

**Whole  
Systems  
Partnership**



**West Kent**  
Clinical Commissioning Group



**Maidstone and  
Tunbridge Wells**  
NHS Trust



**Kent Community Health**  
NHS Foundation Trust

# **West Kent Local Care System Dynamics Model**

# Local Care system dynamic model

- The development of Local Care is critical to the transformation and sustainability of health and social care systems;
- Building on work undertaken by WSP in a number of STP footprints, West Kent (part of the Kent & Medway STP) has adopted the use of System Dynamics modelling to provide an environment within which local partners can increasingly own a single version of the local truth;
- This approach marries population health needs, service transformation and ultimately the resource requirements for Local Care in a single system with clear and transparent assumption building and the ability to explore 'what-if' futures in a 'safe' way using the simulation tool.

# Local Care system dynamic model

- Local care systems continue to be under significant pressure so any approach to modelling possible futures also needs to reflect and inform the here and now;
- The local care system dynamics model is rooted in the 'do-nothing' and the 'as-is' position, but engages stakeholders in a conversation about underlying demand pressures and their possible causes;
- Navigating ourselves to a manageable future state requires a balance between an understanding of our destination and a means of exploring the journey, including the need to make pragmatic choices today with the confidence that they will not have unintended and undesirable consequences in the future;
- We describe this journey as being 'getting to B from A' rather than 'getting from A to B' so that the emphasis is on conceptualising the future state whilst not losing the current picture.

# Local Care system dynamic model

The key objective for the modelling is as follows:

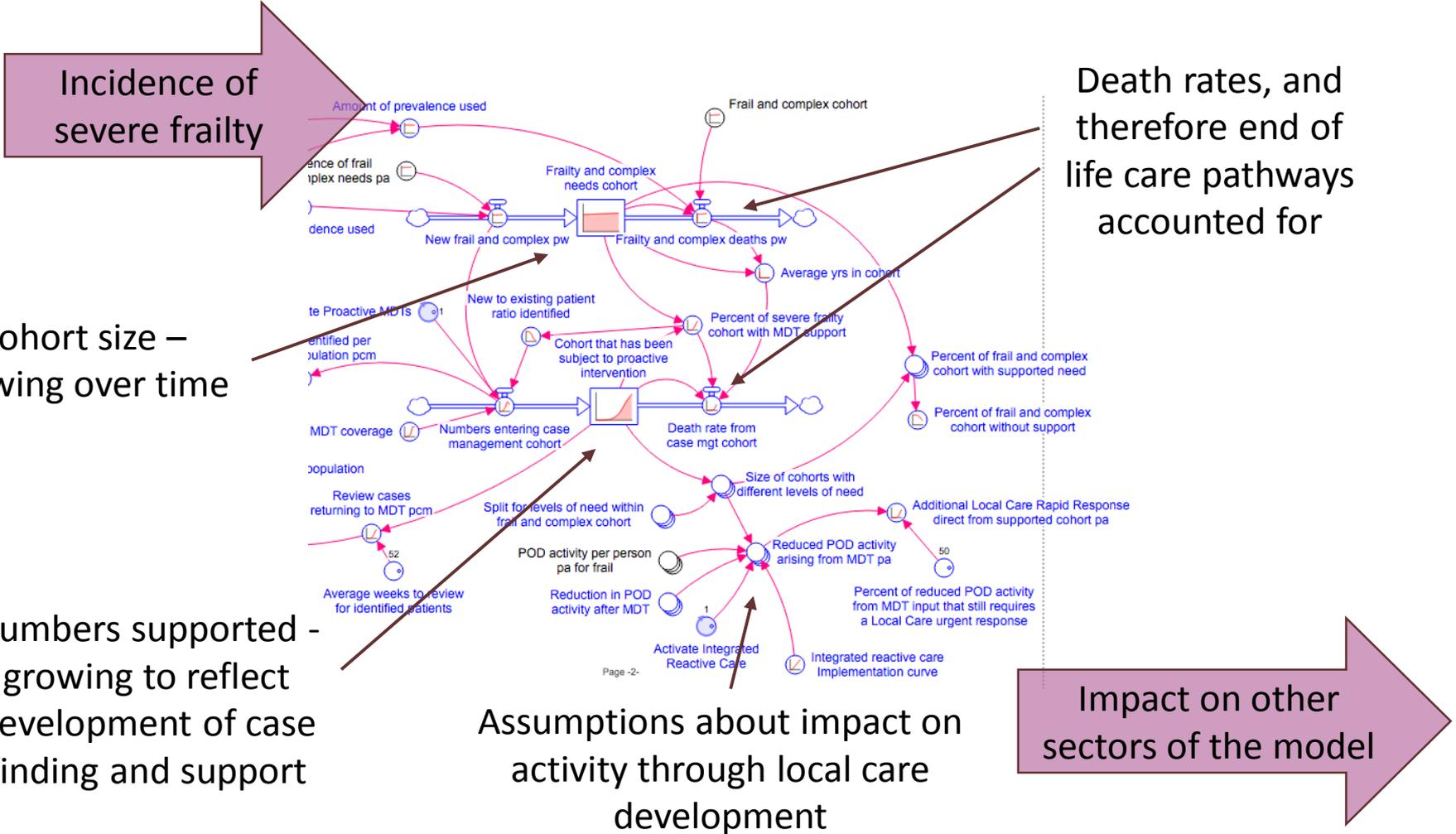
***"To develop a system dynamics model that reflects current STP assumptions and that builds ownership and confidence in implementing the Local Care Model."***

Key requirements are that the model:

1. Reflects the Local Care system being designed.
2. Contextualises and calibrates a Kent-wide approach that underpins the STP to local data and assumptions, including a comparison of the available demand drivers underpinning the 'do nothing' scenario.
3. Produces outputs that scale the capacity requirements in Local Care.

# Local Care system dynamic model

## – an extract to illustrate the 'wiring'



# It's not all about the wiring...

The model interface provides the environment in which to explore the requirements in local care (the example below covers the pre-hospital urgent care pathway) & the impact on POD activity (e.g. A&E)...

**Pre hospital urgent care**

Substitution effect	
	Value
Nowhere	25
111	47
999	3
UTC	15
Pharmacy	10

Urgent need S&T disposition	
	Value
NFA	20
Rapid Response	80
UTC	0

UTC disposition options	
	Value
NFA	95
GP appt	0
A&E	5

Run
Reset

Home
Local care

OP and EL admissions
Non-elective admissions

Improved access to primary care

% improved access appts that meet urgent need

Improved GP access

See and Treat switch

% S&T to UTC that proceed to A&E

See & Treat

UTC switch

UTC coverage

*The impact of local care, were the 'opportunity fully realised, on POD activity...*

CAS disposition options	
	Value
A&E	10
Rapid response	20
UTC	1
NFA	44
Booked appt	25

CAS switch

CAS coverage

6

# Local Care system dynamic model

- Currently the K&M Local Care Investment Plan is based on a range of key data items and assumptions:
  - Points of Delivery (PODs) i.e. high level activity assumptions for A&E, Non-Elective admissions (NEL), outpatient appointments (OP) and Elective admissions (EL);
  - Historic trends in demand for these four PODs (13/14 to 15/16) have been used to project forward from 15/16 to 20/21;
  - Two further assumptions drive outputs from the spreadsheet modelling, i.e. length of stay (LOS) → occupied bed days (OBD) for both NEL and EL.
- The segmentation approach for the current STP modelling has age as the primary category (0-15, 16-69, >70), followed by 8 segments, including 'chronic conditions 4+' with the focus being on the >70s with >4 chronic conditions, although the 'residual challenge' for other cohorts is identified;
- A % reduction in each of the 4 PODs, and in LOS, are applied to the 'do nothing' 20/21 figure using either 'best in class' benchmarking or other evidence of potential reductions and are phased over the 5yr period.

# Local Care system dynamic model

- Retains the four POD structure for purposes of triangulation and financial mapping;
- Explores local trends and cohort needs using a calibrated version of the Kent-wide cohort model now being used to inform the JSNA and blends these to give a new demand driver for each POD;
- Segments by cohort of need, not age (needs led rather than actuarial);
- Identifies impact through care function assumptions as they operate on pathways of need rather than benchmarked/best-in-class methodology (operational rather than statistical assumption building).



# Local Care system dynamic model

- Local analysis plus input from an initial group of stakeholders to:
  - Arrive at a consensus about the ***demand drivers*** for the four PODs;
  - Develop a range of ***implementation profiles*** for each of the different care functions or service transformation plans grouped to map onto one or more of proactive case finding; integrated reactive care; pre-hospital urgent care; integrated discharge; or planned care solutions;
  - Agree assumptions about ***impact***, with scope for testing and scenario building.
- These are captured in a separate document that can be updated as new intelligence of evidence emerges.

# Care Functions

Care function	Brief description of care function
Improved access to primary care	Additional appointments at evenings and weekends, some of which will address expressed urgent care needs and will avoid 111 calls or A&E attendances.
Local MDTs	Case finding and ongoing support for people with high or very high levels of frailty as defined by eFI.
Integrated community rapid response	Any expressed urgent care need that can be resolved through the intervention of a community based rapid response service, typically with a short period of support at home, but excluding P1 (see below).
See & Treat	The ability to address needs following a 999 despatch without conveyance to A&E.
Clinical Assessment Service	The provision of a clinical assessment following initial 111 advice suggesting an A&E attendance that enables the incident to be resolved without such an attendance.
Urgent Treatment Centres	The ability to address all non-emergency needs that require attendance either adjacent to or in a separate geographic location to the A&E Emergency Department.
Pathway 1	Home with support for people presenting mainly at A&E and after admission but requiring an assessment at their usual place of residence including rapid access package of health and social care that enables effective recovery and rehabilitation.
Pathway 2	People who are unable to return home from hospital but who require a period of recovery and rehabilitation in a bed in the community
Pathway 3	People who have complex needs requiring ongoing care and who are not initially able to go home.

# Implementation Profiles

Care function:	Cohort	Narrative	% implementation of care function by end of yr			
			'16/17	'17/18	'18/19	'19/20
Improved/extended access to Primary Care	All	100% capacity will be in place from 1 October 18, with impact fully realised by April 2019 – part of the GPFV improving access to general practice scheme.	-	-	100%	100%
Case finding, integrated proactive care for the severely frail	F&C	Community Frailty Assessment will be in place in all practices by Q3 of 18/19 and will work through new and existing patients with high or very high frailty on GP registers.	-	-	100%	100%
Integrated reactive care	F&C	A rapid response and Home Treatment Service review is underway, and the outputs will inform the final profile. At this stage the profile assumes that 50% of the recommendation (i.e. that additional investment in capacity) from the review is in place by the end of 2018/19	-	-	50%	100%
See & treat by Ambulance Crews	All	The ability to address needs following a 999 despatch without conveyance to A&E. No 'opportunity' built in at this stage - to be reviewed during 19/20	100%	100%	100%	100%
Integrated Urgent Care - Clinical Assessment as part of NHS 111	All	To ensure patients are directed to the right clinician first time and to reduce the number of inappropriate patients to ED through an enhanced CAS, increasing the % of calls dealt with by a clinician from 35% based on the existing non-clinical algorithm to 51% of all calls from April 2019 - linked to Integrated Urgent Care Standards	-	35%	35%	100%

**The adoption profiles indicate expected change from 2015/16 to an optimised implementation at 20/21 – any existing capacity within a care function at 2015/16 is assumed to be factored in to the initial levels of POD activity.**

# Implementation profiles

Care function:	Cohort	Narrative	% implementation of care function by end of yr			
			'16/17	'17/18	'18/19	'19/20
UTC at the front door of the Emergency Department	All	The Five Year Forward View gives a commitment to the roll out of UTCs: open at least 12 hours a day, 7 days a week. The front doors of the ED at Maidstone and Tunbridge Wells have committed to meeting the UTC standards no later than 1 <sup>st</sup> April 19 – linked to UCT standards.	-	20%	40%	100%
Home First – Pathway 1	F&C	Home with support for people presenting mainly at A&E but requiring an assessment at a person's usual place of residence including rapid access package of health and social care that enables effective recovery and rehabilitation. In 15/16 c.20 patients a week were referred to P1 (the baseline), with a current estimate that the full 'opportunity' is 80 per wk. Of this additional 60 patients a week 30 were provided for during the last quarter of 2016/17 (50% of opportunity). It is then expected that an additional 10 (+17%) in 18/19 and 20 (+33%) in 19/20 would fully realise the opportunity – this will be explored.	50%	50%	67%	100%
Home First - Community rehabilitation (pathway 2)	F&C	People who are unable to return home and who require a period of recovery and rehabilitation in a community hospital. The implementation profile reflects the Home First strategy approved early in May 2018 with 12 new therapy beds in place but an opportunity arising from the modelling assumptions of 55 in total . <b>This is the focus of a separate strand of work regarding the future model for beds in the community and different ways of working (i.e. opportunity may be a mix of re-specifying existing capacity plus some additional beds)</b>	-	25%	25%	100%
Home First – complex needs assessment (pathway 3)	F&C	The Home First Pathway 3 is aimed at people with complex long-term care needs and reducing the time these patients spend in hospital at the point they no longer require acute care. The implementation profile reflects the Home First strategy approved early in May 2018. <b>The opportunity will be further understood and explored.</b>	-	40%	70%	100%

# Local Care system dynamic model

Each part of the model responds to a set of assumptions about the expected impact on the baseline 'do nothing' demand profiles for each POD, *for example* the introduction of case finding, MDT support and integrated reactive care will:

1. Reduce the overall incidence of expressed urgent care needs that would otherwise arrive at A&E – in our example by 20%.
2. Reduce the number of non-elective admissions for people with frail/complex needs – in our example by 10%.
3. Of these reductions some of the need will have been prevented and some will have been met by alternative out-of-hospital services – in our example on a 50/50 basis.

Percent reduction in urgent care need for reviewed patients	20%
Percent reduction in non-elective admissions for reviewed patients	10%
Percent reduced POD activity diverted to Local Care	50%

# Model outputs

- The model outputs answer the key question “ what capacity will be required in local care to achieve the expected moderation in demand?”
- The systems model generates a level of activity in Local Care based on the expected/desired level of impact on existing pathways
- This is now being used to translate into a workforce requirement and/or further explore the opportunity presented to look at different ways of working within existing resource/capacity.

# Model outputs

- **Community Frailty Assessments (CFAs)**

- Central to the whole model
- Focused on the population with high or very high levels of frailty – estimated at 14300 (2018) rising to 14900 by March 2020
- Numbers of new cases per week is estimated at 38 rising to 41 by March 2020
- Capacity in the model has been 'capped' at 43 per week – giving capacity for 1118 in 18/19 (PYE) and 2236 CFAs in 19/20
- The cap relates to previous assumptions prior to undertaking WSP modelling
- Whilst the capacity will be enough to keep up with new cases it will not allow what is effectively a backlog to be reviewed – only 15% of the cohort is addressed by 2020.
- This represents an opportunity for further exploration – informed by the capacity that will be in place during 18/19 (the model can support this)

# Model outputs

- **New MDT cases**
  - MDT referrals mainly around high risk frail patients – referrals from GPs or other members of the MDTs
  - Capacity exists through MDT meetings in each of the seven clusters to support 1884 referrals per year (based on 1:3000 referrals per population)
  - Some patients who have a CFA may go on to review through an MDT meeting
  - Some patients who are reviewed at an MDT meeting may go on to require a CGA
- Note – this is not a specific output of the model, it is a capacity that is built into the model

# Model outputs

- **High , medium and low caseload**
  - Following the community frailty assessment the model looks at the expected split across high, moderate and low needs (ability to cope with frailty)
    - 60% expected to need a high level of support of a proactive nature to reduce risk of admission to hospital
    - 40% with medium or low needs and therefore don't require as much support (30% and 10% respectively)
  - The caseload numbers are a constant flow and account for deaths in the population (numbers below will not therefore match the CFA capacity )
  - Based on the above assumptions we expect the caseload to be :
  - In 2018/19 -670 high needs, 335 medium needs and 112 low needs.
  - In 2019/20 – 1984 high needs , 992 medium needs , 331 low needs

# Model outputs

- **Clinical Assessment Service**

- The model focuses on the population with high or very high levels of frailty who utilise 111
- Enhanced clinical capacity in 111 from April 2019 ( linked to Integrated Urgent Care Standards )
- In the model we have assumptions regarding the disposition from the CAS as follows – 10% will go to A&E, 20% rapid response, 1% Urgent Treatment Centre, 25% GP appt (inc home visits) and 44% no further action.
- In 2018/19 we expect 1104 referrals per week from the CAS rising to 2720 in 2019/20 ( split using the assumptions)

# Model outputs

- **Integrated Reactive care**
  - For those who have been through case finding / CFA it is assumed that the rate at which urgent care needs emerge will be reduced through proactive work
  - The model assumes that there will be an 20% reduction in A&E attendances for those in the cohort and a 10% reduction in non elective admissions – half of this reduction are assumed to need a rapid response intervention
  - **In 18/19 the additional referrals to the Rapid Response and Home Treatment Service will be an additional 34 per week rising to 73 per week in 2019/20**
  - This is additional activity as a combined effect of all other changes set out in the model
  - An average 6.8 day length of stay under reactive care is built into the model
  - It is important that the reactive care function is a single function to ensure sustainable service supporting multiple referral points – Rapid response / HTS review in final stages

# Model outputs

- **Home First - Pathway 1**
- Home with support for people presenting mainly at A&E but requiring an assessment at a person's usual place of residence including rapid access package of health and social care that enables effective recovery and rehabilitation.
- In 15/16 c.20 patients a week were referred to P1 (the baseline), with a current estimate that the full 'opportunity' is 80 per wk.
- Of this additional 60 patients a week 30 were provided for during the last quarter of 2016/17 (50% of opportunity).
- It is then expected that an additional 10 (+17%) in 18/19 and 20 (+33%) in 19/20 would fully realise the opportunity – this will be explored.

# Model outputs

- **Home First - Pathway 2**

- The model suggests that if we did nothing then an additional 55 beds in the community might be needed (over and above 2015/16 levels)
- The implementation profile in the model already reflects the 12 therapy beds that were in place during 2017/18
- We are already assessing the model outputs through a separate strand of work regarding the future model for beds in the community and different ways of working (i.e. opportunity may be a mix of re-specifying existing capacity plus some additional beds)

# Model outputs

- **Home First - Pathway 3**

- The model suggests that capacity for an additional 46 patients on pathway 3 will be required at any one time (over and above 2015/16 capacity of 20 beds)
- The system is currently operating within 50 pathway 3 beds at any one time – this means 30 of the additional 46 (over and above starting point of 20 beds) has already been identified
- This would therefore suggest that a potential further opportunity may exist for another 16 pathway 3 beds by the end of March 2020 – this will be explored
- Further work to be undertaken linked to wider modelling of all Home First pathways
- Important to note that seasonality impacts on requirements so not ‘fixed’

# Impact on activity

- The demand drivers, assumptions and implementation profiles are used in the model to forecast the combined impact on activity from the care functions
- **The impact in 18/19 and 19/20 is from the reactive and discharge planning functions**
  - **A&E attendances** - a reduction of 1,780 in 18/19 and 3,994 in 19/20 when compared with 'do nothing' (137,740 and 142,929 respectively), with the impact arising from the clinical assessment service in 111 , integrated reactive care and improved GP access
  - **Non-Elective admissions** – reduction of 371 in 18/19 and 1,233 in 19/20 when compared with 'do nothing' (45,313 and 46,491 respectively), with the impact arising from integrated reactive care and Home First Pathway 1
  - **Non-elective occupied bed days** – reduction of 13,728 in 18/19 and 23,938 in 19/20 when compared with the 'do nothing' (221,742 and 226,274 respectively), with the impact arising from the integrated re-active care, Home First Pathways 1, 2 and 3

# Impact on activity

- In addition to the NEL admissions - 30% (31) of falls business case impact (PYE from October) should be added to give a total impact.
  - A specific query is being run through the WSP model to determine the correct proportion of falls impact to include as the business case focused on over 65yo and the model is focused on the most complex patients; therefore some of the falls impact is already within the model output.
  - A&E, NEL Admissions and NEL OBD impacts will be updated once the above has been determined
- The proactive care function (case finding) will mitigate future growth - involves a holistic review of the patient and may lead to MDT discussion, goal setting, care planning and multidisciplinary interventions targeting the specific areas affected for the individual
- Important to note - ongoing positive discussion and challenge around assumptions, impacts and opportunities will be required – it's a dynamic model and can be used to explore alternative scenarios.

# Next Steps

- Monitoring to be established (where not existing) for each of the care function outputs – to be used going forward to aid positive discussion and challenge around assumptions, impacts and opportunities;
- Specific work stream on beds in community model underway – using outputs from the modelling work to understand remodelling vs additionality requirement;
- Commenced the workforce transformation modelling – system wide workshops planned;
- A description of the future workforce for local care by function can then be set against the ‘as-is’ workforce across the system, including where appropriate in General Practice, Social Care and the wider voluntary and independent sector.
- Planned care system dynamic modelling
- Discussions regarding further modelling – past 2019/20