Envisioning enhanced primary care in Singapore: a group model building approach

2nd Asia-Pacific Region System Dynamics Conference

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Why is chronic care an issue?

The chronic care "problem" is an episodic acute disease oriented system meeting a rapidly expanding long-lived population

- People are living longer with chronic conditions
- Many chronic conditions are unmanaged
- Unmanaged chronic conditions become complex
- This dynamic exacerbates system stress
  - ↑use of acute services (triply undesirable)
  - Inefficiencies due to service mismatch: PCPs making referrals to specialists, specialists trying to provide primary care

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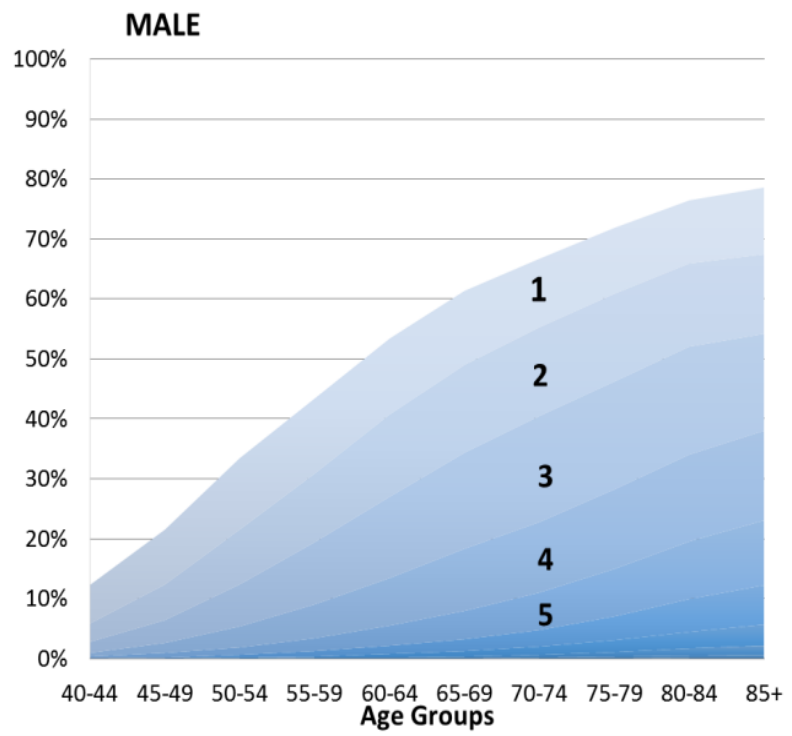
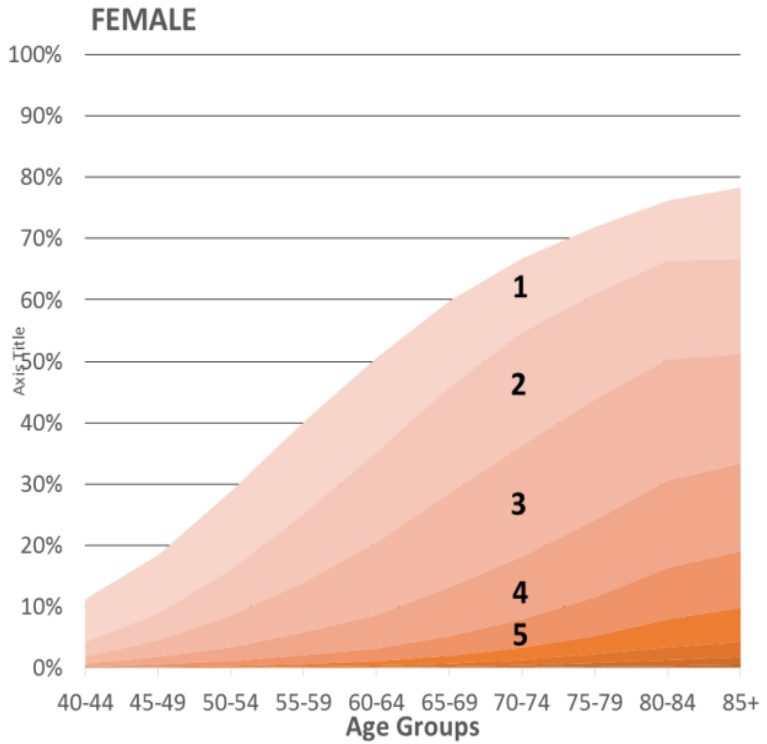
Proportion with Multiple Chronic Conditions





People are living longer with chronic conditions

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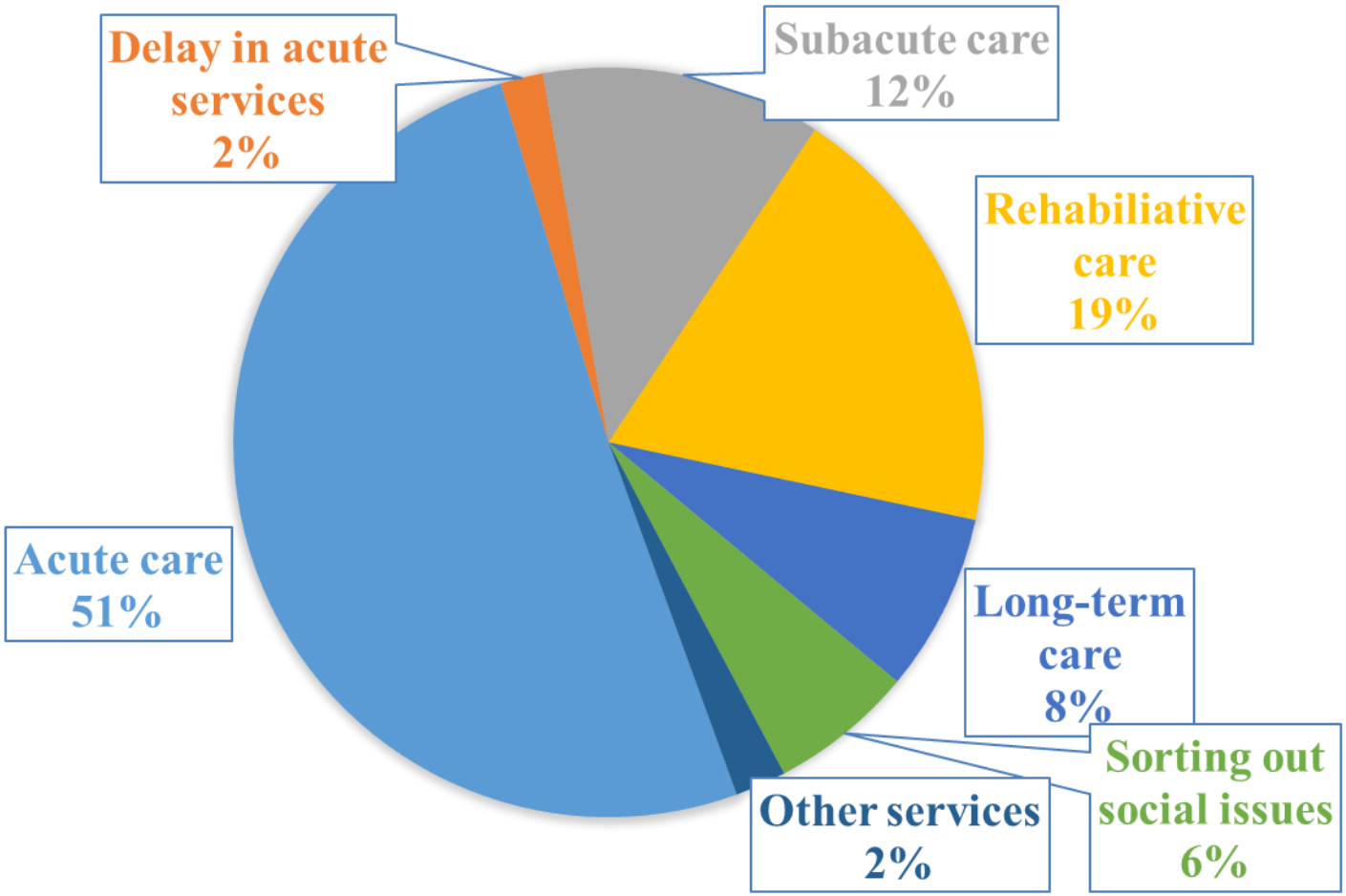
Service mismatch: Many beds filled with people not needing acute care



Based on reviewing case notes of Geriatrics ward in an acute hospital in Singapore

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Enhancing Chronic Care in Singapore

- An effective primary care system is key to successful chronic disease management
  - Coordination of health needs across the various medical and health-related social services
  - Accessible, affordable and patient-centric
  - Education and illness prevention
- However, Singapore's health system poses unique challenges
  - Multiple stakeholders with competing interests
  - Constraints on number and training of providers
  - Limited interface between public and private sector health services

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Primary Care in Singapore

Polyclinics

- 18 polyclinics
- Attends to 45% of chronic patients
- Payment is combination of out-of-pocket, Medisave payment and subsidies
- Provides comprehensive range of services—outpatient medical care, health screening, education and vaccinations, x-ray and laboratory services
- Patients assigned any available doctor from a common group of medical officers and family physician

Private GP Clinics

- ~1,500 private GP clinics
- Attends to 55% of chronic patients
- Payment is usually on a fee-for-service basis and Medisave payment and subsidies not always available
- Usually do not possess on-site facilities
- Service provision is heterogenous—some offer aesthetic medicine
- Patient sees the same solo physician

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Primary Care Roundtable 2015

- 50 stakeholders with interests in chronic care
  - GPs, polyclinic doctors, medical educators, representatives from hospitals and ministries, as well as health services researchers
- Group model building (GMB) exercise
  - Presentations of perspectives
  - Preliminary model
  - Insights
- Subsequent integration of results into a more detailed model, capturing key dynamics

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Presentation of perspectives

- Public primary care providers
  - “Bailing water from a leaky boat”
- Private primary care providers
  - “Many willing but what’s the business case?”
- Government
  - “Ready to support major innovation”
- International experts
  - “Enhanced chronic care works but the devil’s in the details”

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Consensus: The "quadruple aim"

- A health system consists of multiple sectors: acute and chronic, generalist and specialist, public and private, and so on. This manifold enterprise is intended to produce a mix of services that maximizes the health of the population (effectiveness), while maintaining sustainable costs (efficiency) and a high level of patient and provider satisfaction. An optimal mix of these features is the so-called "quadruple aim" of health care.

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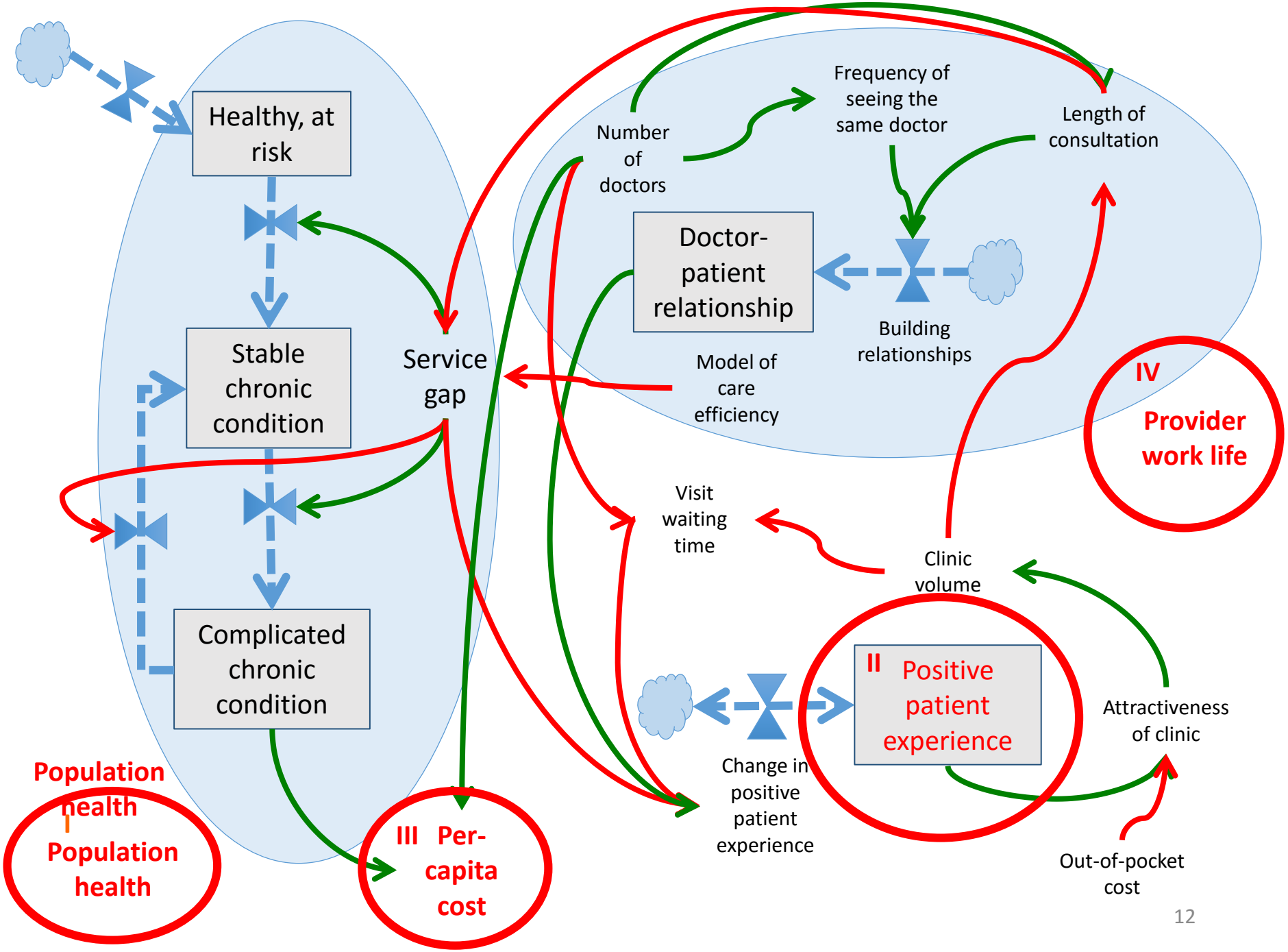
Consensus: The level of analysis = "needs segments"

- A framework for planning, implementing, and evaluating health and health-related social services to optimize population health
- Objective of our efforts = meeting the needs
  - "Need" = health and social features that increase risk for bad outcomes, and risk can be alleviated by providing specific services

Segments and typical needs

I. Healthy, at risk
II. Stable chronic conditions(s)
III. Complex chronic conditions
    I. Long course of decline
    II. Limited reserve and serious exacerbations

- Physician-level services & procedures
- Patient self-management & education
- Home services (non-medical)
- Befriending services
- Care coordination
- Medication adherence
- Caregiver support & education
- Day care
- Skilled nursing services
- Monitoring of symptoms, signs, and biomarkers and prompt follow-up
- Hospice care (palliative care)


Healthy, at risk
Stable chronic condition
Complicated chronic condition
Service gap
Number of doctors
Frequency of seeing the same doctor
Length of consultation
Doctor-patient relationship
Building relationships
Model of care efficiency
IV Provider work life
Visit waiting time
Clinic volume
II Positive patient experience
Change in positive patient experience
Attractiveness of clinic
Out-of-pocket cost
Population health
Population health
III Per-capita cost

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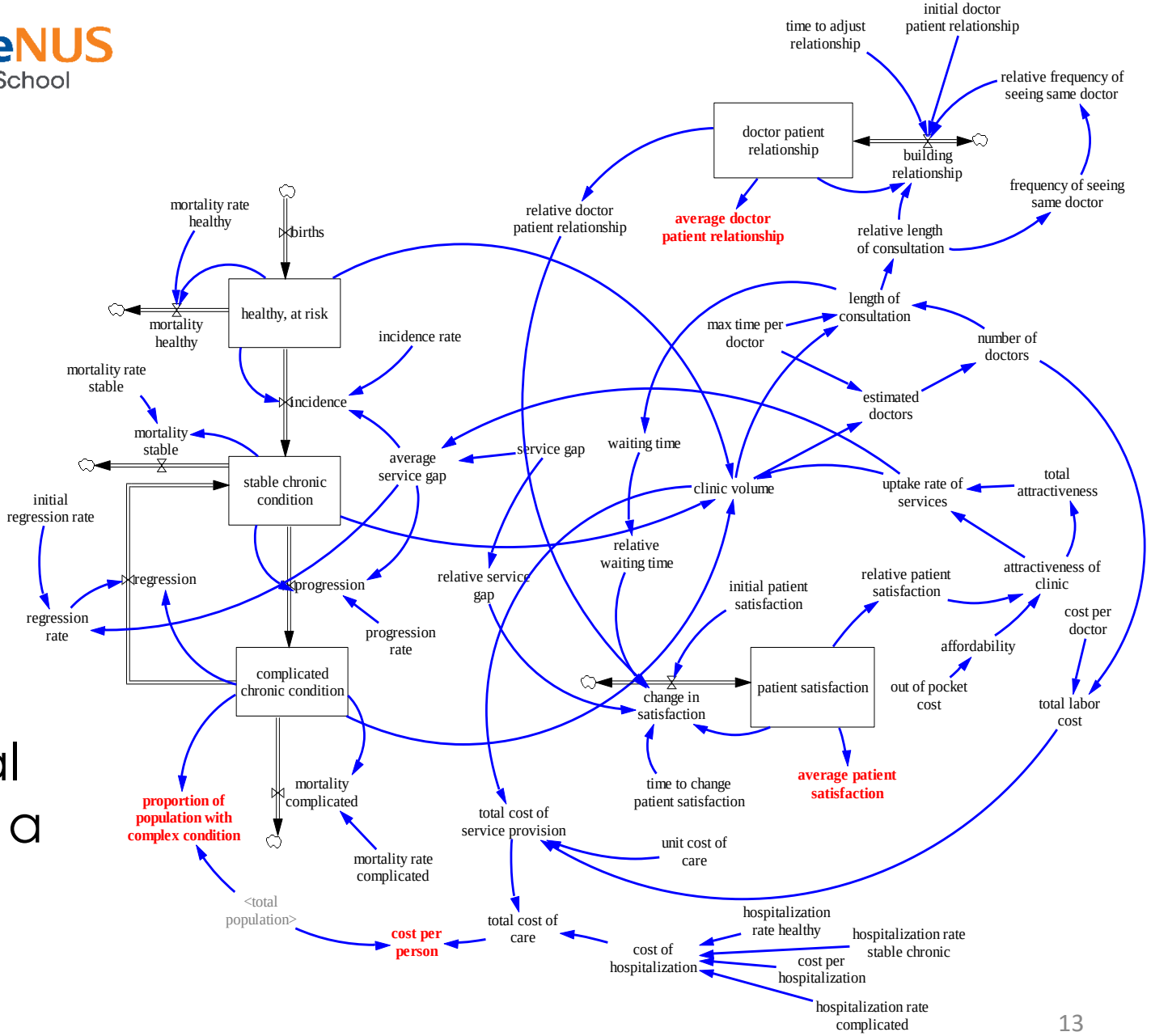
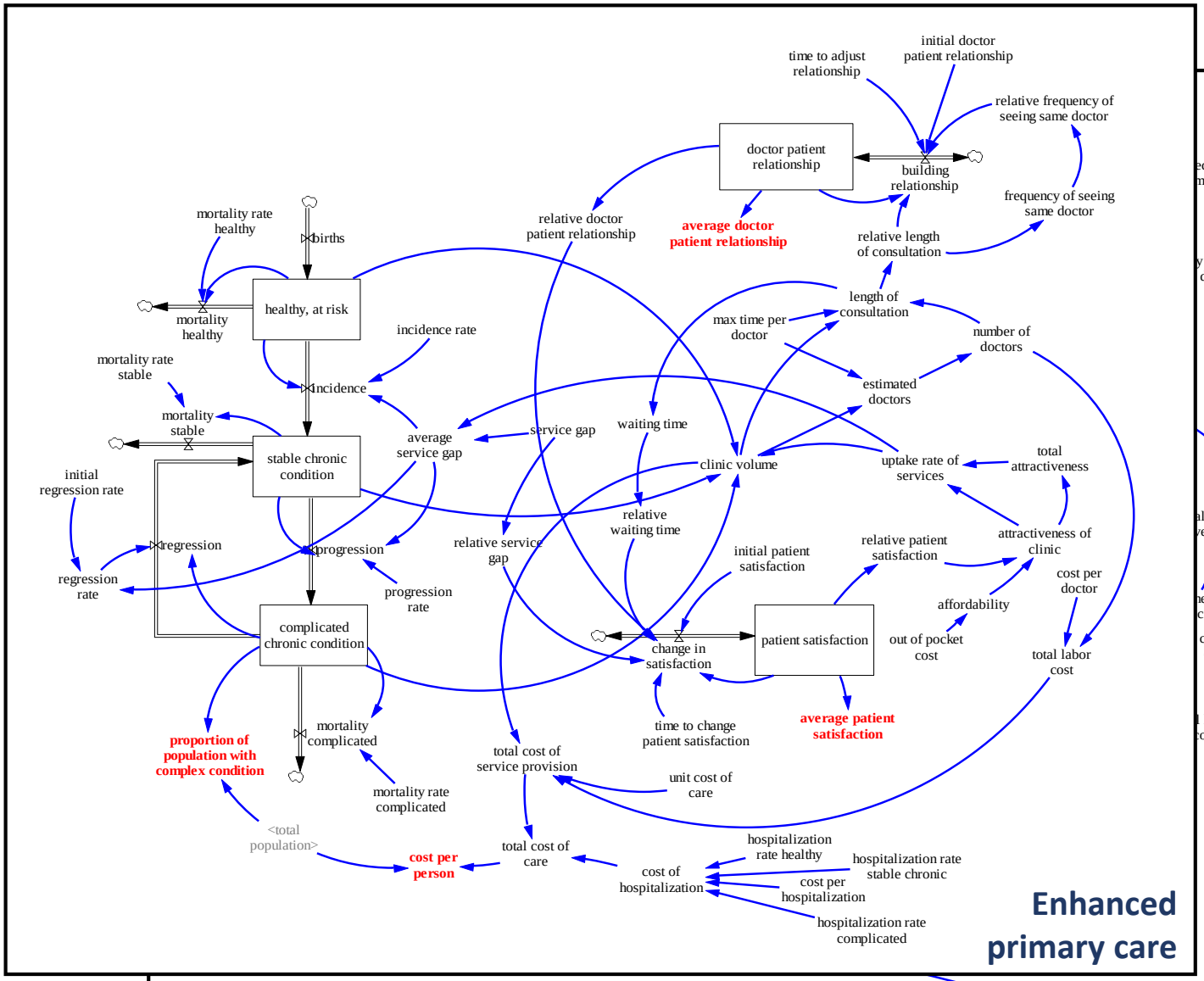
Translating the conceptual model into a dynamic simulation model



Interaction between care venues



Enhanced primary care

Normal Primary care

Policy experimentation

- Equilibrium
  - Effectiveness of normal and enhanced primary care
  - Out-of-pocket costs
  - Number of doctors
- Effective enhanced primary care
  - Service gap in enhanced primary care reduced from 0.5 to 0.1 at time 5
  - Service gap in normal primary care remained at 0.5

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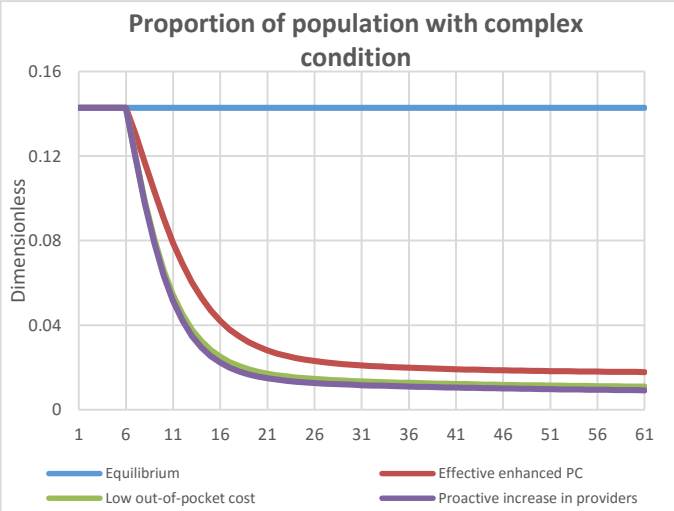
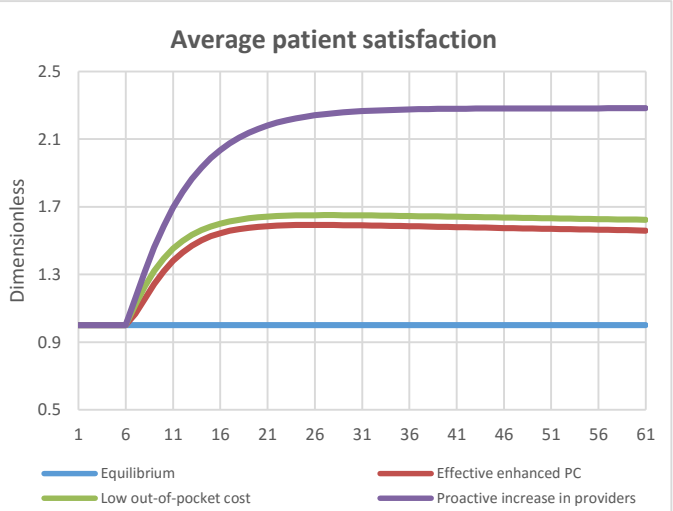
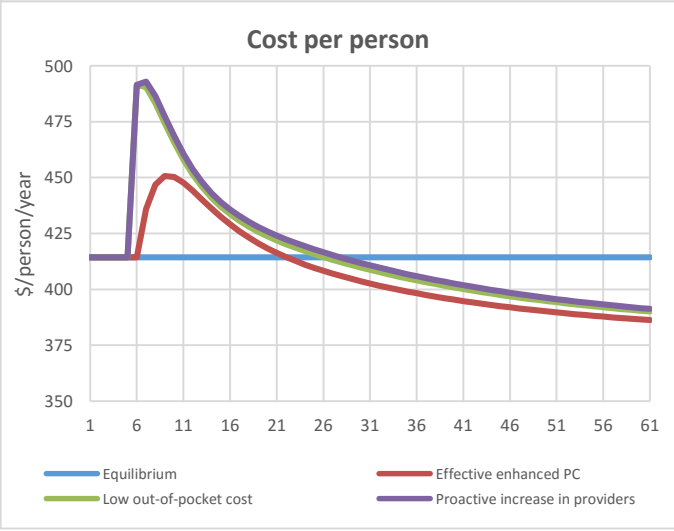
Policy experimentation

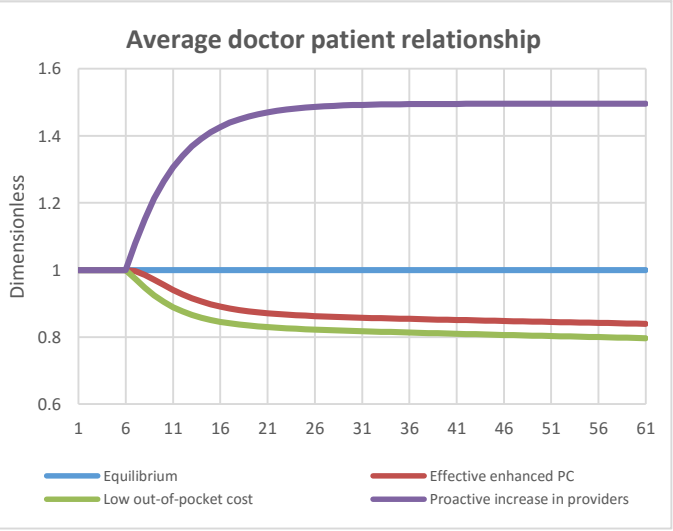
- Reduced out-of-pocket costs: enhanced primary care
  - Service gap in enhanced primary care reduced from 0.5 to 0.1 at time 5
  - Service gap in normal primary care remained at 0.5
  - Out-of-pocket costs for enhanced primary care set at half that of normal care
- Proactive increase of enhanced primary care providers
  - Service gap in enhanced primary care reduced from 0.5 to 0.1 at time 5
  - Service gap in normal primary care remained at 0.5
  - Out-of-pocket costs for enhanced primary care set at half that of normal care
  - Supply of enhanced primary care providers (number of doctors) proactively increased in response to demand

Proactive increase of enhanced primary care providers: Reduced out-of-pocket costs for enhanced primary care, and proactive increase in enhanced primary care providers









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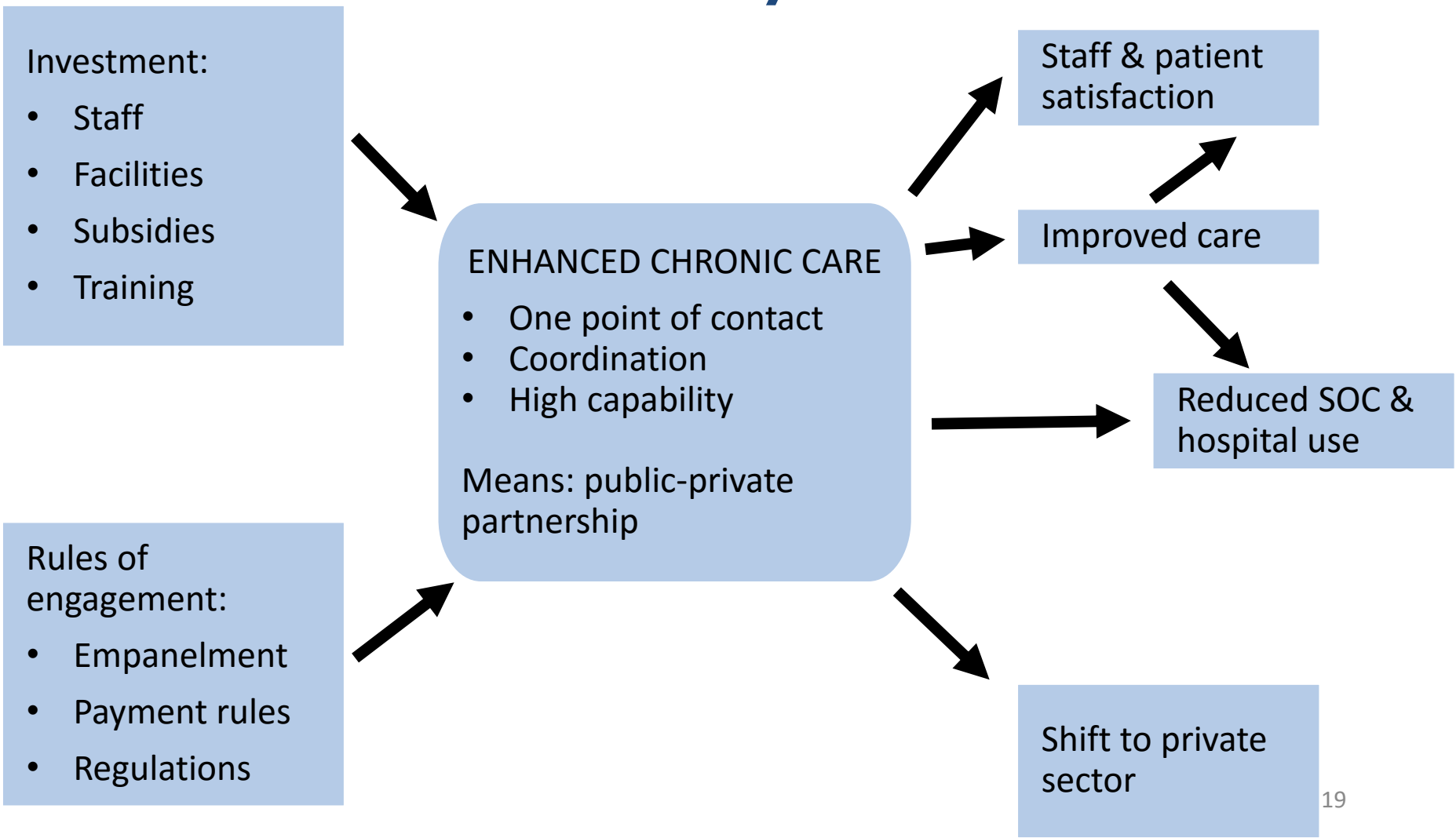
Insights

- GMB facilitates the identification of important system interactions
- A major potential policy option is to empanel patients in high risk segments under contract (e.g., in the UK mode of “commissioning”)
- The private sector has capacity and willingness; need a “business case”
- Enhancing chronic care requires enhancing the capacity and capability of primary care
  - Finding the optimal mix of quadruple aims
- To work we must consider the broader health care ecosystem…

How does an enhanced chronic care sector impact the ecosystem?



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Future Work

- What are the met and unmet needs?
  - Identifying needs by segment, not just by diseases
  - Understanding the dynamics of needs over time
- What makes different modes of care more or less attractive
  - To providers
  - To patients
    - Engage patient groups: not involved in GMB
- Simulating current and potential policies
  - Evaluating different policies *in silico*
  - Performing sensitivity analysis: assessing confidence and further data needs
- Use models to track, reassess, improve iteratively

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Thank You

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