

Clinical pathways: a direction forward in health care

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Abstract

As in many developed nations, health care consumers in Singapore are demanding better (and more costly) services. At the operational level, one way to address consumers' demands while ensuring cost-effectiveness is through the implementation of a clinical pathway program. This paper provides an overview of the program at Changi General Hospital (CGH), a regional general acute care hospital in the Republic of Singapore. The paper highlights the problems encountered during the planning, developing and implementing phases. It concludes by predicting what the future might hold for clinical pathways in Singapore and the South East Asian Region.

Introduction

The health care situation in Singapore and the South East Asian Region is in a state of flux, operating within an ever-changing environment due to rapid technological changes, an ageing population, changing consumer behaviour, and an evolving political climate (Hindle, 2000). In general, patients are demanding cost-effective, high-quality care, and a more efficient and seamless health care delivery system. As a result, there have been many health care reforms that had taken place in developed countries such as the United States where health care institutions have attempted to meet these demands through a variety of approaches, including managed care, and disease management strategies such as critical or clinical pathways, case management and utilisation management. This paper reviews the evolution of clinical pathways as applied to hospital services, and assesses their effectiveness in a regional acute care hospital in Singapore.

A historical overview of clinical pathways

A clinical pathway is defined as a “clear outline of the usual pattern of care for a group of patients with a given diagnosis or procedure performed. For each patient in the group, the staff can quickly see the expected time frame for delivery of care” (Zander, 1992).

In the literature, clinical pathways are also known by other terms, such as critical pathways, critical paths, caremaps or care paths. The term “clinical pathways” is used in this paper.

The origin of clinical pathways can be traced to the nursing profession’s use of integrated nursing documentation forms as a tool to provide structured care within hospitals. Analogous process tools have been used for decades to facilitate project management tools in the construction and aeronautical industries. They were first used in the health care industry in 1985 at New England Medical Center Hospitals (NEMC) in Boston, USA. They were developed to address three main problems: to assist clinicians to integrate the documentation of separate clinical disciplines, to capture the total work to be performed on patients, and to manage care with the aim of reducing patients’ hospitalisation costs. The initial clinical pathways comprised lengthy patient care plans and were cumbersome to use. In 1986 the New England Medical Center revised these plans to one-page clinical paths, which were co-ordinated by nurse case managers (Zander, 1992).

Another pioneer in clinical pathway implementation was Hillcrest Medical Center in Tulsa, Oklahoma, USA. Hillcrest Medical Center used a one-page abbreviated clinical pathway to case manage selected DRG-related patient groups that would benefit from nursing case management (Spath, 1994). The intended purpose of clinical pathways was to guide patient care. The case manager tracks the patient’s progress on a day to day basis, takes note of deviations from the clinical pathways, and implements corrective action as needed.

Since these early adopters, clinical pathways have become ubiquitous and have been implemented in hospitals, rehabilitation centres and home health agencies throughout the United States, Canada, England and Australia.

Clinical pathways have been popular because of their inherent features which provide a systematic methodology for co-ordinated care planning. However, there is still little evidence in the published literature of their effectiveness and impact on clinical outcomes (Cheah, 1998). In particular, it is often difficult to objectively assess a clinical pathway using the randomised controlled trial methodology because of ethical and operational constraints. It remains to be seen if clinical pathways achieve all the expected goals.

An overview of the healthcare delivery system in Singapore

The Singapore healthcare system is a dual care delivery system with a mix of public and private providers. Public healthcare providers, comprising 6 acute care hospitals, account for 80% of total national acute care in-patient and day surgery services averaging 350,000 episodes annually, and approximately 80% of total national bed capacity. Beds are differentiated into ward-classes according to the level of creature comfort (such as air-conditioning, privacy, amenities, etc). The overall average bed occupancy rate is about 85%. There are four other public sector national specialist centres for tertiary care for cancer, cardiology and cardio-thoracic surgery, ophthalmology, and neurology and neurosurgery. In addition, there are 7 acute care private hospitals that are fee-for-service. These hospitals are generally smaller in size and do not receive any funding from the government.

Health care financing

The philosophy of healthcare delivery in Singapore is underpinned by two major principles. The government is committed to providing access to basic healthcare services to all Singaporeans. However, every citizen is responsible for maintaining his own health and wellbeing.

The government's role is discharged through the allocation of subvention (or funding) to public sector hospitals, the main source of which is general taxation. Previously, public hospitals were subvented based on 19 different specialty piece-rates on a per diem basis. This funding system served us well since its inception in the mid-1980s. The government established target subsidy rates for different ward classes, ranging from 0% (for 'A' class) to 80% (for 'C' class).

To ensure that usage of medical services is rational and appropriate to needs, Singaporeans are required to co-pay for healthcare services consumed. The co-payment portion can be from a combination of the following means.

- Out-of-pocket (cash)
- A withdrawal on compulsory savings accounts (Medisave). All employed Singaporeans are required under the law to have a savings account (Medisave), into which a small percentage of the monthly wages is deposited. This scheme was established to ensure that Singaporeans have the means to pay for their future health care.
- An insurance scheme such as Medishield or a private insurance scheme. Medishield is a catastrophic insurance scheme to which Medisave account holders can subscribe. It has elements of co-payment and deductibles.
- Employer benefits (if these are available to the patient).

For the poor who are unable to pay out-of-pocket for their hospital bills, the government established an endowment fund called Medifund which public sector hospitals can use to offset fees that are waived.

In 1998, Singapore spent about 3% of its GDP on healthcare (S\$4.1 billion), with the bulk of healthcare expenditure on hospital services (75%). Government healthcare spending has been rising steadily over the past decade and is projected to escalate over the next 30 years. This is due to the following factors.

- An ageing population with falling fertility rates and rising life expectancy. It has been projected that by the year 2030, healthcare spending will be at 7% of GDP due to the ageing factor alone.
- Introduction of new and expensive high-technology equipment and medicines.
- Rising patient expectations for the newest and most expensive treatments and medicines.
- Emphasis on prolonging life through the use of intensive care units.
- Emergence of chronic illnesses as the predominant cause of morbidity.

Against this backdrop, the Ministry of Health decided to look for innovative means to minimise unnecessary healthcare spending and maximise the use of available resources. In October 1999, the government implemented casemix funding for all public acute care hospitals and institutions, whereby the subvention is on a per case basis by DRG instead of the 19 per diem piece rates. The government adopted the Australian National Diagnosis Related Groups (AN-DRG) classification system, but has applied it in a unique way to the Singapore health care system. Public hospitals have been preparing for casemix implementation by re-engineering their workflow systems and piloting new clinical management systems to maximise resource utilisation efficiency. One such popular quality improvement tool that has been piloted is the clinical pathway.

Overview of the clinical pathway program at Changi General Hospital (CGH)

The clinical pathway program was initiated at CGH in August 1996. Prior to the implementation, CGH sent its first Clinical Quality Manager to visit some hospitals in the USA to study the concept and practice of clinical pathways and case management. The objectives for developing and implementing clinical pathways in CGH were to improve the quality of patient care through a collaborative and multidisciplinary approach to the management of patients' problems, deliver cost-effective healthcare, decrease the average length of stay for selected case types, develop a database for future clinical audit and research, and to integrate and streamline clinical documentation.

A Case Management Steering Committee (CMSC) was established to oversee the planning, development and implementation of the program. The CMSC comprised clinician champions from the medical, surgical and orthopaedics disciplines, and representatives from the Department of Nursing Administration, Social Work Department, Rehabilitation Department, Pharmacy Department and Case Managers from the CGH's Case Management Unit. Individual workgroups were formed to develop, trial and use clinical pathways centred on homogenous patient populations, high caseloads and patients requiring multi-disciplinary care. A series of "Road Shows" and workshop training sessions were conducted to introduce staff to the program.

The CMSC started by developing hospital policies with regard to implementing pathways. Key tasks were to examine clinical documentation, variance collection and aggregation, pathway design and format, and the pathway development process. This was an important first phase for a hospital-wide implementation program.

CGH implemented a laparoscopic cholecystectomy pathway in November 1996. This was followed a week later by the Uncomplicated Acute Myocardial Infarction (AMI) Clinical Pathway and a Fracture Hip Clinical Pathway in December 1996. All clinical pathways were discussed at the Hospital Medical Board prior to being approved. To date, CGH has implemented 13 clinical pathways across the medical, surgical, orthopaedics and psychological medicine disciplines.

Development of clinical pathways at CGH

The first step in the development process was to identify the patient group to be covered by the pathway. This process would vary from hospital to hospital, depending on the patient profile, prevailing length of stay, and system wide issues to be managed. Typically, high volume and high cost case types would be selected. In CGH, the CMSC identified and targeted selected case types

for clinical pathway development on a yearly basis. The individual clinical chief or head of department nominated a specific clinician who would lead a multidisciplinary team to develop the pathway. Sometimes a number of medical clinicians were involved such as a surgeon and an anaesthetist for the laparoscopic cholecystectomy pathway. The case manager and the clinician in charge carried out a thorough literature search. This search included relevant practice guidelines, clinical pathways from other institutions, and randomised controlled trials or systematic reviews and meta-analyses. The objective was to devise a pathway that is based on evidence and reflects best current practice.

After completion of the background work, the case manager proceeded to draft a framework for the pathway, and circulated this for all the team members for comment. Members' input depended on the topic of the pathway. For some pathways such as hernia repair, only a team of nurses and surgeons needed to be included. However, for other more complex pathways such as for cerebrovascular diseases (stroke), a larger multidisciplinary team was involved. Several meetings needed to be organised over a few months for each new pathway. The outcome was a draft clinical pathway document, which was reviewed and refined by the CMSC prior to submission to the Medical Board. After Medical Board approval, a series of briefings and training workshops for medical, nursing and paramedical staff were conducted prior to implementation in order to equip the staff with the necessary skills and knowledge in the use of pathways.

Every pathway was piloted for a defined period. Thereafter, the initial results were evaluated, and the pathway further refined, taking into account the recorded variances and feedback from staff. The revised pathway would be tabled once again at the Medical Board for approval before full implementation. Thereafter, each pathway would be reviewed once per year to take into account recent advances in clinical management.

Evaluation of clinical pathways in CGH

The CMSC evaluated each clinical pathway annually to monitor and analyse the data pertaining to quality issues, with a view to improving the system of care delivery and patient outcomes. Clinical pathways were revised in accordance with changes in clinical management strategies. The aim was to ensure that pathways operationalise evidence-based medicine as clinical management changes across time and incorporated best practices within the available resources.

The evaluation of clinical pathways in CGH was a two-step process. The quantitative evaluation phase involved the analysis of data on average length of stay, total bill sizes, patient profile, demographics, severity of illness, co-morbidities, complication rates (especially for surgical pathways), and other clinical outcomes such as mortality, morbidity, functional status (if a scoring scale was developed) and perhaps even quality of life measurements. In view of the ethical difficulties in carrying out a randomised controlled trial (RCT) – by comparing randomly assigned pathway patients to non-pathway patients – most evaluations employed a before-and-after design. This is methodologically weaker than an RCT. However, for management purposes, the before-and-after methodology was sufficient. In addition, trend analyses were performed as the volume of data grew.

The qualitative evaluation phase involved a descriptive account of system-wide quality-related issues that emerged from pathway use. Examples included referral patterns, pre- and post-operative counselling for surgical cases and asthma counselling. These issues were discussed in the

appropriate forums and follow up actions were documented. Ensuring that the appropriate corrective measures were taken to rectify the problems closed the feedback loop. In this manner, pathways operationalise the practice of continuous quality improvement. This is similar to the Deming's familiar Plan-Do-Check-Act (PDCA) cycle.

Problems and difficulties encountered

In the initial phases of the planning, development and implementation of clinical pathways, several problems and difficulties were encountered. These included a lack of knowledge and experience in using clinical pathways, staff resistance (especially among clinicians), limited resources and duplication of documentation. There were five issues of particular importance, as follows.

Lack of staff knowledge and experience. As the clinical pathway was a relatively new concept, our staff initially lacked the knowledge and experience in its use. We embarked on a massive educational program through workshops conducted on a hospital-wide scale for doctors, nurses and paramedical professionals. Regular clinical pathway workshops were conducted for newly recruited staff. In addition, being a teaching public hospital, briefings had to be held regularly for new House Officers and Medical Officers (residents) who are on rotational postings.

Staff resistance. According to Spath (1994), many practising physicians perceive clinical pathways to be contradictory to their professional values as they have been viewed as tools at controlling costs and not improving quality. This was true for CGH during the initial phases of planning, developing and implementing clinical pathways. Some but not all clinicians were suspicious, and viewed the initiative as a cost-controlling management tool. This resistance was partly overcome with the appointment of a clinician champion for each clinical pathway. We believe clinician involvement was absolutely crucial to the success of the clinical pathway program and hence the program should be a clinician-driven effort. A supportive Medical Board also offset much of the resistance. Top hospital management support was also crucial to the success of the pathway program in CGH.

Limited resources. CGH started with two part-time case managers. These case managers had other work commitments. There are currently 5 full-time case managers in the Case Management Unit. Two are permanently stationed in the Unit, while the others are trainee case managers. This is to ensure that a pool of trained case managers or clinical pathway co-ordinators is available within the Hospital. The training is also useful for nurses who wish to embark on an administrative career path.

At the beginning, the case managers lacked any variance collection software, and resorted to collecting data manually. This was tedious and time consuming, especially in the early stages, as the quality and standard of documentation of variances by the ward staff was sub-optimal. The case managers are now in the process of developing an automated variance management system in collaboration with a local polytechnic and a software development firm.

Duplication of documentation. In the initial stage of implementation, the nurses had to resort to duplicating their documentation in the clinical pathways and nursing notes. This created problems in hand-over shifts, as the nurses had to refer to two sets of notes, namely, the nursing notes and the clinical pathways. This issue was addressed by integrating the nurses' report onto

the flip side of the clinical pathway documents. This effectively created an integrated clinical documentation system, thereby streamlining clinical documentation for doctors, nurses and paramedical staff.

Failure to identify goals. In the initial implementation of the clinical pathways in CGH, goals for each day of stay were not identified. The pathways focused on the care processes and interventions rather than clinical and functional outcomes. Based on feedback from clinicians, the outcome goals were documented and included in the revised clinical pathways. This enabled medical, nursing and paramedical professionals to know the goals for each day, and to work towards achieving them.

Impact of clinical pathways

First, clinical pathways have demonstrated their effectiveness in strengthening the cost-quality link both quantitatively and qualitatively (Bower, 1993). Clinical pathways have been consistently associated with a reduced length of stay and cost per case.

These effects were evident in CGH after the implementation of the clinical pathway program. Comparative analysis of the before and after results has shown significant reduction in average length of stay and average bill sizes for different classes of patients (see Tables 1–4). This is evidenced for patients put on the Laparoscopic Cholecystectomy and Uncomplicated Acute Myocardial Infarction (AMI) clinical pathways as depicted in the Tables. In both cases, the reduction in the ALOS was statistically significant ($p < 0.05$), using the Wilcoxon Rank Sum Test. However, the reduction in bill sizes was inconsistent because of increased itemised charges over the period of study.

Table1: Average bill size for laparoscopic cholecystectomy

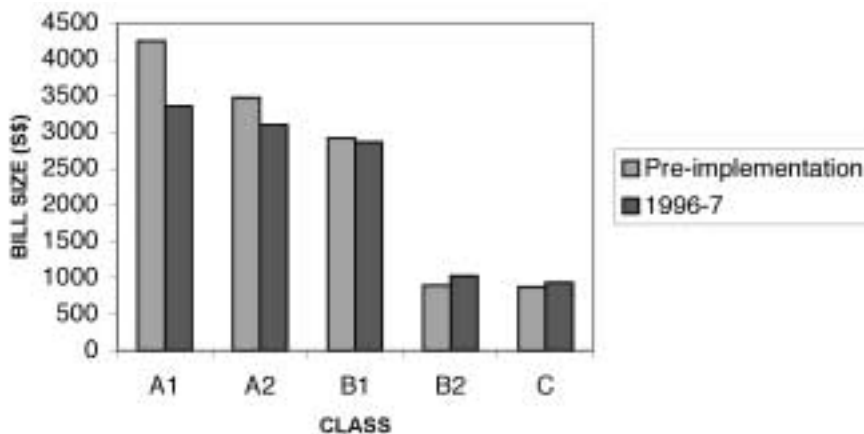


Table 2: ALOS for laparoscopic cholecystectomy

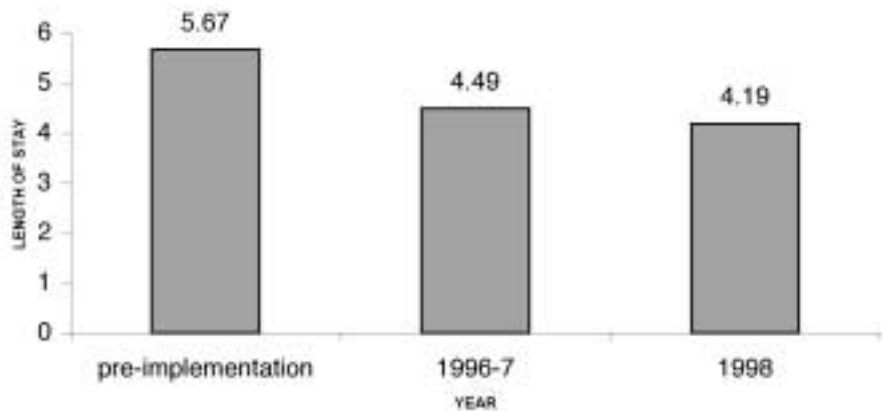


Table3: ALOS for AMI

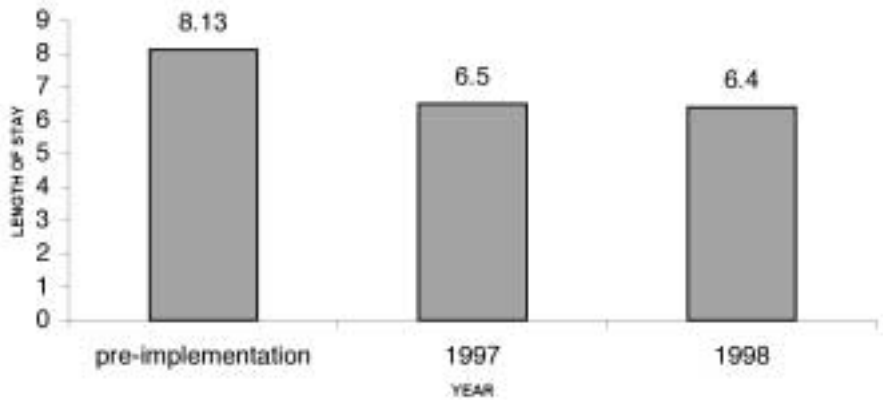
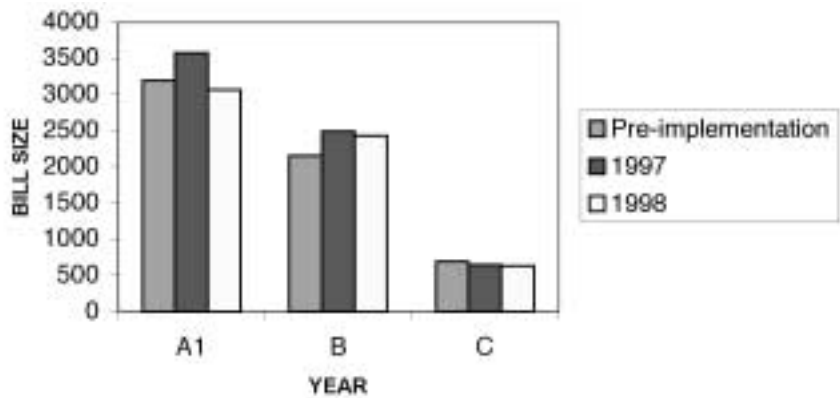


Table 4: ABS for AMI



Second, the benefit of “increased level of meaningful communication between all disciplines” (Riches, Stead & Espie, 1994) was evidenced with the implementation of the AMI clinical pathway. A multi-disciplinary team was involved in its initial planning and implementation phases. All team members shared their expertise in achieving improved patient outcomes through a multi-disciplinary collaborative approach as all worked towards common goals or outcomes for the patients. This appeared to result in intangible improvements in patient care delivery.

Third, through the use of the pathway, nurses were empowered to keep patients and their relatives informed of the interventions outlined in the clinical pathways. The pathway provided nurses and other care staff with necessary knowledge about the plan of care so that they could explain to patient and relatives expectations of treatment and outcomes. The anecdotal evidence is that this fostered better communication between the care staff and the patients.

Fourth, consistency of care and practice for patients with clinical pathways was achieved by implementing “best practice” methods. The documentation, tracking and monitoring of variances provide continuous audit data on the care being delivered, and are essential components of continuous quality improvement.

Assessment of organisational effort

The CGH’s experience suggests that a considerable organisational effort be required to initiate this kind of program. Kolter (1995) has proposed an eight-step approach to transforming organisations. CGH performs well against this model in the clinical pathway initiative, although there is no doubt that there is always scope for improvement. Table 5 shows the Kolter’s steps and CGH’s performance levels against them.

The future of clinical pathways in Singapore

Although the use of clinical pathways for patient care is a relatively new concept in Singapore, our analysis suggests it has nevertheless proven to be effective in delivering quality and cost-effective patient care. This is evidenced by the experience of Changi General Hospital. Other local public hospitals such as Tan Tock Seng Hospital, Alexandra Hospital, Singapore General Hospital and the National University Hospital have also embarked on developing clinical pathways. It would be beneficial for these hospitals also to share their experiences by documenting their results in the literature or in local seminars and conferences.

The future of clinical pathways lies not only in the acute hospital setting but also for chronic care and community settings. Clinical pathways are especially beneficial for the care of the chronic sick and elderly who require multidisciplinary care. Current thinking suggests these pathways should flow seamlessly from the hospital setting to the next level of care. With clinical pathways that span the continuum of care, a more integrated health care system could evolve those enable outcomes to be tracked longitudinally.

In the primary health care setting, clinical pathways could be used for patients with chronic diseases such as diabetes mellitus. The Singapore Naval Medical Services has recently developed pathways for hyperbaric therapy.

With the implementation of casemix funding for all acute care public hospitals, there will be greater incentives for hospitals to deliver cost-effective care. Clinical pathways provide the means for achieving this objective.

Table 5

Kolter's eight steps	CGH's performance
1 Establishing a sense of urgency	The hospital's top management and Medical Board mandated the establishment of clinical pathways in anticipation of changes to the hospital funding system. This was communicated to all staff.
2 Forming a powerful guiding coalition	Workgroups and teams were formed to develop specific pathways. These consisted of clinician leaders, nurses, allied health professionals and case managers.
3 Creating a vision	A specific and clear mission statement and objectives were articulated at the outset and communicated to all involved.
4 Communicating the vision	Roadshows were held early to create awareness. Thereafter, workshops were held for all nurses and allied health professionals. Clinicians and resident doctors were briefed on the clinical pathways before implementation.
5 Empowering others to act on the vision	Case managers and nurses were empowered to commence clinical management for patients on the clinical pathway. They were also given the accountability for case managing patients. The clinical pathway development teams were empowered to develop and implement pilot pathways.
6 Planning for and creating short-term win	Relatively simple and straightforward pathways were developed to gather initial momentum. Pilot projects were evaluated early to illustrate tangible impact on outcomes and improvements to operational processes.
7 Consolidating improvements and producing still more change	All pathways are evaluated annually with the aim of improving on clinical practice and operational workflow. Variances are tracked and monitored.
8 Institutionalising new approaches	Through the use of clinical pathways, clinical documentation has been streamlined and workflow has become smoother. Variance data have highlighted many deficiencies in operations and these were rectified through new approaches to clinical management and operational workflow.

Conclusion

Although Changi General Hospital faced many problems during the initial period of implementation of clinical pathways, we were able to surmount them by continuous feedback and dialogue with our doctors, nurses and paramedical professionals. The Case Management Unit and CMSC continue to gather qualitative and quantitative data to refine and improve on the clinical pathways. The keys to a successful clinical pathway program lies in continued clinician support and acceptance, top management leadership and support, and a dedicated team of case managers, doctors, nurses and paramedical professionals.

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