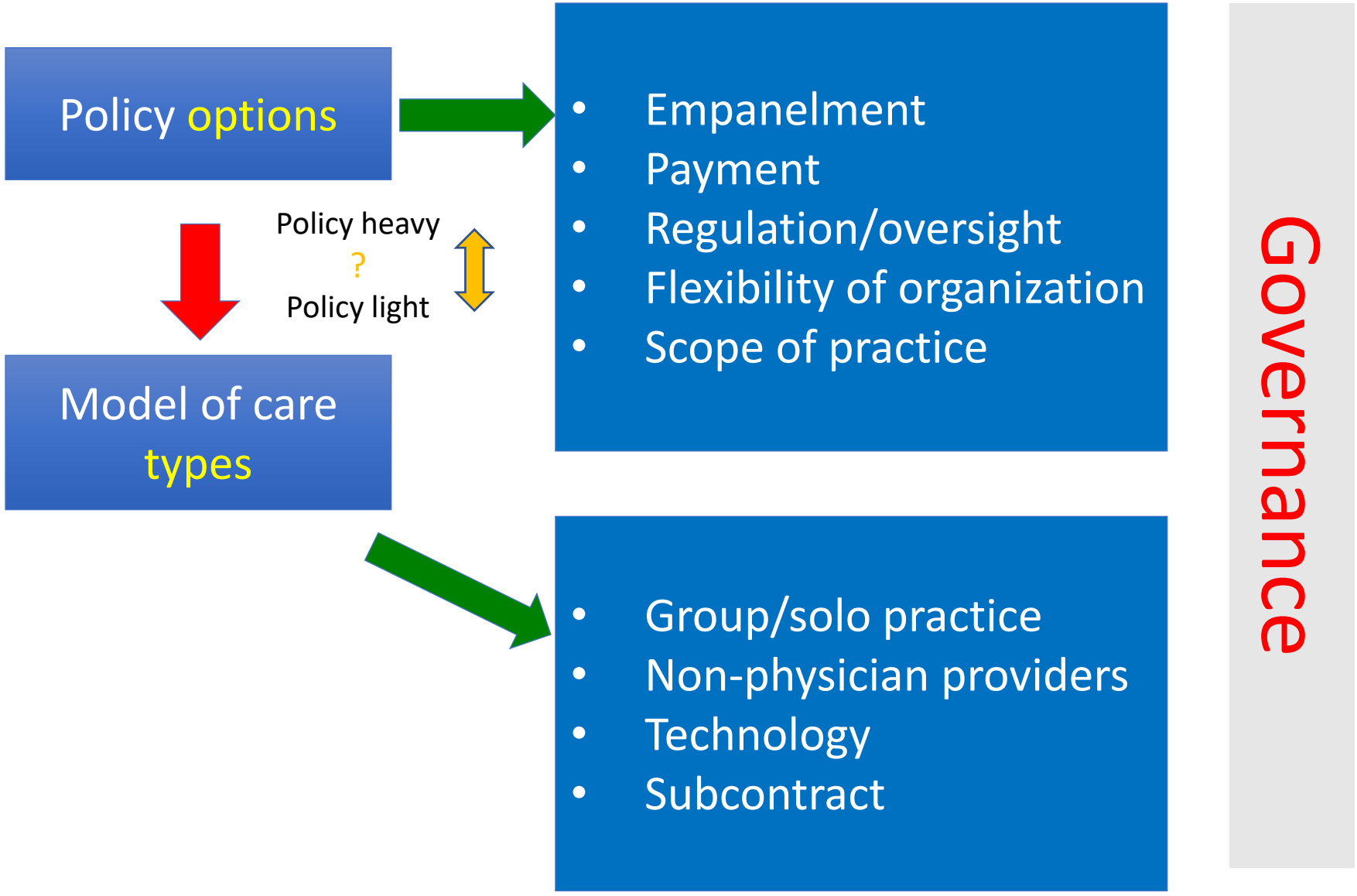
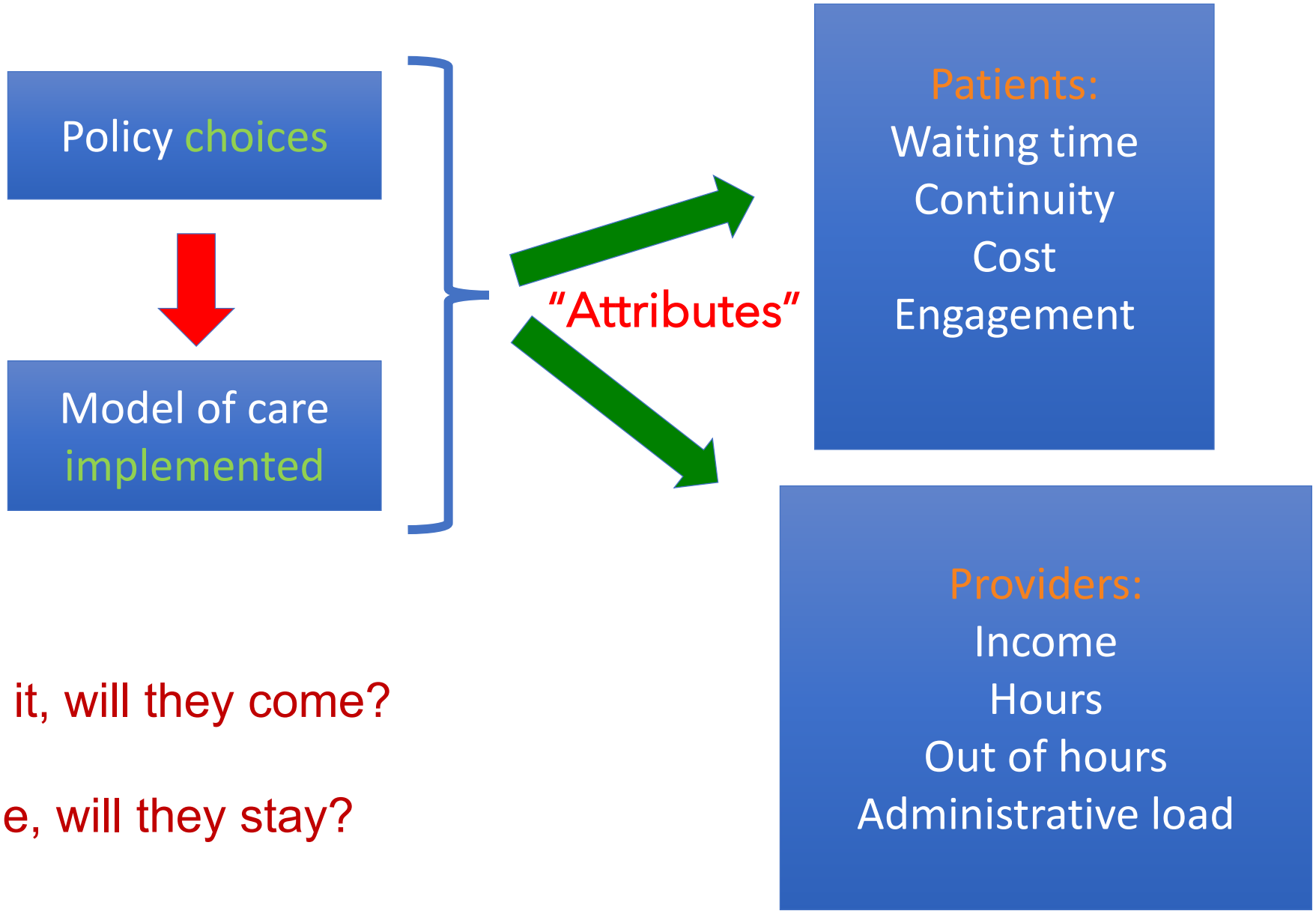
Others	2.221409	.7284803	2.43	0.015	1.168123	4.224431
unmetneed_binary						
At least 1 unmet need	.6741461	.1124231	-2.36	0.018	.4861884	.9347674
w0_GI_binary						
GI III-VI	1.357005	.1756087	2.36	0.018	1.053	1.748778
w0_GI_binary#unmetneed_binary						
GI III-VI#At least 1 unmet need	1.465468	.2974529	1.88	0.060	.9844731	2.181467
w0_CF_count	1.15494	.0406419	4.09	0.000	1.077969	1.237408



Core Question 3 – How to change?



Core Question 3 – How to change? (Cont.)



If you build it, will they come?

If they come, will they stay?

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Moving on to Agenda #2: Methodology

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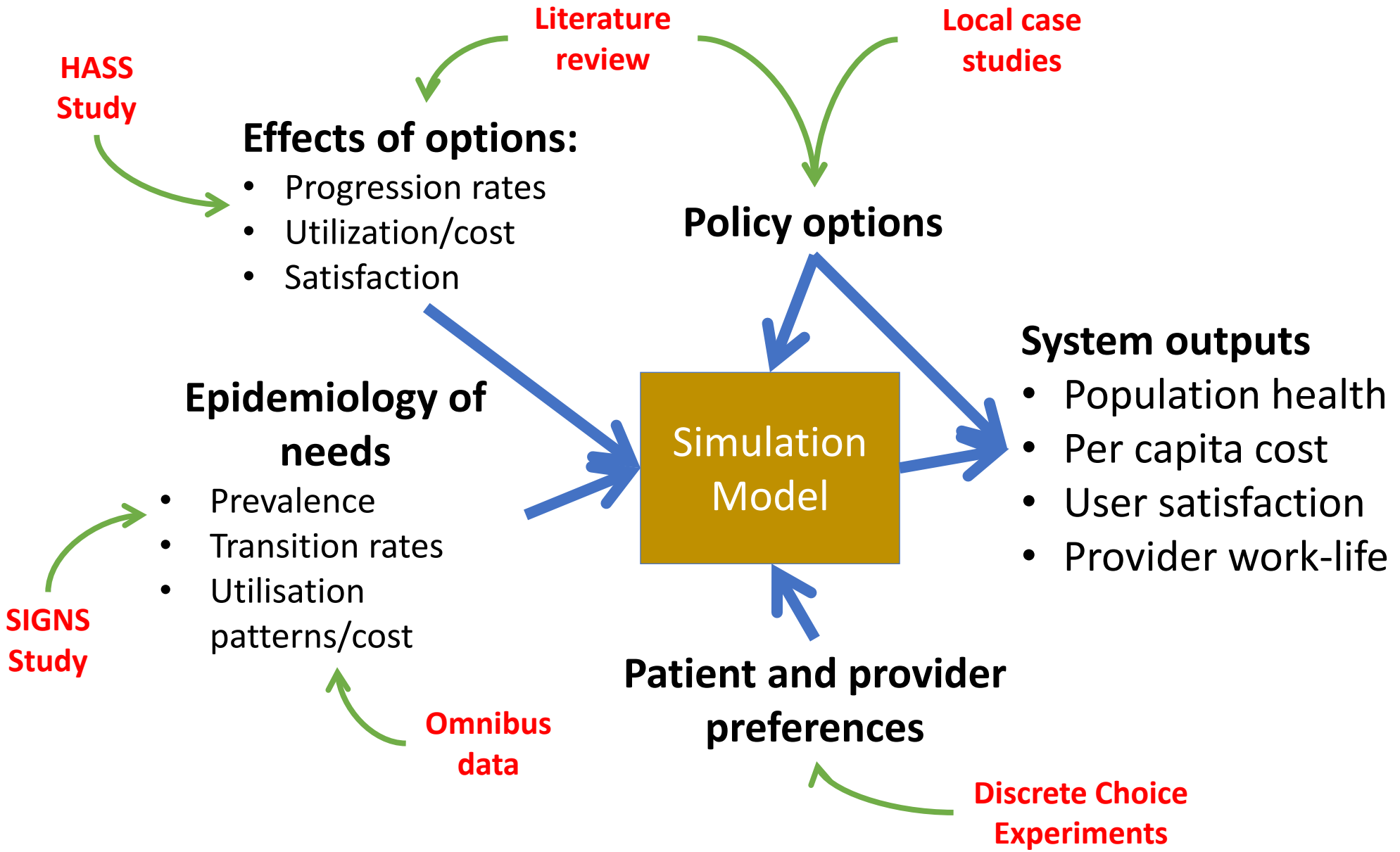
Methodology: Framework



Methodology: Tasks within the framework

To achieve the objective, we are developing a systems model (both conceptual and calculation) of chronic disease care in Singapore, informed by a series of interlocking studies ("Research Tasks"):

Research Task 1: Liaise with key stakeholders in the Singapore healthcare system, documented with case studies

Research Task 2: Synthesise existing international evidence in a systematic review

Research Task 3: Gather and analyse epidemiologic data

Research Task 4: Elicite patient and provider preferences

Research Task 5: Modell the impact of different policy scenarios on "the quadruple aim" (and other stuff)

EPC Research Tasks

Research Task 1: Liaise with key stakeholders in the Singapore healthcare system, documented with case studies

Led by: **Prof Gerald Koh**

National University of Singapore

Saw Swee Hock School of Public Health

Research Task 1 – Case studies in Singapore

Purposive and snowball sampling

Basic demographic data collected

In-depth semi structured interviews conducted

Inductive thematic analysis

Qualitative study

55 respondents interviewed in total

- 31 Private General Practitioners
- 8 Policymakers
- 12 Allied Health Professionals (clinic manager, programme managers, health administrators, care coordinators, nurses etc.)
- 4 polyclinic personnel

Background of Family Medicine Clinics (FMC)

Family Medicine Clinic (FMC) was introduced by MOH in 2011 to provide support for private GPs to manage chronic diseases.

An **FMC**:

- Brings together multiple private GPs, nurses and allied health services under one roof.
- Developed through partnerships with like-minded private GPs and Regional Health System (RHS). This **public-private partnership** lasts for three years, after which FMC will function as a private entity i.e., **privatisation**.
- Under this partnership, MOH provides **seed funding** for capital and operational expenses and RHS provides support on clinical matters and governance to ensure the appropriate use of funds.

Research Task 1 – Key Findings

Challenges to the sustainability of FMCs

Relationship and Power

Staffing

Information system

Background of Primary Care Networks (PCN)

A PCN:

- Is a **group of private GP practices** that come together **de novo**
- Is helmed by two leaders in the PCN Headquarters (HQ).

Current PCN landscape

- Application call for PCN opened from 1 April to 31 May 2017.
- A total of **10 PCNs** of various sizes were formalised in **Jan 2018**.
- As of 22 April 2020, **511 practices** are enrolled into a PCN.
- Currently, PCNs care for **more than 100,000 patients**, up from 70,000 in 2019.
- MOH's ambition is to enrol more than half of all CHAS clinics into a PCN by the end of 2020.

Enabling features of the PCNs

Chronic disease registry (CDR)

- A platform that promotes adherence to good clinical guidelines by tracking process and clinical outcome indicators

Ancillary services

- Diabetic Retinal Photography, Diabetic Foot Screening, Nurse Counselling provided as mandatory services by all PCNs
- The services are generally provided by a mobile team of nurses (can be outsourced to external vendors)
- Mobile team can go to every clinic, making it more convenient for patients to attend these services
- The services are reimbursed at an agreed piece rate

Care plus fee

- Quantum of $100 per patient per annum is disbursed to GPs to compensate for extended consultation time with patients with chronic conditions

Continuing Medical Education (CME)

- Funds provided to invite guest speakers, book venues and to hire locums
- Platform to network with fellow GPs and for benchmarking practices
- GPs can accumulate CME points for the renewal of practising certificates

EPC Research Tasks

Research Task 2: Synthesis of existing international evidence in a systematic review

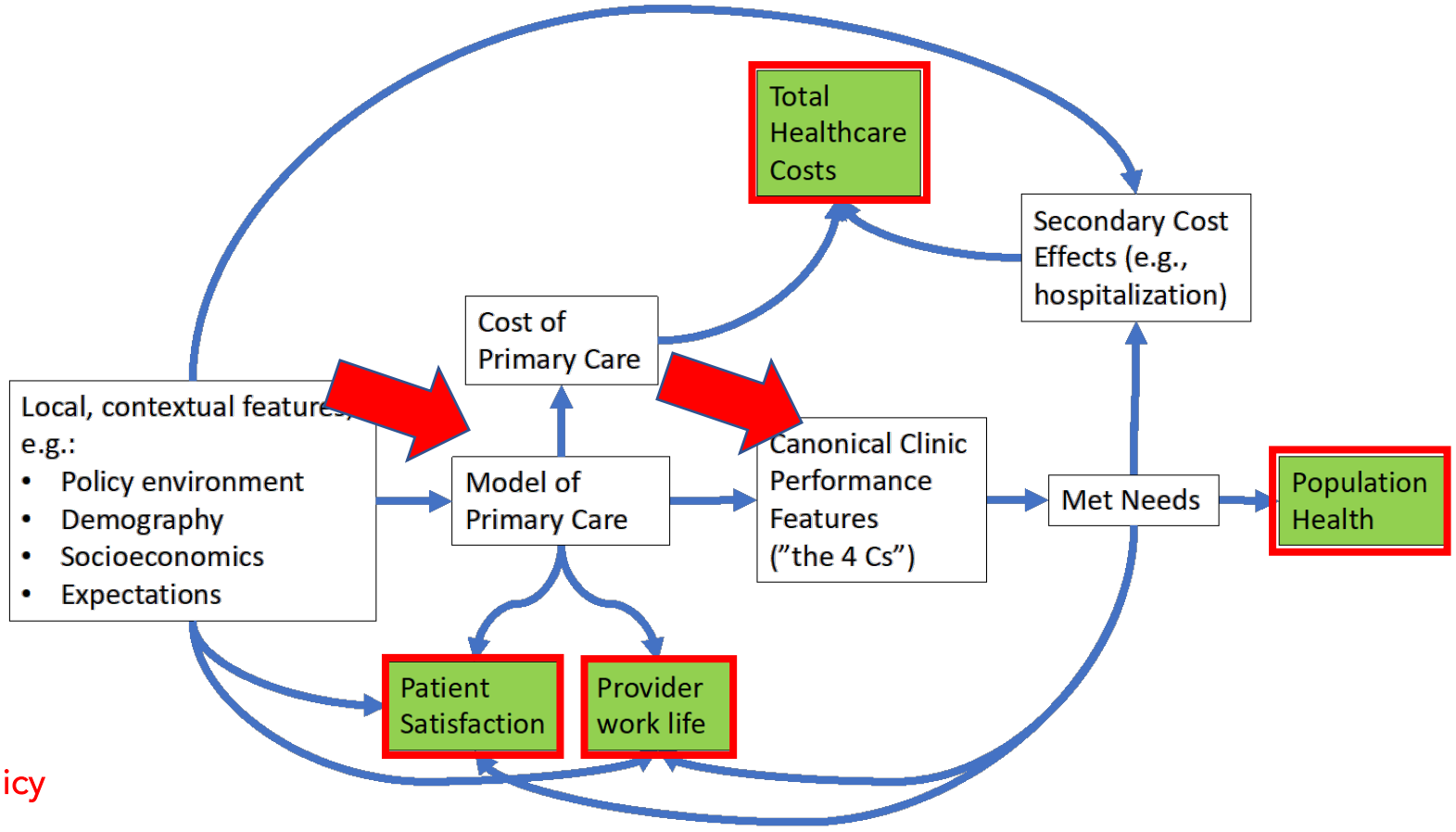
Led by: **Prof Josip Car**

Nanyang Technological University, Singapore

Lee Kong Chian School of Medicine, Centre for Population Health Sciences (CePHaS)

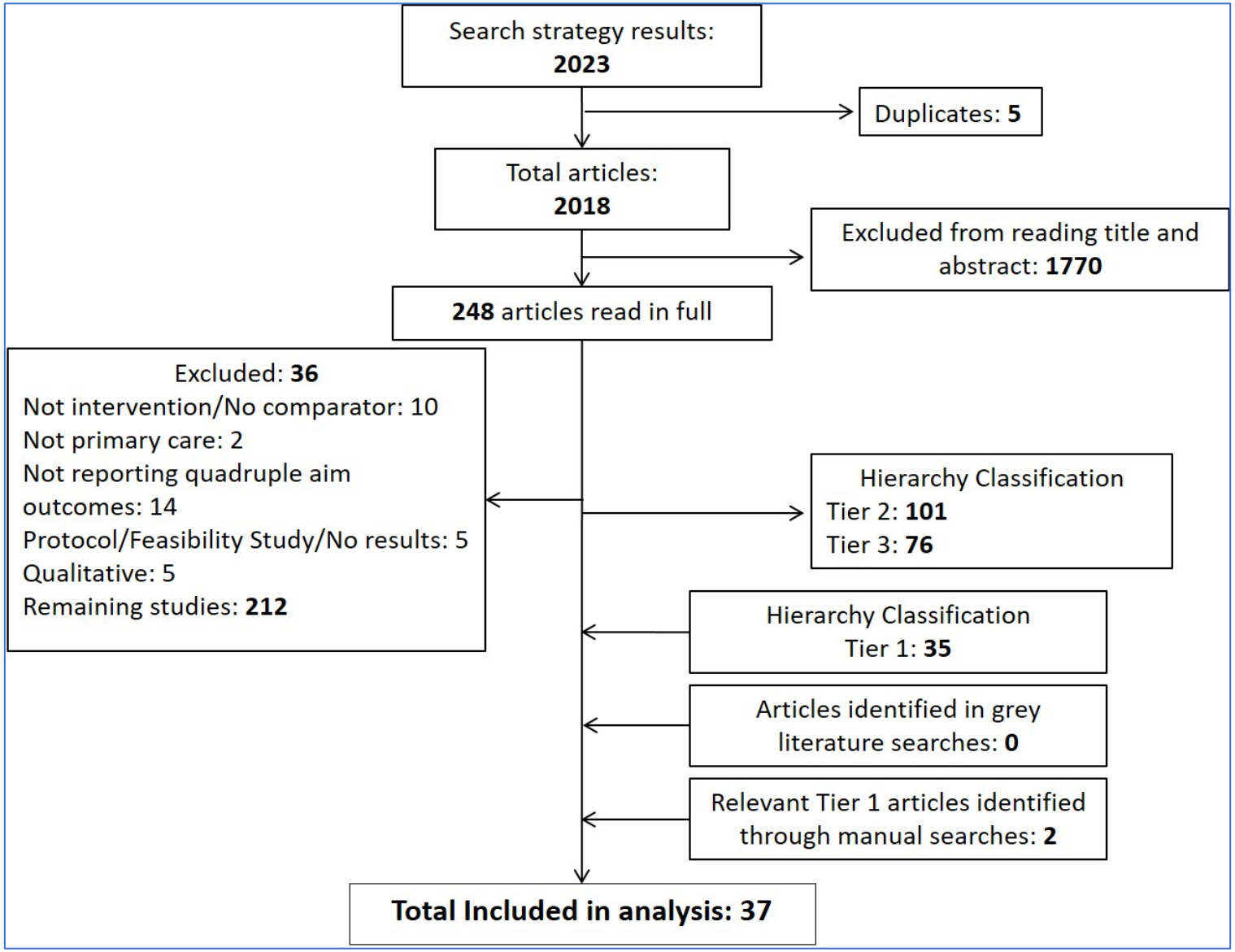
Research Task 2 – International literature review

To identify the potential impact of multicomponent strategies or innovation environments* for enhancing primary care



*Strategies or Innovation environments = policy changes, changes in payments, case management, team-based care, special roles added to the teams, the specific way in which payments are restructured, etc.

Research Task 2 – Results



Research Task 2 – Results

- Efforts to improve **continuity** (e.g., via assignment) increase PC visits while maintaining or decreasing specialist visits
- Increasing **comprehensiveness** by systematizing screening and/or preventive services increase those activities
- No matter what the intervention, results were mixed for impact on **hospital admissions** and **ED visits**, and **expenditures**
- Further research is needed
  - Systematic, context-sensitive assessment of the relationship between the specific interventions intended to enhance the functional goals of PC, and degree to which these changes achieve those goals, and the effect those changes have on population health (and other outcomes).

EPC Research Tasks

Research Task 3: The epidemiology of health and health related social service (HASS) needs

Led by: **Prof Angelique Chan**

Duke-NUS Medical School

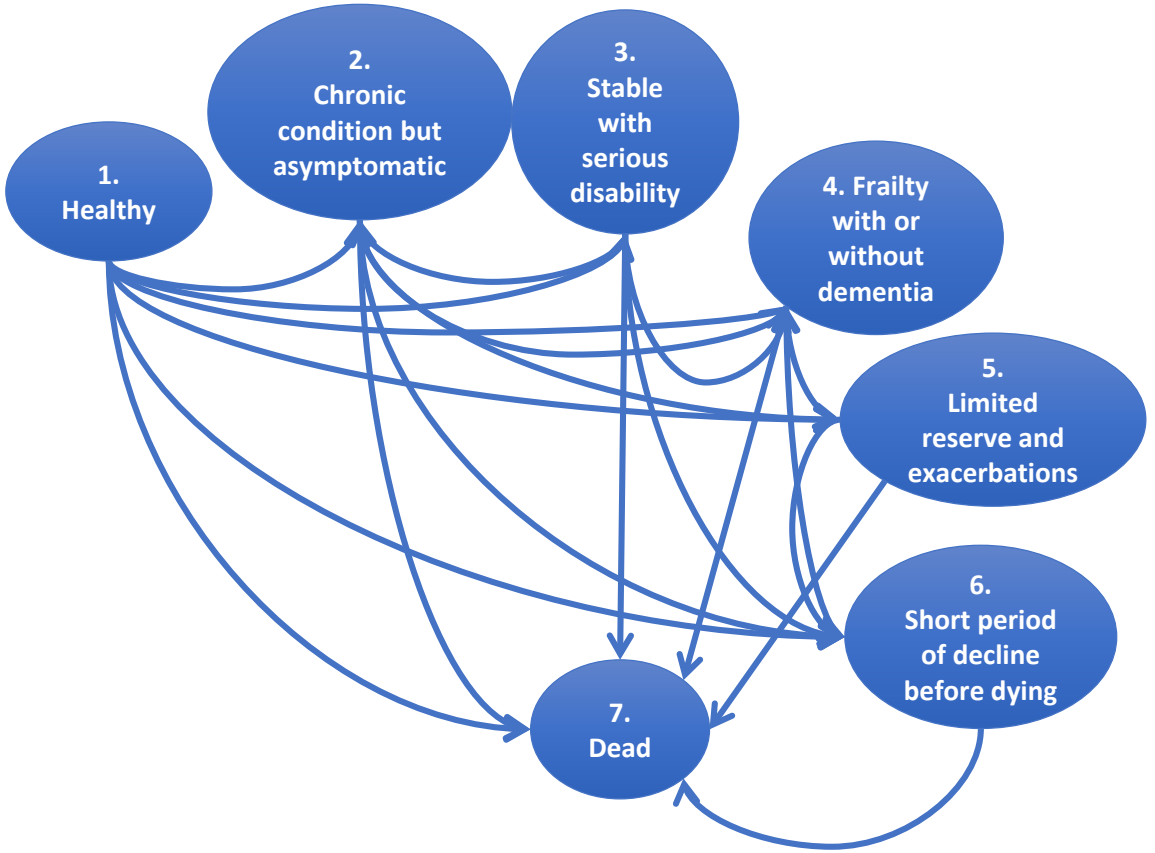
Centre for Ageing Research & Education (CARE)

Research Task 3 - Objectives

Epidemiology of need segments and healthcare utilization/health costs

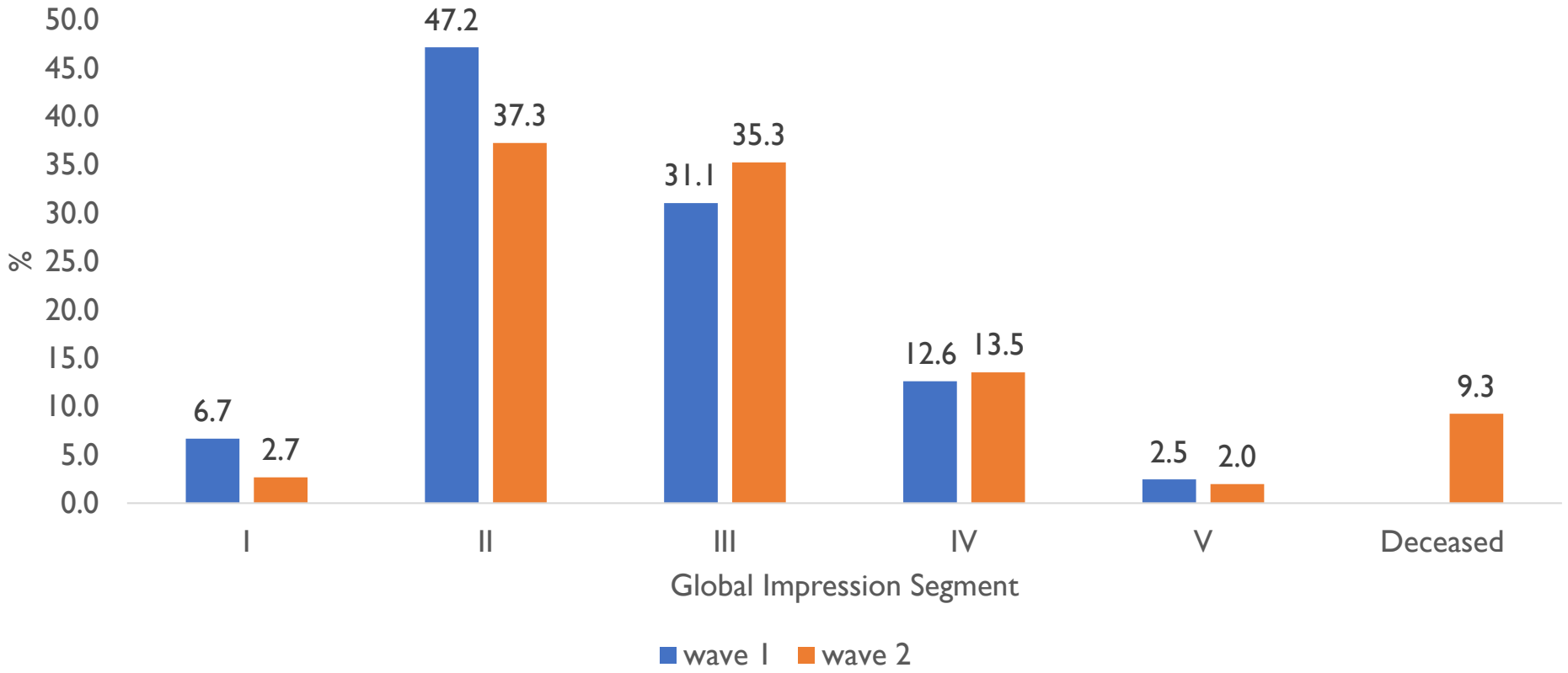
Estimate:*

- Transition rates between need states
- Healthcare utilization and cost within states, accounting for age, gender, presence of complicating features and use of primary healthcare services



Research Task 3 – Preliminary Findings

Distribution of global impression segments

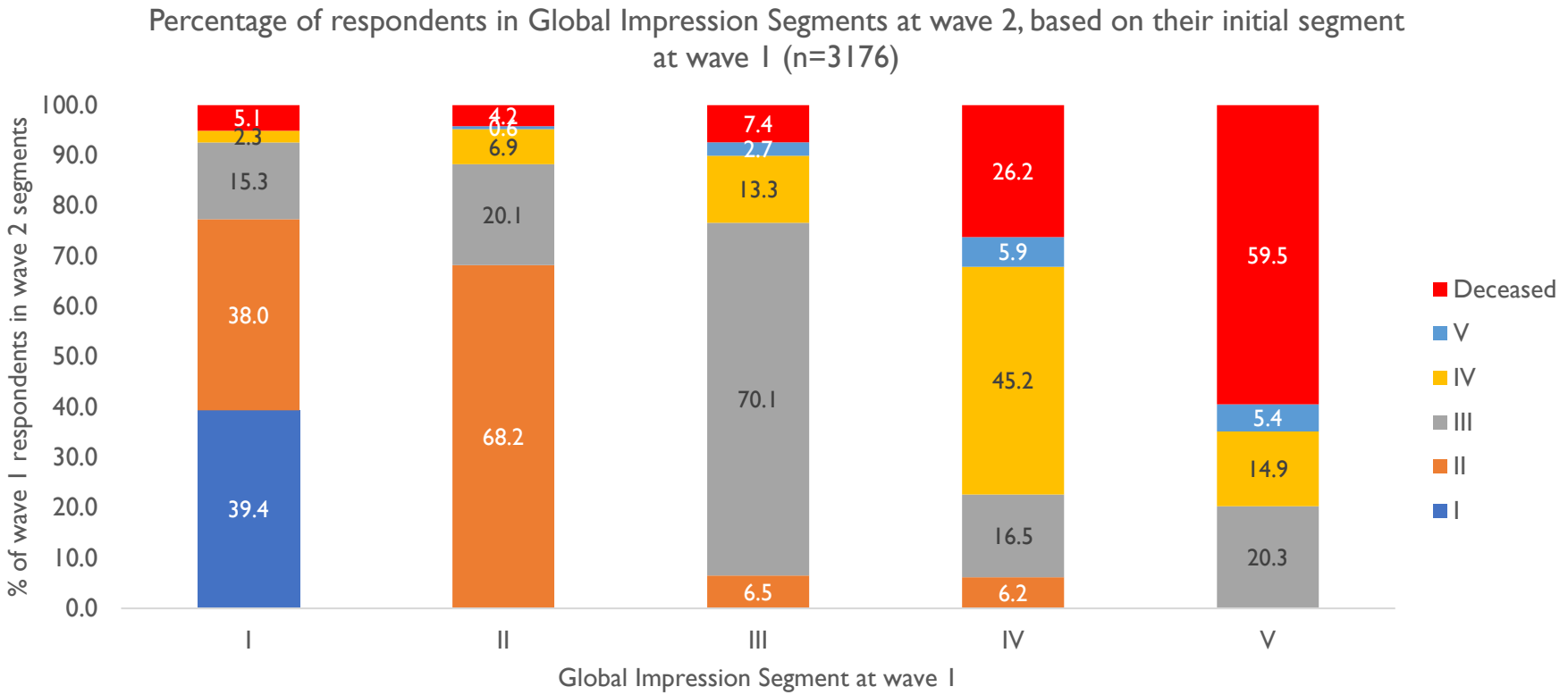


Global Impression Segments: I: Healthy; II: Chronic conditions, asymptomatic; III: Chronic conditions, stable but moderately/ seriously symptomatic or silently severe ; IV: Long course of decline; V: Limited reserve & serious exacerbations

Data: THE SIGNS Study wave 1 (2016-2017), n=4549 and THE SIGNS Study wave 2 (2019), n=3176 inclusive of respondents interviewed and known mortality status

Research Task 3 – Preliminary Findings

Transition in global impression segments



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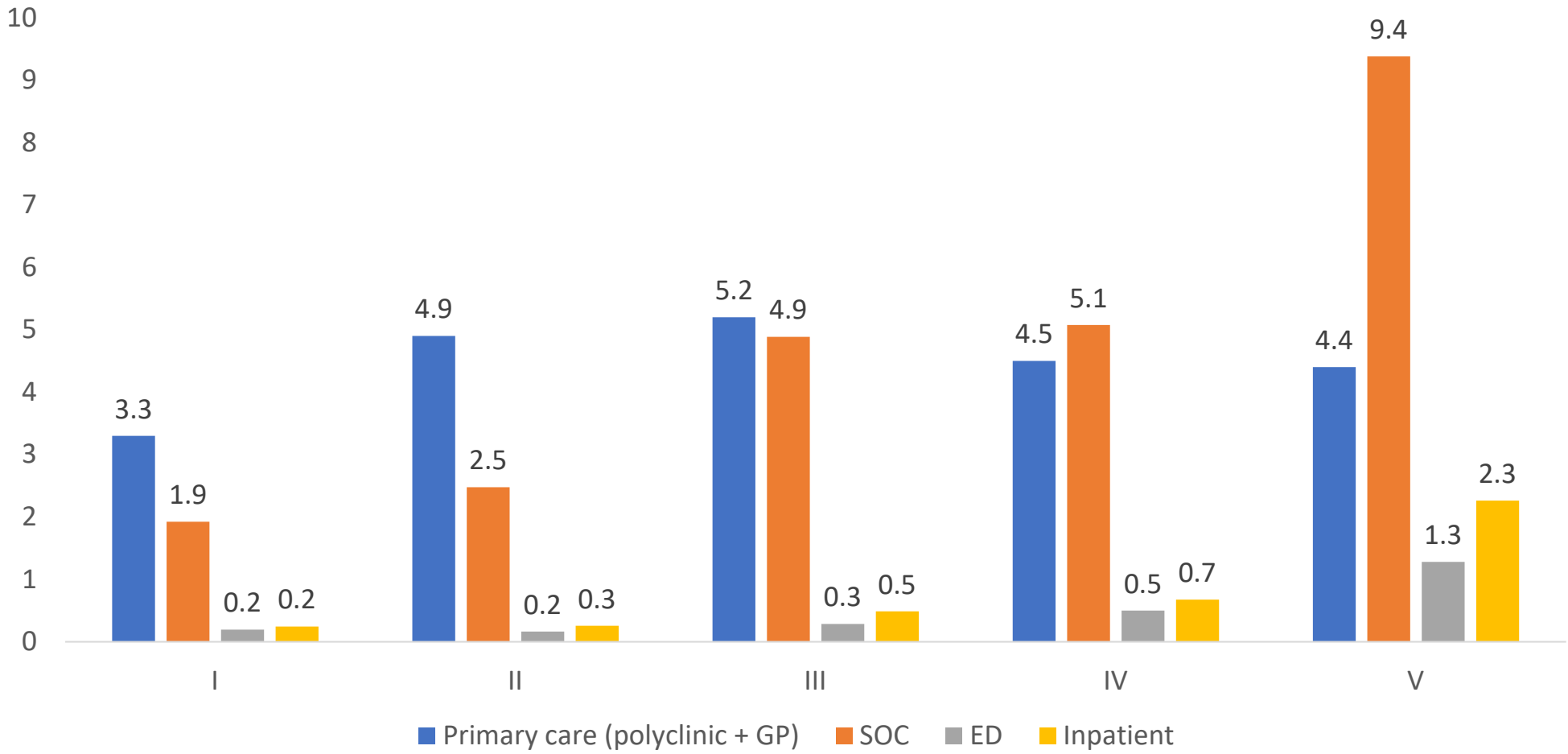
Data: THE SIGNS Study wave 1 (2016-2017) and THE SIGNS Study wave 2 (2019). n=3176, inclusive of respondents interviewed at both waves, and interviewed at wave 1 and with known mortality status at wave 2

Research Task 3 – Preliminary Findings

Average number of visits in the 12 months preceding wave 1 interview



Research Task 3 – Preliminary Findings

Non-users of primary care use had higher risk of transition to worse health states

Logistic regression — Number of obs = 3,137; LR chi2(9) = 440.27; Prob > chi2 = 0.0000; Log likelihood = -1733.4531; Pseudo R2 = 0.1127

transition	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
w1_age	1.090486	.0062254	15.17	0.000	1.078352	1.102756
sex						
Female	.9682892	.0815924	-0.38	0.702	.8208787	1.142171
1.comp_binary	1.429965	.1515214	3.38	0.001	1.161798	1.76003
SST						
II	.2035313	.0330809	-9.79	0.000	.1480067	.2798859
III	.0928977	.0167819	-13.15	0.000	.0651982	.1323652
IV	.0697631	.0148374	-12.52	0.000	.0459822	.1058428
V	.4663694	.1493832	-2.38	0.017	.2489321	.8737339
primary_care						
Saw a provider	.8097558	.0725612	-2.35	0.019	.6793271	.9652264
specialist_care						
Saw a provider	1.374015	.1349174	3.24	0.001	1.133471	1.665608
_cons	.0041314	.0016757	-13.53	0.000	.0018658	.0091482

Research Task 3 – Preliminary Findings

Average charges per visit in the 12 months preceding wave 1 interview

Provider type	Mean (S$)	Median (S$)
Primary Care	97	62
SOC	182	99
ED	354	322
Inpatient	3,270	1,354

Research Task 4:
Eliciting patient and provider preferences

Led by: **A/Prof Semra Ozdemir**

Duke-NUS Medical School

Research Task 4 – Objectives

To examine the preferences of Users and Providers in Singapore with regards to the features of a particular model of primary care.

These features, also referred to as attributes, concern the organizational structure, payment mechanisms, as well as service and delivery factors.

Research Task 4 – Methodology

Preferences for Models of Care: Discrete Choice Experiments (DCEs)

- Separate exercises for **providers** (stratified by public/private) and **public** (stratified by needs segment)
- Identify **features of a health service** that relate to the **desirability to participate**
- Provide a **tableau of option pairs**: participants select preferred and whether they would switch from current
- Estimate **elasticity of demand**: "if you build it, will they come?"

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Research Task 4 – Attribute List and Levels for PROVIDERS

Attributes	1. Operating hours of the clinic	2. Services available	3. Continuity with patients	4. Typical patient load per day	5. Hours of administrative work per day	6. Professional development and training	7. Income per month
Level 1	Weekdays and working hours	Doctor consultation and medication	Mostly same patients	20	0.5 hour	No protected time	No change
Level 2	Working hours, evenings and weekends	Doctor, medication and common diagnostic services	Mostly different patients	40	1 hour	1 day per 3 months	5% increase
Level 3	24/7 including home visits	Doctor, medication and wide range of diagnostics and specialist services		60	3 hours	1 day per month	10% increase
Level 4							25% increase

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Research Task 4 – Sample DCE Task for PROVIDERS

	Clinic A	Clinic B
Operating hours of clinic	24/7 including home visits	Weekdays and working hours
Services available	Doctor, medication and common diagnostic services	Doctor and medication
Continuity with patients	Mostly same patients	Mostly same patients
Typical patient load	60	20
Hours of administrative work per day	3 hours	1 hour
Professional development and training	1 day per 3 months	No protected time
Income per month	5% increase in income	25% increase in income

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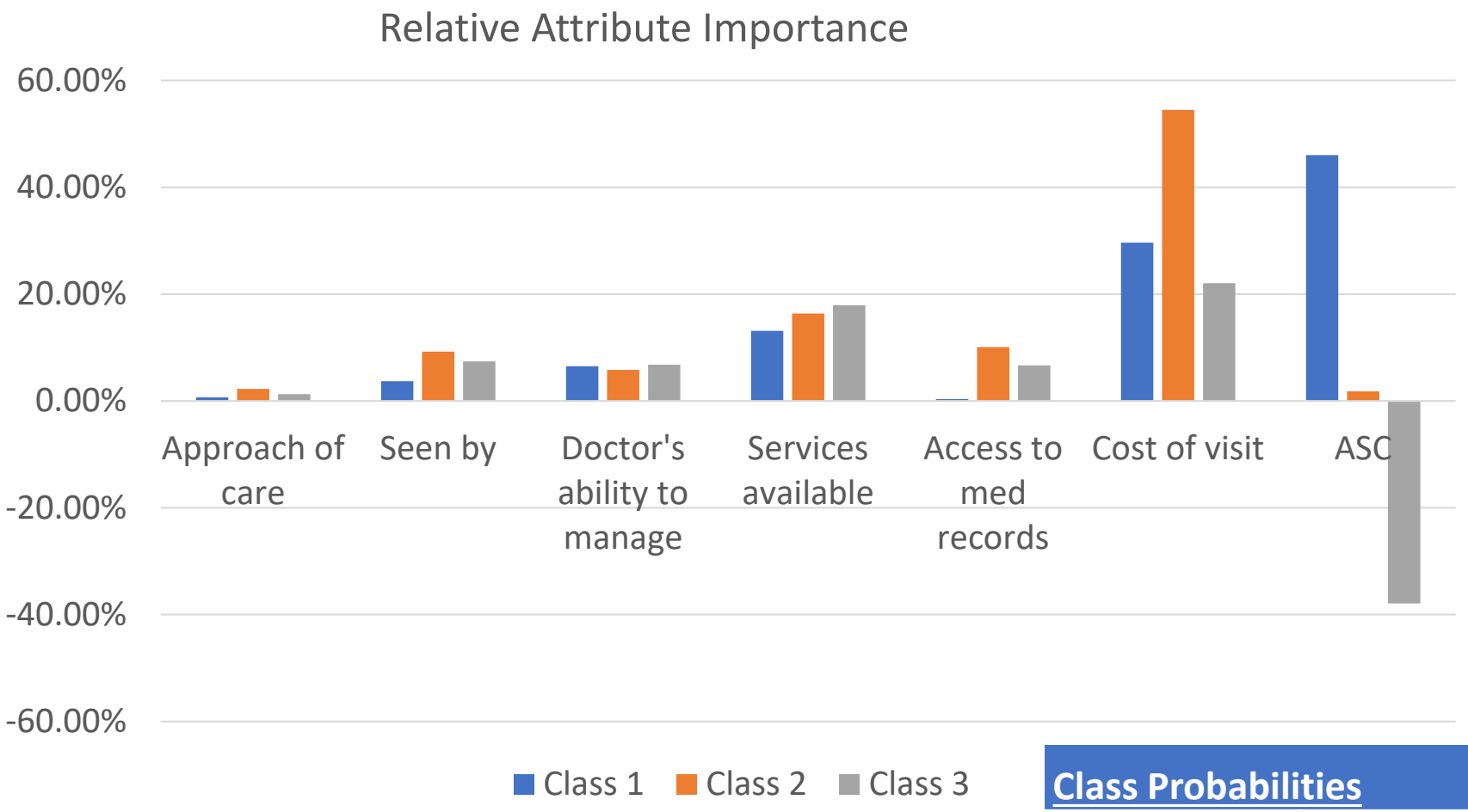
Research Task 4 – Attribute List and Levels for USERS

Attributes	1. Approach to care	2. Seen by same or different doctor	3. Doctor's ability to manage	4. Services available in the clinic	5. Access to medical records	6. Out-of-pocket cost (Consultation and Medication)
Level 1	Usual care	Same doctor	Common or stable medical conditions	Doctor consultation and medication	From clinic	$5
Level 2	New approach to care	Different doctor	Common as well as uncommon or unstable medical conditions	Doctor, medication and common diagnostic services	From clinic and other health facilities	$20
Level 3				Doctor, medication and full range of diagnostics and specialist services		$50
Level 4						$100

Research Task 4 – Sample DCE Task for USERS

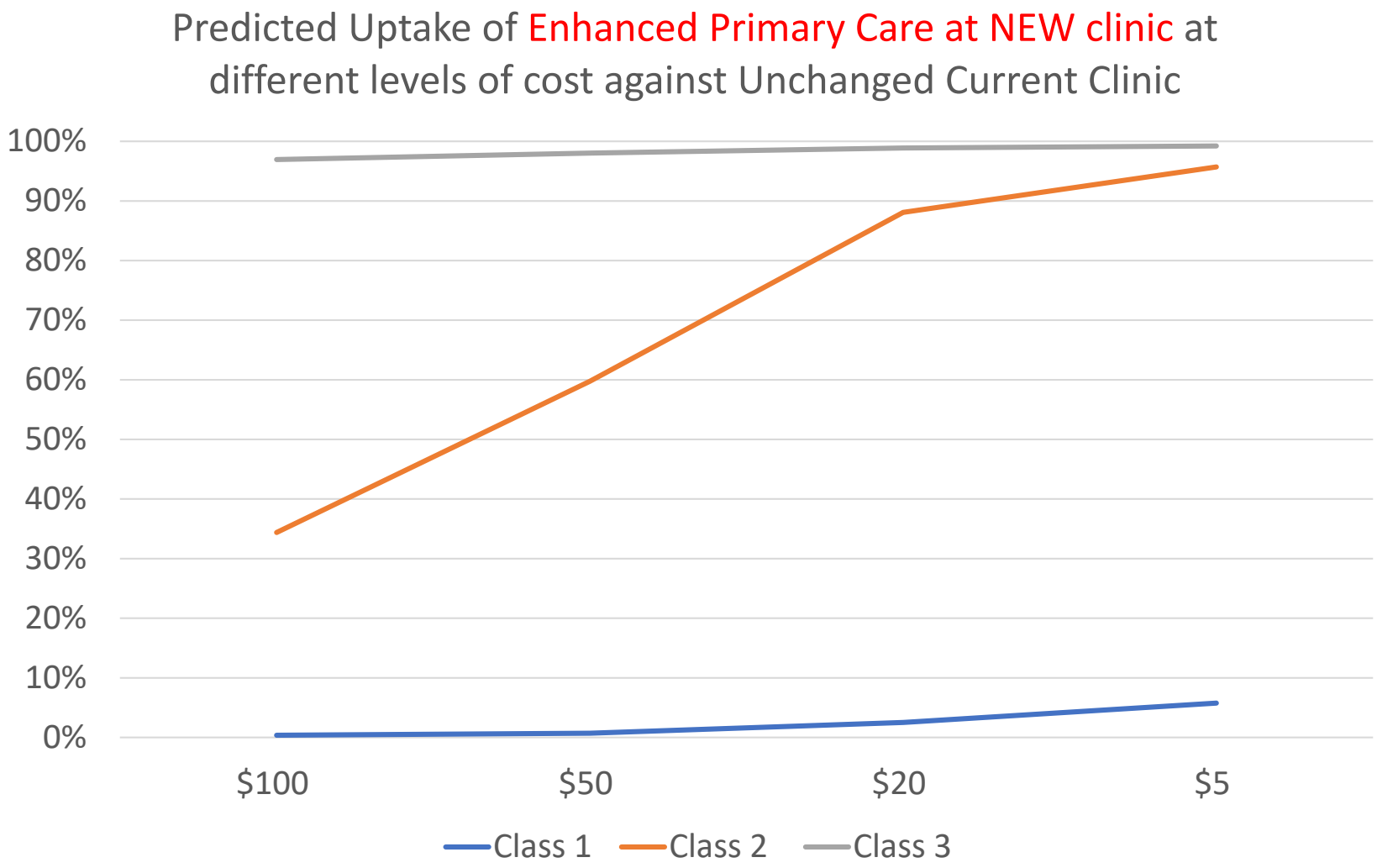
	Clinic A	Clinic B
Approach to care	New approach to care	Usual care
Seen by same or different doctor	Same doctor	Different doctor
Doctor's ability to manage	Common as well as uncommon or unstable conditions	Common or stable conditions
Services in clinic	Doctor, medication and full range of diagnostics and specialist services	Doctor and medication
Access to medical records	From clinic and other health facilities	From clinic
Out-of-pocket cost	$20	$5

Research Task 4 – Preliminary Findings (USERS)



Class Probabilities	
Class 1	48.4%
Class 2	24.2%
Class 3	27.4%

Research Task 4 – Preliminary Findings (USERS)



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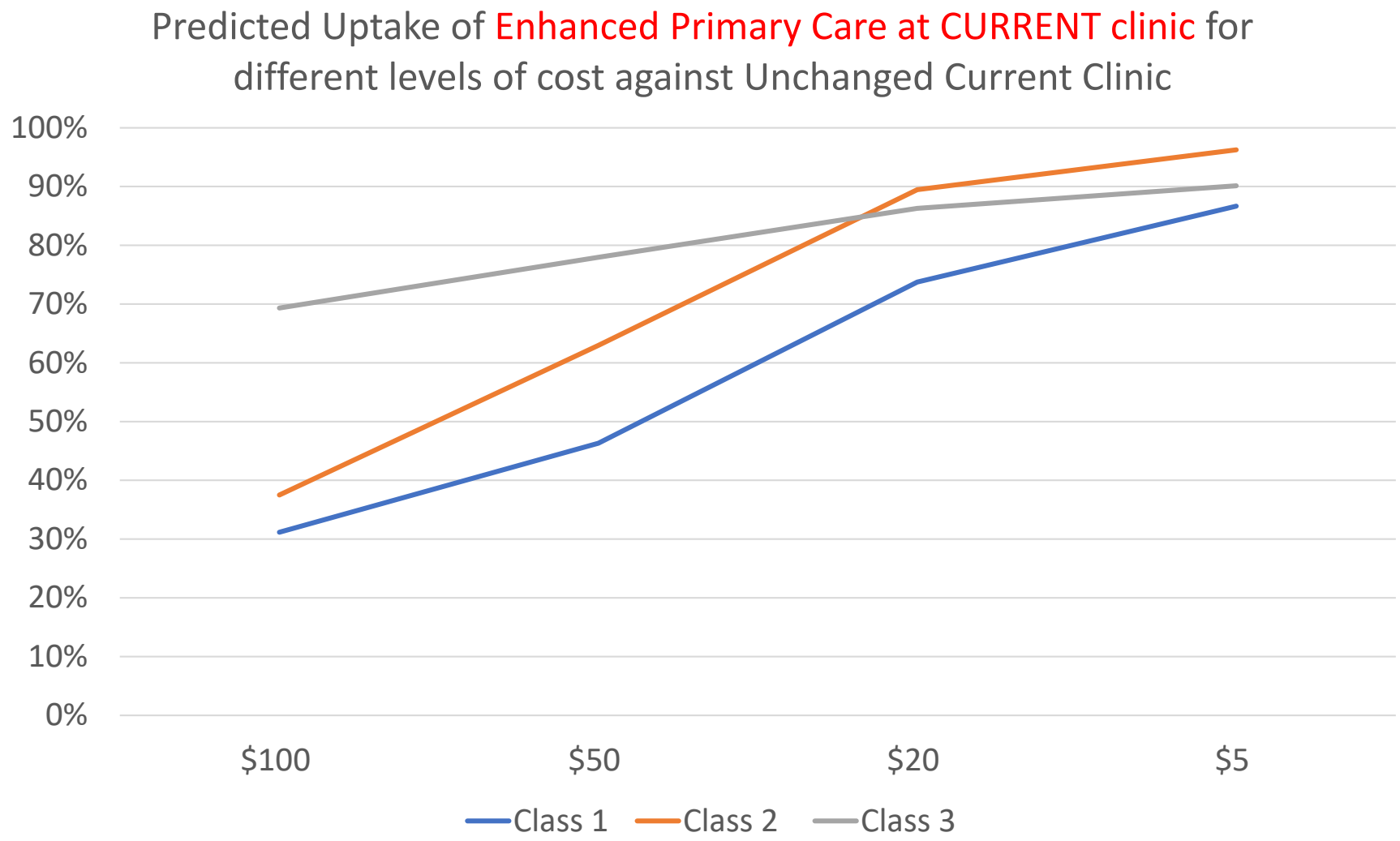
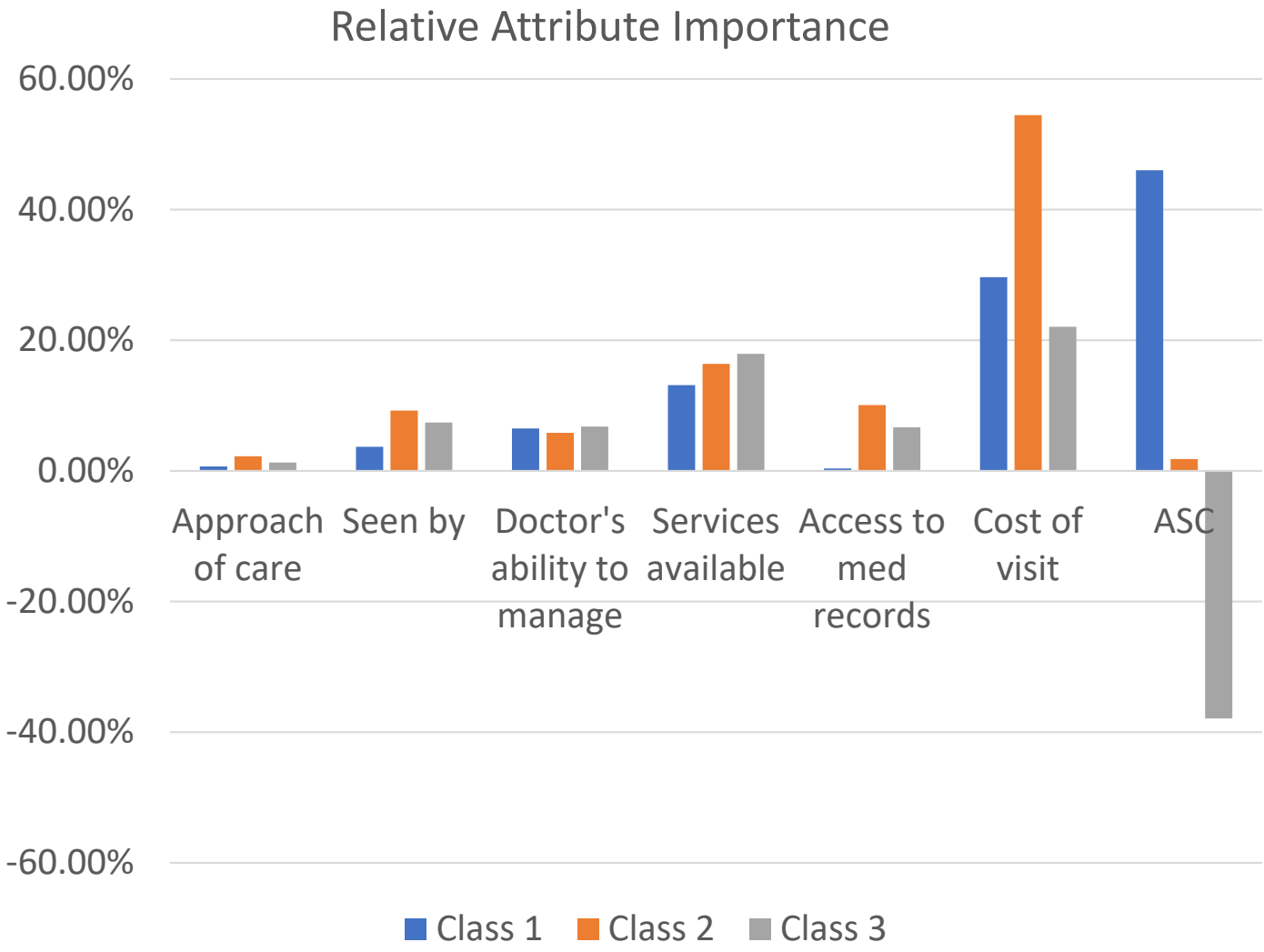


Research Task 4 – Next Steps (USERS)

Who are the individuals in the 3 classes?

To what extent does this high positive/negative weighting of current site of care relate to actual decision-making?

What does this mean for policy?



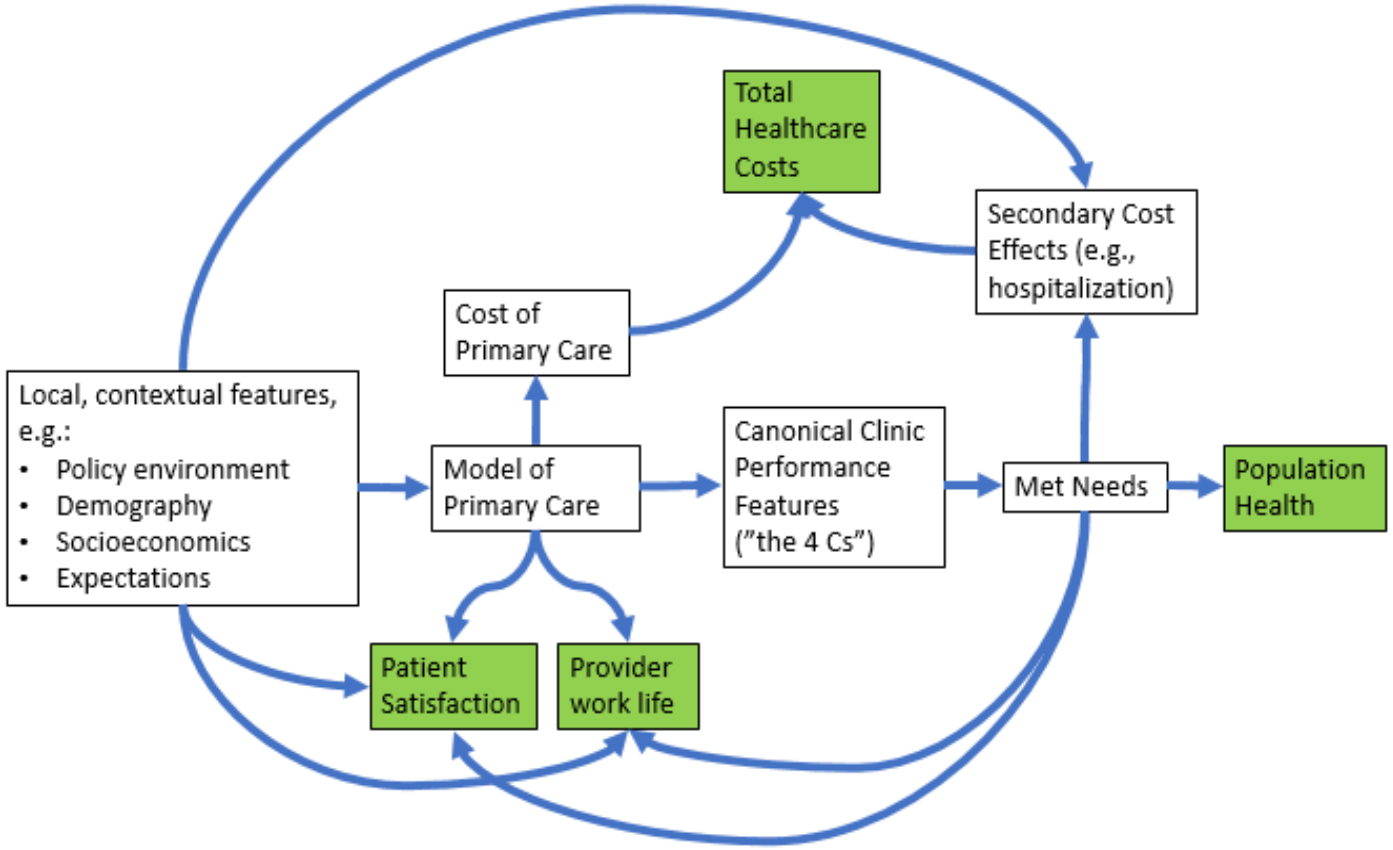
Research Task 5: Modelling the impact of different policy scenarios on outcomes satisfaction and outcomes

Led by: **A/Prof John Ansah**

Duke-NUS Medical School

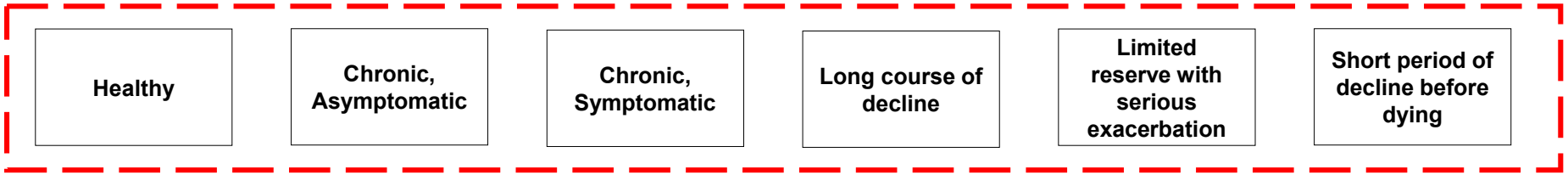
Research Task 5 – Objectives

- Develop an integrated model based on outputs of the literature review, case studies, epidemiological study, choice experiments research tasks to simulate the impacts of investment in enhanced primary care on:
  - Population Health
  - Cost
  - Patient Satisfaction
  - Provider Satisfaction



Research Task 5 – Data Inputs

Foundation 1: Population Health Segments (using Simple Segmentation Tool)



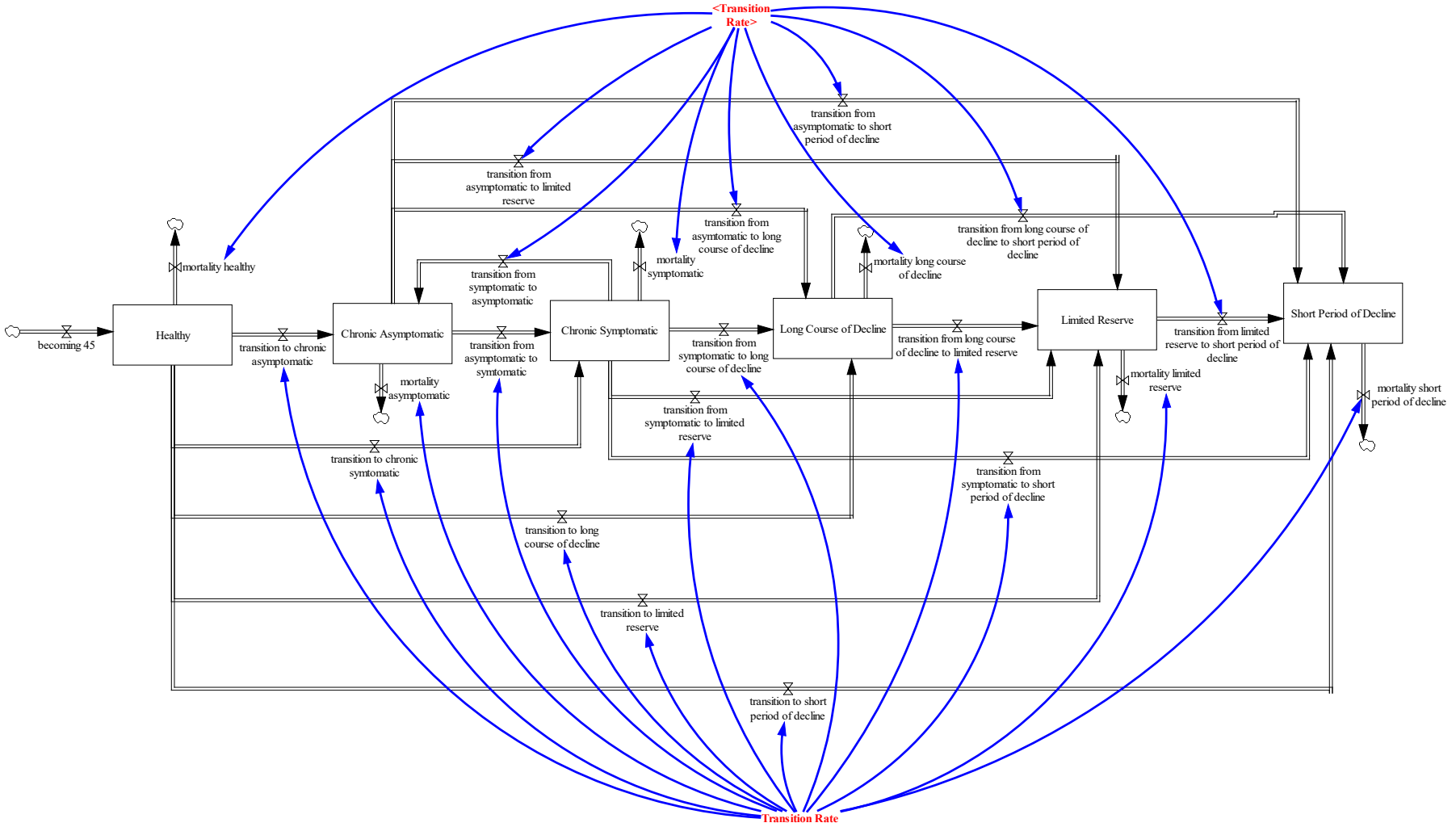
SIGNS (Wave 1&2) and MOH Omnibus dataset will be used to classify population into each health state (segments)
(Data from epidemiological studies, research task 3)

Patient characteristics:

- Age
- Gender
- SES
- Ethnicity
- Complicating features

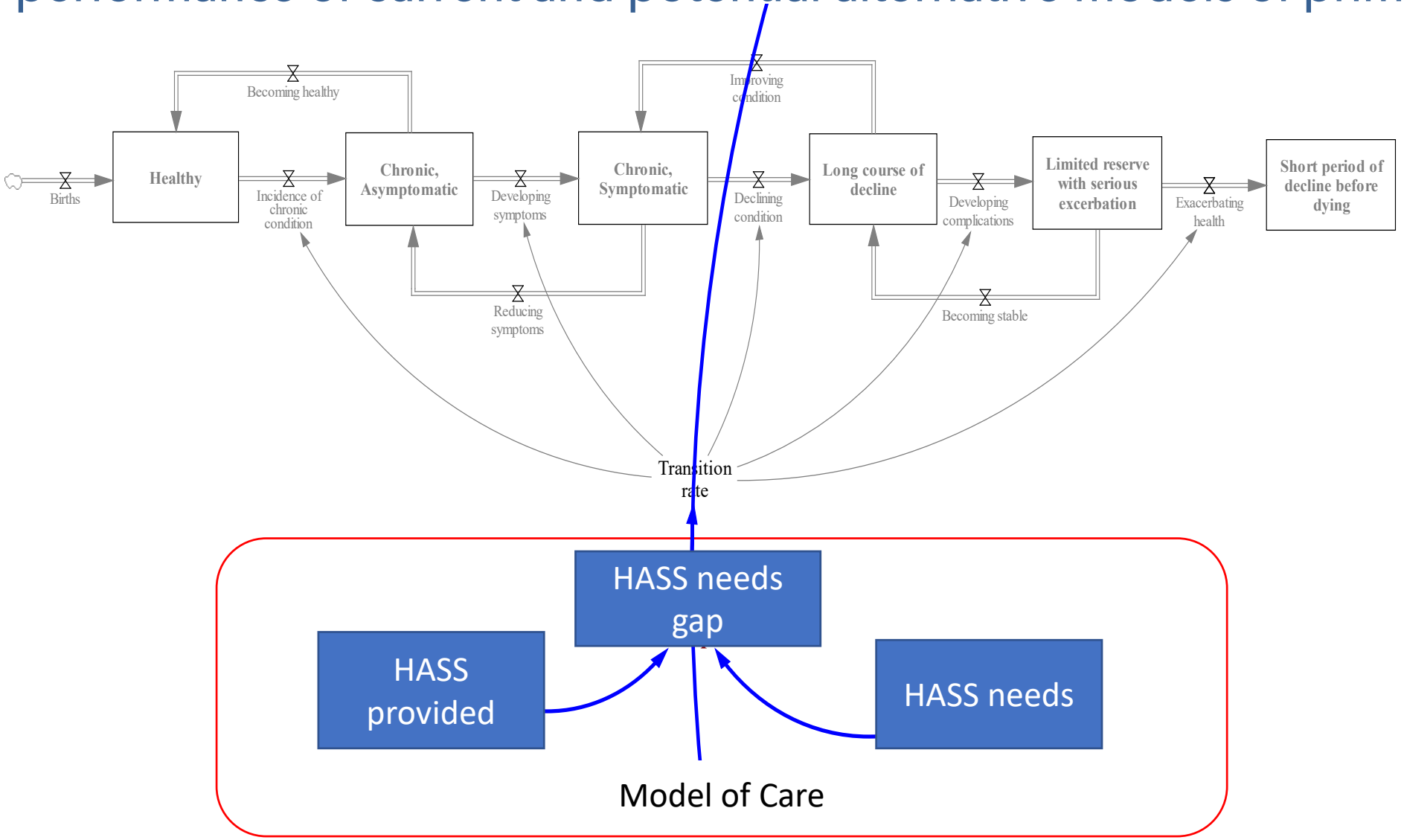
Research Task 5 – Data Inputs

Foundation 2: Transitions across Health Segments



Research Task 5 – Data Inputs

Cost and performance of current and potential alternative models of primary care



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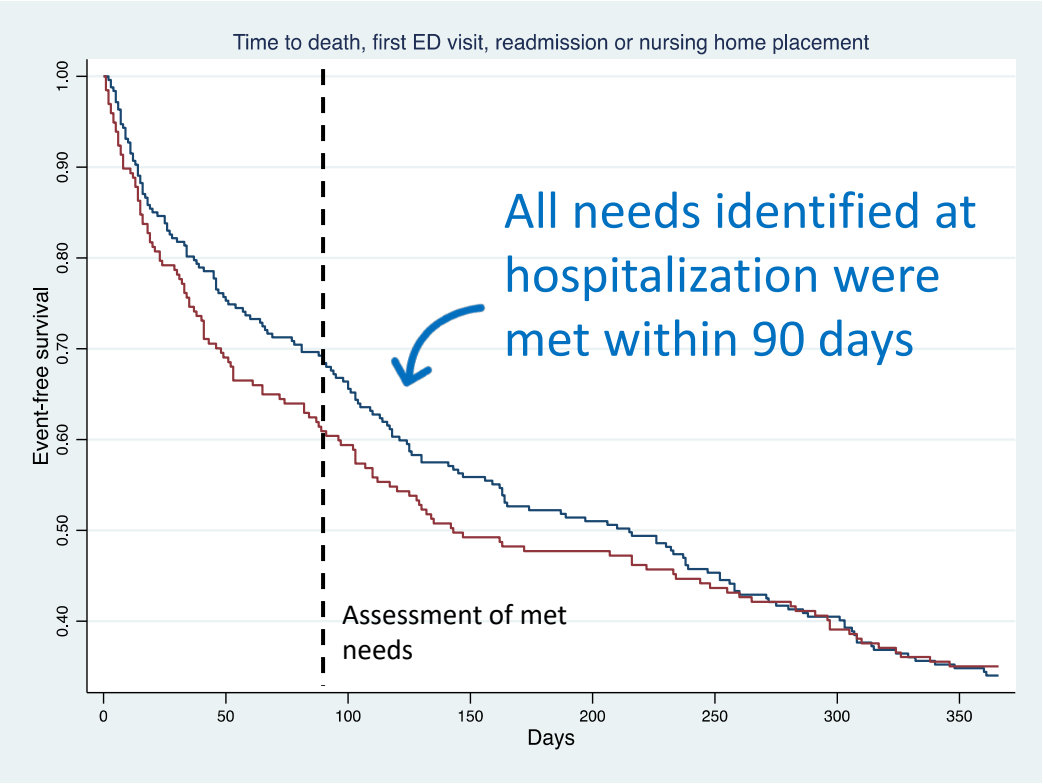
pt_sex						
Female	.8151356	.0764359	-2.18	0.029	.6782848	.9795975
a1_race1						
Malay	.973048	.1450211	-0.18	0.855	.7265624	1.303154
Indian	.9910837	.1373654	-0.06	0.948	.755323	1.300433
Others	2.221409	.7284803	2.43	0.015	1.168123	4.224431
unmetneed_binary						
At least 1 unmet need	.6741461	.1124231	-2.36	0.018	.4861884	.9347674
w0_GI_binary						
GI III-VI	1.357005	.1756087	2.36	0.018	1.053	1.748778
w0_GI_binary#unmetneed_binary						
GI III-VI#At least 1 unmet need	1.465468	.2974529	1.88	0.060	.9844731	2.181467
w0_CF_count	1.15494	.0406419	4.09	0.000	1.077969	1.237408



Estimates of Impact of Enhanced PC: Experts

Assessing cost and performance of current and potential alternative models of primary care

Task 1

- Develop a common understanding amongst the panellists of the characteristics of the current and future enhanced primary care models
  - GPs
  - Polyclinics
  - Enhanced Polyclinics
  - Enhanced GP 1.0

Task 2

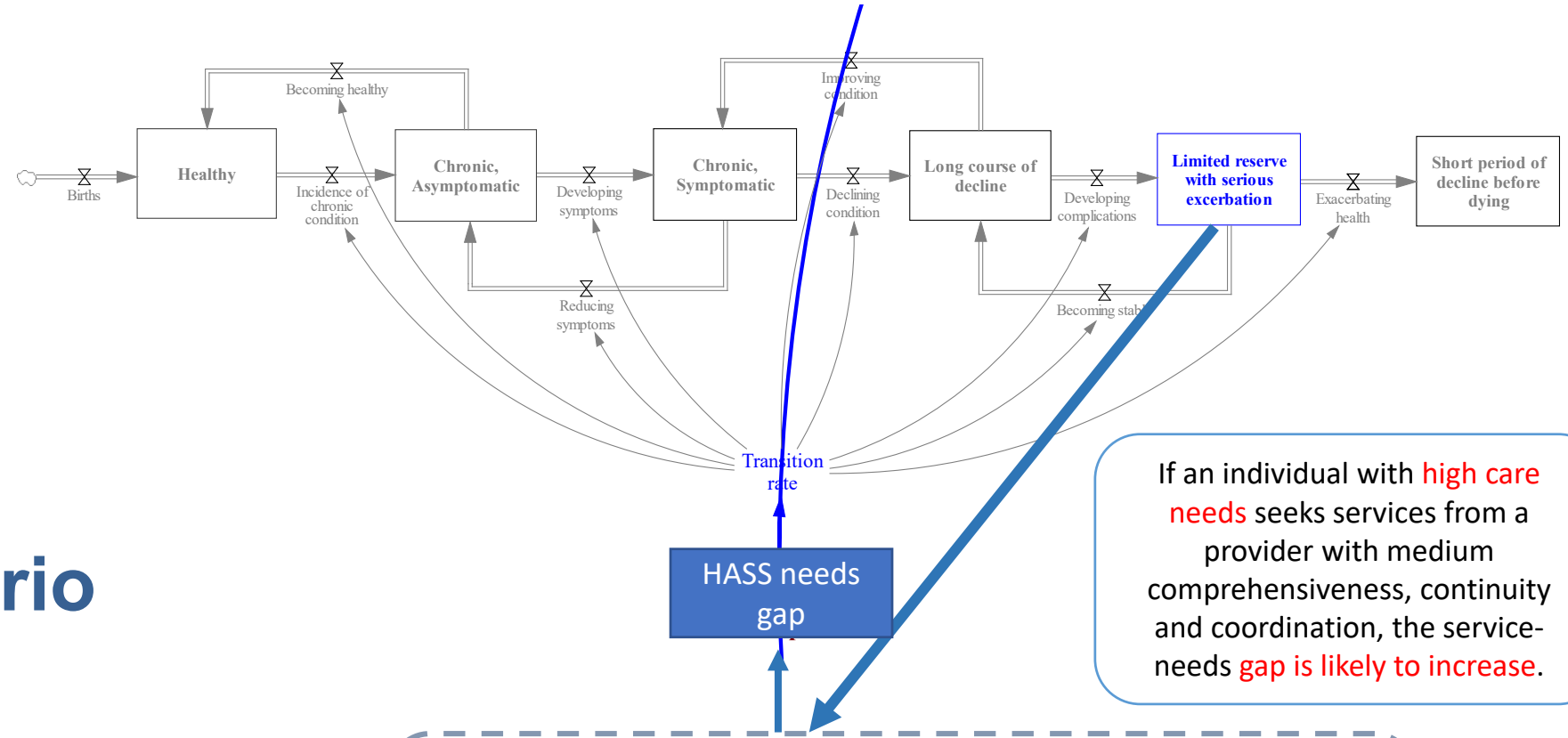
- Evaluate each primary care model on the 4 dimensions proposed by Starfield:
  - First-contact,
  - Comprehensiveness,
  - Coordination
  - Continuity.

Task 3

- Estimate the relative change for future vs. current primary care models in:
  - Rate of progression of patients to worse health states
  - Use of services including primary care, specialty care, ED services, and acute hospital.

Research Task 5 – Models

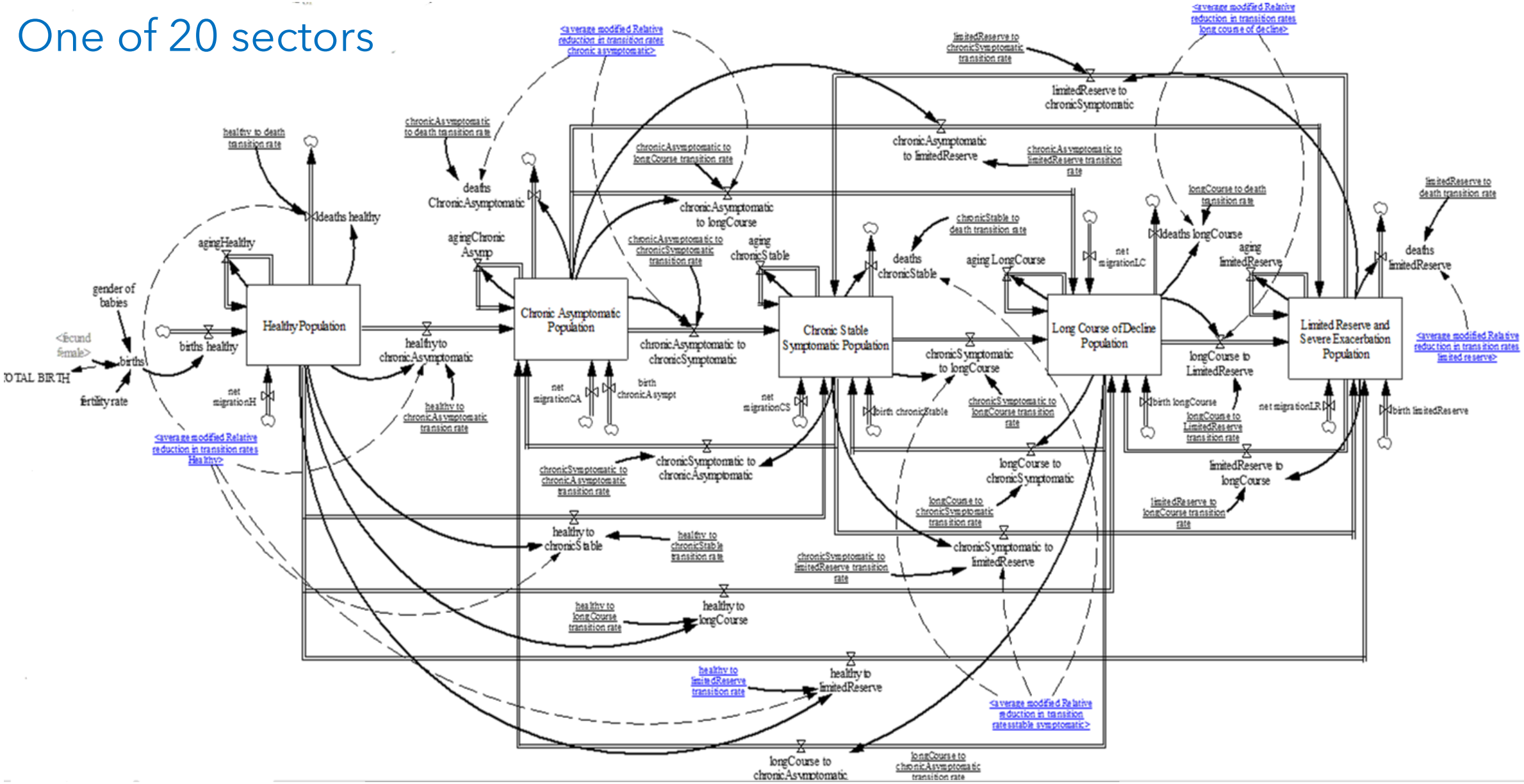
Scenario



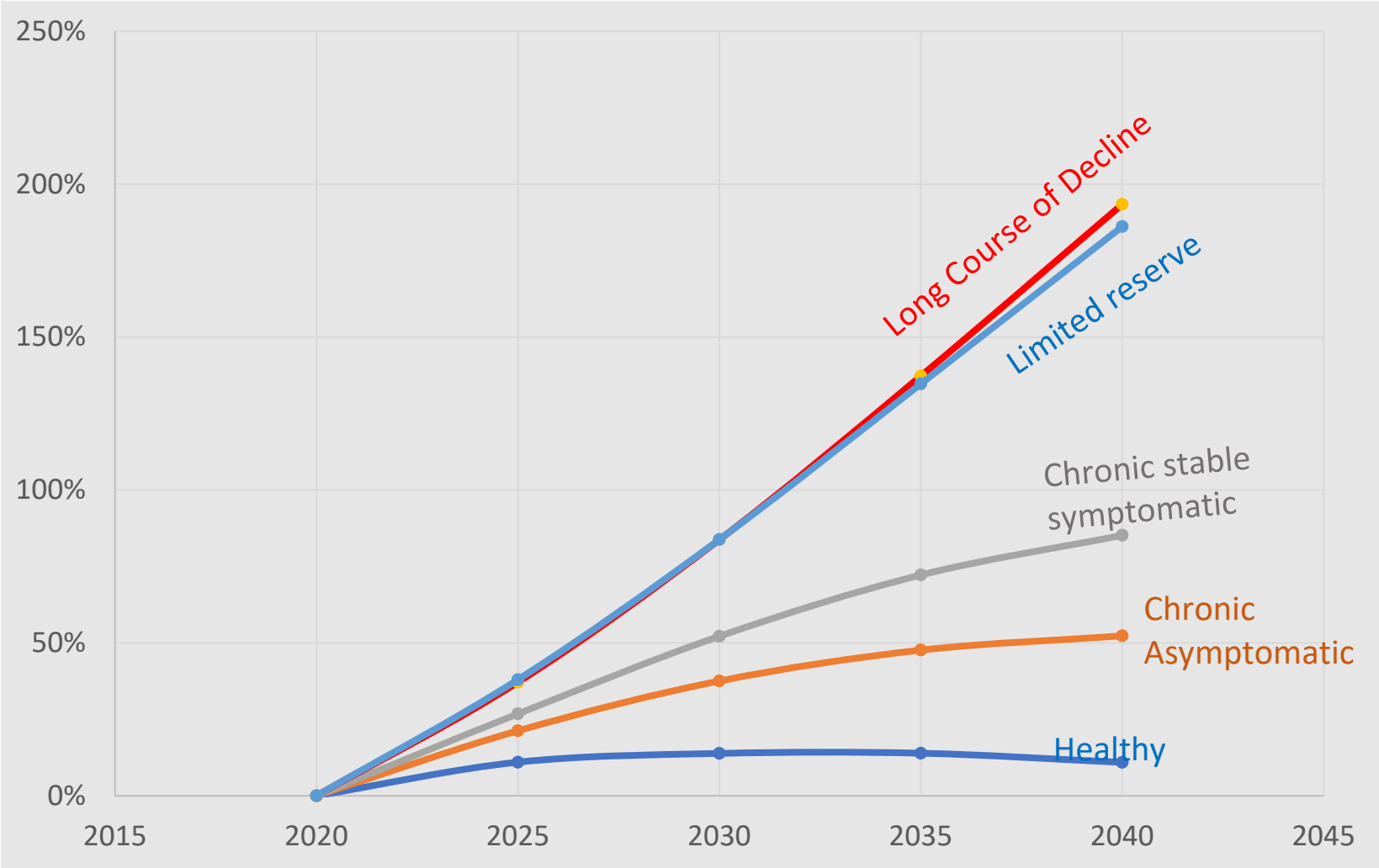
If an individual with high care needs seeks services from a provider with medium comprehensiveness, continuity and coordination, the service-needs gap is likely to increase.

Research Task 5 – The Core (Population) Model

One of 20 sectors



Population of older Singaporeans by Health State



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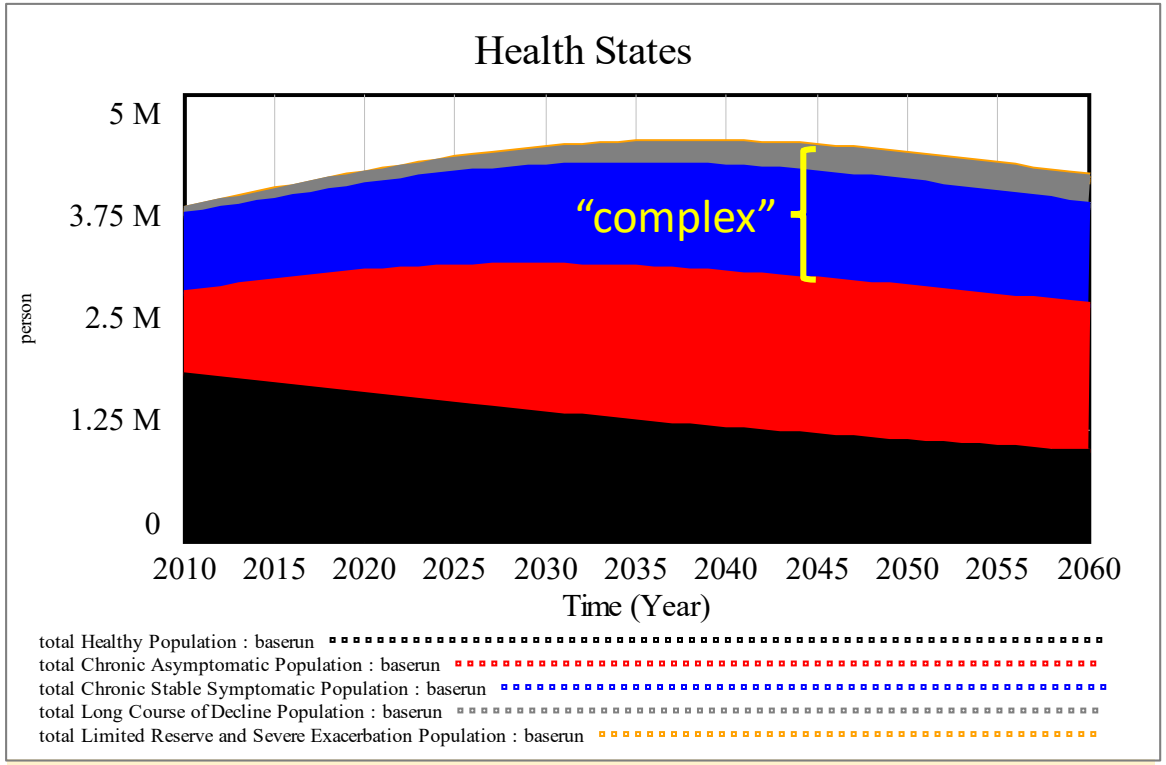
Four scenarios are evaluated with respect to a "base case", using the work-in-progress model

Policy switches

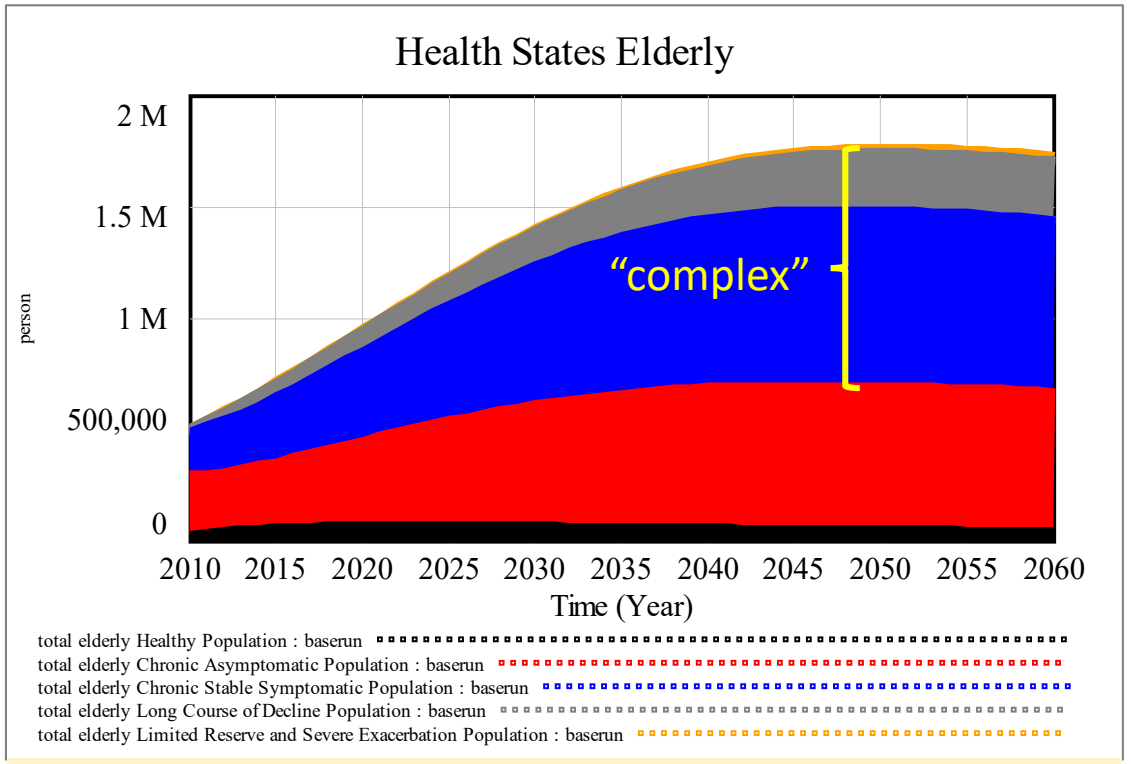
1. **Base case** scenario: current pattern of primary care use
2. **Complex** patients are provided enhanced primary care
3. **All** primary care becomes enhanced primary care
4. **All** primary care becomes enhanced primary care, and **all non-users** of primary care become users

Base case: current pattern of primary care use

Distribution of medical needs over time



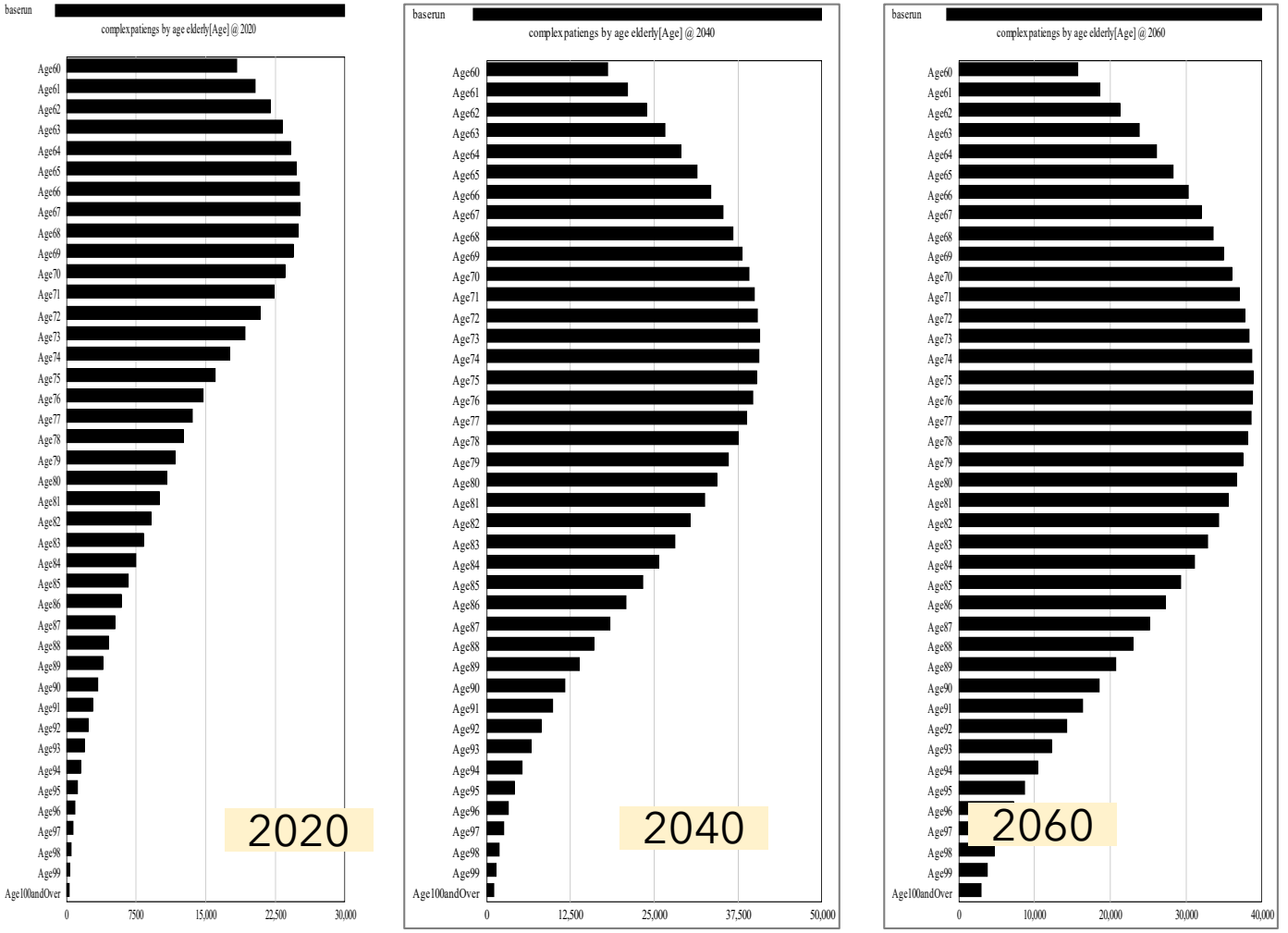
Resident population by health state

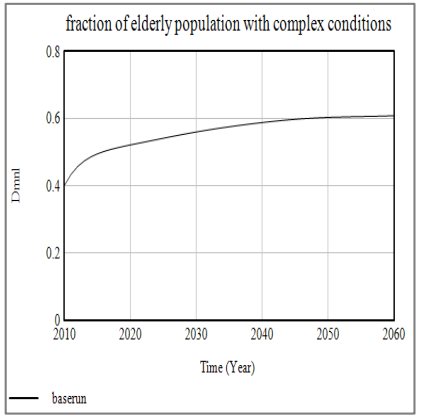


Elderly resident population by health state

Base case: current pattern of primary care use

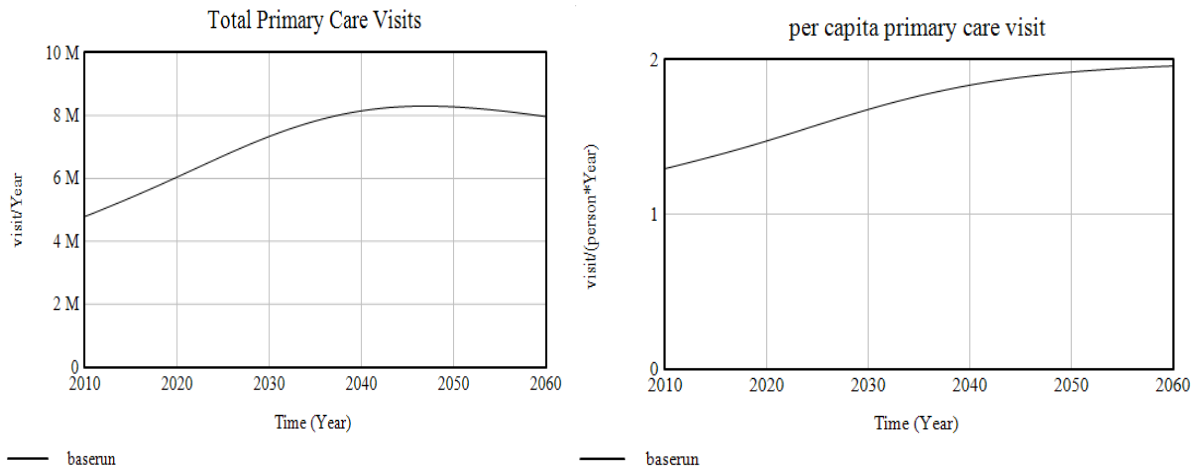
Number of medically complex elderly

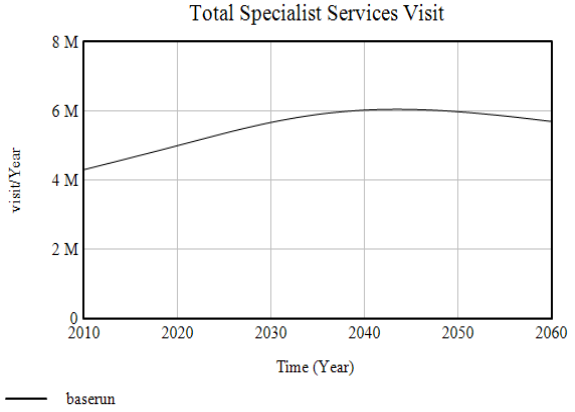


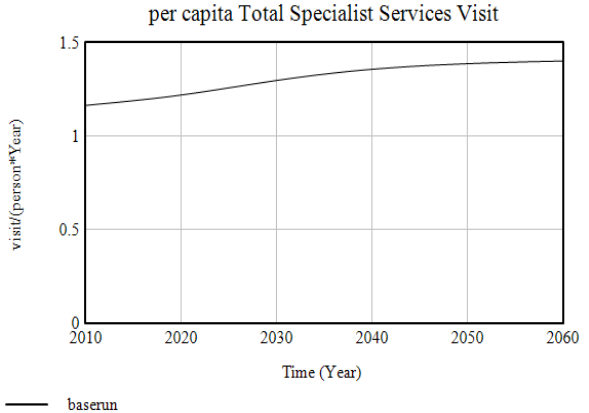


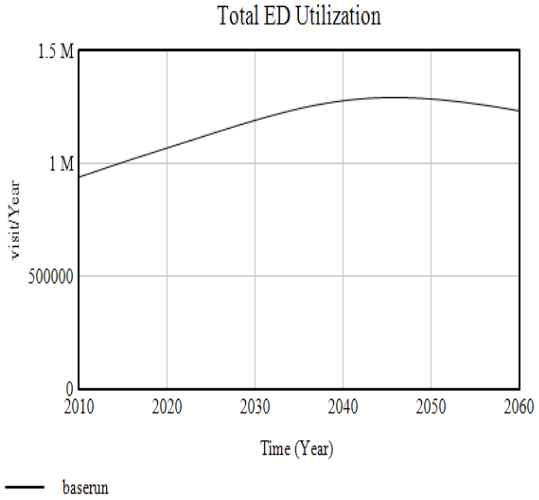
Base case: current pattern of primary care use

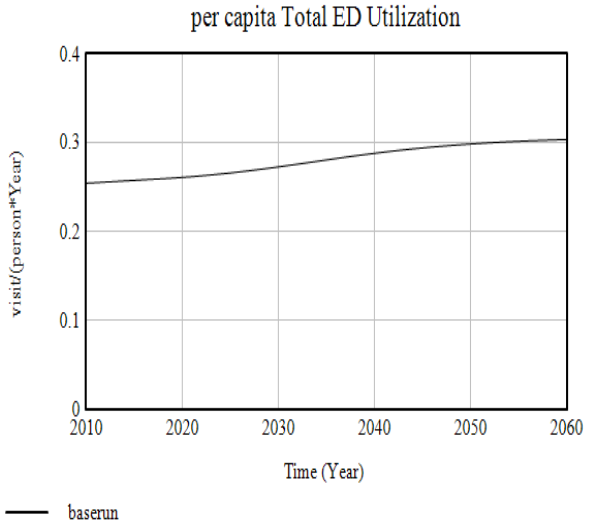
Use of medical services

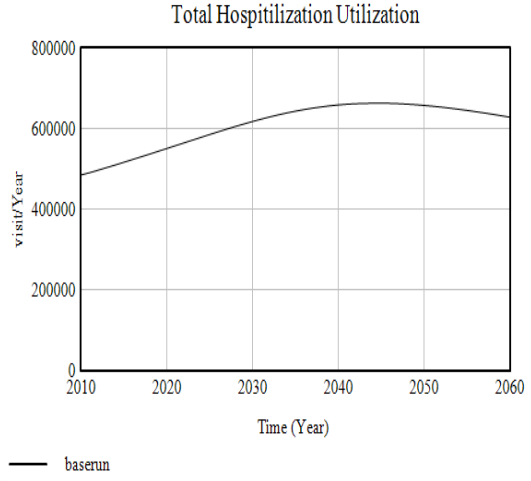


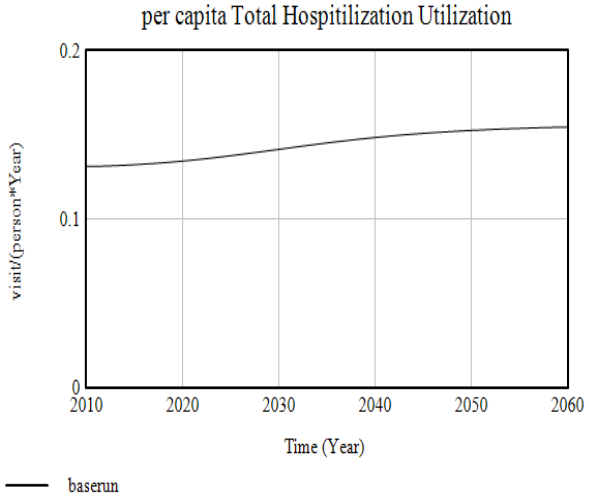






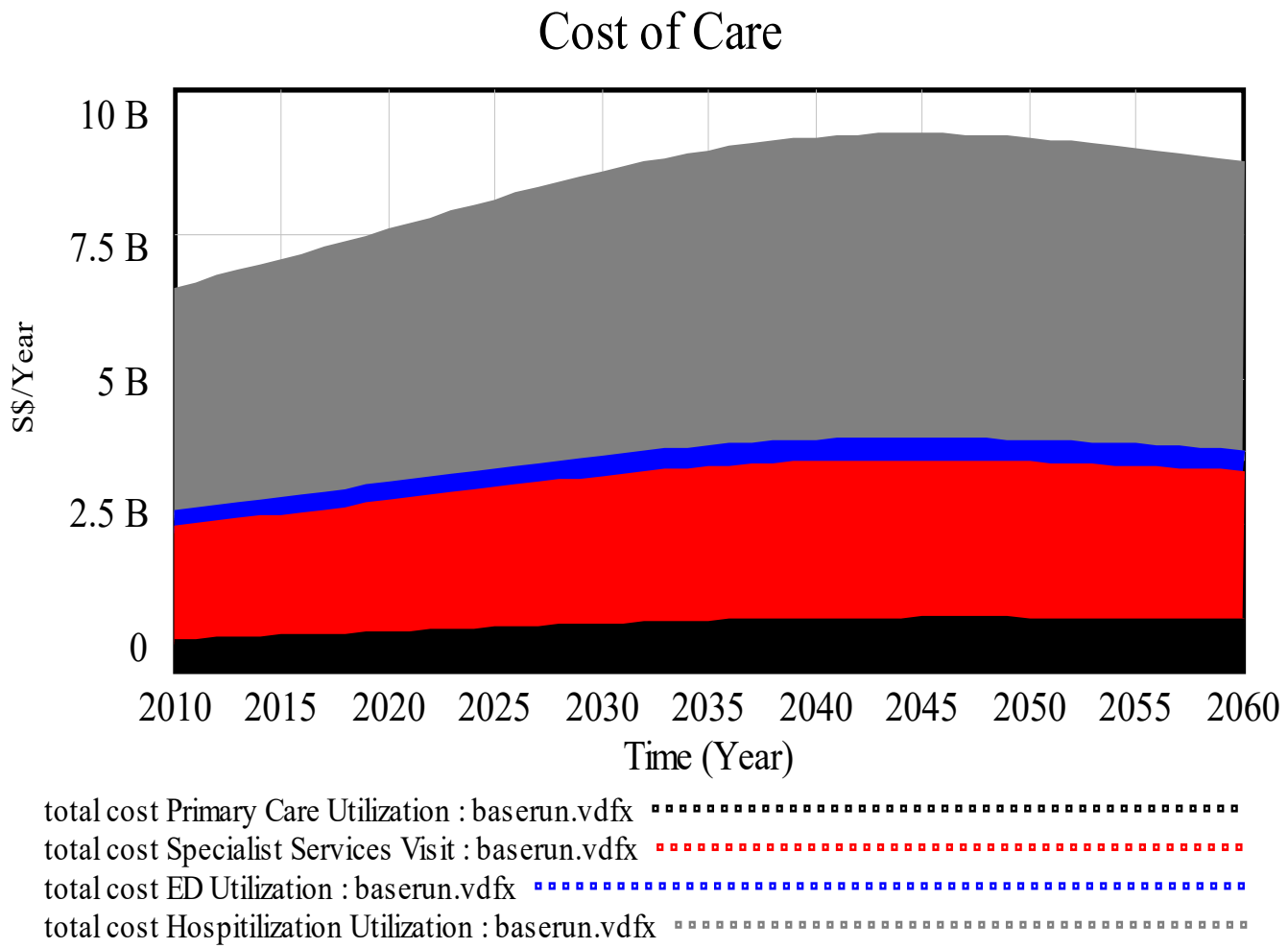






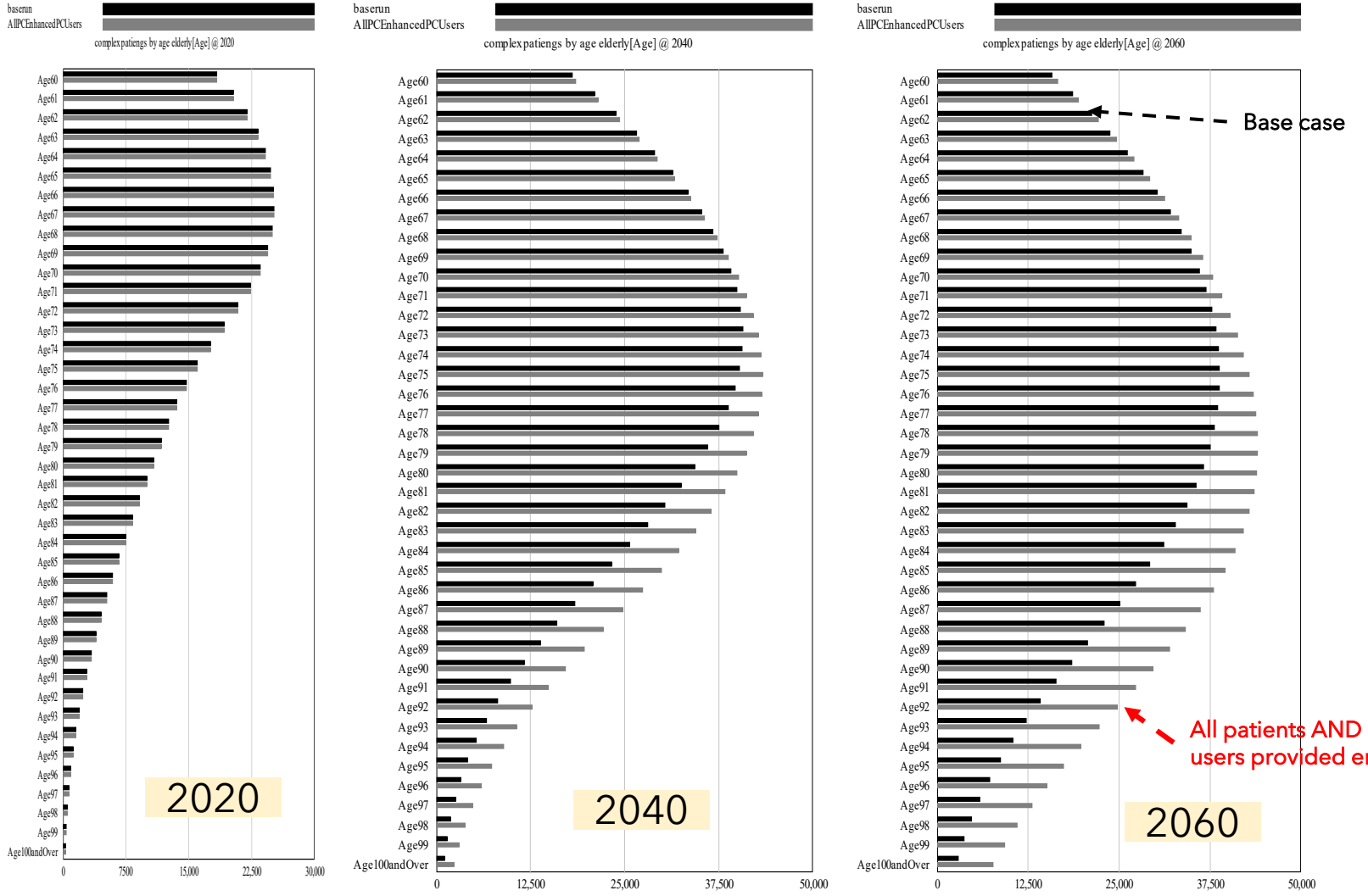
Base case: current pattern of primary care use

Cost of care

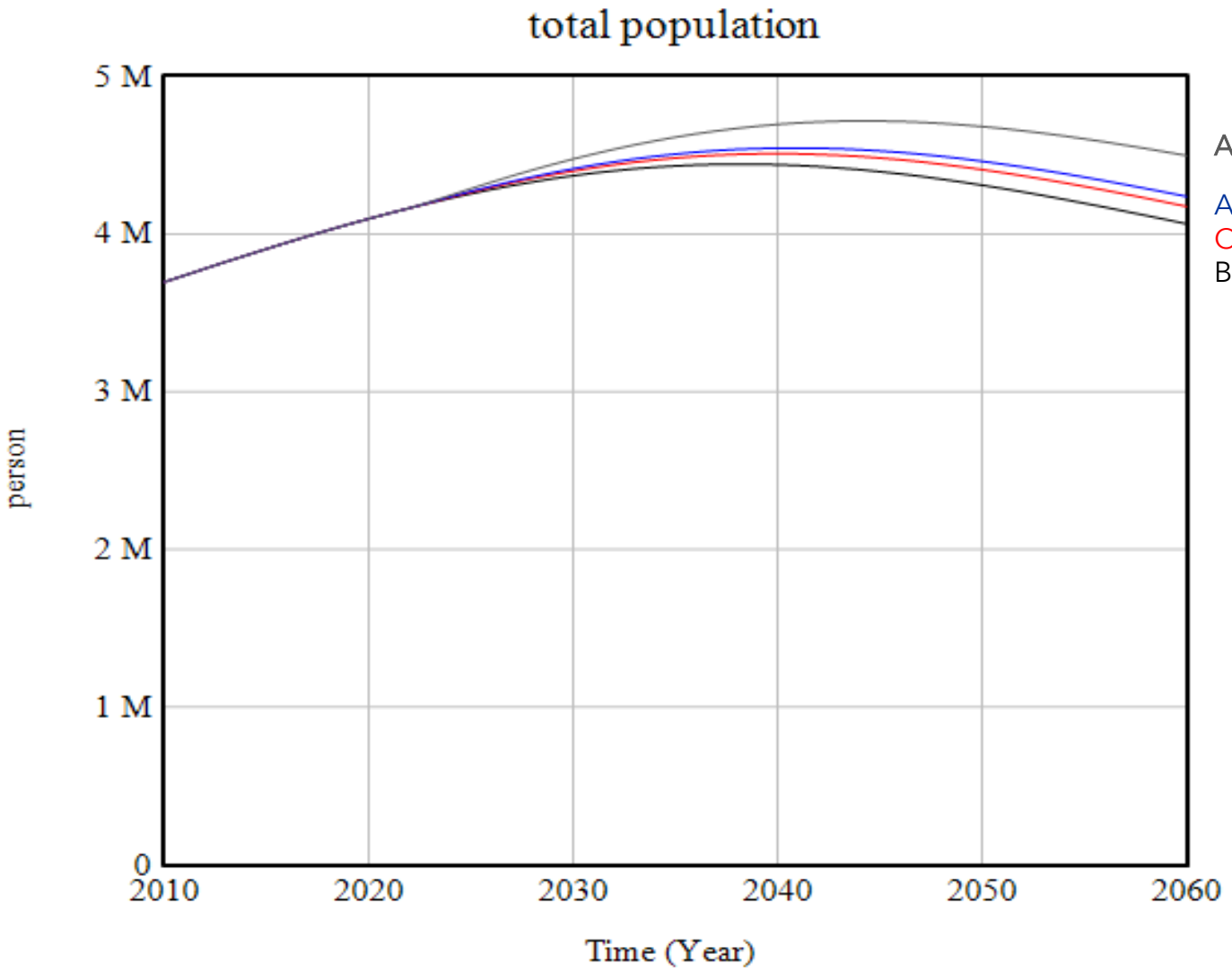


Extreme scenarios compared (base case vs everyone in enhanced primary care)

Number of medically complex elderly



All scenarios: Total Singapore population to 2060



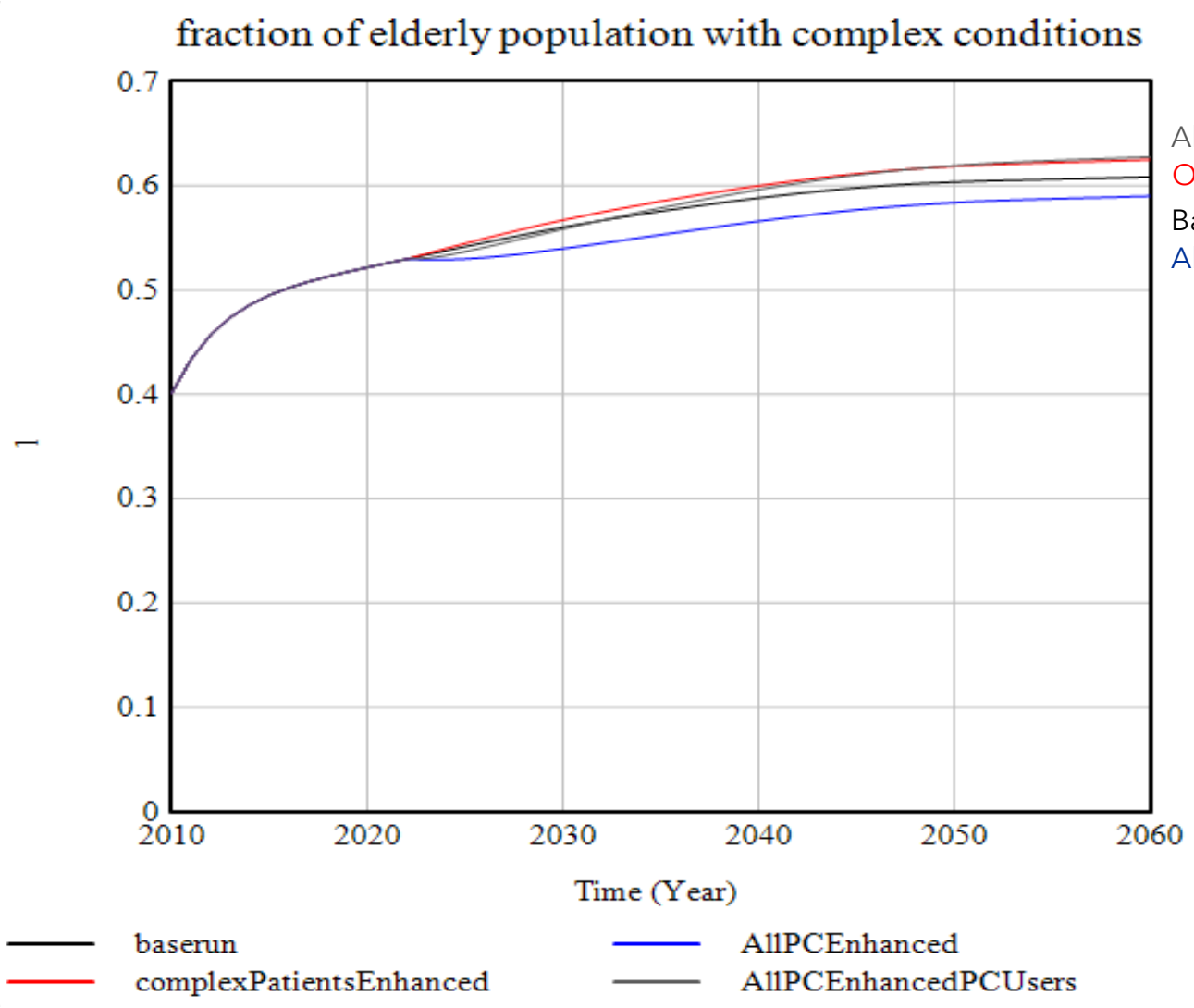
All patients AND current non-users provided enhanced PC

All patients are provided enhanced PC

Only complex patients are provided enhanced PC

Base case

All scenarios: Fraction of elderly with complex medical needs



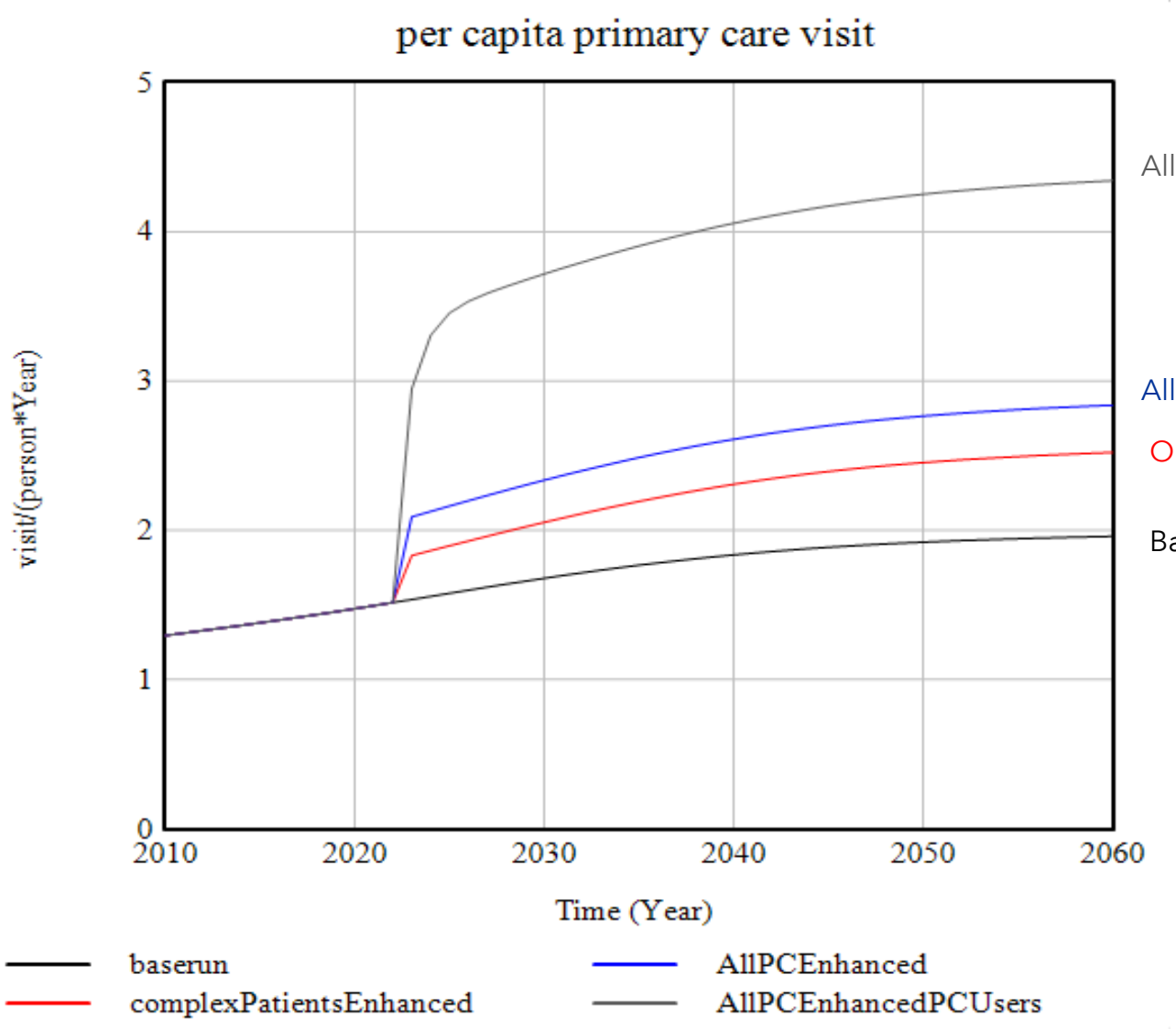
All patients AND current non-users provided enhanced PC

Only complex patients are provided enhanced PC

Base case

All patients are provided enhanced PC

All scenarios: per capita primary care visits



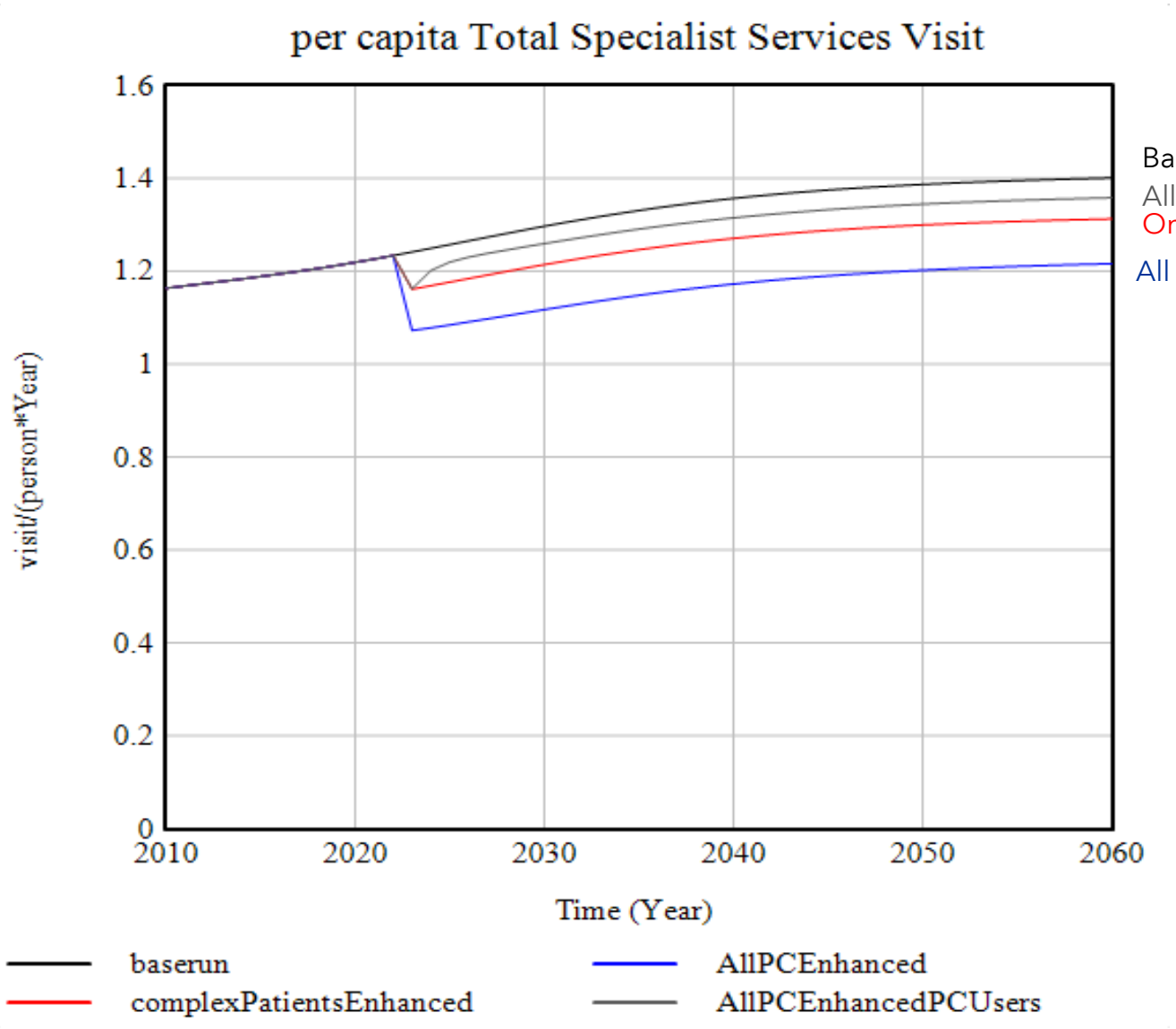
All patients AND current non-users provided enhanced PC

All patients are provided enhanced PC

Only complex patients are provided enhanced PC

Base case

All scenarios: per capita specialist visits



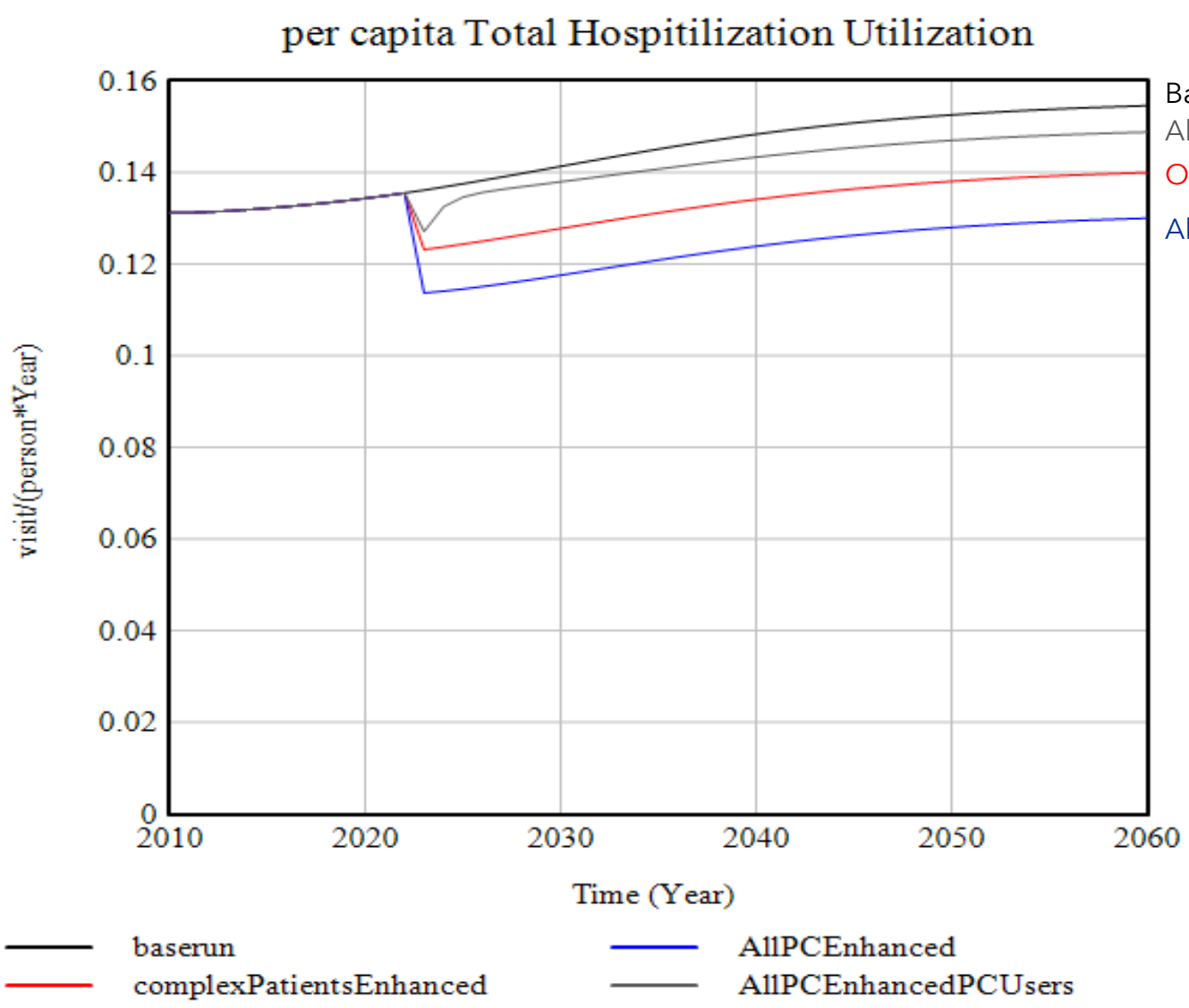
Base case

All patients AND current non-users provided enhanced PC

Only complex patients are provided enhanced PC

All patients are provided enhanced PC

All scenarios: per capita hospital utilization



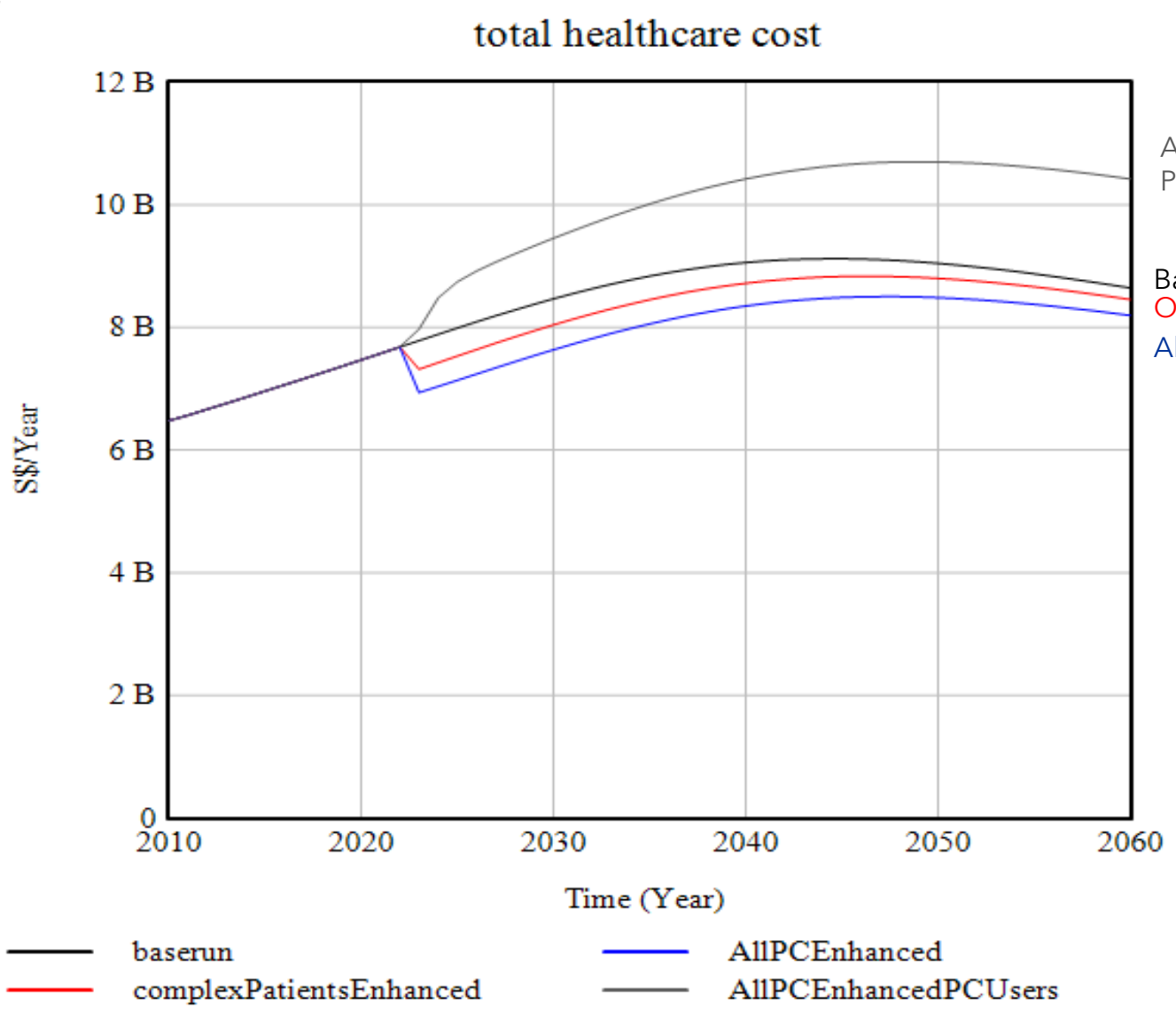
Base case

All patients AND current non-users provided enhanced PC

Only complex patients are provided enhanced PC

All patients are provided enhanced PC

All scenarios: Total health system cost



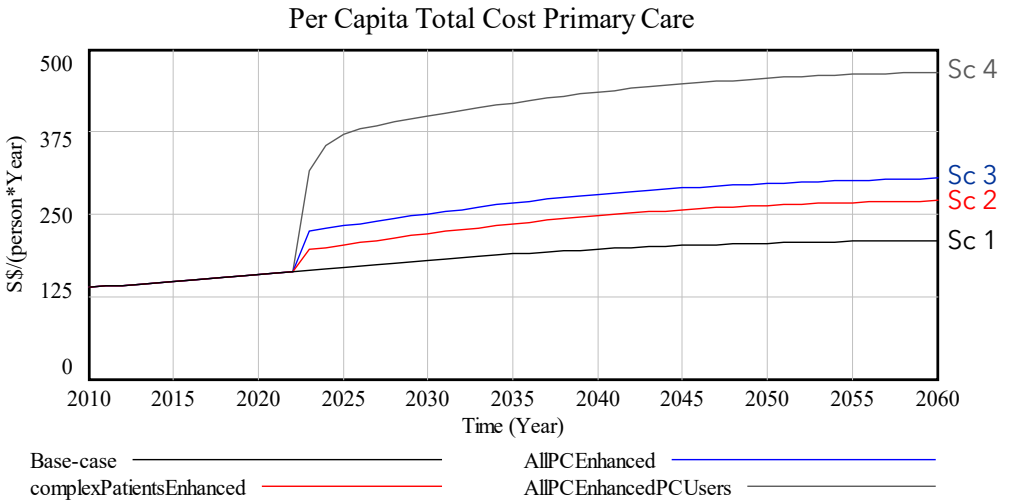
All patients AND current non-users provided enhanced PC

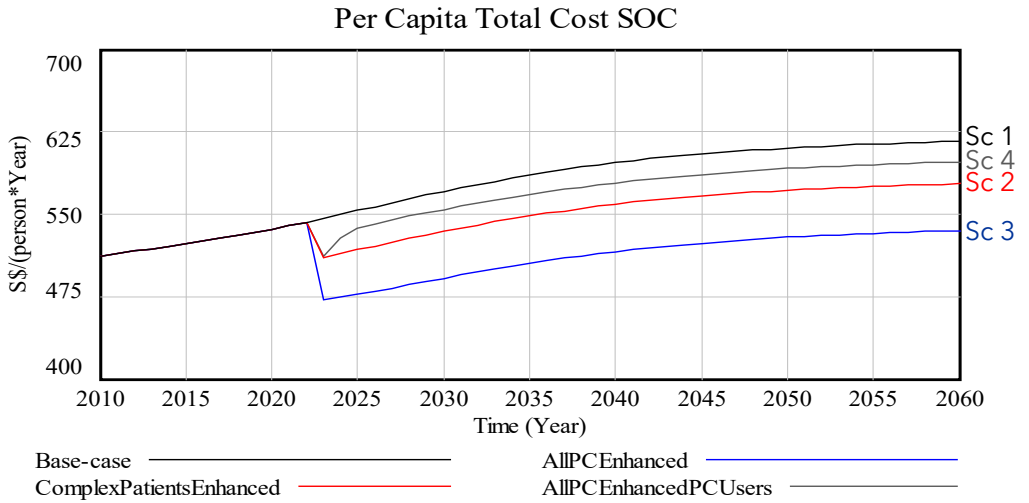
Base case

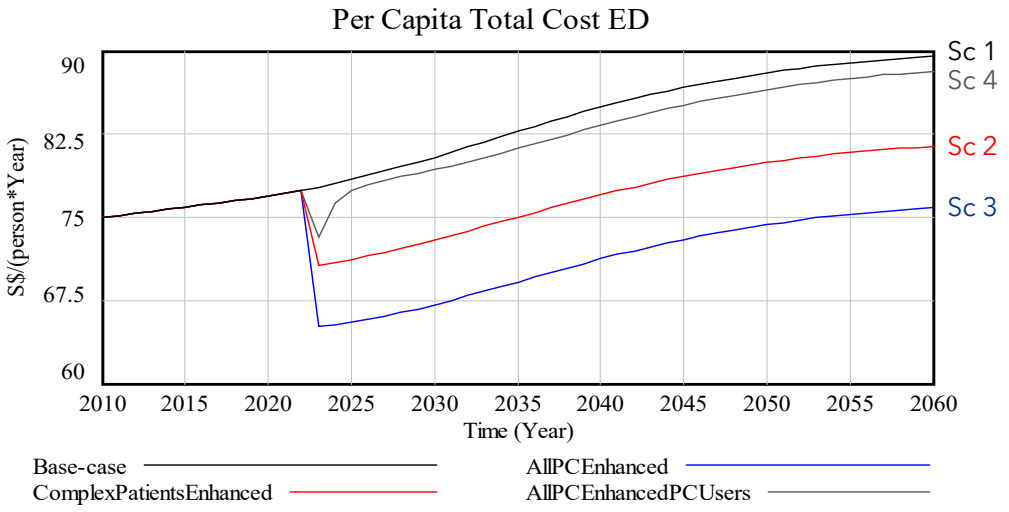
Only complex patients are provided enhanced PC

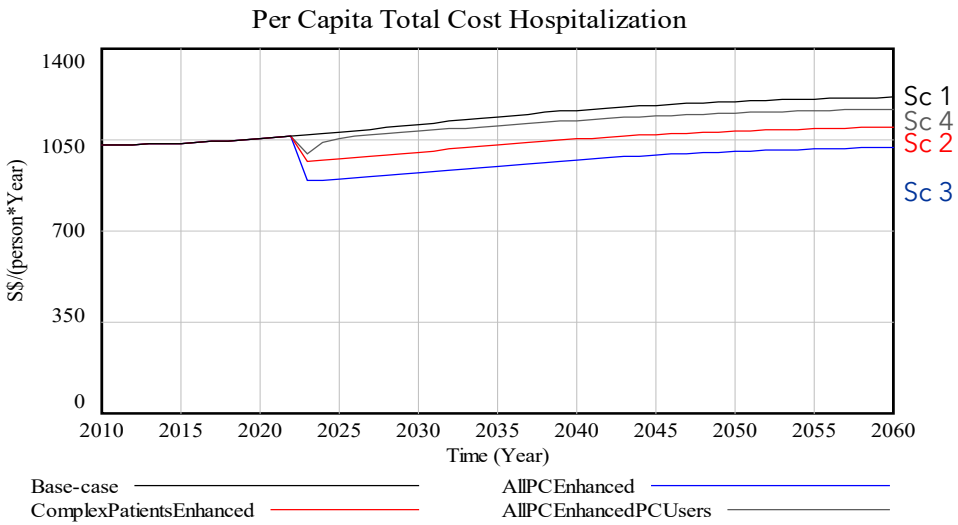
All patients are provided enhanced PC

All scenarios: per capita cost









Value of the EPC Project to Primary Care Planning?

- Can provide insights into the impact of proposed changes
- Modeling can provide a "counterfactual": to track performance of new programs vs. projections
- Offers a flexible framework:
  - A "cause and effect" model of the relationship between policy and health system performance that makes clinical sense (face valid)
  - Can contribute to prioritizing where accurate data are crucial to informed decision making

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Signing off… Questions?

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