

Post-hospital intermediate care – Examining assumptions and systemic consequences of a health policy prescription

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Extended abstract

The provision of health and social care for an increasing elderly population is a challenge facing many societies. The financial and social problems associated with long-term institutional care and the use of beds in acute hospitals by patients who are medically stable and do not necessarily require expensive hospital care have gained particular attention. UK policy makers advocate the establishment of intermediate care services as a partial solution to both of these problems.

In this presentation system dynamics is used to examine the logic behind these policies and bring into focus the crucial role of (frequently overlooked) assumptions about costs and outcomes of intermediate care for their systemic consequences. This work shows how valuable and practically relevant insights can be gained from an analysis of the sensitivity of the behaviour of a relatively simple model to changes in underlying assumptions, even if the quality of the available data is poor.

Key words: health care, social care, sensitivity analysis

The policy issue: care for the elderly and intermediate care

The proportion of elderly people is increasing in many industrialized societies. The provision and funding of adequate health and social care is becoming more difficult. Elderly patients constitute a large share of hospital inpatients and frequently require long-term care. Among the particular concerns with the current situation are the high cost of institutionalisation partly resulting from the failure people to achieve their full rehabilitation potential and from prolonged hospital stays by patients who are medically stable and could be cared for in a sub-acute setting.

Health policy makers in the UK advocate the use of post-hospital intermediate care to mitigate both of these problems. Intermediate care is in this context understood as a time limited care service (normally six weeks or less) in a sub-acute setting (in their own homes or in specialized facilities) for medically stable patients which aims to rehabilitate them so that they can retain their independence.

The hopes connected with intermediate care are high: both to provide better care outcomes and to reduce costs. However, so far the evidence base for the effect of intermediate care and its cost-effectiveness in a whole systems view is quite limited and some critics of intermediate care fear substandard care or an inappropriate moving of the burden from acute hospitals to others (such as primary care, informal carers, private payers and social services).

The aims and scope of this work

The presentation aims to show how a system dynamics approach can help in this situation and inform the policy debate on intermediate care. While the primary aim of the work is to contribute to health and social care policy, this work aspires also to demonstrate that system dynamics methods are well suited to deal with situations in which the quality of the available data is poor.

The work examines the consequences of post-hospital intermediate care on the health and social care system. The work focuses on intermediate care services for a specific patient group: elderly patients who after hospital treatment are medically stable and would without intermediate care rehabilitation be destined for long-term intermediate care. Other patient groups which might receive intermediate care are not considered here.

Previous use of system dynamics in care policy planning

System dynamics has been previously used for the study of policy issues in the provision of health and social care for the elderly: Wolstenholme (1993 and 1999), Linard (1996) and Walker and Haslett (1999) are some examples.

The discussion in Wolstenholme (1999) includes specifically pre- and post-hospital intermediate care and advocates the benefits of intermediate care from a patient flow perspective. The work reported in this presentation aims to add to knowledge by studying in more detail a smaller part of the system and, in particular, by including the factors influencing the rates of patient flows, costs and resource constraints as well as the outcome of intermediate care treatment.

Dealing with imprecise data

A major problem in many areas of health and social care policy planning is the poor availability of precise data. This problem exists also with the issue at hand. In their system dynamics work on care services for the elderly Wolstenholme (1993 and 1999) and Linard (1996) have shown that some insights can be gained from structural analysis and estimates of some parameters.

The study of the structure of the system can provide valuable insights, but major features of the problem are not satisfactorily addressed (from a policy perspective) by

this approach. Without simulation, the strengths of system dynamics to contribute to important features of the problem (e.g. the 'recycling' of patients) are not fully exploited. Homer and Oliva (2002) have argued that simulation can almost always add substantial value beyond the analysis of the structure alone, while Coyle (2001, 2002) has warned against misleading results caused by reliance on inaccurate quantification.

Major uncertainties exist in the problem under study here, in particular, the relationship between spending on intermediate care and its short and long-term treatment outcomes. Only limited trials of intermediate care services have been evaluated and these services had quite different characteristics in terms of costs and outcomes. In order to deal with these difficulties, the work reported here therefore explores how sensitive the impact of intermediate care services is on different assumptions on intermediate care spending and outcomes etc.

A model of the impact of post-hospital intermediate care

The work is based on a simplified model of the health and social care system in order to reveal more clearly the relevant features. In addition to "Independence at home" only these care settings most relevant for the discussion (hospital, intermediate care, institutional care, and home care) are distinguished. Patients move (potentially after some wait) between the care settings and can in particular return to the hospital. The rates of patient flows are partly based on typical values. Some rates are influenced by different assumptions about the relationship between spending and short and long-term outcomes of intermediate care and rules regarding the allocation of resources. The sensitivity of the simulation model in terms of cost and patient flows to changes in these assumptions and to different resource allocation policies was tested.

Key lessons from simulation and sensitivity analysis

A major influence on the behaviour of the system are patients which fall ill some time after treatment and have to return to hospital requiring expensive treatment. Depending on the mechanisms of resource allocation, this can even lead to a feedback loop of reductions in funding available for intermediate care, reduced quality of intermediate care and worse outcomes, etc.

Much of the current debate about intermediate care services is based on the assumption that such services can at the same time reduce short-term costs (i.e. these services are cheaper than a further stay of the patient in an acute hospital) and provide better care outcomes. However, there are some indications that this does not hold in reality. The analysis of the model indicates that even if treatment costs for high quality intermediate care are higher than alternative hospital care, savings can still be made in the longer term if institutionalisation can be avoided as a consequence of rehabilitation. In contrast, however, cheap, but low quality intermediate care is likely to raise costs in the long run, as it does not result in sustainable long-term avoidance of institutionalisation.

The impact of intermediate care on the health and social care system could be greatly improved if the risk of people returning to their homes and subsequently falling ill and requiring hospital treatment could be managed and reduced. Practically this could be achieved by better support of the individual in the home, using, if human carers are not available, ICT technologies to provide access to support and raise alarms in case of emergencies such as falls or the detection of a deteriorating health status (telecare). In future work it should be examined to what extent the combination of intermediate care with improved support in the home can have improved systemic outcomes.

Conclusion

This work demonstrates how a system dynamics approach can contribute to an important debate in health and social care policy. Even when there are substantial uncertainties, a simulation model can, in combination with sensitivity analysis, provide insights into which influences might be relevant and which issues demand further scrutiny because systemic consequences are substantially dependent on more precise knowledge. A system dynamic approach helps to clarify the case for intermediate care and brings into focus the crucial assumptions regarding cost and effectiveness on which this case rests. The study draws attention to the importance of the fact that patients might "recycle" through the system, emphasises that higher costs in the short-term might lead to savings in the long-term and that intermediate care might benefit from being combined with policies to improve support at home.

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