

Commissioning for Complexity: exploring the role of System Dynamics in social care

KEY POINTS

- System Dynamics provided a conceptual framework through which commissioners could gain an overview of the services within the system and how they inter-relate.
- Iterative group model-building by stakeholders provided a way of achieving consensus with the emergent model structure.
- The interactive nature of the model enabled commissioners to feed in data on future needs and test different combinations and capacities of services.
- The availability of relevant and accurate data was a key issue that must be considered before developing a model. If not available then time must be built into the project to gather the required data.
- System Dynamics could make a positive contribution to social care commissioning if used on a medium-long-term basis to allow for development of data sets and potential scenarios.

INTRODUCTION

Commissioning has been defined as 'the process by which public services plan the services that are needed by the people who live in the local area, ensuring that these are available, high quality and appropriate' (UoB 2014, p37). This is often presented as a cyclical process in which local

System Dynamics uses computer modelling and simulation techniques to facilitate understanding of (or learning about) how complex systems behave over time.

This scoping project sought to explore the potential contribution of System Dynamics to social care commissioning through testing its application within services for people with a learning disability

authority commissioners assess the future needs of a population, develop a system of care that are required to meet these needs, and then design and deliver a market strategy to ensure the services are in place. While this process is simple in principle, achieving it in reality is complex. This is due to uncertainties in what future needs will be, often inadequate evidence on the strengths and weaknesses of alternative models, and the need to ensure that different services in social care are successfully interlinking and supporting individuals and their families.

System Dynamics combines qualitative 'systems thinking' with computer simulation to model the interactions between different elements of the system. In particular, it seeks to represent the feedback loops that are in place. These include 'positive' feedback which reinforce a behaviour of the system (for example the spread of a flu virus in which increased numbers infected in turn raises the rate of infection) and 'negative' feedback which arise from a 'limit' in the system (for example a reablement service which has insufficient capacity to support

The study represents independent research funded by the National Institute for Health Research (NIHR) School for Social Care Research (SSCR). The views expressed are those of the authors and not necessarily those of the NIHR, SSCR, Department of Health, or NHS.

NHS
National Institute for
Health Research



all people being discharged from hospital leading to people remaining on the ward longer than necessary (see McKelvie 2013 for a comprehensive overview of System Dynamics).

This scoping project sought to explore the potential contribution of System Dynamics to social care commissioning through its application within services for people with a learning disability.

It worked with social and health care commissioners in one local authority area to explore the potential impacts of introducing a community-based intensive support service for people with a learning disability and complex behavioural needs. In particular, the commissioners wanted to understand the impact on admissions to residential care and in-patient treatment facilities.

The initial overview of the model was developed through a stakeholder workshop and then refined through discussions with the commissioners. Data from the locality, national data sets and research were then used to populate the model. A second workshop enabled stakeholders to provide further comment and to test out different service configurations in light of the anticipated needs and demand.

THE MODEL

The first workshop began by developing a high level view of the population of people with a learning disability and the health and social care system that supports them. This model differentiated between the population in question (people of working age), and those groups which connect with this (i.e. children who move in to adulthood and adults who are aged sixty-five years of older). The model also included services to support those of adult working age and the funding available.

The focus of the project was the impact of an Intensive Support Service (ISS) on the use of in-patient beds and out-of-borough (OOB) residential care home and therefore this element of the system was developed in more detail. The adult population of people with a learning disability was categorised into levels of need ('states').

Figure 1 represents the population of adults with learning disability. Rectangles represent all possible states, being people:

- with simple needs
- with complex needs but stable (including many with care packages)
- experiencing a crisis
- in local hospital
- in hospital out of borough (OOB)
- in residential care out of borough.

These states are mutually exclusive and exhaustive. The straight double-arrows are flows of people moving between states; such as moving from having a simple level of need to complex need, or onset of a crisis. Understanding these flows helped the commissioners to understand the difference that will be made through introducing the ISS or changing its capacity. To simulate this, we had to consider what drives these flows. The kind of variables that drive these flows include: the probability that something will happen; the mean duration of an episode; the proportion going next to state a, b, or c. For example: The proportion of people with complex needs who experience a crisis; The mean duration of a crisis; The proportion of crises that result in hospital admission; What these durations and proportions would be for people if on the ISS caseload.

Figure 2 shows how to how this impact was modelled. Impacts are drawn as curved red lines; plus and minus signs show the direction of influence. The purpose of an ISS is to help people 'in crisis' therefore we modelled how the ISS influences flows out of that state. Given effective intensive support, people in crisis are MORE likely to return to a stable state, and LESS likely to need either hospital admission or placement out of borough.

Once the model was developed the commissioners could test out how differences in the capacity of the ISS would influence people being admitted into in-patient beds or moving into OOB placements.

Figure 1: Population of adults with learning disability

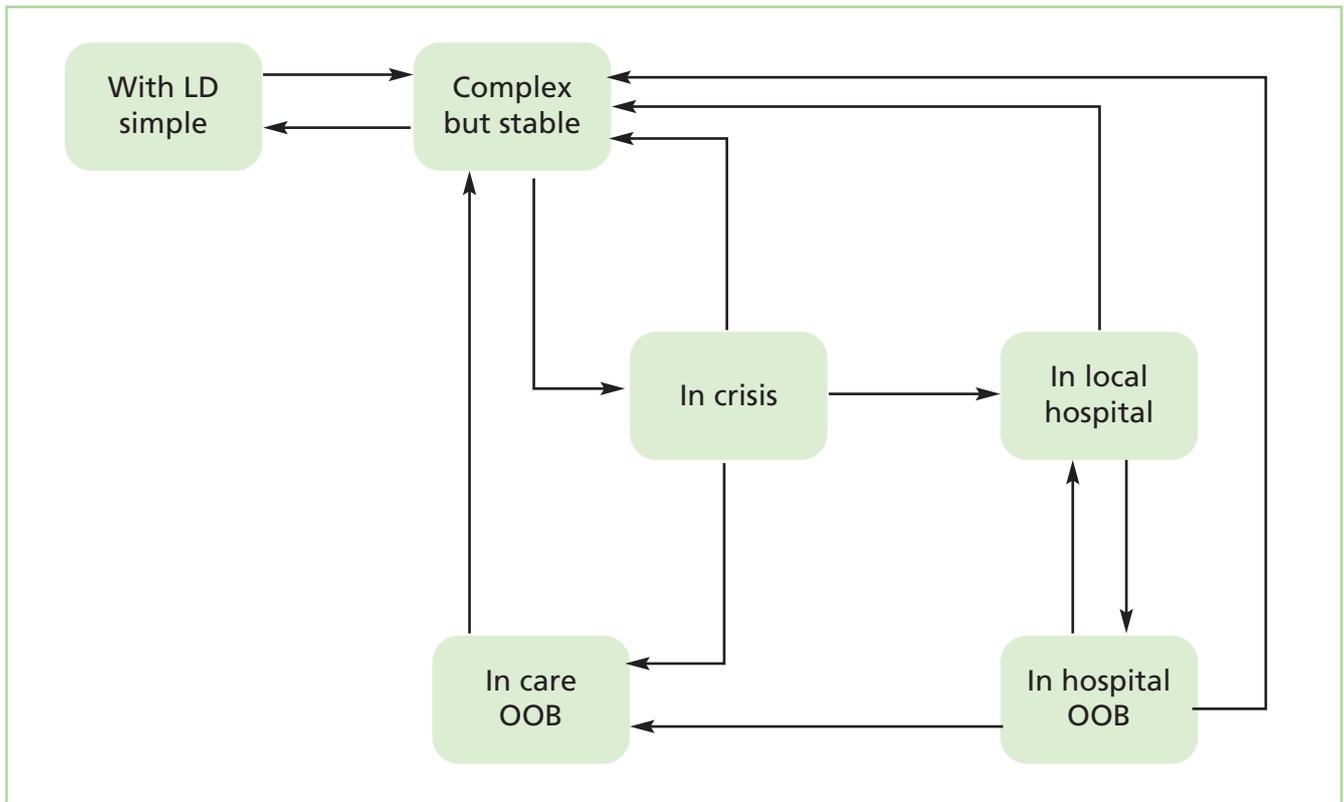
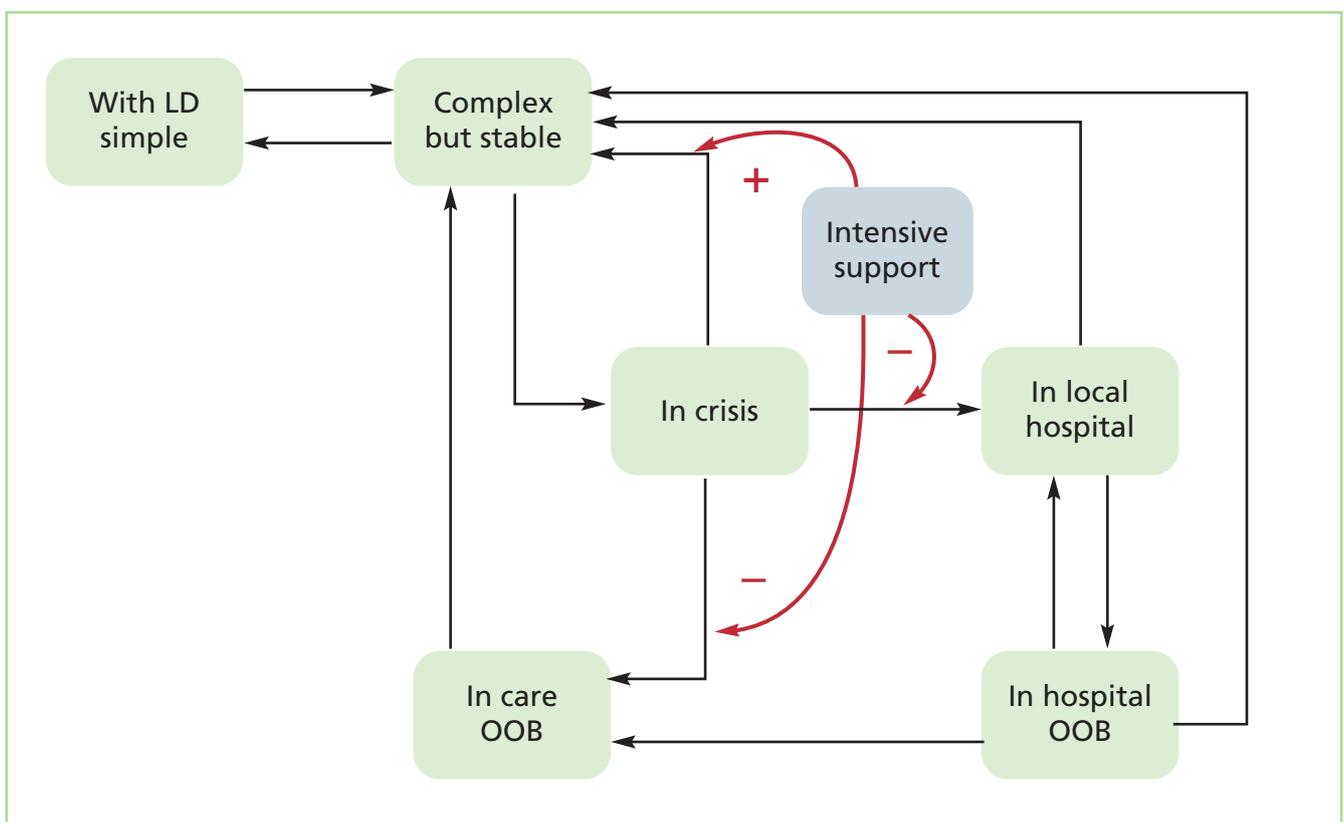


Figure 2: The impact of intensive support



POTENTIAL ROLE OF SYSTEMS DYNAMICS IN SOCIAL CARE COMMISSIONING

As might be expected, initially the commissioners found the language used within System Dynamics to be unfamiliar. However once they understood the terminology and key concepts that lie behind the modelling they found it an accessible framework. It provided a helpful birds-eye view of the main services and the interactions between them. The interactive nature of the model was of particular benefit, as it enabled commissioners to input data on future needs and test different combinations and capacities of services. The process of developing the model was also helpful in itself as it required commissioners with different responsibilities and providers to make explicit their assumptions and to share their knowledge and insights.

Developing the model required two workshops and a limited number of individual discussions between the modeller and key stakeholders. The commissioners saw the insights that the model provided as being of considerable value with the benefits outweighing the cost of commissioner time and focus. For example, the model has been used to identify the future capacity that will be required within the intensive support service and this is predicted to be greater than the commissioners initially expected.

The main difficulties were related to data and consistency of commissioning personnel.

The data that commissioners saw as most helpful was not always available or accurate. This meant that some aspects of the model had to be populated by national data sets or by local data that was only partial. With a longer-term engagement that the scoping project allowed the data might be improved and the model refined as live data for the ISS came on stream.

Even over the short time of the project there was considerable change in the people undertaking the various commissioning roles and in the priority demands on their time which did affect continuity in discussions.

ABOUT THE RESEARCH

The research team would like to thank Sandwell Metropolitan Borough Council and Sandwell & West Birmingham Clinical Commissioning Group for their commitment, time and enthusiasm.

The project was carried out by Dr Robin Miller, Senior Fellow, Health Services Management Centre at the University of Birmingham; and Douglas McKelvie, Partner, The Symmetric Partnership

It was also recognised that there is a danger that the insights that the model produces regarding cost could dominate other considerations such as quality of life, which could be modelled but for which in this instance the data was especially sparse.

CONCLUSION

This project would suggest that System Dynamics could make a positive contribution to social care commissioning. To achieve the maximum benefits requires a medium-term commitment from local authorities to ensure that commissioners can maintain their focus and enable the development of relevant and accurate data sets.

A more detailed appendix outlining the key elements of the model can be found at www.symmetricpartnership.co.uk/resources/index.html#publications.

REFERENCES

- McKelvie D (2013) *Modelling Social Care Complexity: The Potential of System Dynamics*, London: SSCR ([/www.sscr.nihr.ac.uk/publication/mr014](http://www.sscr.nihr.ac.uk/publication/mr014)).
- University of Birmingham (2014) *Commissioning for Better Outcomes: A Route Map*, Birmingham: HSMC (www.birmingham.ac.uk/schools/social-policy/departments/health-services-management-centre/news/2015/02/commissioning-for-better-outcomes-a-route-map.aspx).