

**SYSTEM DYNAMICS AND
ACTION RESEARCH IN AGED
CARE**

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Abstract

This paper reports on an action research project undertaken to implement a continuity of care model in an extended-care centre. System dynamics modelling and group-modelling techniques were used to examine and improve patient stay times. The paper documents the success of the project, the reduction of patient stay times, improvements in team work and staff morale, as well as systemic adaptations of the rest of the system. It also demonstrates the unintended policy consequence where upstream providers responded to the reductions in patient numbers by swamping the centre with intractable patients which effectively reduced upstream providers' patient stay times and caused the centre's patient stay times to return to pre-intervention levels.

SYSTEM DYNAMICS AND ACTION RESEARCH IN AGED CARE

INTRODUCTION

Broad policy and practice changes had led to changes in the framework for hospital funding in Victoria resulting in a reduction in base services. Within the Aged Care Program, these funding changes had been accompanied by an average growth in the older population of 1.9 percent per year. In "Aged Care in Victoria: The 1996-97 Budget", the Department of Human Services (DHS) proposed two sub-acute purchasing models for the inpatient services. One continued the existing variable funding model; the other required a redefinition of service targets and funding allocation for streams of care, along the continuum of care, across inpatient, residential and community settings (DHS 1996). The funding policy for the second model was based on the substitution of the bed-based service by a community option where continuity of care programs provided care and support for ex-patients in their home. The paper discusses an intervention, using Action Research, to implement a continuity of care program in an aged care centre.

ACTION RESEARCH

Action research was characterised as a cyclical inquiry process in which a problem was diagnosed, an action was proposed and implemented, and the results evaluated (Warmington 1980; Checkland 1991). The evaluation leads to further insights which were then implemented and again evaluated. An essential feature of the process was the focus on those staff who were assumed to have an intimate knowledge of the system and were in the best position to diagnose the problems and implement suggested solutions. These staff were involved in all stages of the research – sanctioning the research, defining the problems, designing the inquiry, collecting and interpreting the data and validating the results, action plan and implementation (Marsh Russell & Robinson 1984).

Cunningham (1993) referred to four varieties of action research. These were diagnostic, participative, empirical and experimental action research. Diagnostic action research was 'a process of becoming aware of the problem and offering solutions to them' (p. 15). Warmington (1980) emphasises the partnership required by the researcher and those involved in the problem.

ORGANISATIONAL CONTEXT

Following a review of metropolitan hospitals and services in 1995, health care networks were established in Victoria. Each network was required to develop a health services plan that would facilitate the redistribution of services and provide a seamless health service within easy access of those who needed them. The aged care centre under study was a member of a health care network, which provided a range of clinical services along the continuum of life and in a number of settings.

The extended-care centre in which the project was undertaken provides aged care and psychogeriatric inpatient, outpatient, community and residential services. The Inpatient Services, the focus of the project, was structured into four clinical teams, three Aged Care Program teams and one Psychiatric Program team lead by geriatricians or a psychiatrist respectively. Nursing and allied health clinical staff could be assigned to one or more teams. Only the Aged Care teams were involved in the Continuity of Care initiative.

The Development of the Continuity of Care Initiative

To meet the strategic directives of the network and the funding requirements of the Department of Human Services, it was necessary to change the provision of inpatient services. The aims for the Continuity of Care initiative were agreed to in negotiations between management and the Department of Human Services.

These were:

- to facilitate the continuity and coordination of care between the inpatient and community programs for the aged, and
- to reduce the length of inpatient stay and to reduce the cost of the episode of care.

The main problem identified was how to change the traditional way of providing an aged care inpatient service in order to achieve specified outcome targets where the approach for achieving the targets was not known. This was the problem the Inpatient Services Manager needed to address.

The Inpatient Services Manager negotiated with the General Manager to combine her management role with that of internal consultant and change agent. They also agreed that the process of change would benefit from being conducted as an action learning project.

The Change Objectives

Two key questions provided some initial direction for the implementation of the required change:

- What changes were needed to the care management process to enable the implementation of an alternative method of care management?
- What system strategies/tools could be used to inform decisions and facilitate the change process?

The success of the action learning change project was to be considered against the following criteria:

- the ownership of the process improvement strategies by the clinical team members;
- the development of new skills by team members;
- the development of the group as a high performance team;
- the contribution to the body of knowledge in the areas of organisational theory, and systems thinking methodology as applied to the health-care system, in particular aged care.

THE CHANGE PROCESS

The process had three stages each followed by a period of reflection:

1. Formation of a project team for the Continuity of Care initiative
2. Exploration of the inpatient care process
3. Implementation of the change

Formation of a Project Team

The change project required both the diagnosis of the problem and the involvement of representatives of all clinical disciplines from the inpatient team. Their involvement was important for two reasons: first for understanding and agreement on the scope of the project, and second, for the implementation of the plan before the end of the financial year. The change process was therefore managed by establishing a multi-disciplinary team and the conduct of weekly cross-functional meetings.

Reflections on Formation of a Project Team

The Inpatient Services Manager had deliberately not been prescriptive as to the strategies that could be undertaken to bring about a change to the inpatient process that would facilitate the achievement of the output targets. She had, as Burns (1993) suggests, stated that there was 'no single determined future but a panoply of potential futures depending on which purposeful decisions and actions we take. The past was gone forever but the future was still ours to determine' (p. vii.).

After the initial meeting, the Inpatient Services Manager realised that some staff were not comfortable with the abstract nature of the process and expected to be given instructions on what to do. Some staff were not comfortable with the responsibility of identifying the change options to meet the targets of the project. In addition, other clinical staff were not comfortable with the prospect of working both in the inpatient setting and in the community setting. The commencement of weekly forums where issues were addressed assisted in resolving their discomfort.

Exploration of the Inpatient Care Process

The Inpatient Services Manager, the Project Coordinator and the Project Team worked collaboratively to create the Continuity of Care Model and identify the time frame for the new inpatient service, now known as the Continuity of Care project.

(Figure 1 about here)

During the early phase of the project, the team activities centred on the examination of the infrastructure processes linked to the existing inpatient episode of care. An inpatient episode of care commenced when the patient was admitted to the facility and ends at the date of discharge (see Figure 2). During the episode of care, the patient was assessed by a multi-disciplinary team, diagnosed, and a treatment plan was established; ultimately, the patient was discharged.

(Figure 2 about here)

The model shown in Figure 2 was expanded to identify the sub-processes involved in the inpatient episode of care (Figure 3). These processes were then examined and documented. Existing and possible areas for benchmarking and reengineering were identified and the Project Team was able to identify opportunities for improvement (Rummler & Brache 1995). These were located at the interface between referral, admission, treatment and discharge, and within the treatment process where the patient passes from one provider to another or between one step of the treatment process to another.

(Figure 3 about here)

System modelling activities were undertaken in parallel with these activities. The information from the early flow charting of the inpatient process was extended, and simulated using the ithink® modelling software. A model built on the user friendly simulation package was available for the inpatient team to use and provided a more detailed understanding of the inpatient process, in particular the admission/discharge process and the availability of interpreters on admission. The simulation provided the opportunity to visualise the impact of the availability of interpreter services which were used to assist with the admission and assessment of the length of stay of patients, many of whom were from non-English-speaking backgrounds.

The process of modelling was undertaken with the clinicians over many weeks and helped to elicit relevant knowledge from individual mental models to form an agreed model. The clinicians were able to run simulations of 'what if' questions that enabled the evolution of possible strategies for change. This was made possible by the ability of the ithink® modelling software to play out the dynamics of changed strategies in contrast to the static output of a flow chart.

Reflections on Exploration of the Inpatient Care Process

Understanding the current process required team members to disclose information about how they allocated their time and carried out their work. Such disclosure required a climate of trust that was not present in early

meetings. Initial reticence to disclose the information was, in the view of the Inpatient Services Manager, related to competition between disciplines for resources. The rivalry hindered the progress of identifying additional resource requirements. In the view of the Project Coordinator, the reticence was also related to an uncertainty held by the clinical staff as to how the information would be used by management. She addressed the resistance in one-to-one discussions with representatives from each discipline and was able to reassure each discipline as to the need for the data and encouraged a sharing of data through the weekly forum.

The perceived lack of commitment by the medical staff had also become an issue. The medical staff's lack of engagement in the planning for change in the way the service was to be delivered was raised at the Inpatient Management Meeting. Subsequently, the geriatrician met with the general manager and the Inpatient Services Manager to clarify what was required in the Continuity of Care project. The confirmation by the general manager was a 'doctor to doctor' communication and therefore had credibility. The confirmation was a significant event, as following the meeting, medical staff became more involved. The involvement of medical staff was of considerable importance because decisions to discharge within an inpatient setting had been traditionally made within a medical framework. The move from an inpatient to a community model of care represented a move from a medical to a social model of care.

Implementation of the Change

The action learning process involved the establishment of a multi-disciplinary clinical team which met weekly to examine the inpatient care delivery system. The team developed an understanding of the macro process and the sub-processes that were integral to the continuum of care.

The action learning process was supported by the use of system methodologies including system dynamics modelling and causal loop diagrams. These were used to develop a better understanding of individual and team learning activities throughout the change process. System dynamics contributed to the appreciation of the 'big picture' of the inpatient process and provided insights into the use of interpreters at the admit/assess sub-system and the discharge transition (Flood & Jackson, 1991). System dynamic strategies also assisted the translation of the ideas generated from the understanding of the inpatient process into policies and procedures to improve the inpatient process. Structural changes were introduced throughout the process to improve communication and decision-making between team members about client needs. These included the development or revision of various tools including the referral form, discharge checklist, and a community care plan.

The changes were implemented mid-March 1997 and had been fully implemented by the end of April 1997. The initial impact on the inpatient performance indicators was dramatic: separations (discharges) increased and the average length of stay (ALOS) dropped 4 days from 24.09 days in March to 19.91 days in April. Although movement in subsequent months was not as dramatic, the length of stay did decrease further, particularly for those in the rehabilitation stream (see Table 1).

(Table 1 about here)

Reflections on Implementation of the Change

The Project Team

The Project Team began as a group of individuals, representing each clinical discipline, who were considered to have an insider view of the Inpatient Services. The core membership of the team throughout the change process represented all disciplines but did not directly include medical staff.

Over time the group members 'converted the vision' to 'consistent action' by meeting weekly and working together to bring about a change in practice. Initially a 'pseudo team', the Project Team did not take the risks necessary to explore the 'panoply of potential futures' or to be accountable for care delivery choices

(Burns 1993). Over time, the Project Team emerged as a potential team and began to identify and challenge the obstacles inherent in a change process. Ultimately, the Project Team became a 'real' team and performed at a high level (Katzenbach & Smith 1994).

The Staff

Individual staff members used the weekly forums to reflect on their practices, confirm their actions and to be reassured. Project Team members were observed to be more confident in their decision-making about the community care plan, its implementation and the decision to discharge. During the implementation period, the relationship between Project Team members and the Inpatient Services Manager changed. Members saw her less and less as 'figure head' and as a manager, and more as a 'team member' who understood the variety of issues impacting on team members and was seen to be able to balance both the clinical and budget constraints.

The change process affected all staff at the facility, with improvements made in a variety of ways.

- All staff now provided aspects of care off-site where previously this would have been undertaken on-site or by community and ambulatory services staff.
- Staff treating inpatients developed a greater awareness of their clients' rights and ability to choose to accept, or not to accept, referral to community services.
- Communication improved between the inpatient treating team and community service providers.
- The decision-making ability of the Inpatient Services Manager increased through the close working relationship with the Inpatient staff, thus facilitating flexibility in decision-making.

Unintended Consequences

An unanticipated impact occurred on the inpatient occupancy and patient mix due to a change in the balance between patient turnover, admissions and the waiting list composition. The implementation of the strategies to reduce the length of inpatient stay resulted in an initial 20% reduction in the rehabilitation stream of care. However, the rate of discharges outstripped the rate of referrals. As a result, high acuity patients were admitted on referral from other streams of care classification until the beds were fully occupied. The mix of patients changed, with more patients with more complex needs for care being admitted; these patients remained in hospital longer and the waiting list increased, with a delay in admission. This is shown in Figure 4.

(Figure 4 about here)

The period spent studying the impact of the changes on the waiting list, which reverted to its original length, was significant in the evolution of the team. The members came to shared understandings of the inpatient process and the systemic impact of a change in practice. The outcomes of these sessions were causal loop diagrams (for an example see Figure 5) that provided 'a language for articulating our understanding of the dynamic interconnected nature' (Kim 1992, p. 1) of the inpatient process and the systemic impact of the changes that had resulted from the implementation of the Continuity of Care initiative.

(Figure 5 about here)

Continuing the Change

During the evaluation focus forums, systemic and structural issues were identified that required ongoing attention. The systemic issues related to the transition points (commencement and end of a client's inpatient episode of care) in the inpatient process. Specifically, these concerned the access of interpreters and the interface between other community service providers, and significantly, the ongoing monitoring of the impact of the introduction of a continuum of care model of service delivery.

The structures identified as difficult to change, and worthy of continuing activity, included:

- the ability to set a target date for discharges and anticipated length of stay;
- pre-admission information on the functional ability of the client;
- involvement of client, carer/family in developing treatment goals;
- reinstating the discharge form to all units.

The Continuity of Care project was extended into the 1997/1998 financial year and processes implemented to facilitate and monitor the change. Time will tell if the learning that enabled strategies to be put into place to implement a continuity of care initiative will be sustained.

CONCLUSION

The organisational benefits of implementing this change project were significant. Improved team work and problem-solving capability led to documented improvements in the performance of the centre in the key performance area of ALOS. However, these improvements were wiped out by the changes in patient mix as upstream providers took advantage of the improved throughput of the centre by moving more acute patients out of the hospitals and into the centre. Overall, the performance of the network had benefited from the Continuity of Care project. However, on the surface, the performance of the unit that implemented the project had not improved, while there had been an improvement in other parts of the system.

The project highlights two important lessons. The first was that the use of action research techniques in conjunction with system dynamics modelling can have a dramatic and positive impact on performance. The second was that administrators need to understand that cause and effect, in this case improvement and benefit, can often be separated in time and space. Funding models must focus on rewarding the areas where improvement was made, not the areas where the benefit appears.

REFERENCES

- Burns R 1993, *Managing People in Changing Times*, Allen & Unwin.
- Checkland P 1991, 'From framework through experience to learning: the essential nature of action research', in Nwassen H Klien H & Hirschheim R (eds), *Information Systems Research: Contemporary Approaches and Emergent Traditions*, Elsevier, Amsterdam.
- Cunningham J 1993, *Action Research and Organisational Development*, Draeger, Connecticut, pp 11-27.
- Dept of Human Services (DHS) 1996, *Aged Care in Victoria: The 1996-97 Budget*, July. Publication No. 96/011.
- Flood RL & Jackson MC 1991, *Creative Problem Solving*, John Wiley & Sons, Chichester.
- Jewell SE 1993, 'Discovery of the discharge process: A study of patient discharge from a care unit for elderly people', *Journal of Advanced Nursing*, vol 18, pp 1288-1296.
- Katzenbach JR & Smith DK 1994, *The Wisdom of Teams: Creating The High Performance Organisation*, McGraw-Hill, New York.
- Lafferty G 1996, 'Community - Based Alternatives to Hospital Rehabilitation Services: A Review of the Evidence and Suggestions for Approaching Future Evaluations', *Reviews In Clinical Gerontology*, vol 6, pp 183-194.
- Kim DH 1992, 'Guidelines for drawing causal loop diagrams', *The Systems Thinker*, vol 3 no 1. pp 1-8.
- Marsh N Russell L & Robinson P 1984, 'Using action research to design a management development scheme', *Journal of Management Development*, vol 3, no 2, pp 56-65.
- Rummler GA & Brache AP 1995, *Improving performance* (2nd ed.), Jossey-Bass, San Francisco.
- Tierney A & Closes J 1993, 'Discharge Planning for Elderly Patients', *Nursing Standard*, vol 7, no 52, pp 30-33.
- Warmington A 1980, 'Action research: Its methods and its implications', *Journal of Applied Systems Analysis*, vol 7, pp 23-39.

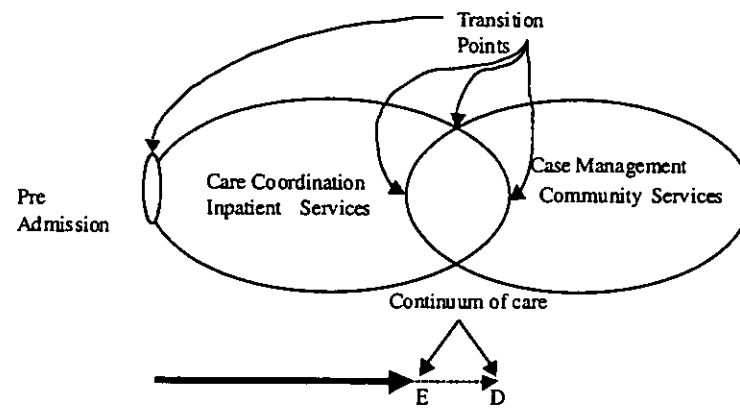


Figure 1. Continuity of Care: The Model

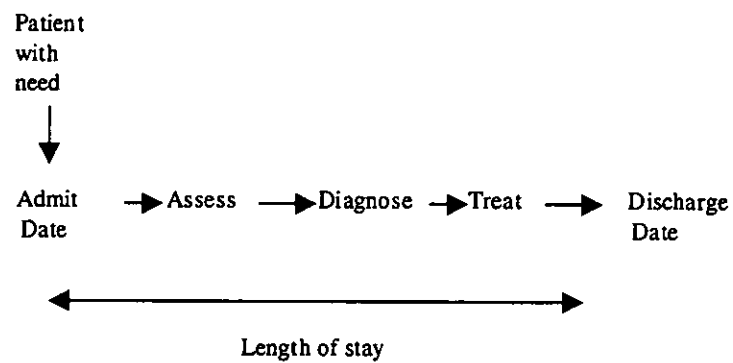


Figure 2. The inpatient episode of care.

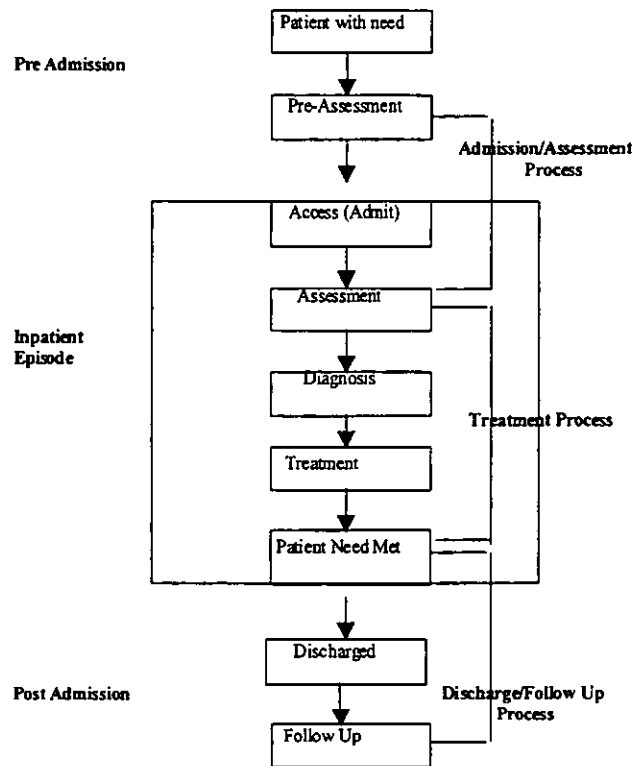


Figure 3. Flow chart of the remapped inpatient process.

Table 1. The Comparison of the Average Length of Stay by Stream of Care

	June 1996	March 1997	April 1997	May 1997	June 1997
Rehabilitation	36	32	25	32	33
Medical assessment & management	19	32	25	35	25
Waiting residential care	39	48	31	16	31
Booked respite	9	9	8	9	10
Others: Palliative care	19	0	0	0	7
Psychogeriatric	15	12	0	0	20
Average	23.90	24.09	19.91	22.96	23.50

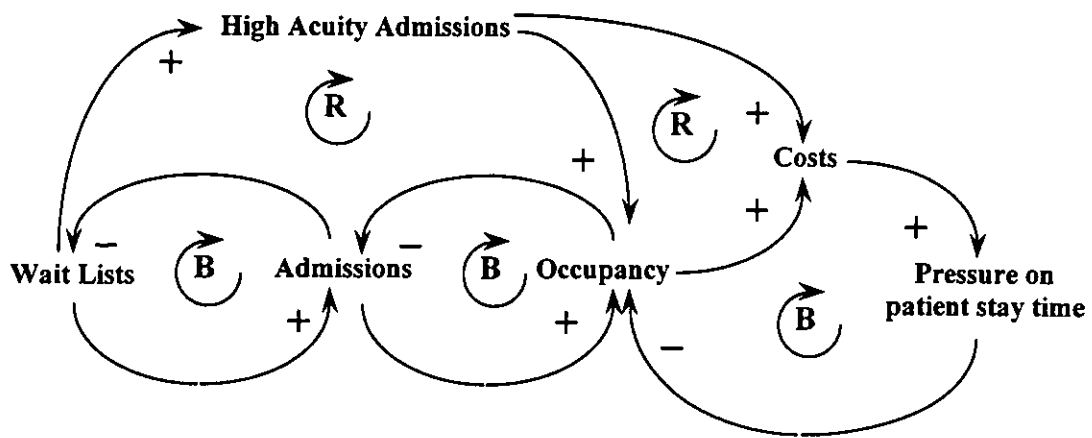


Figure 4. Impact of increase in high acuity patients.

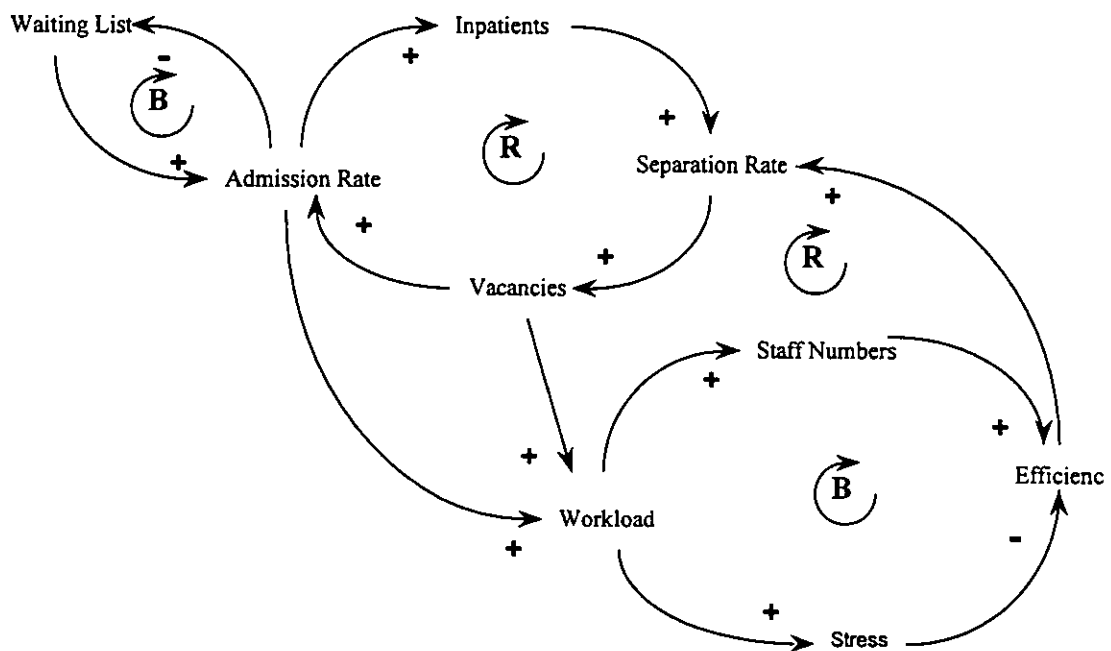


Figure 5. The Dynamic relationship between elements of the Inpatient Process

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