Population Health Planning and Forecasting in Acute and Chronic Disease

Hosted by:

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Agenda

- Introductions
  - Jacquie White
  - Dr Eileen Pepler
  - Claire Cordeaux
- Canada and UK Health Systems: Dr. Eileen Pepler
- NHS England and New Models of Care: Jacquie White
- Simulation/Population Health Modelling to inform long term conditions: Claire Cordeaux
- Reflections from Canada: Dr Eileen Pepler
- Discussion

How did this conversation happen?

Global challenges

Increasing demand

- Rise of long term conditions and multi-morbidity: physical and mental
- Ageing population
- Increasing system wide expectations: access, treatment, cure not care

Supply pressures

- Dependence on system
- Hospital and medic-centric care models
- Workforce – recruitment & retention, ageing, diversity and culture
- Fragmentation of care in health and to social care
- Crisis curve

Solution – Transforming what we buy and how we buy it:

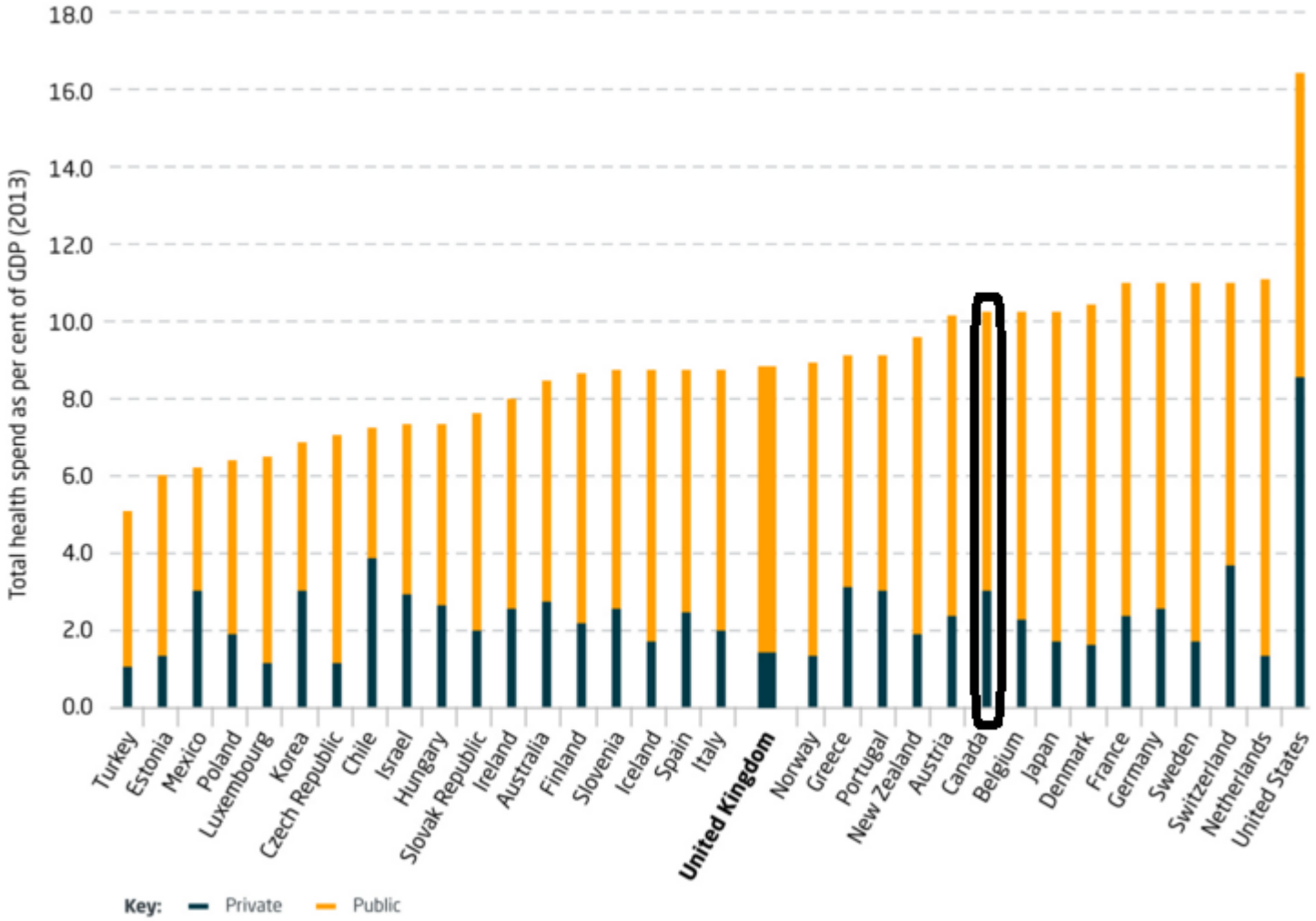
- Person centred co-ordinated care – whole person approach to improve outcomes and value

Canadian and UK systems compared

Canada and the UK

Country	Life expectancy	Infant mortality rate	Physicians per 1000 people	Nurses per 1000 people	Per capita expenditure on health (USD)	% of government revenue spent on health	% of health costs paid by government
Australia	81.4	4.2	2.8	9.7	3.137	17.7	67.7
Canada	81.3	4.5	2.2	9.0	3.895	16.7	69.8
France	81.0	4.0	3.4	7.7	3.601	14.2	69.0
Germany	79.8	3.8	3.5	9.9	3.588	17.6	66.9
Japan	82.6	2.6	2.1	9.4	2.581	16.4	61.3
Sweden	81.0	2.5	3.6	10.8	3.323	13.6	81.7
UK	79.1	4.8	2.5	10.0	2.992	15.8	70.7
US	78.1	6.9	2.4	10.6	7.290	16.5	45.4

Canada and the UK

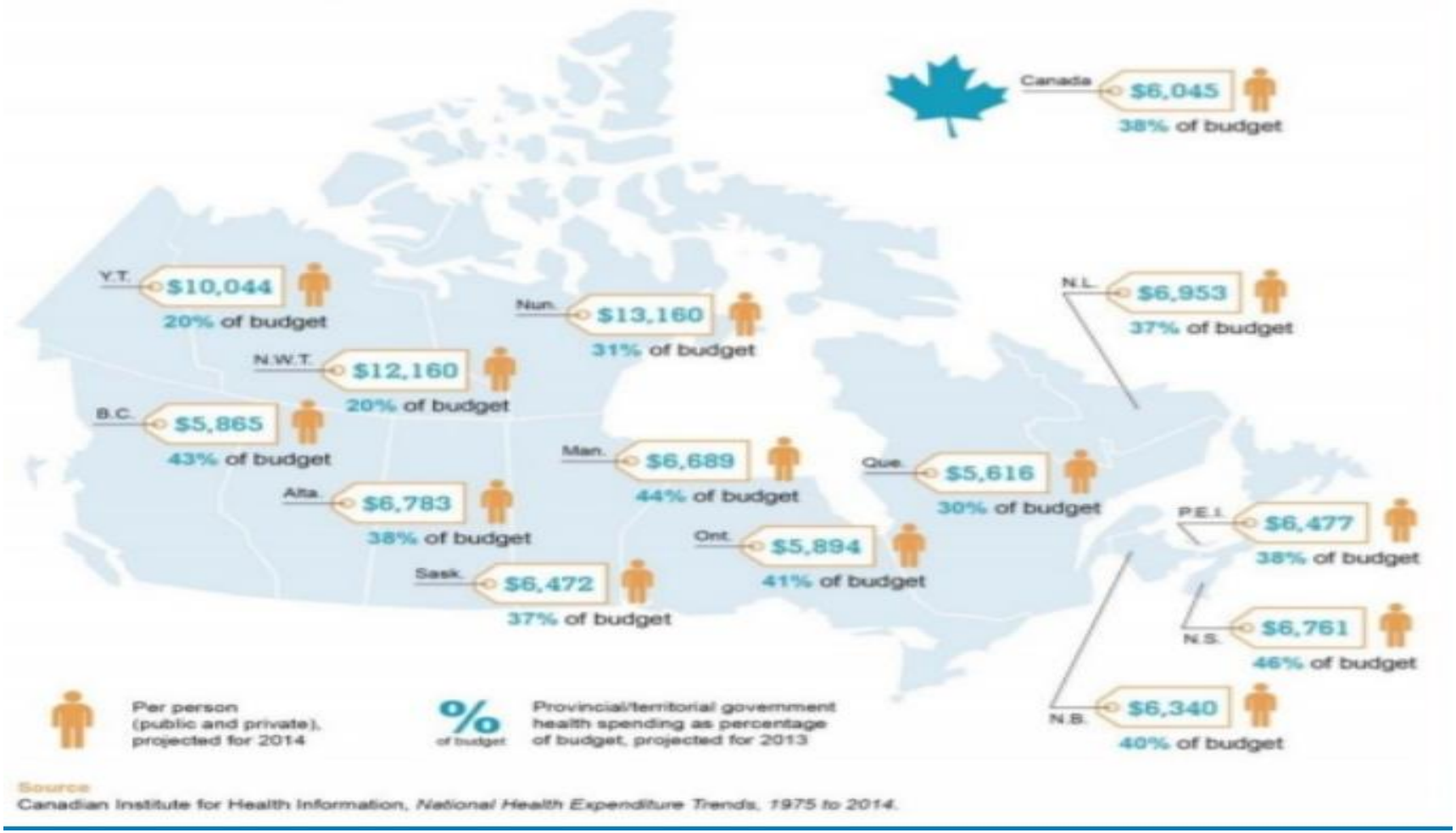


Source: OECD

Similar Challenges

- On September 16, 2004, the Canadian government announced $41 billion over the next 10 years of new federal funding in support of the action plan on health.
- That Health Accord expired in 2014 and the federal government did not negotiate funding leading up to 2015—just measurement, accountability and best practices
- The funding is set—an increase of six percent in the first three years, and a minimum of three percent in the remaining seven years
- In 2015 new government---another shift, new thinking, new demands for non-physician centric models, rural, aboriginal, vulnerable service improvements and workforce aging……

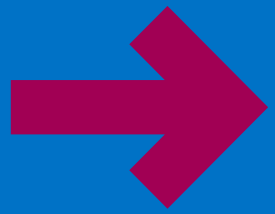
Need to Reset Our Delivery System



Resetting—Shift to Population Health

- New Models of Care—strategic methodology
- Population Shifts—aging, chronic disease, etc.
- Workforce Implications---existing versus future
- Shifting dynamics between patients and clinicians
- Self-care management
- Impact of Technology enabled care
- Workforce arrangements demand co-operation between very different workforce groups
- Coordinator or ‘navigator’ roles become crucial in a complex fragmented landscape
- Thinking outside the ‘box’ and keeping the welfare of the patient at the forefront
- Learning from other jurisdictions--- **NHS Long Term Conditions Program/Simulation/Funding**

NHS England Approach



The NHS England programme

Definitions

- Person not patient
- Long Term Conditions not chronic disease
- Whole person not separation of physical, mental, emotional and social needs
- Co-ordinated care not integrated care

Tackling the priorities in the NHS

- Empowering patients and informal carers to be full partners in care
- Whole person focus
- Life course approach to care needs
- Strengthening Primary and Community Care
- Older people with increasingly complex needs including frailty
- New care models moving away from purely medical, hospital-centric focus
- Strengthen key enablers – IT, Workforce, Technology
- Need for a new purchaser/provider/funding model

LTC Framework: House of Care

Outcomes and benefits

- More activated patients have **8% lower** costs in the base year and **21% lower** costs in the following year than less activated patients
- Health coaching can yield a **63% cost saving** from reduced clinical time, giving a potential annual saving of £12,438 per FTE from a training cost of £400
- Coaching and care co-ordination has shown to **reduce emergency admissions by 24%**
- Improved medication adherence improves outcomes and yields efficiencies, for instance in 6000 adults in the UK with Cystic Fibrosis, could save more than **£100 million over 5-years**
- Between **20% and 30% of hospital admissions** in over 85's could be prevented by proactive case finding, frailty assessment, care planning and use of services outside of hospital

Long Term Conditions Year of Care Commissioning Programme

- **Engagement and commitment across the system**
    - Patients, Clinicians, Managers, Senior leaders
    - Joint vision and narrative
    - Shared benefits
- **Whole Population Analysis**
    - Understanding the population
    - Risk profiling and segmentation
- **Patient & Service Selection**
- **Planning for Change**
    - Simulation Modelling
    - Workforce
    - Capitated Budget
- **Delivery Models**
    - Service redesign
- **Contracting and performance monitoring**

National Population Analysis

Prevalence:

- There are 16 million with one LTC, 10 million with two LTCs, 1 million people in England with frailty, and 0.5 million approaching end of life

Quality of life:

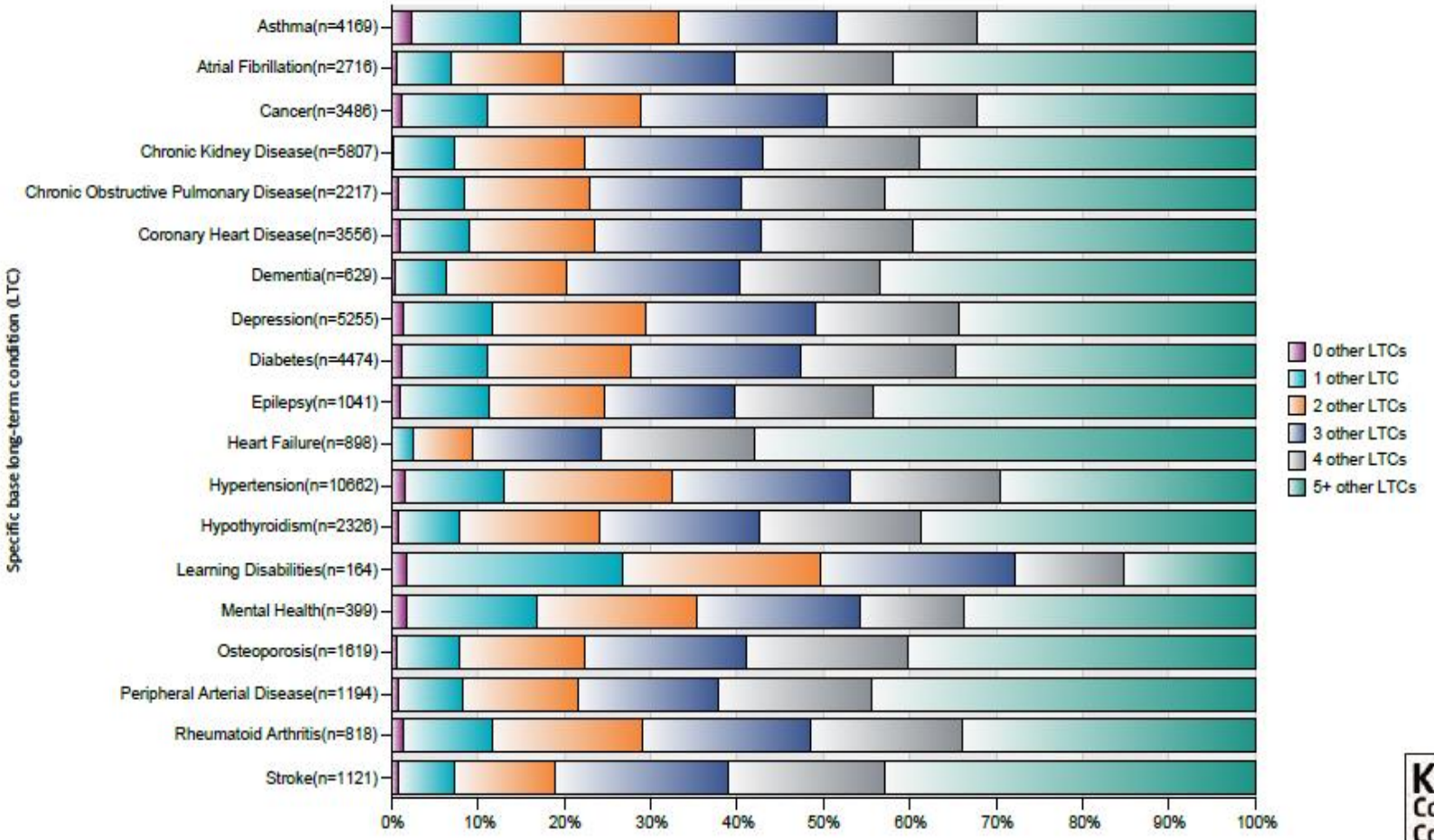
- The larger the number of co-morbidities a patient has the lower their quality of life
- Increasing evidence of over-treatment and harm
- Social isolation/loneliness a risk factor for mortality in over 75s

National Population Analysis

Impact on the health system:

- The average person with a LTC in the UK spends less than 4 hours a year with a health professional
- Research has shown that 33% of all GP consultations are now with people with multi-morbidity
- The number of days in a hospital bed increases strongly with age: those under 40 account for 1 million emergency bed days and those over 85 account for over 7 million emergency bed days
- Three-fold increase in health costs across all care sectors due to frailty
- 1300 people die each day and 25% of all hospital beds are occupied by somebody who is dying

Multi Morbidity is Common:



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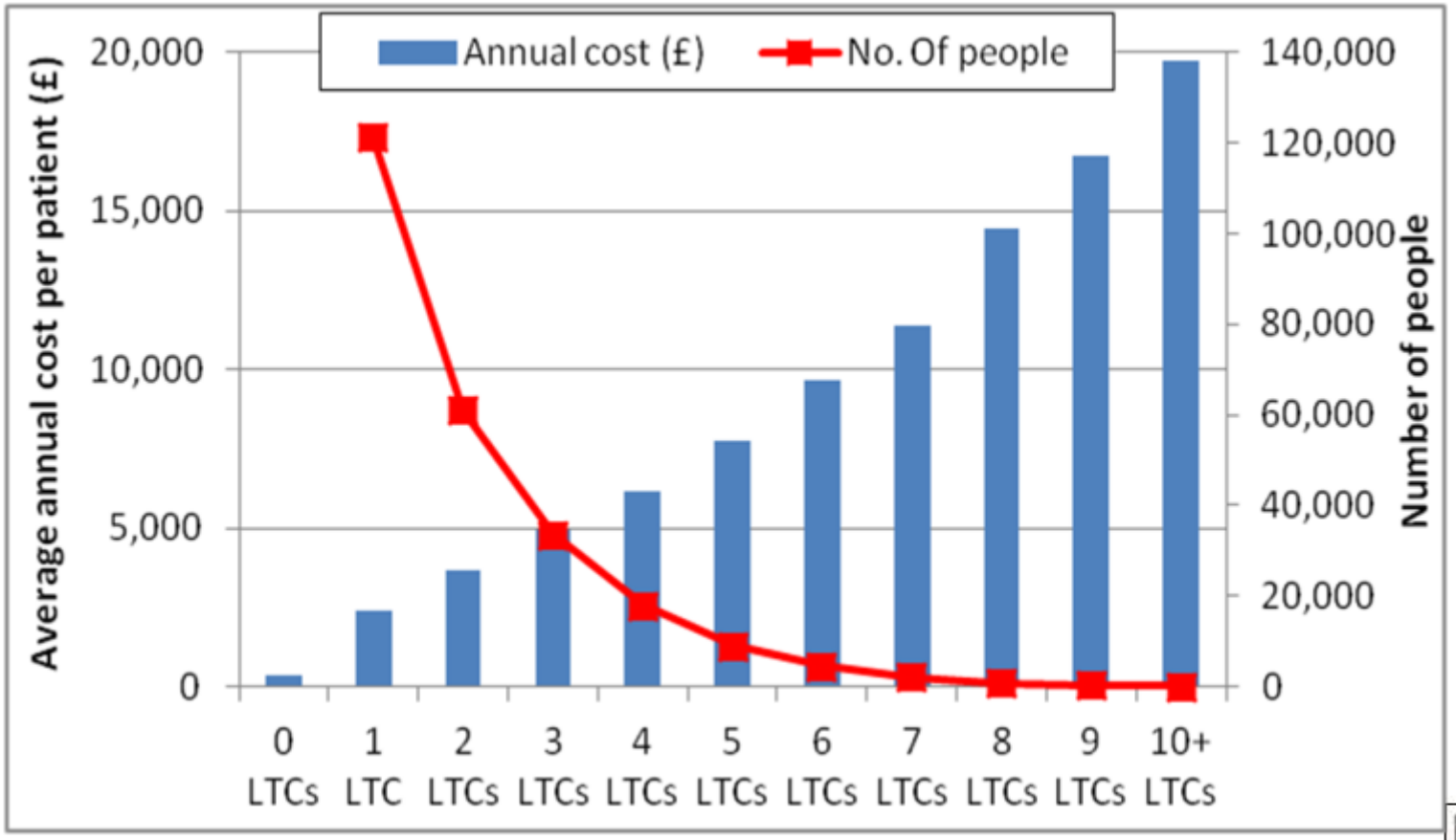
The total health and social care cost is strongly related to multi morbidity:



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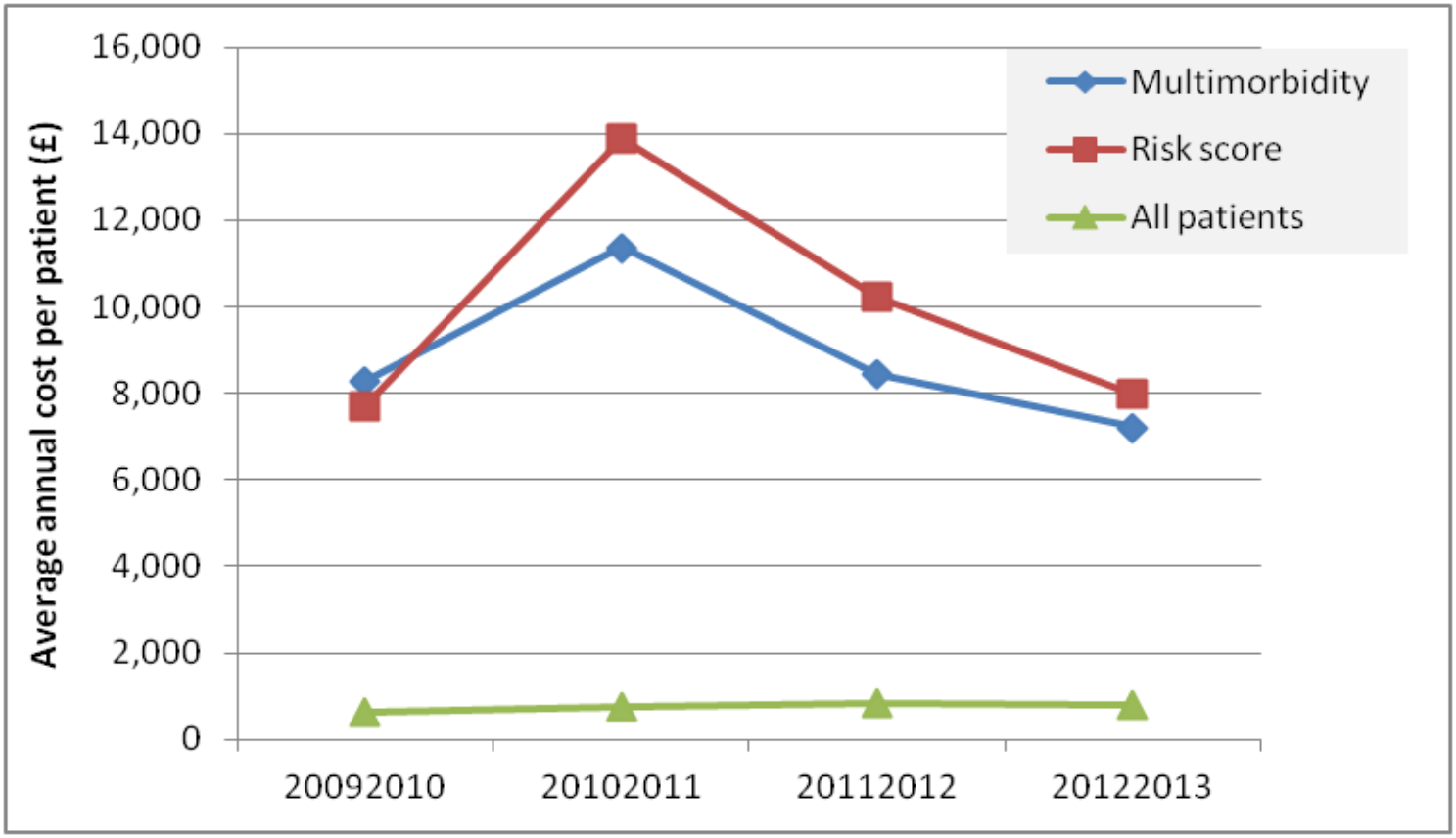
People with complex health and care needs appear to demonstrate a ‘complex curve’:



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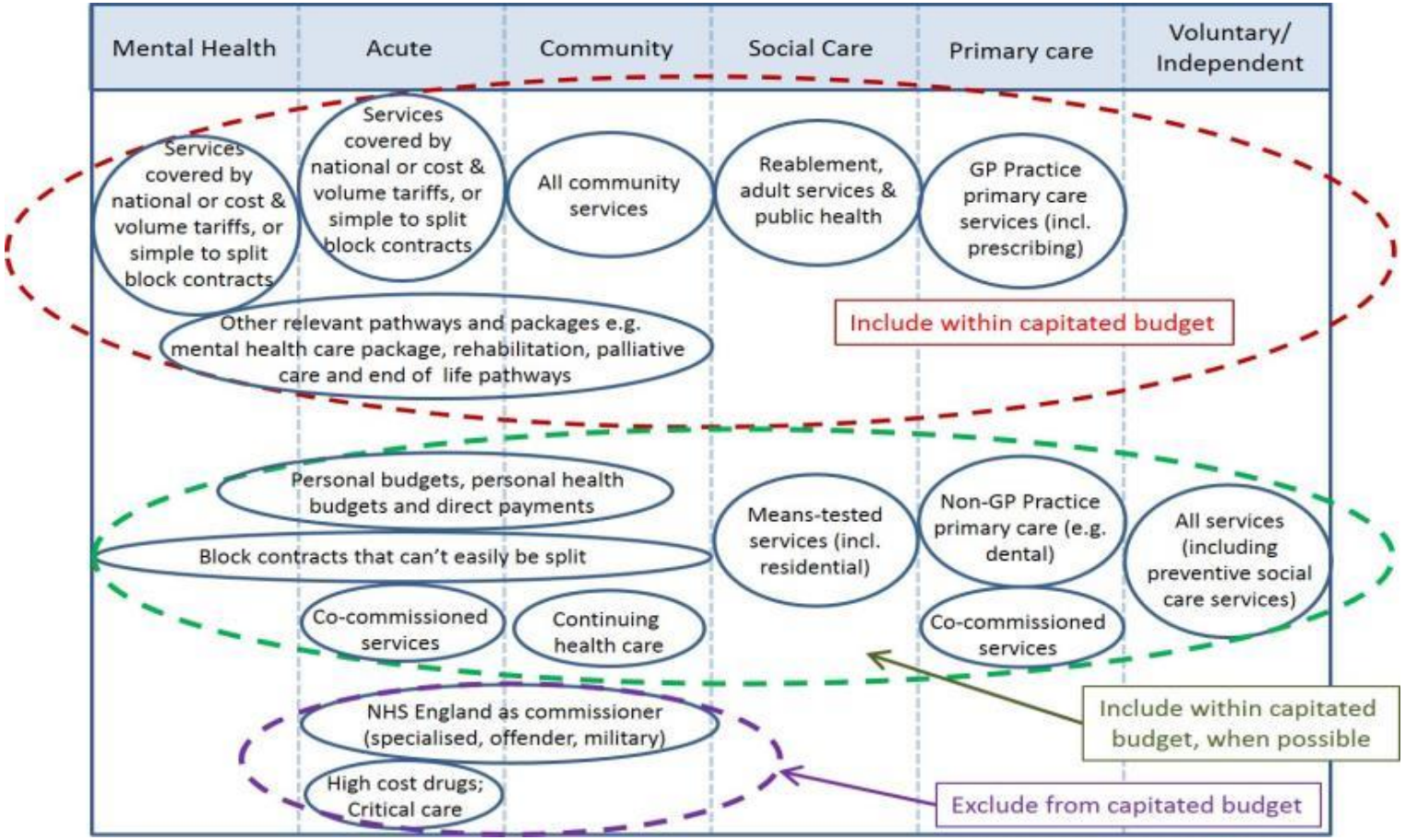
Long Term Conditions Year of Care Service Bundle:



Delivery Models

The service models being developed by our sites are essentially similar but differ to match local conditions.

Similarities include:

- Single point of access
- Care planning and shared care record
- Supported self management
- Care co-ordination
- Community multi-disciplinary team based around primary care,
- Wider neighbourhood support including specialist practitioners, therapists
- Recovery, Rehabilitation and Reablement “services”
- Care navigators and voluntary sector as a key enabler.

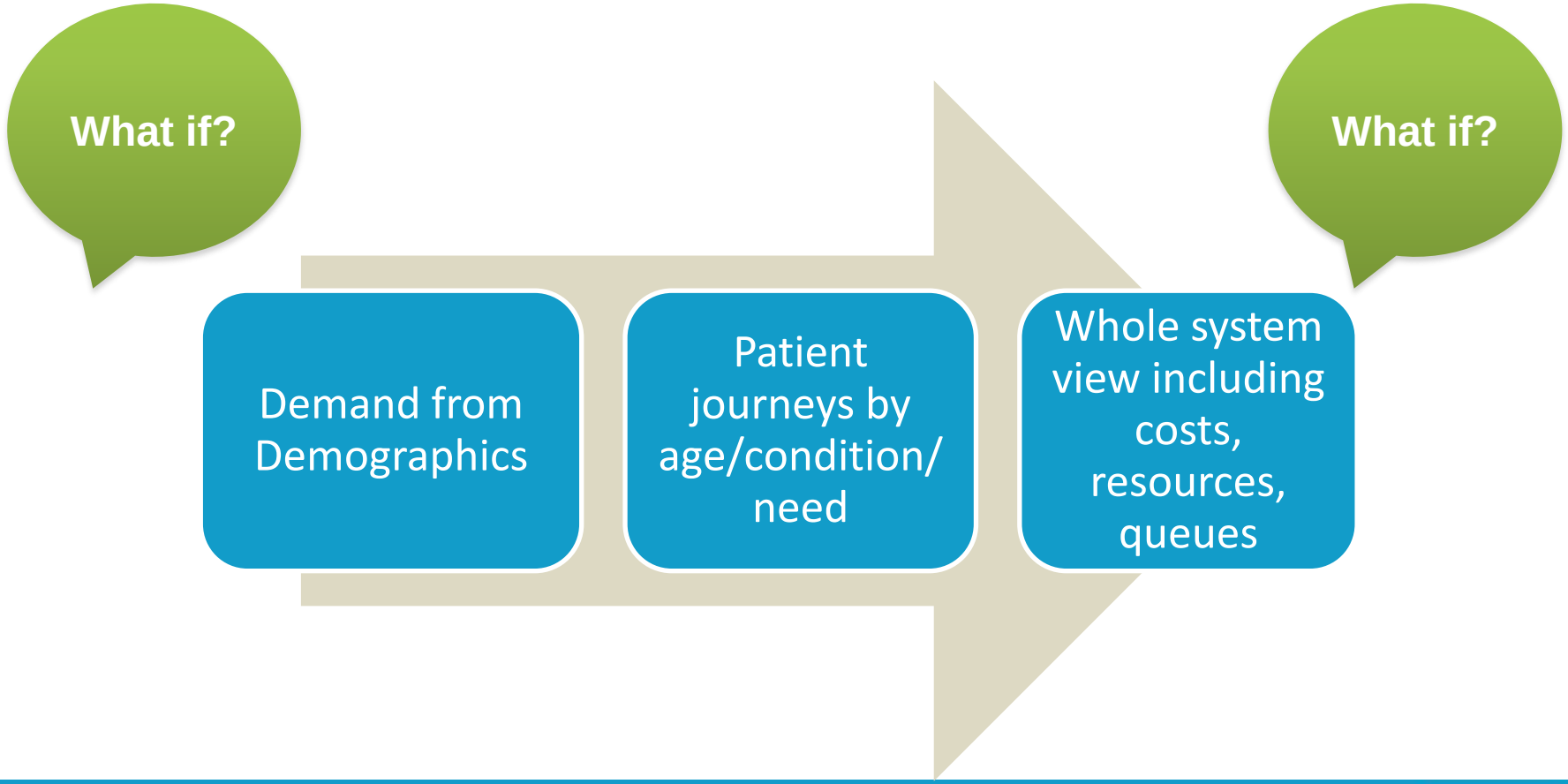
Differences include:

- Whole population or selected cohorts
- Formation of new organisations
- New delivery models within and across existing organisations

The role of simulation

Whole system impact of change

Scenario Generator

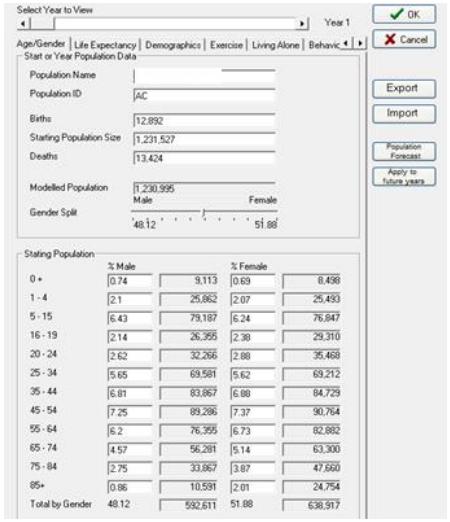


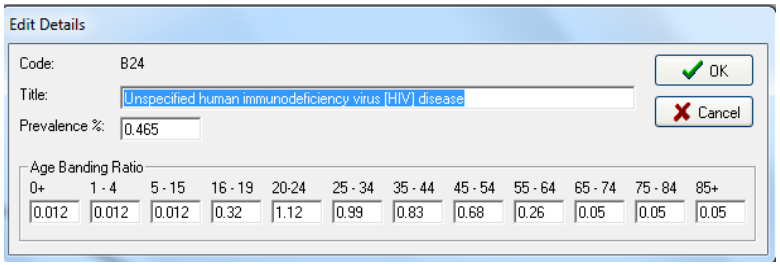
Predictive Population Analytics

Age-banded population projections → Age-banded disease prevalence → Demand

HIV example

1.23m x **HIV 0.465%** = **2531**





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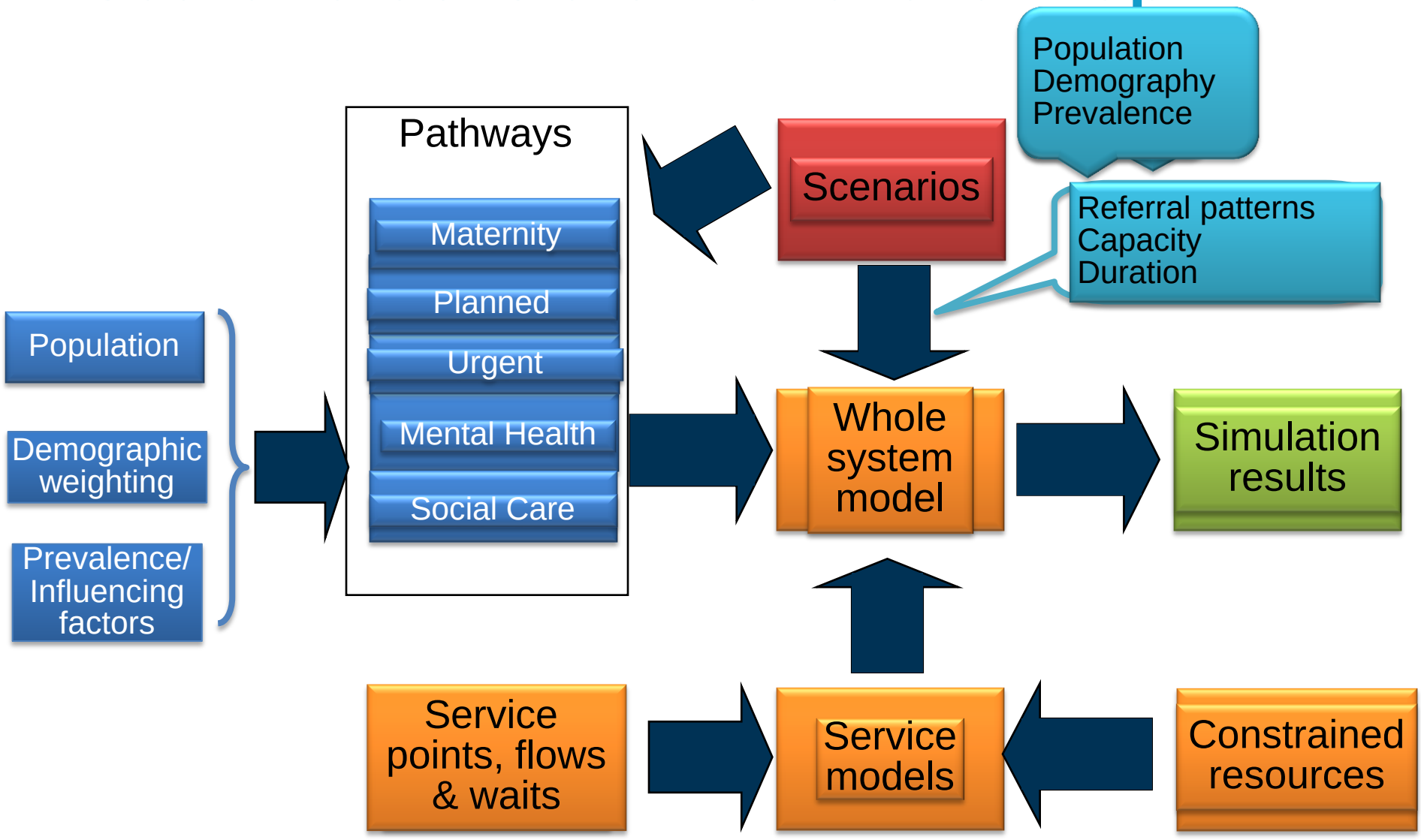
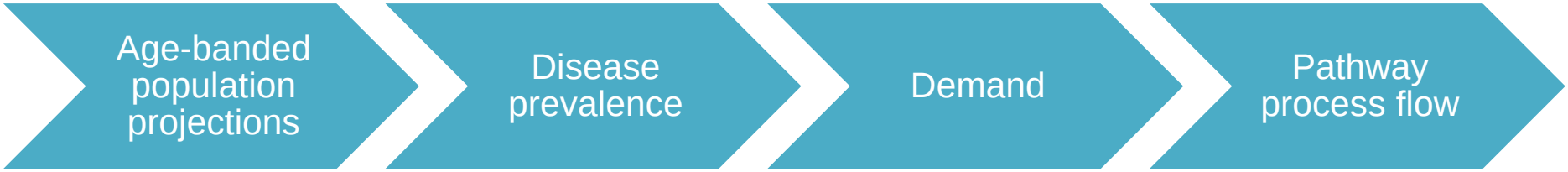
Scenario Generator Functional Map

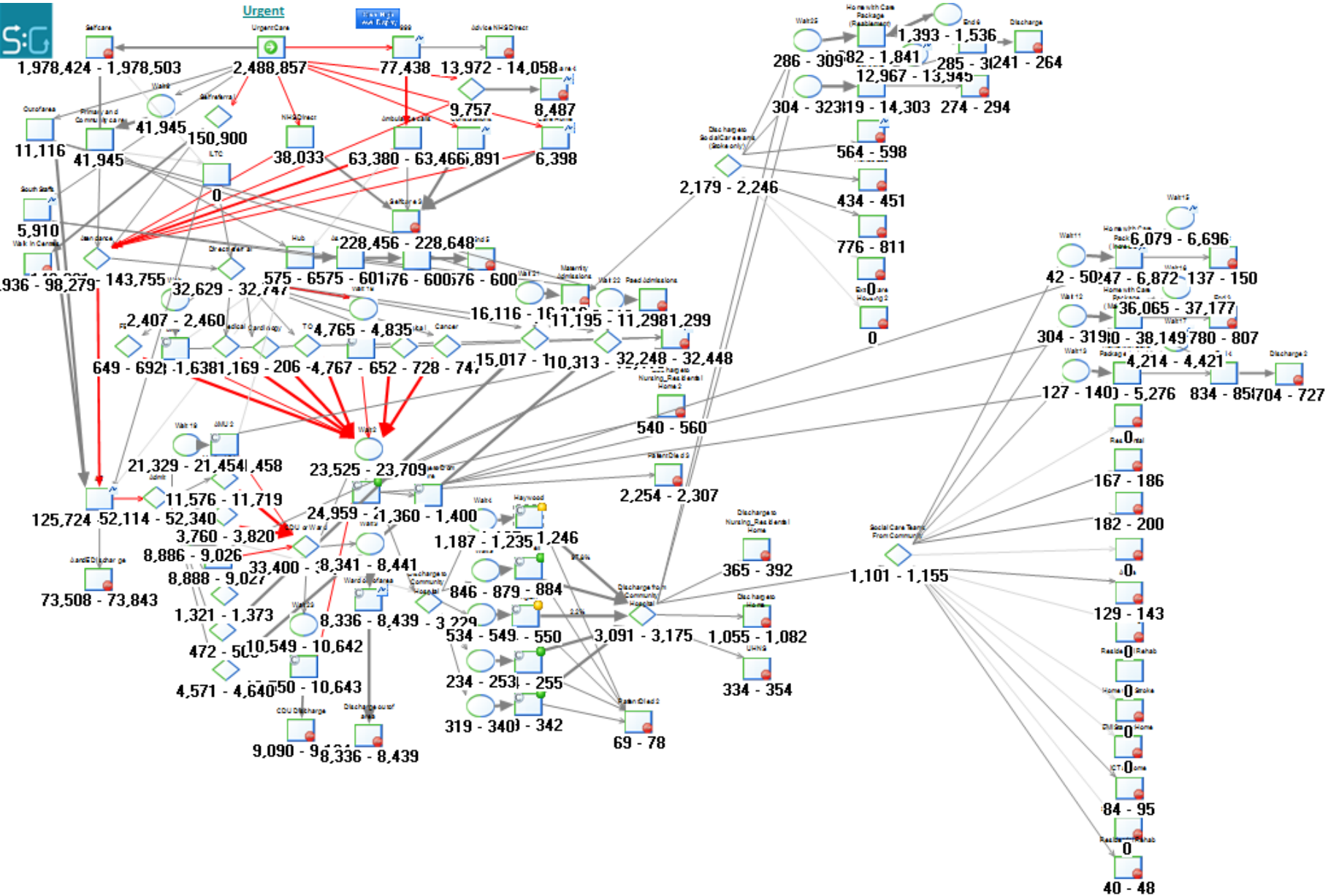


Example: North Staffordshire and Stoke on Trent Simulation

- What does current unscheduled care flow look like?
- What will it look like in 5 years with ageing population?
- What is the impact of increasing referrals to home care direct from hospital?



Initial Model



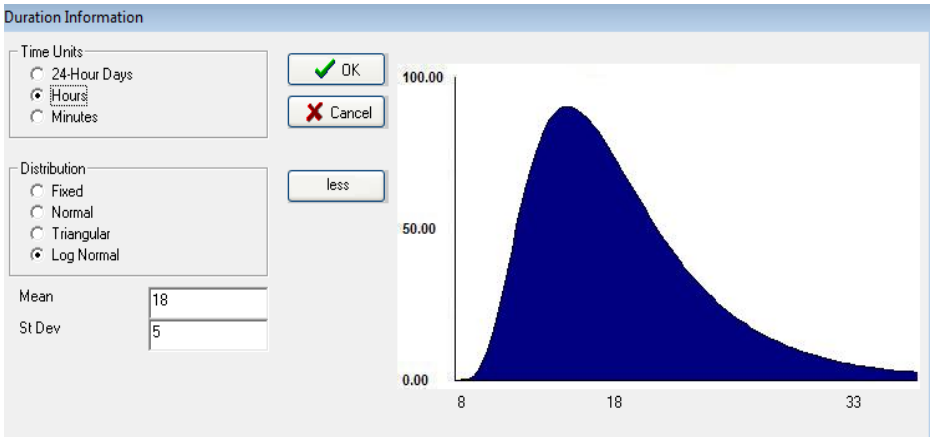
Baseline Results – 10 run trial

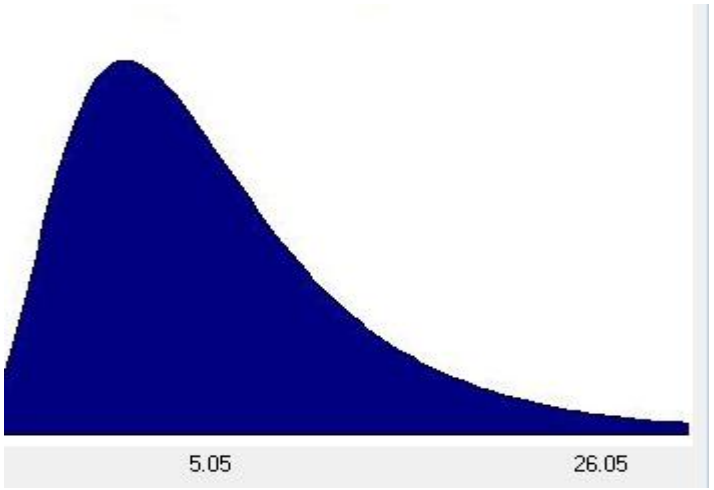
- Ran the model through with the received population data
- Set routing percentages so model matches activity data.

Aea	NHS data	Scenario Generator	%
A+E	108,472	125,302 (17,026 out-of-area)	
A&E out of area (5% S Staffs)	17,000		0.99864512
Total NEL Admissions	84,297	84,470	1.00205227
Elective admissions	12,674	12,710	1.00284046
Daycase	49,983	49,895	0.9982394
Discharges to Community Hospital	4560	4507	0.98837719
Discharge to social care teams (Stoke)	2183	2203	1.0091617
Discharges from Community Hospital	4347	4430	1.01909363
Intermediate Care (admission avoidance)	590	581	0.98474576

Cost and Length of Stay Assumptions

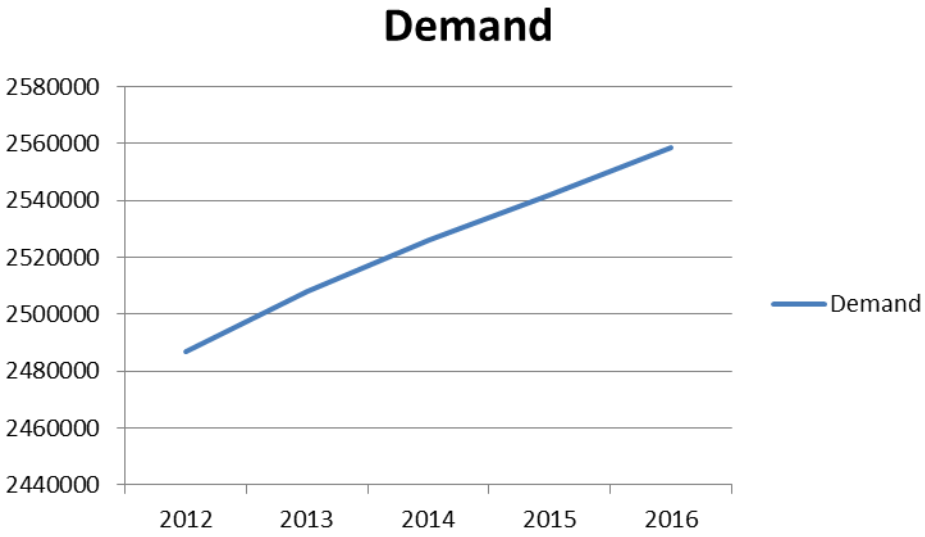
Item	£	LOS
Hospital Bed	£500 a day	AMU/SAU/CDU Inpatient
Community Hospital Bed	£263 per day	21 days
Intermediate care	£47 per hour	30 hours
A&E	£105.5	



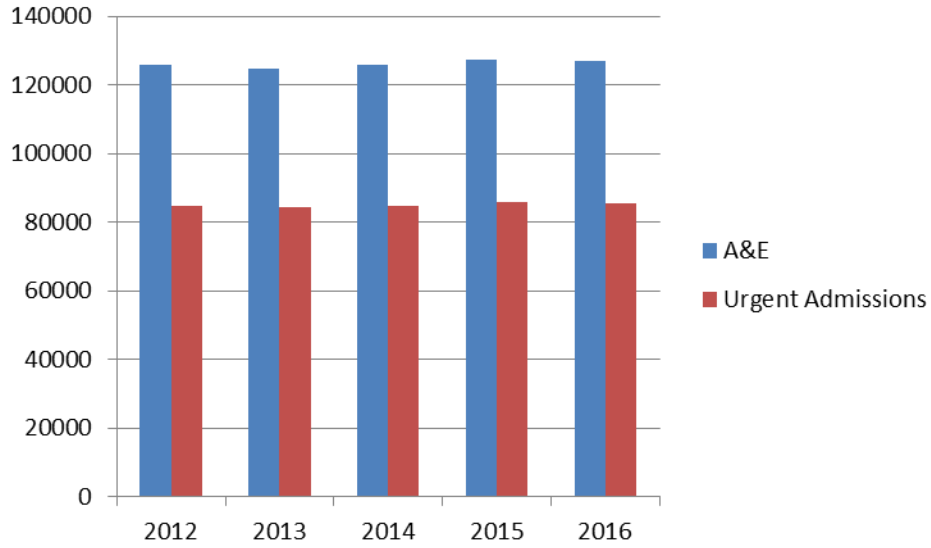


In 5 years

With population increase



Increase in A&E and admissions +5% over 9 years



+ £11.3m (£1m domiciliary care)

(1% annual inflation)

Home care scenario

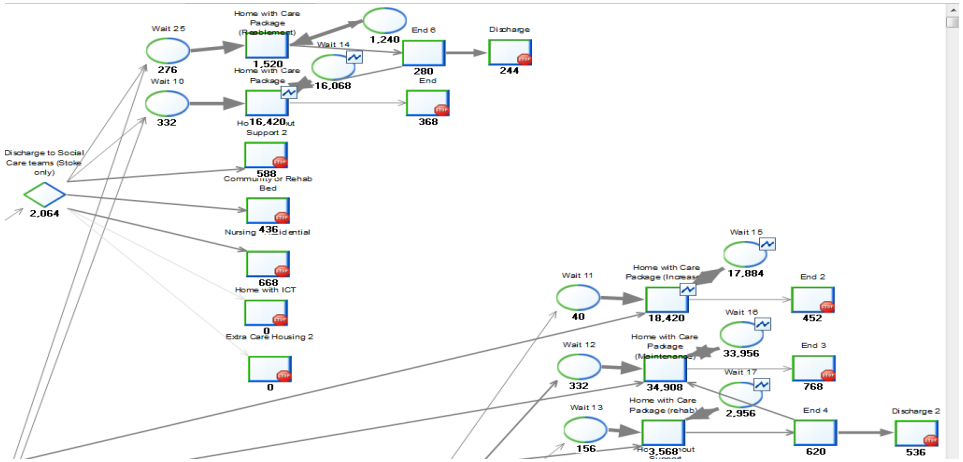
- Average 6 week package for rehabilitation
- Other packages average 48 weeks

Scenario:

- Increase direct referrals from hospital – 30% of community hospital referrals
- Average 2 additional days in hospital
- Referrals 10% to complex, 38% maintenance, 51% reablement (North Staffs only)

Home care scenario results

- £2.6m savings overall
  - Plus £4m social care
  - Plus 1.3m additional LOS, max bed occupancy + 10, +1% utilisation
  - £7.6m savings community hospital, utilisation reduced by 25%, max bed occupancy minus 90



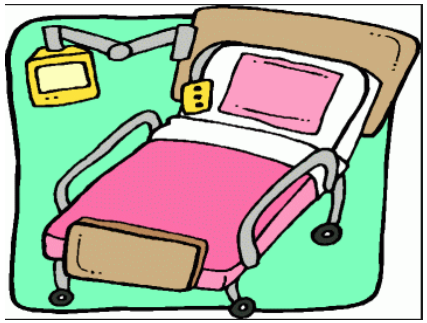
A Year of Care

9%

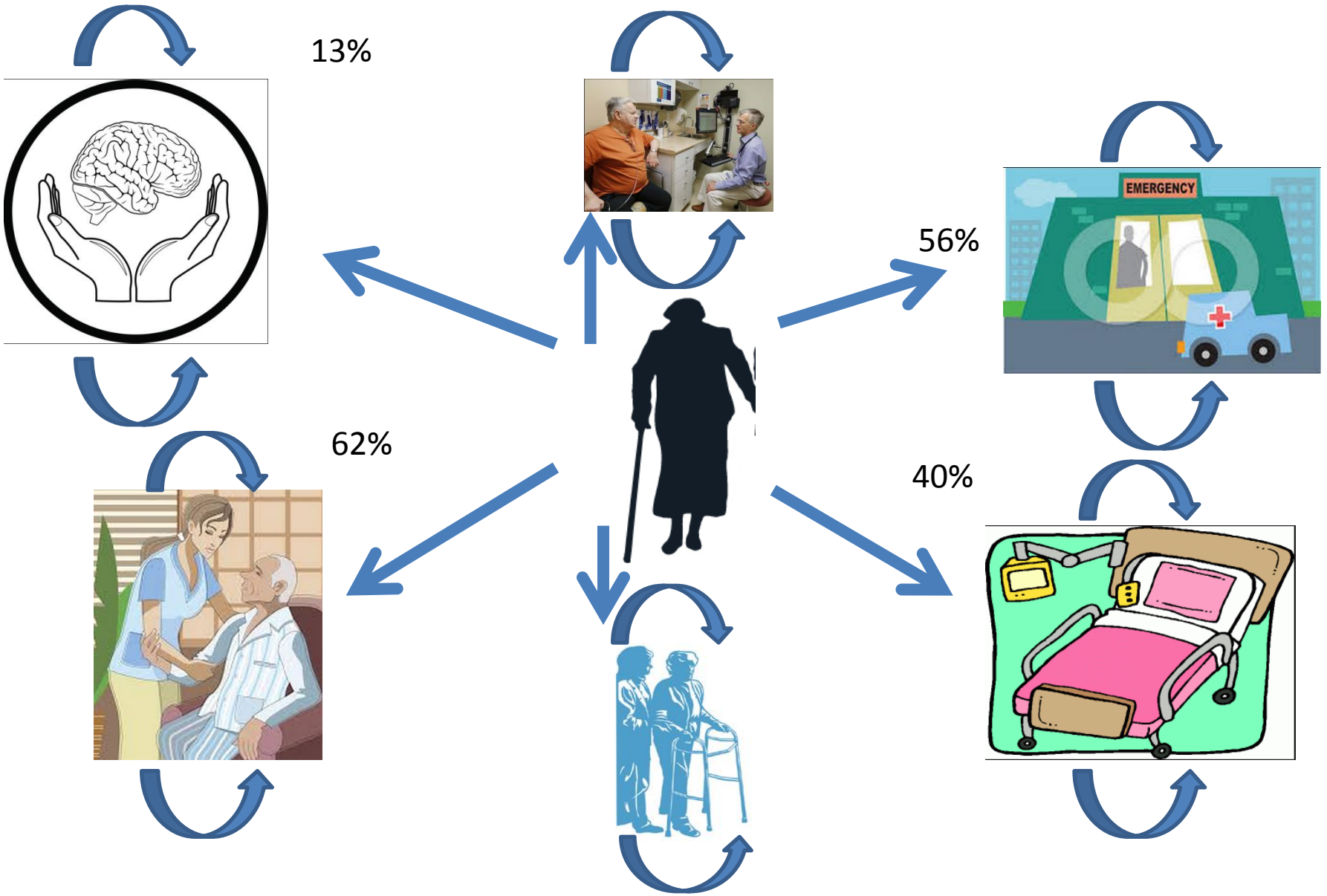
39%

40%

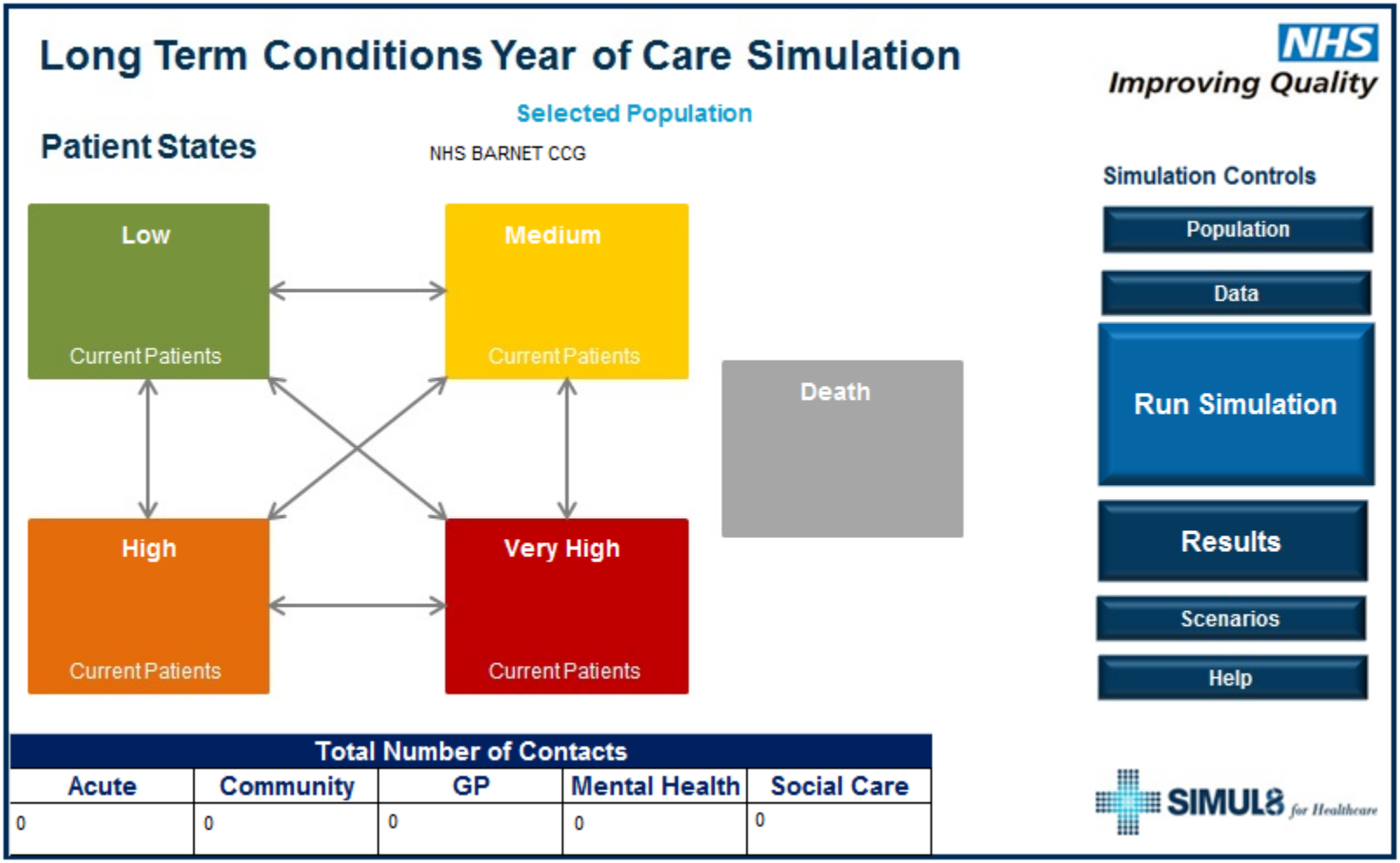
22%



A Year of Care – next level



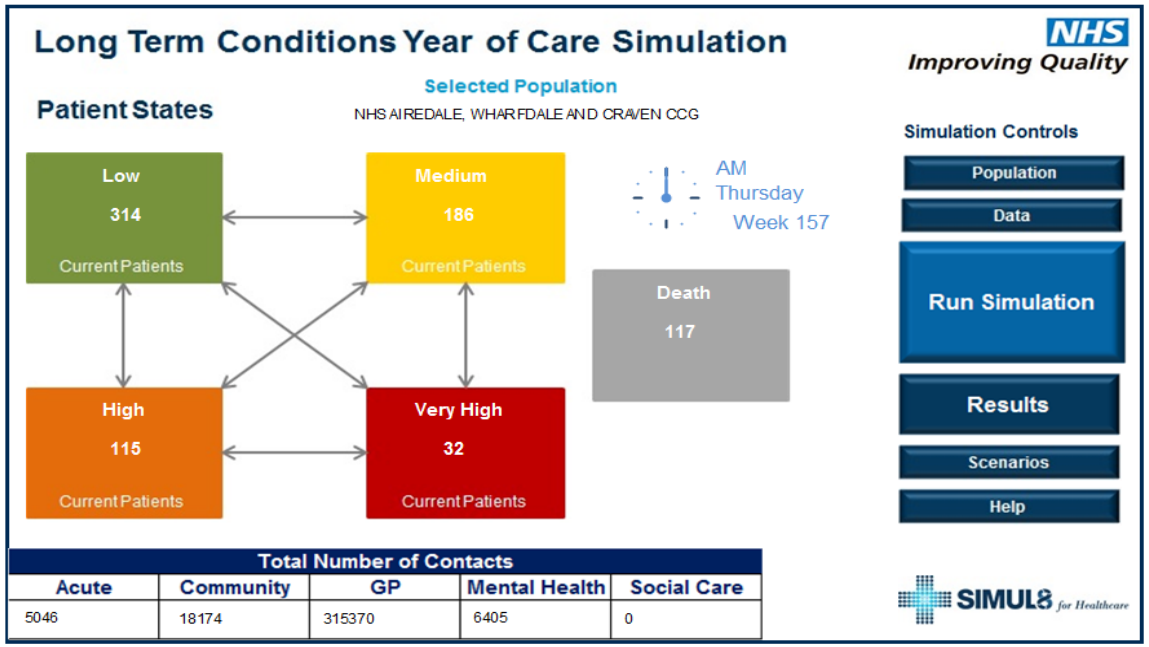
How it works


Long Term Conditions Year of Care Simulation
NHS
Improving Quality
Model
Selected Population
Patient States
NHS BARNET CCG
Simulation Controls
Low
Current Patients
Medium
Current Patients
Death
Population
Data
Run Simulation
High
Current Patients
Very High
Current Patients
Results
Scenarios
Help
Total Number of Contacts
Acute
Community
GP
Mental Health
Social Care
0
0
0
0
0
SIMUL8 for Healthcare

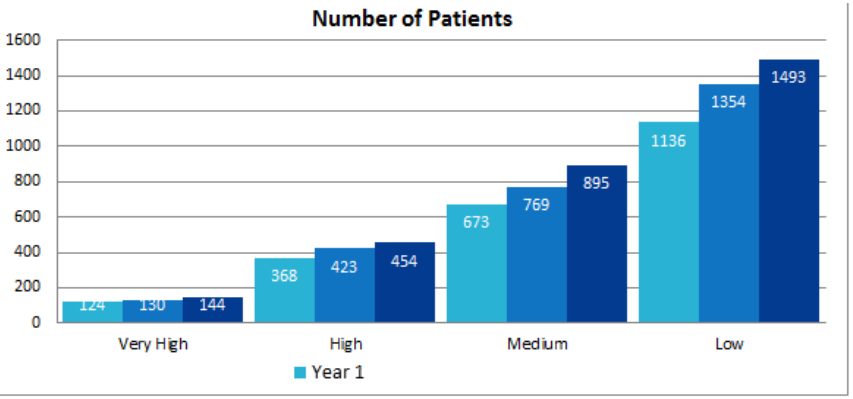
What drives the model?

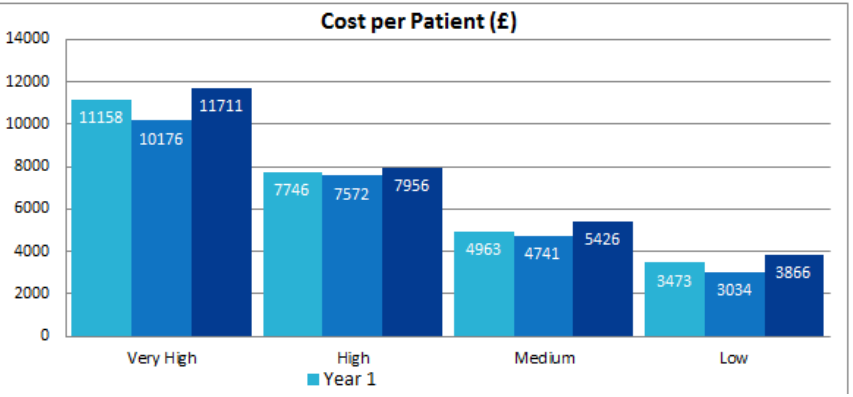
Patients with long term conditions by acuity

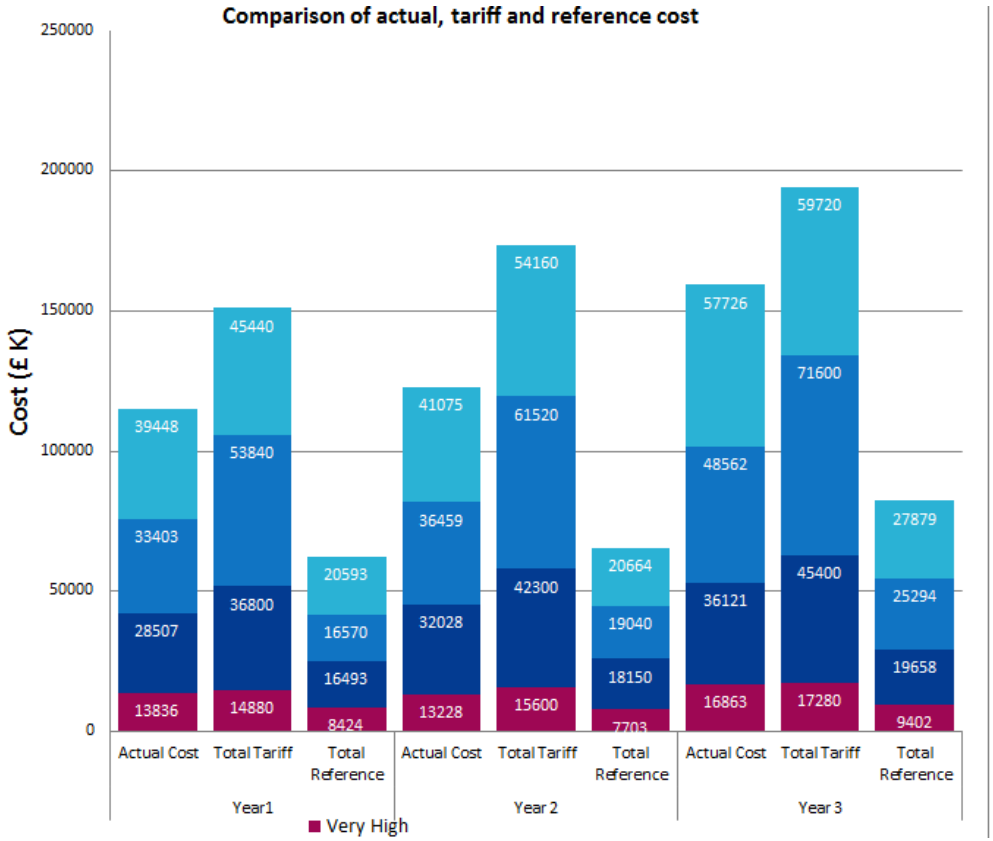
- Group patients by level of acuity
- Increasing numbers of long term conditions



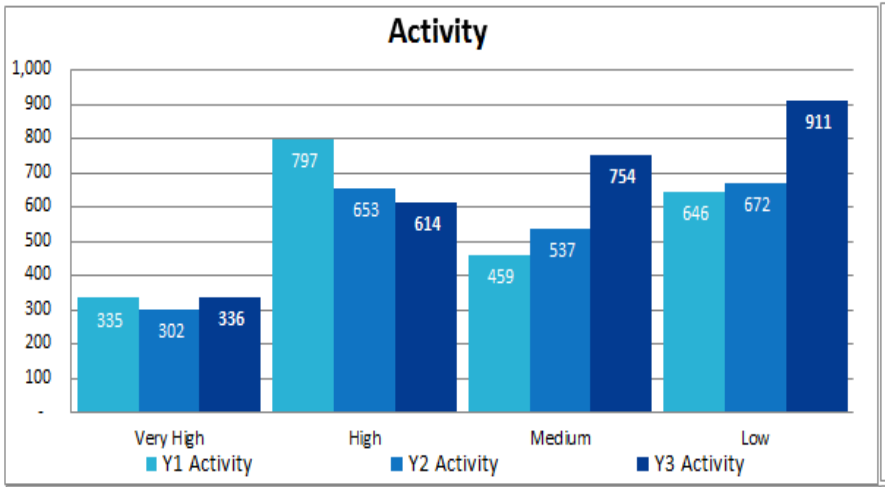
Results

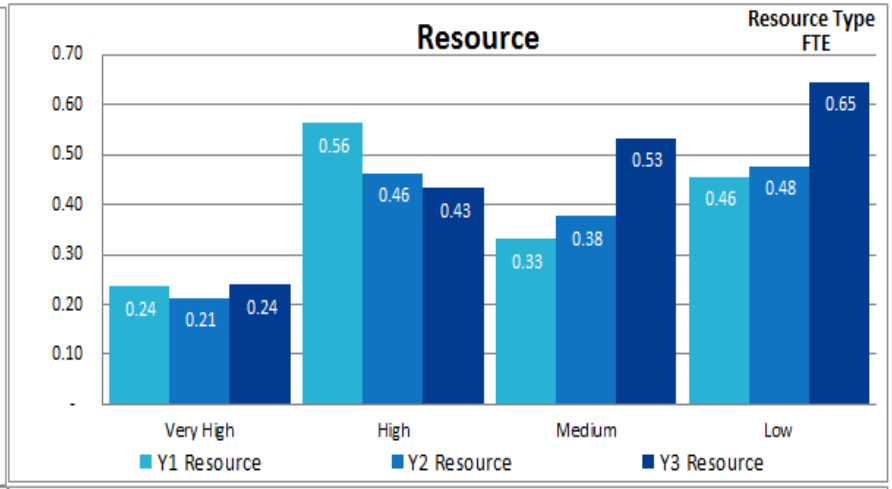

Number of Patients
1600
1400
1200
1000
800
600
400
200
0
124
130
144
368
423
454
673
769
895
1136
1354
1493
Very High
High
Medium
Low
Year 1

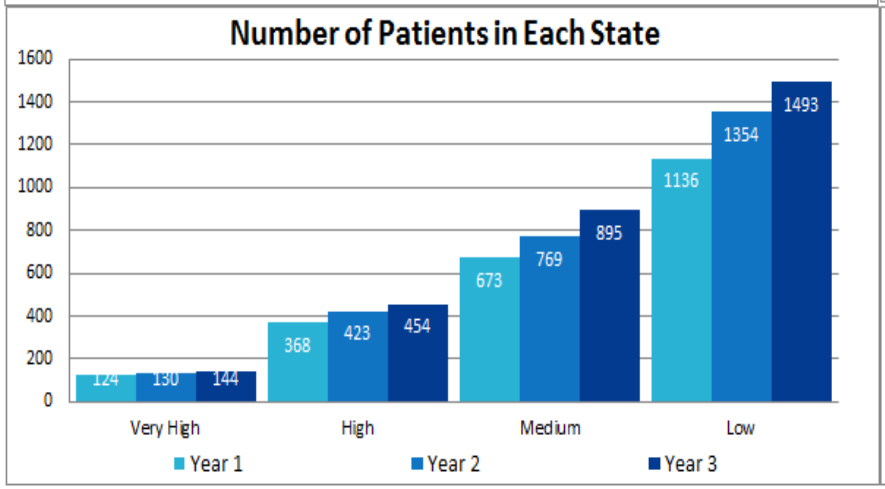

Cost per Patient (£)
14000
12000
10000
8000
6000
4000
2000
0
11158
10176
11711
7746
7572
7956
4963
4741
5426
3473
3034
3866
Very High
High
Medium
Low
Year 1

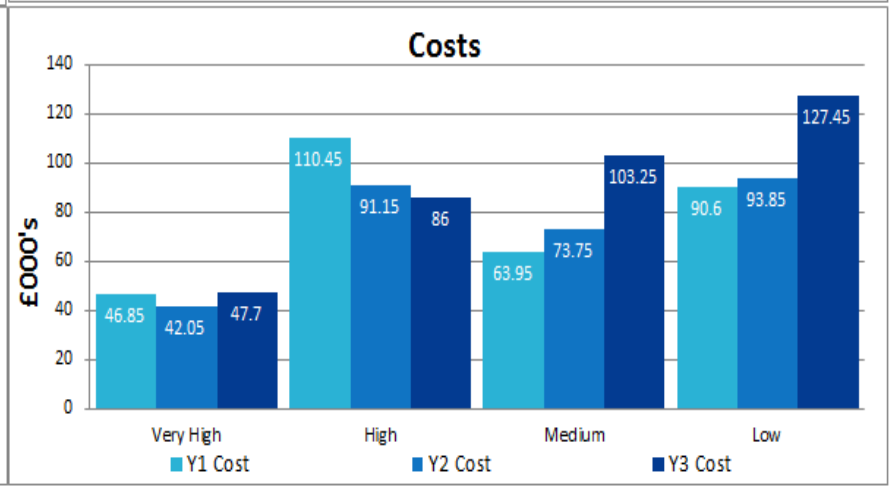

Comparison of actual, tariff and reference cost
Cost (£ K)
250000
200000
150000
100000
50000
0
39448
33403
28507
13836
45440
53840
36800
14880
20593
16570
16493
8424
41075
36459
32028
13228
54160
61520
42300
15600
20664
19040
18150
7703
57726
48562
36121
16863
59720
71600
45400
17280
27879
25294
19658
9402
Actual Cost
Total Tariff
Total Reference
Year1
Year 2
Year 3
Very High

Example Results: ED activity









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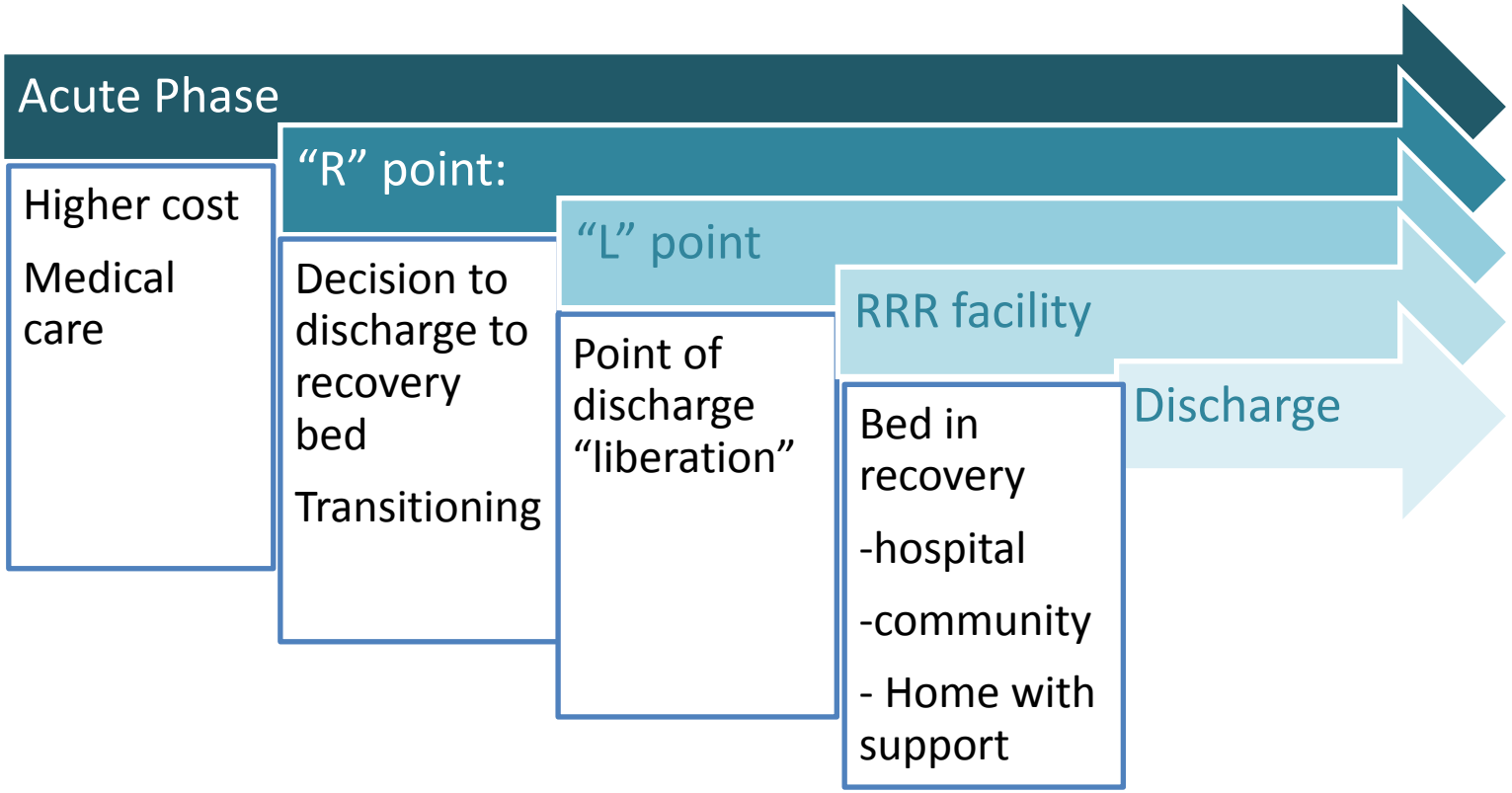
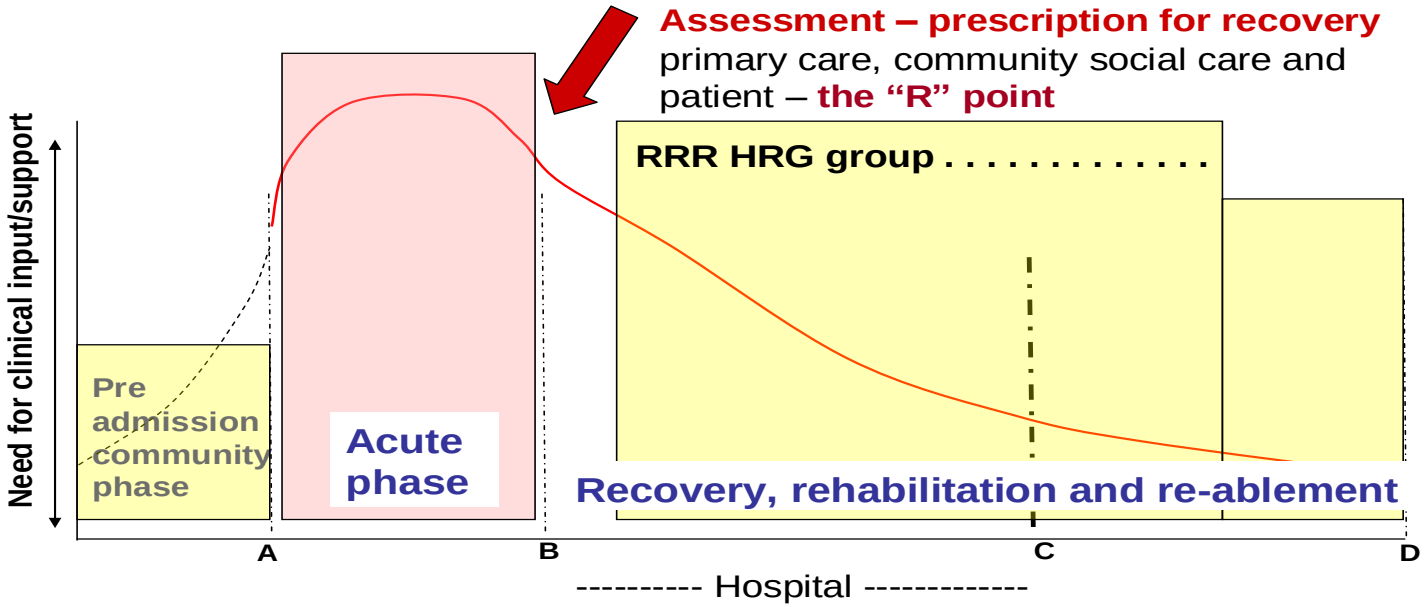
Acute to Rehabilitation



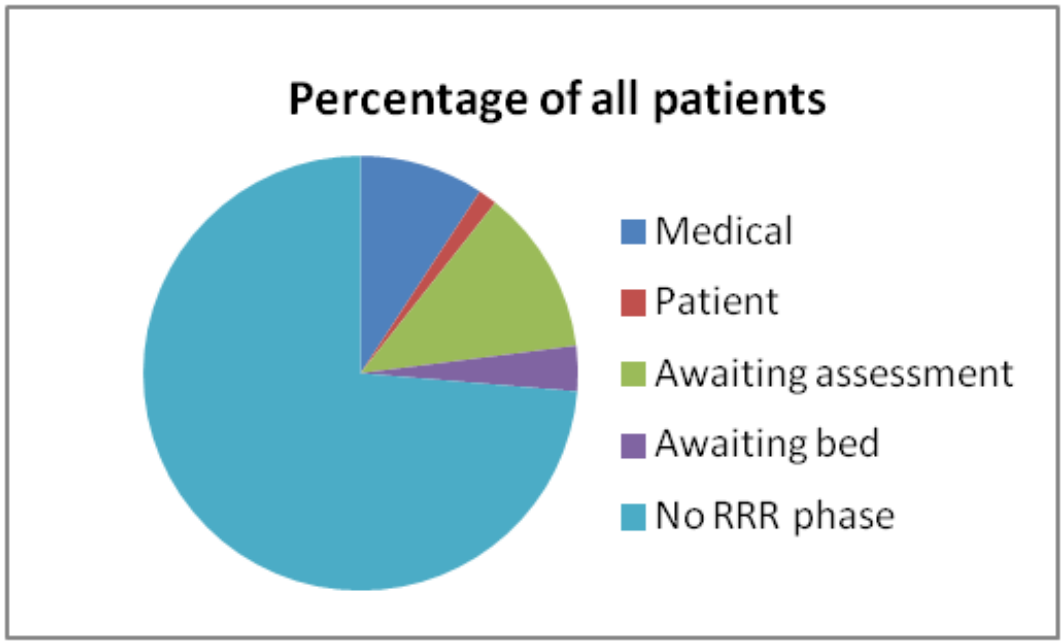
RRR audits identify the point in the acute patient pathway that patients are medically fit for discharge.

"change the tariff at the point when the patients' needs change and not when they change institution"



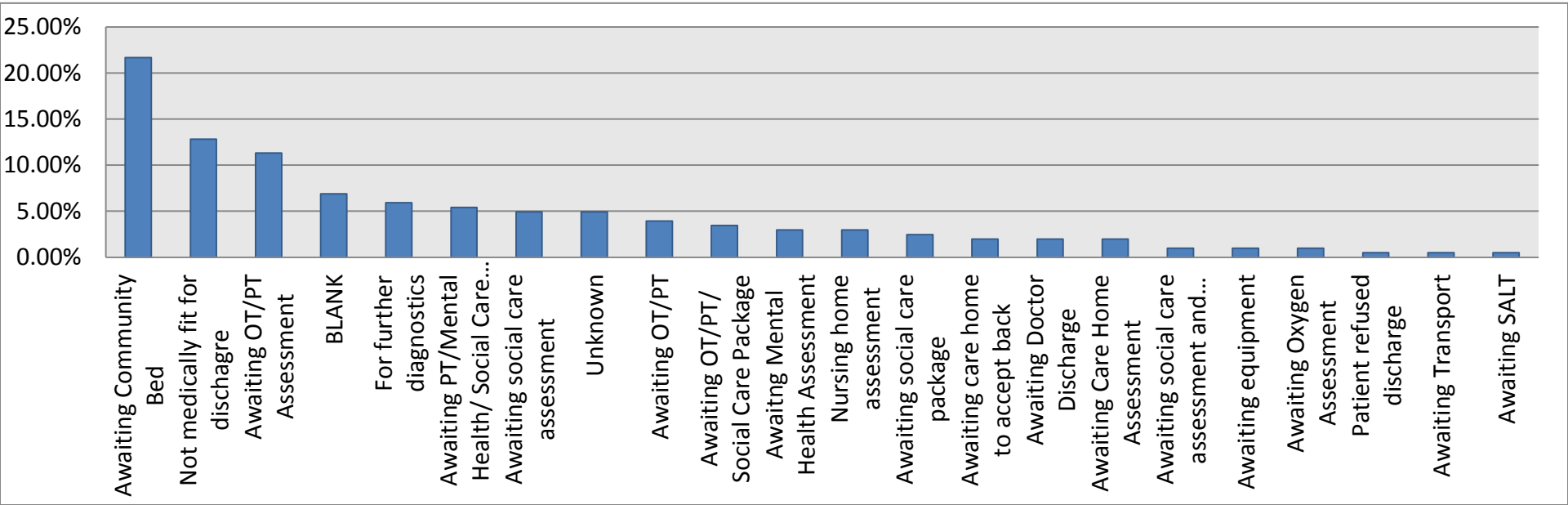
1 crosses secondary – community, 2. unlocks rehab resource for different models

3. Puts primary care and social care at earliest point in rehab, 4. sustainable discharge

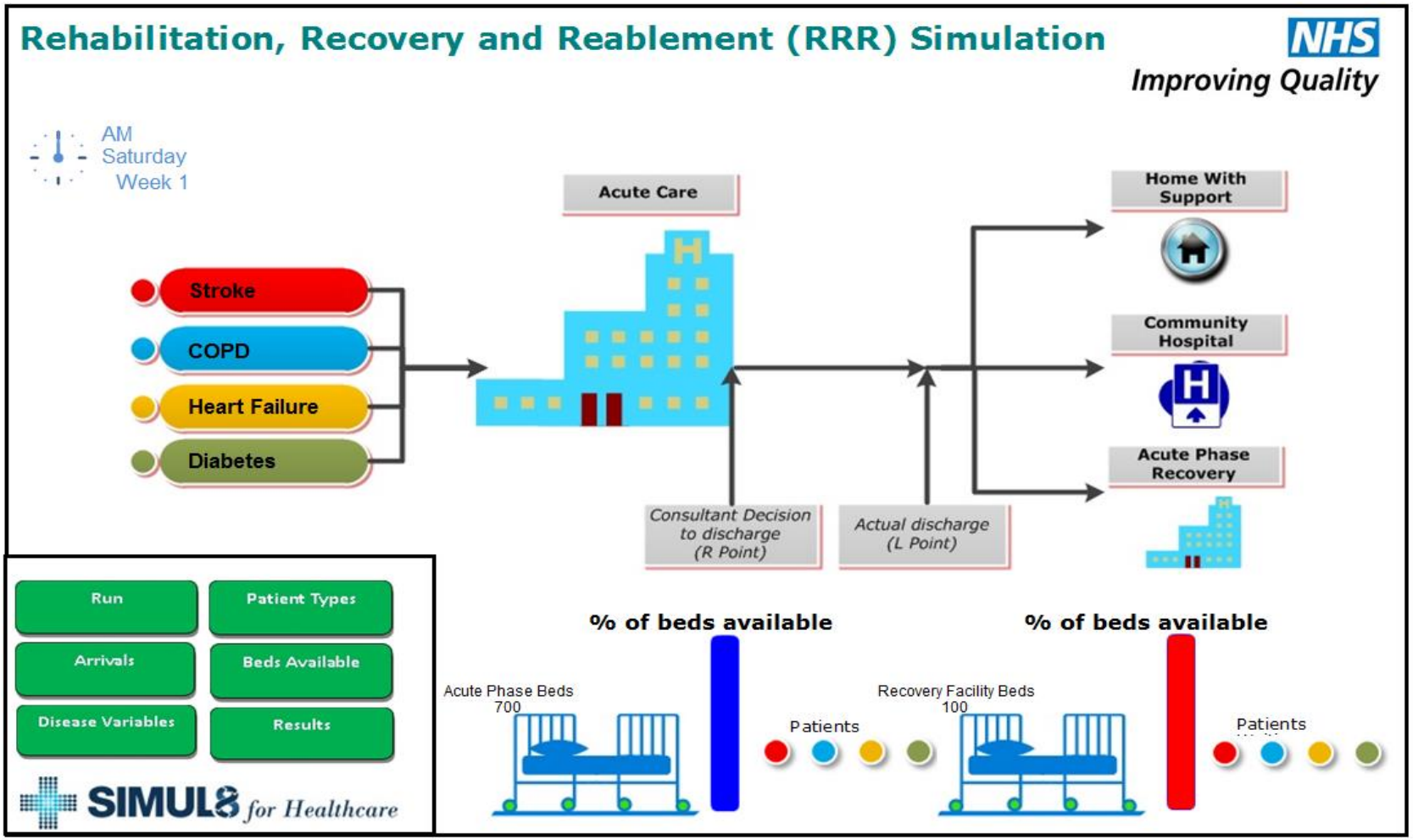


RRR audit - results

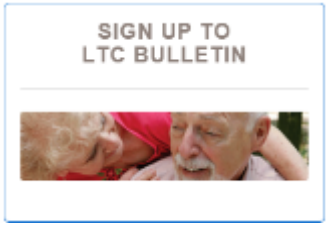
- R-point – can be a medical, community/social or patient reason for delay

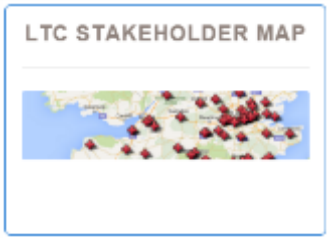


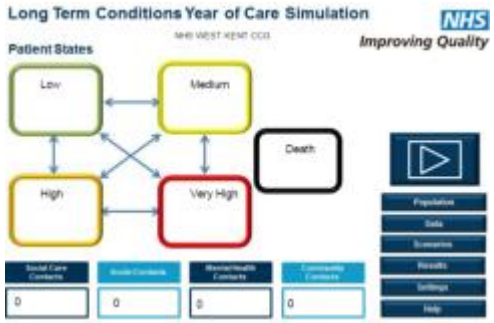
The Simulation



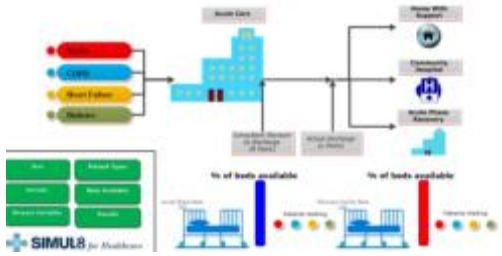
LTC Resources and Tools:





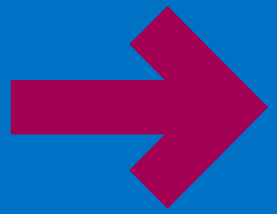


Simulation model



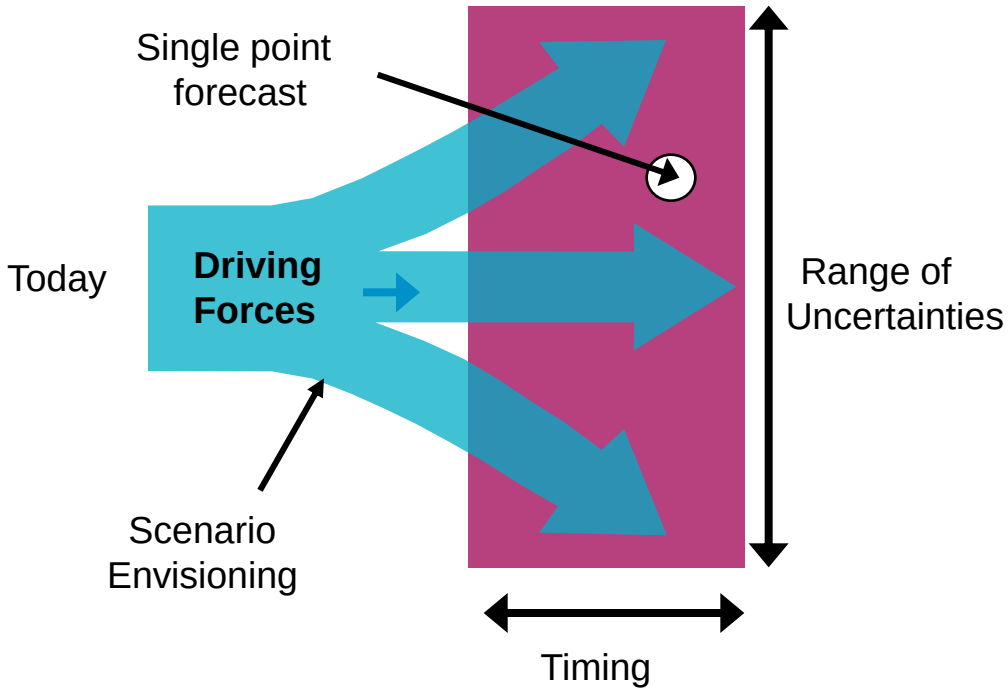
Unbundling recovery simulation model

Over to Canada…



Lessons & Applicability to Canada

Scenario Planning –'what-if' considers future uncertainties: Enables the linking of strategy to service delivery



While Long-Range Forecasts…

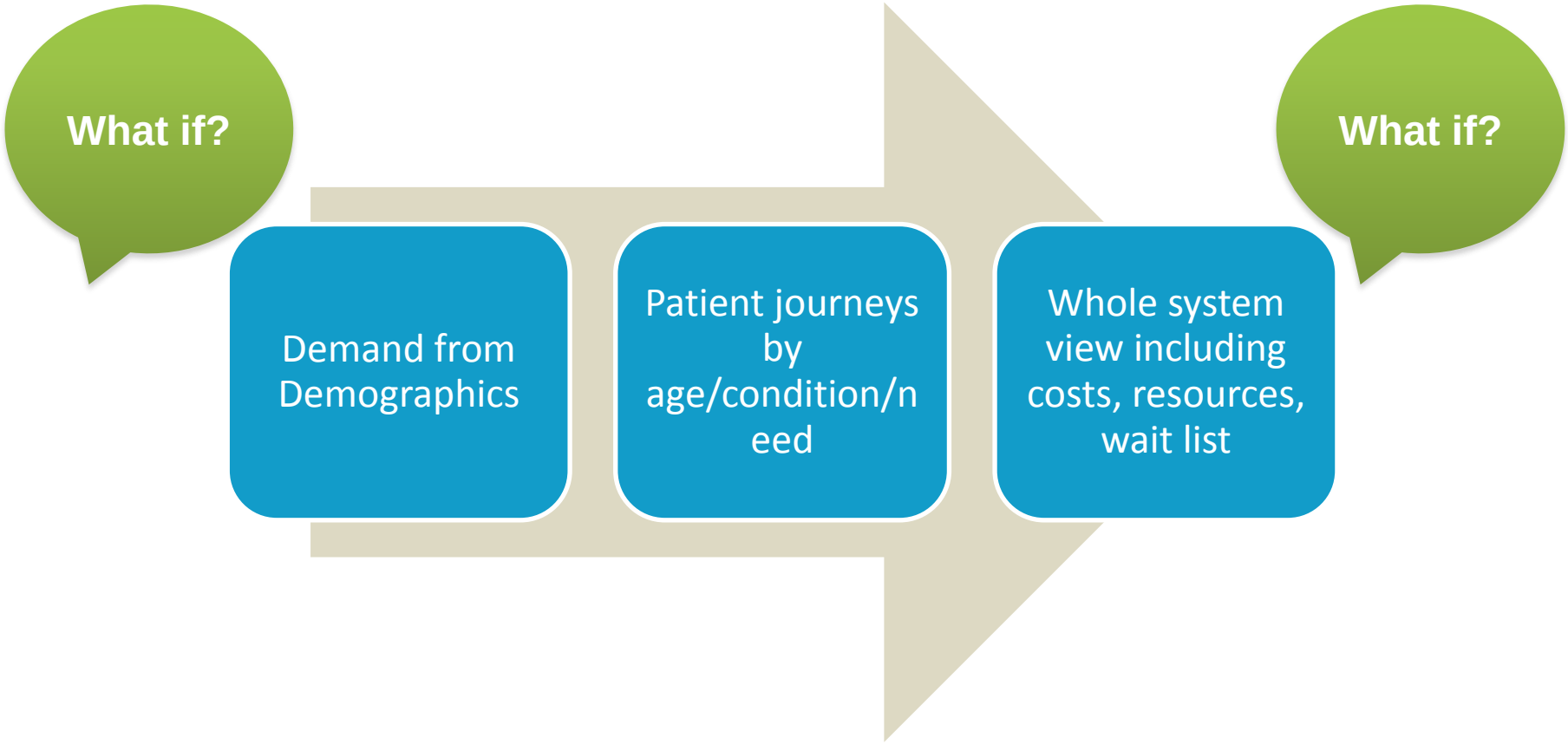
- Extrapolate the impact of known trends and assumptions
- Are important for one year plans
- Are unable to capture the potential impact of key events (e.g., technology breakthrough, capacity and demand changes, government regulatory changes) that could significantly change the system environment for delivery services
- Unable to capture 'true costs' for delivering health and social care services

Scenarios…

- Provide a plausible range of future outcomes and help identify the key "trigger" factors/events that can significantly alter the future
- Take a long view over time, usually 5-10-20 years
- Helps to question consensus and "past to future" linear thinking
- Provide options not a single answer

Impact of whole system change – workforce implications

- **Using new tools to explore…**



Using Predictive Population Analytics to get in Front of the cost curve……

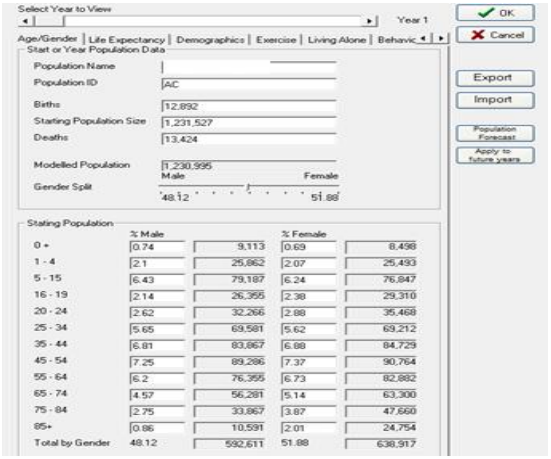
Age-banded population projections → Age-banded disease prevalence → Demand

3 out of 5 Albertans 18+ are either overweight or obese

Adult w/overweight + Obesity Est. 1,732,000

Over weight 35.2%

Obesity 23.9%



Source: HCQA Overweight & Obesity in Adult Albertans: A Role for Primary Healthcare July 2015

SIMUL8 Healthcare

The Pepler Group

NHS England

‘What if’ Scenarios

1. How many children aged 1-15 years with complex needs, stress, anxiety, obesity, diabetes, and mental health, may need to access primary pediatric care services in 2020, 2025 and 2030?
2. What impact do different care stage durations have on cost and resource use for patients with 3+ comorbidities associated with obesity across the continuum of care?
3. What percentage of the population with Type 2 Diabetes had access to a primary care hub and to one-on-one or group sessions led by a nurse practitioner, LPNs, dietitians, or peer coaches in person or virtually?
4. How may increasing population and obesity rates affect future incidence and resource demand over time and what are the workforce implications??

High-Level Overview of Scenarios

Type of Project: Future Scenario Planning

Non-Funded Maternity Care Services to Immigrant & Refugee Women

Business Challenge

- In 2011, the client wished to begin laying the groundwork for a strategic transformation in response to potential reforms to providing care to immigrant women who had were without ‘papers’ and had no status, and no care cards or waiting for deportation,
- Due to the inherent uncertainty around reform and future developments to the change in immigrant status and the ‘high risk pregnancy’ population that the organization served, the client required a scenario planning approach that allowed for different strategic directions given various future scenarios
- The key objective for Project 2011 was to provide a longer-term vision of the costs and possible strategic options

Project Approach

- Developed a long-term vision of partnerships between downtown hospitals for delivering immigrant and refugee care services
- Provided an assessment of new capabilities compared to future capabilities needed
- Developed a portfolio of strategic options for responding to changing federal government conditions over the next decade through stakeholder workshops
- Created a critical decision path for choosing among the strategic options

Client Benefits

- Increased strategic planning to address funding issues, loss revenue, physician collaboration
- Comprehensive understanding of immigrant and refugee needs served for future service delivery development
- Path to transformation that accounts for and adjusts to changing federal government regulations, provincial government, and local provider/funder conditions
- Provincial government committed funding for future immigrant and refugee care

Type of Project: Future Scenario Planning

Linking Food Banks to Chronic Disease

Business Challenge

- Increased awareness of people using Food Banks and the link between health behaviours and health outcomes, Moreover, from a local perspective the report highlights that health behaviours and health outcomes, regarding mental illness, addictions, obesity, diabetes, smoking and cardiovascular disease, oral care.
- A multi-organization partnership explored the link between food banks and chronic disease and could a new way of delivering services to this population group change behaviours and improve outcomes.
- Specifically if a change to access to primary care health services could show a reduction in emergency room visits, hospitalization, a decrease in obesity and improved self care management for diabetes.

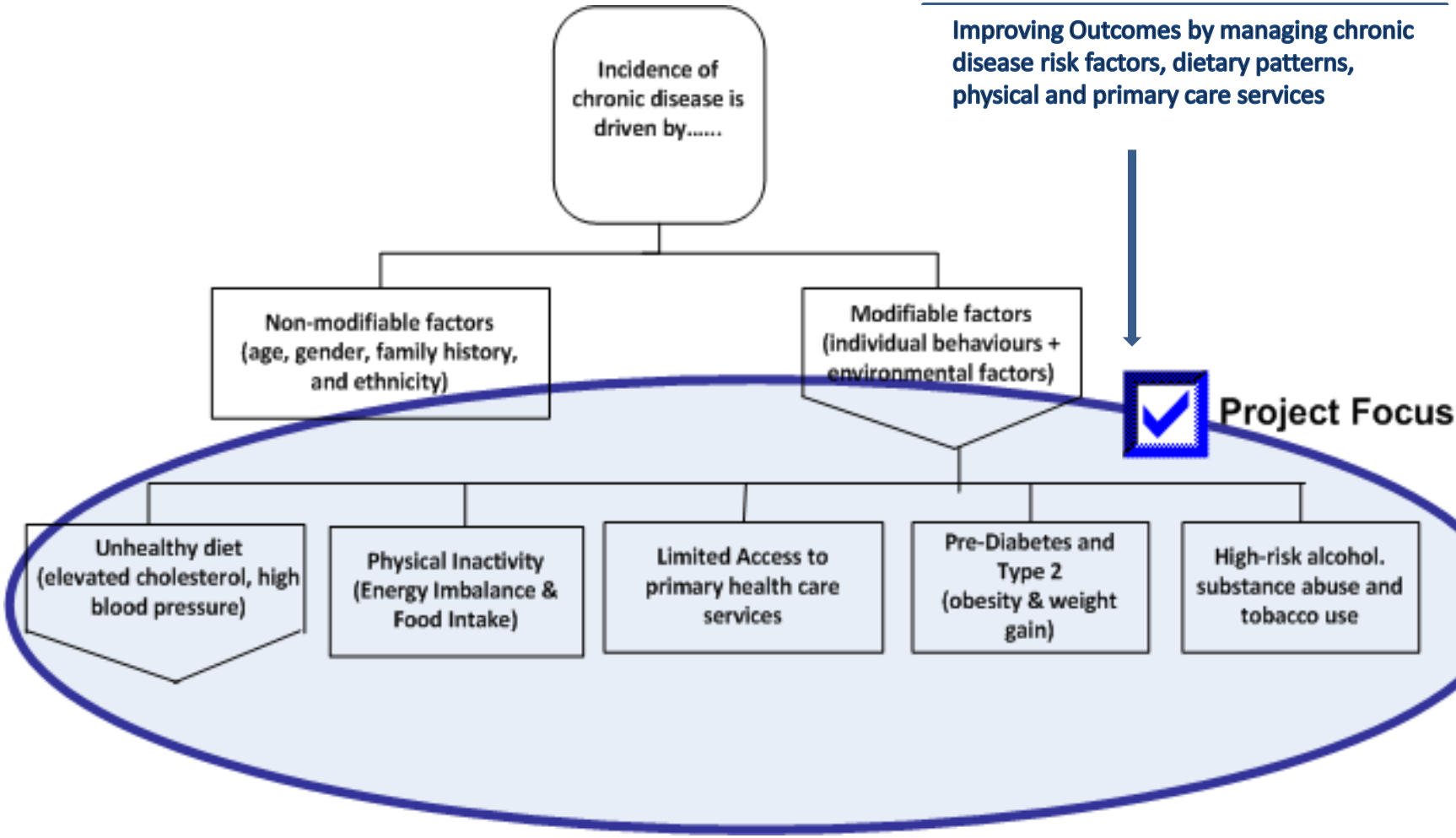
Project Approach

- Activity from population projections, age-related, immigration and ethnic factors, income, and prevalence based data for chronic diseases are all factors shown to influence demand. Thus, a review was conducted of the global, national, provincial and local literature using search terms such food insecurity, food distribution, homelessness and poverty, housing affordability, income and food bank users.
- ,Several scenarios developed and socialized with providers and community stakeholders

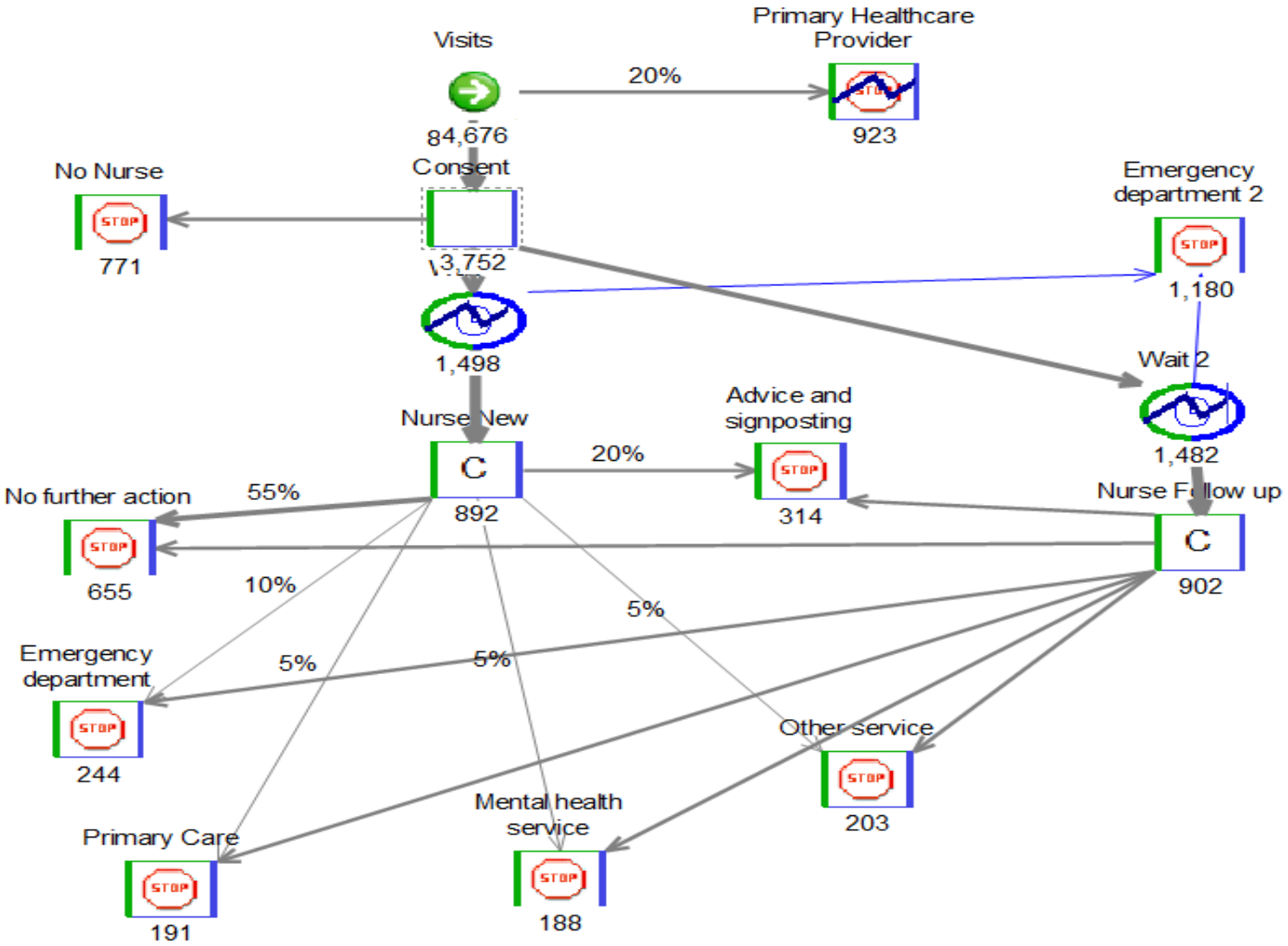
Client Benefits

- A demonstration of the scenario tool (Scenario Generator) was given to the project team highlighting the economic benefits of implementing a Nurse Practitioner Led Clinic. Additionally, a power point presentation
- Identification of partnerships and possible marketing solutions to key stakeholders and potential community and corporate partners.

Demonstration Pilot Goals: Improving Individual and System Health Outcomes

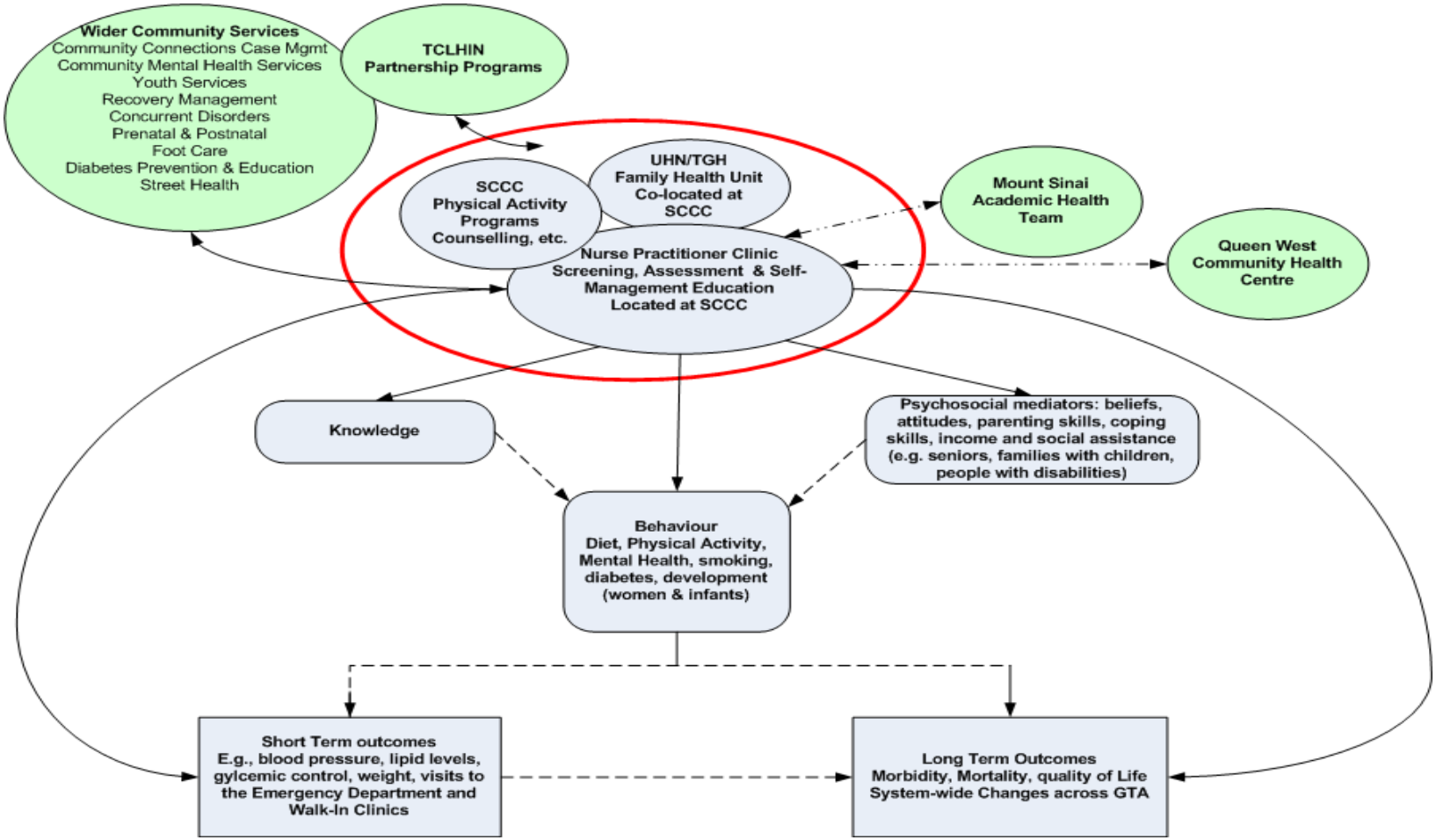


Scenario 1 – Nurse Practitioner Led Clinic



Create a simulation that projects the resource cost savings related to PCS and shows the impact on ED visits

Family Health Team + Nurse Led Practitioner Clinic Pilot – 12 months



Type of Project: Future Scenario Planning

Improving Outcomes for Children & Youth Mental Health Services

Business Challenge

To increase access to children, youth and their families to mental health and addiction services across SW Ontario.

Evaluate the duplication of resources, activities and eliminate and/or reduce the fragmentation and hand-offs between providers to ensure continuity of services for families accessing mental health services.

Identify opportunities for new models of care and partnerships

Explore opportunities for leveraging resources and workforce optimization

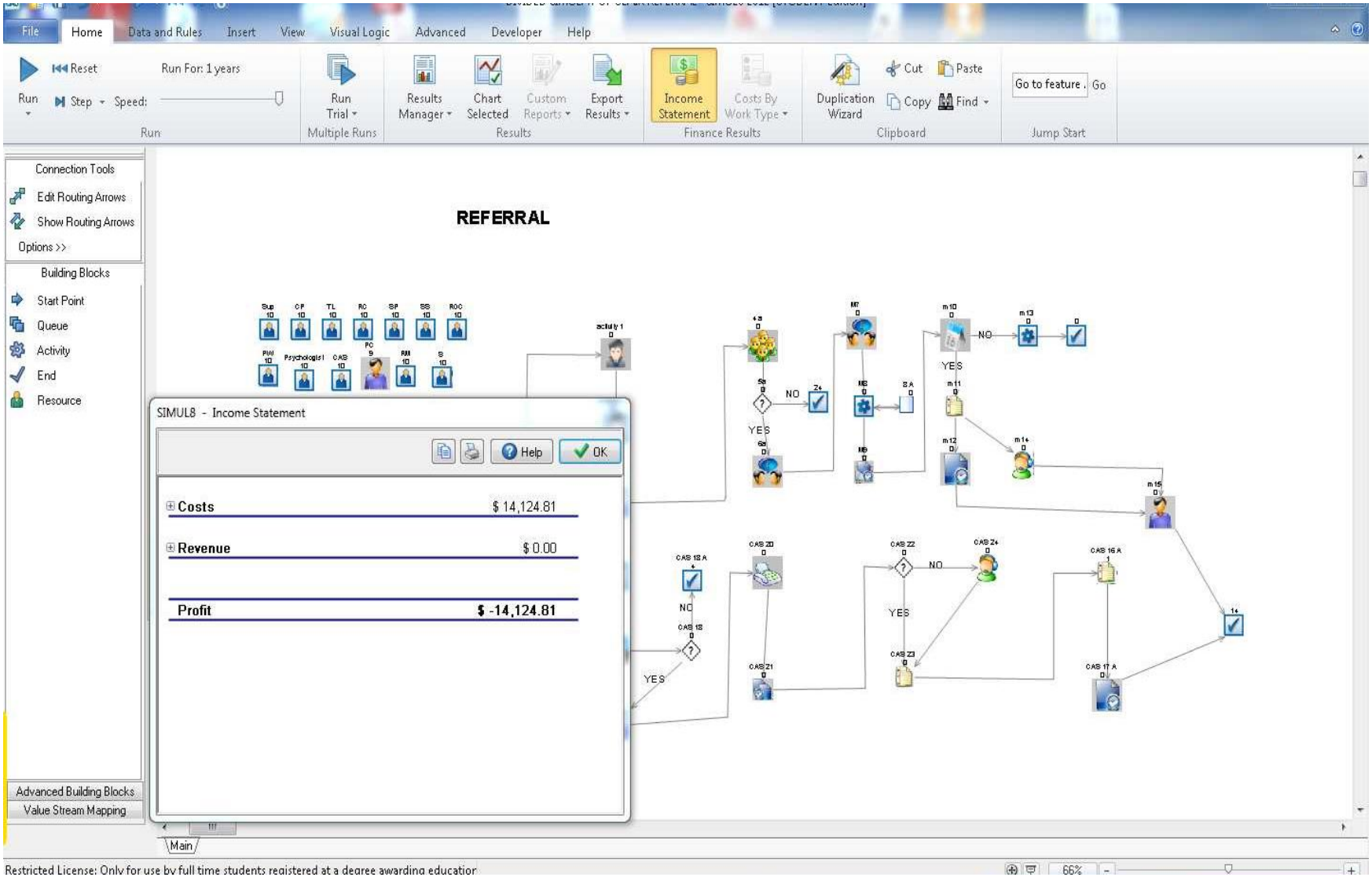
Additionally, the system wide costs were difficult to measure given the disparate data systems, multiple organizations, vast array of providers and funding streams (e.g. health, justice, education, social services, housing)

Project Approach

- Multi-provider (30 CYMH agencies) + 2100 front line staff + 9 Children Aid Societies, + 7 inpatient psychiatric hospitals/units + 5 emergency departments
- Technology enabled collaboration (Think Tank) used to collect front line staff challenges, family experiences and prioritization of challenges
- Scenario planning explored and implemented to drive mind-set shifts to explore resetting their model of care
- Used SG to test new approaches and improvements

Client Benefits

- Increased awareness for the need to rethink partnerships, services and delivery mechanisms
- Five agencies amalgamated to deliver centralized services leveraging resources, funding and workforce
- System-wide standardized approach to assessments across government agencies (e.g. health, social services, education and justice)
- Increased use of tele-health for access to psychiatric assessments and evaluations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Help
Reset
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Run
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Chart Selected
Custom Reports
Export Results
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Income Statement
Costs By Work Type
Finance Results
Duplication Wizard
Cut
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Find
Clipboard
Go to feature
Go
Jump Start
Connection Tools
Edit Routing Arrows
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Building Blocks
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Help
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Revenue
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Profit
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NO
YES
Main
Restricted License: Only for use by full time students registered at a degree awarding educatior
66%

Screenshot of the Simulation Results Report

Intake Process Timings

Process	Average Timing (mins)
Screening	7
Case Creation	3.5
BCFPI	40
Case Assignment	7.5
Appropriateness of Fit	15
Red Flags	10
CFT Case Assigned	12.5
F2F Appointment Coordination	7.5
Case Close out	5

Initial Assessment Process Timings

Process	Average Timing (mins)
Inital F2F Meeting at Agency	67.5
Assessment Meetings	67.5
Red Flag Follow Up	30

Pre-Admission Process Timings

Process	Average Timing (mins)
Pre Admission Case Conference	90
Admin Support	30
Clinical Formulation Report and Update	60
MDT Meeting	90
Other Clinical Services or Consults	67.5
Documentation	20
Admission Meeting	60
Placement Discussion	20
Parental Decision	0
Family Accepted	6
Orientation Meeting	90

Admission Process Timings

Process	Average Timing (mins)
Completion of Admission Package	90
Child in Room	37.5
Admin Documentation	165

Treatment Delivery Process Timings

Process	Average Timing (mins)
Communication	12.5
Document Mgmt	90
Med Admin	15
Child Daily Routine	10
Facility Mgmt	90
Medical Appts	60
Case Reviews	18
Case Mgmt	25
Other Referrals	10

Discharge, Transition, Follow-up Process Timings

Process	Average Timing (mins)
Discharge Planning	120
Discharge Case Conference	75
Discharge Documentation	37.5
Day of Discharge	30
Follow Up	30

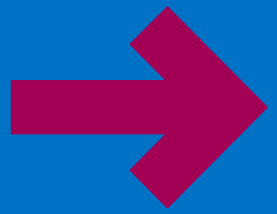
Potential Opportunities for System Reinvestment

Process	Evidence	Possible Solutions	Potential Benefits
Referral **Entry Points average 22** **1300 Children Placed in Residential Services** **Est. 53K days of service**	Multiple Eligibility Criteria Distinct Records Data Disparity Service Fragmentation Service Duplication Multiple hand-offs Significant bottlenecks/delays Multiple Access Points **20-30% non-value activities** **Variation in Screening Tools**	Shared Records Agreed Standards Common Data Set Collaborative Practices Standardized Decision Making Standardized Care Pathways	Integrated Service Processes Reduced Waiting Times Optimized Re[illegible]es Shared I[illegible] Align[illegible]pacity and Dema[illegible] Appropriate Referrals **Cost-Avoidance of approximately 8%**
Intake **Average wait time** **2-4 wks** **Skill Variation Exists**	Variation between services (e.g. community versus residential placements) Data collection of MCYS screening and assessment tools not standardized Resource duplication across the continuum Silos Professions and practices **Single Point Access – 2-4 hours per** **Agency reviewing planned cases add 4-6 weeks to service user waiting time** **40% of resource time attributed to non-direct activities/documentation**	Agreement to vision for client pathways Standardized eligibility and prioritization criteria Common metrics Standardized approach to waiting times and reporting	Increased accountability and transparency Responsiveness to families, children and youth Cross-sector approach to appropriate use of resources Reduced wait times **Potential savings – 28% intake activity steps considered non-value**

$500K

$1.7M

Learning from the collaboration



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