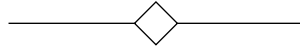


CASE STUDY



Community Parenteral Therapy Project: A pilot study

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Abstract

The pilot study reported in this paper was devised to develop and compare service delivery models that would achieve the provision of high quality parenteral therapy care to patients in the Gold Coast District Health Service community. All data were collected on 113 patients for a 12-month period, January to December 1996. The study compared the provision of outreach nursing services and contracted nursing services on measures of satisfaction and cost.

The study showed that patient and carers indicated a preference for community care, medical officers advocated the benefits of administering parenteral therapies in the community, general practitioners were interested in managing future community parenteral therapies, and contracted (nurse) service providers endorsed the development of a parenteral therapy resource centre. The findings also revealed considerable potential cost savings in community-based care.

Introduction

The need for evidence-based practice in health care has resulted in a commitment to collaboration between State and Commonwealth health care initiatives. The Commonwealth Department of Health and Family Services established an Ambulatory Care Reform Program, which subsequently funded 29 health care

facilities throughout Queensland to pilot ambulatory care projects. The aim of the Commonwealth program was to establish a national ambulatory care database through research of core data items collected by each project. This paper reports on a Community Parenteral Therapy Project in the Gold Coast District Health Service (GCDHS). Parenteral therapy is defined as any medication route other than the alimentary canal, such as intravenous, subcutaneous or intramuscular (Taber 1993).

The project was developed to compare service delivery models that would achieve the provision of high quality parenteral therapy (including intravenous or subcutaneous methods of administering treatment) care to patients in the GCDHS community. The health district revolves around the Gold Coast Hospital, an acute provincial public hospital of 500 beds serving residents of one of the fastest growing areas in Australia (Queensland Health 1995). Local interest in developing a community-based parenteral therapy project was stimulated by the increasing number of patients referred for home intravenous antibiotics (from 3 in 1992 to 33 in 1995). Also influencing establishment were published studies from Australia and overseas reporting successful outcomes and the development of several professional interest groups (both nursing and medical) whose members were working toward the common goal of ensuring safe, community-based practice in this area (Plumridge 1990; Tice 1993a, 1993b; Torr 1993; Grayson, Silvers & Turnidge 1995).

The trend toward home and community care has been motivated by several other factors as well. One is the risk of intravascular nosocomial (hospital-acquired) infection, which represents a significant cost to the health care system (Collignon 1994). Another is heightened consumer awareness of costs and choices in health care delivery. In the United States the consumer movement has, for some time, exerted considerable influence on the provision of health care services, primarily due to the 'user-pays' system of health insurance. In Australia, universal health insurance (Medicare) has cushioned the impact of escalating health care costs and it is only recently, when the health care system is considering increased privatisation, that people have begun to exert their right to make choices related to health, including where they receive treatment. Previous studies have shown that, given a preference, people tend to choose ambulatory models of service delivery (Moody 1994; Tice 1996).

Technological innovations have also paved the way for increased community care. In response to demand, portable, tamper-proof, lightweight infusion devices that operate on the principle of elastomeric pressure instead of gravity have been designed to allow patients to engage in normal daily activities whilst infusing. Demand for this type of therapy can be expected to grow exponentially with an

ageing population and increasing numbers of younger patients requiring parenteral therapy for infectious diseases such as acquired immunodeficiency syndrome (AIDS) (Torr 1993).

The challenge for all health professionals is to respond to the community's demand for seamless services and continuity of care, one of the major goals of the Council of Australian Governments reforms (COAG 1995). National and international comparative trials such as the one described here contribute to the evidence base of health care practice from which recommendations for easing patient transitions can be made. Equally important is the contribution this information makes to the wider health care reform debate, which has now become an imperative for practitioners in all settings.

The study

Stage 1

The project was established six months before the evaluation period with the formation of a reference group comprising health administrators and practitioners involved in parenteral therapy. Following appointment of the project coordinator, an extensive literature review was conducted as a basis for developing a needs assessment (survey).

The survey was then distributed to existing parenteral therapy patients (n = 186) on their preferences for inpatient, home care, periodic hospital attendance, clinic administration or self-administration of therapy. The 124 patients who responded consisted of people who received chemotherapy and/or blood transfusions periodically at the hospital oncology day unit or who had already received parenteral therapy at home. Analysis of the needs assessment data using Pearson's chi-square and Fischer's exact test revealed a significant preference for community-based treatment among those with previous experience of home or community parenteral therapy.

A study tour was undertaken wherein four interstate facilities conducting community parenteral therapy services were visited to examine the range of service delivery models.

Stage 2

Based on the support for community-based parenteral therapy from the needs assessment, a second stage was planned to implement the two selected models of service delivery: hospital nursing outreach (Model 1) and contracted nursing

services (Model 2). Patients were allocated to either based on the medical prescription. Those prescribed equal to or less than seven days parenteral therapy were assigned outreach services (Model 1). Those prescribed greater than seven days parenteral therapy were assigned contracted nursing services (Model 2).

Key providers from hospital and community agencies were then interviewed to ascertain the local capacity to provide community parenteral therapy services. At this time a range of patient documentation strategies were developed, including admission forms, checklists, flow charts for referrals and resource/home care manuals.

Sample

Model 1: Outreach Nursing Service

The sample group for those allocated to Model 1 were patients prescribed short-term (< seven days) intravenous antibiotics; specifically, Australian Diagnosis Related Group (AN-DRG, version 2) 490 cellulitis age > 9 without complication or co-morbidity (w/o CC). Patients in this group were expected to receive treatment via a peripheral catheter that could be easily replaced and managed in the home. It was also envisaged that this group would not have complex needs, ensuring relative ease of home care. Other factors influencing their allocation included the ability to access this group from the emergency department, suitability for general practitioner follow-up, and the capacity to capture data on the potential reduction in length of stay. Also included in this model were those patients taught how to administer their own therapy.

Model 2: Contracted Nursing Service

The sample group for those allocated to Model 2 were patients prescribed long-term (> seven days) intravenous antibiotics. The rationale for selecting this group for Model 2 services was that they were already using this model prior to project establishment and the fact that longer treatment regimes often meant more complex needs, requiring longer visits and after-hours and weekend care which was beyond the personnel capacity of the study team. It was expected that by continuing to contract services, enhanced linkages with community service providers would be created through provision of direct in-home consultation between themselves and the project team, thereby reducing barriers to continuity of care.

Method

Evaluation data were compiled to examine the relative merits of each service delivery model. It was expected that collected data would reveal cost efficiencies in two areas; namely, using project staff as compared to contracted staff and providing consumables from hospital resources versus purchasing from contracted services. In addition, we expected the information provided from the patient and carer satisfaction perspectives would reveal possible differences between service providers from the different models of service.

Measures included the following.

- Patient characteristics: age, gender, home location.
- Diagnostic information: AN-DRGs.
- Service provision: total number of patients referred to the project; number of accepted admissions; reasons for non-acceptance; number of occasions of service; average visit time per patient; average length of stay.
- Individual service utilisation: prescriptions; intravascular device types.
- Satisfaction analysis: a mail survey asked respondents to rate their satisfaction with eight aspects of home parenteral therapy on a five-point Likert scale ranging from 'a big advantage' to 'a small advantage'. The survey also included three open-ended questions. These prompted respondents on the following issues: safety and general comments related to service delivery.
- Cost analysis.

Data analysis

An access database was established to collect data and computerised data analysis used to evaluate the information. Content analysis was conducted on open-ended responses. Inpatient and projected inpatient costs were extracted using the Transition Clinical Costing System 2 information program.

Cost analysis

Cost comparisons were conducted by an independent health computing consultant. Costs were calculated for each inpatient stay per diem DRG (most patients were inpatients prior to project admission) and projected inpatient stay (had the patient remained in hospital for the duration of their treatment). These costs were then compared with the cost of providing each of the community service models (outreach and contracting).

Inpatient direct costs were collected by the Transition Clinical Costing System 2 from the feeder systems of the Gold Coast Hospital. They included nursing, medical, pharmaceutical, catering, allied health, pathology and consumable costs. Indirect costs such as environmental and administrative costs were not included. Projected inpatient costs were based on the inpatient length of stay and the project length of stay, which was the total length of stay with the additional cost of the project days calculated at the per diem cost for each patient under DRG. Costs included in Model 1 services were the wages of project coordinator and clinical nurse, pharmaceuticals, consumables and other sundry costs for the time frame January to December 1996 as reported in the Gold Coast Hospital General Ledger. Costs included in Model 2 services included the agency charge rate per hour, pharmaceuticals and consumables (as charged by the contract service). Extracting medical review and community pathology costs proved too difficult, and therefore these were not included in either model. However, only a minority of patients utilised these services.

Findings

Participants

A total of 156 patients were referred, 113 of whom were accepted for admission to the project. Of these, 41 were females and 72 were males, with an average age of 45 years (Figures 1 and 2). The geographic distribution indicated several clusters of patients in close proximity, which suggests several possibilities for planning a community-based infusion resource centre. There were no referrals for residents of nursing homes. Six patients were privately insured but at the time were unable to claim the cost of visits. Some referrals were excluded from the study, including those on treatment regimes deemed unsuitable, earlier than expected conversion to oral therapy, past history of severe intravenous drug use, inappropriate or delayed insertion of intravascular access device, after-hours referral and patient preference. People with the five most common DRGs were identified in the study, the majority of whom ($n = 32$) had a diagnosis of cellulitis age > 9 w/o CC (DRG 490). Seven others had post-operative and post-traumatic infection, and there were four cases each of osteomyelitis, chronic obstructive pulmonary disease and aftercare, muscular system and connective tissue (Table 1).

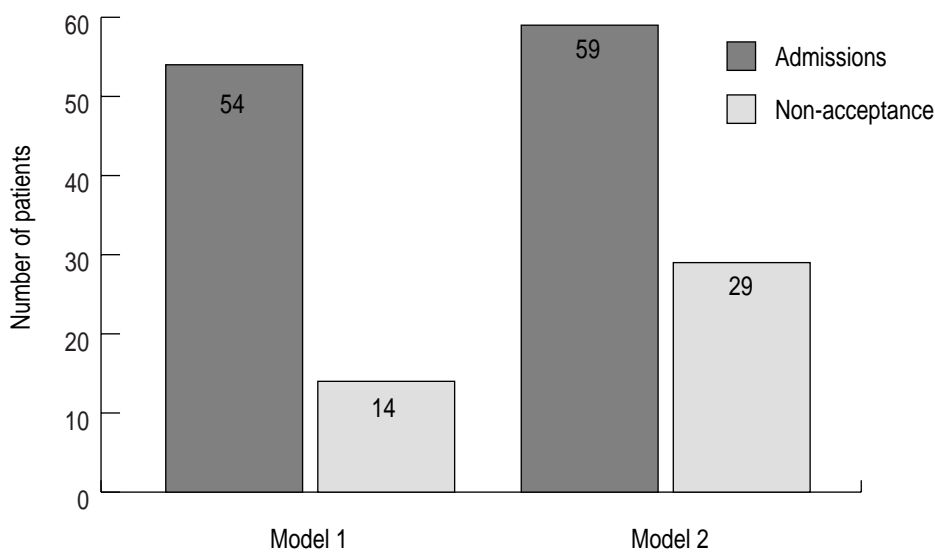


Figure 1: Total number of patients referred to project

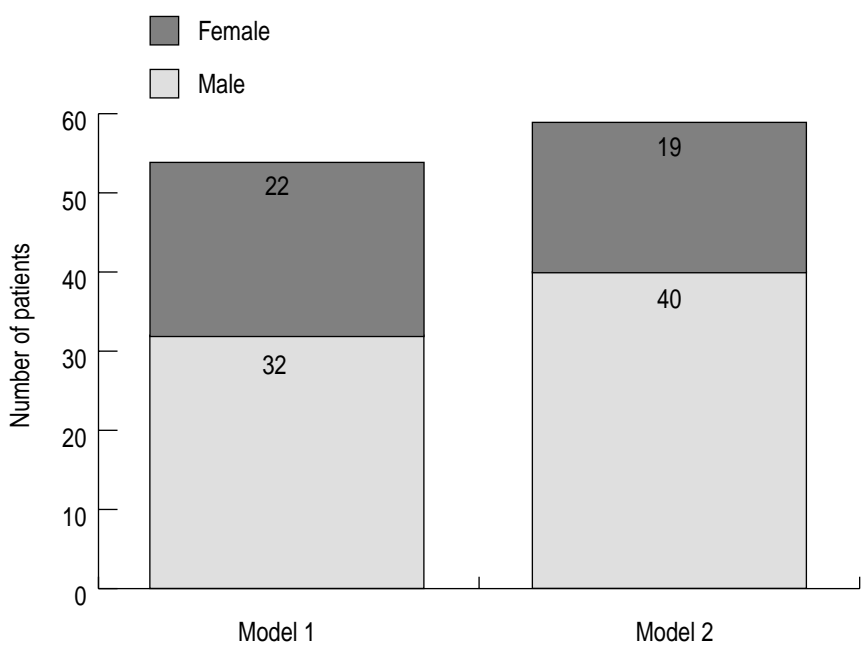


Figure 2: Patients accepted to project by gender

Table 1: Top five AN-DRGs of patients referred to project

AN-DRG code and description	Model 1	Model 2	Total number of cases
490 cellulitis age > 9 w/o CC	32	0	32
810 post-op & post traumatic infection	3	4	7
428 osteomyelitis	0	4	4
177 chronic obstructive pulmonary disease	0	4	4
438 aftercare, muscular system & connective tissue	0	4	4

Treatment

The four most commonly prescribed intravenous antibiotics are identified in Table 2. Fifty-seven patients were prescribed ceftriaxone, 25 vancomycin, 14 flucloxacillin and 12 gentamycin. Prescribed therapy was most commonly administered via a peripheral catheter (n = 54), followed by a peripherally inserted central catheter (n = 35) (Figure 3).

Table 2: Top four prescriptions issued

Prescription	Model 1	Model 2	Total number of cases
IV ceftriaxone	52	5	57
IV vancomycin	4	21	25
IV flucloxacillin	1	13	14
IV gentamycin	0	12	12

Note: 63 per cent of patients prescribed IV ceftriaxone had been prescribed a course of oral antibiotics by their general practitioner prior to review in hospital.

Service utilisation

As can be seen in Table 3, a total of 1562 occasions of service were made; most of which were home visits by contracted nursing services (1124) as compared with 438 in the outreach group. The disparity in the number of service visits between the two groups was primarily due to prescribed treatment regimes. Patients in Model 1 generally were prescribed a daily antibiotic while those in the other group had multiple treatment visits and telephone contacts, the latter of which were counted as occasions of service for both. The average visit time

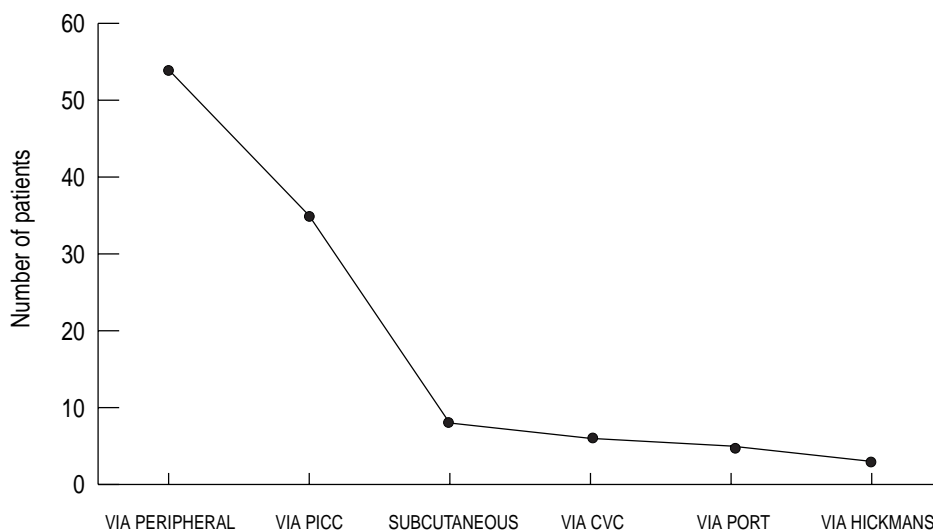


Figure 3: Intravascular device types/mode of administration

per patient was 50 minutes (including travel time). The project average length of stay was 12 days. Most people (n = 57) were former inpatients, but 45 referrals came from the emergency department, eight from outpatient clinics and three from private consultants (Table 4). Fifty-four people received outreach nursing services (Model 1) and 59 were referred to external nursing agencies (Model 2).

Table 3: Occasions of service per service delivery model

Clinic type	Model 1	Model 2	Total
Home visit	438	1124	1562
Outpatient clinic	70	89	159
Emergency department	41	3	44
GP clinic	3	17	20
Private practice		12	12
Total	552	1245	1797

Table 4: Referral source for accepted patients

Source	Model 1	Model 2	Total
Emergency department	44	1	45
Former inpatient	7	50	57
Outpatient clinic	3	5	8
Private consultant		3	3
Total	54	59	113

Patient satisfaction

The response rate for patient satisfaction surveys was 70 per cent, with the majority describing home treatment as 'a big advantage' (Figure 4). Respondents were satisfied with the amount of nursing care received at home, as well as frequency and length of visits by both service models. A minority ($n = 10$) of respondents requested extra services after discharge from hospital. Model 1 respondents found it easier to request extra services than did the Model 2 group. The view is that project staff have a better understanding of the hospital infrastructures to assist problem-solving or easier access to key players within the organisation. All respondents felt safe receiving parenteral therapy at home and results indicate that the home care record they were given was helpful and worthwhile.

Respondents having a partner/carer at home during the course of their therapy numbered 101. However, almost one-third of Model 1 respondents lived alone and complied with treatment. Respondents indicated that life for their partner was generally easier because of home treatment. A small group of Model 1 and 2 respondents ($n = 6$) believed their partner was adversely affected by them having treatment at home, however, all but one respondent answered affirmatively to participating in a similar project again.

Carers

The response rate for carer satisfaction was 58 per cent ($n = 59$). Again, the majority ($n = 52$) described home treatment as 'a big advantage' (Figure 5). Respondents indicated that the amount of nursing care provided was satisfactory, as were the frequency and length of visits. A minority ($n = 6$) of respondents requested extra services and information, and there were no problems associated with this process.

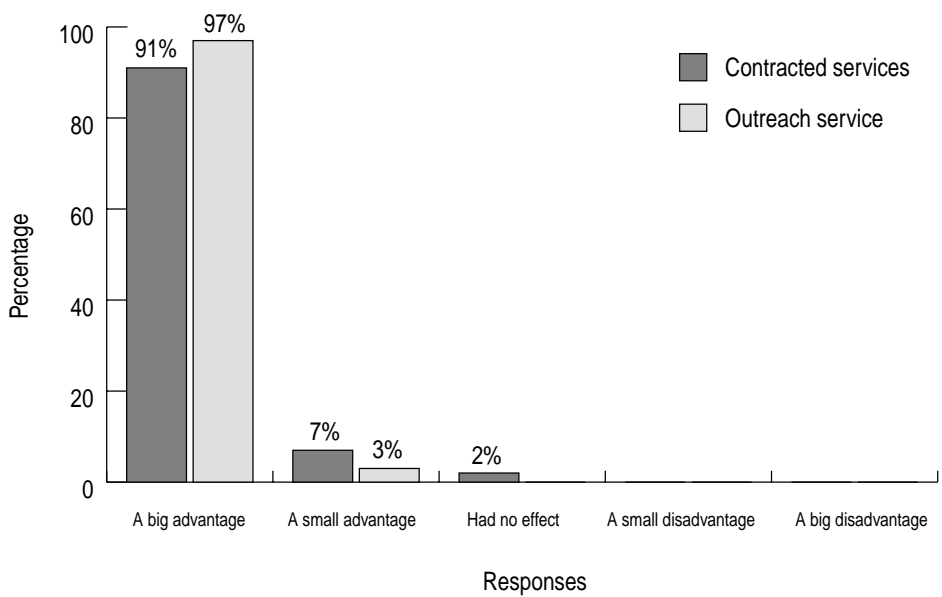


Figure 4: Patient ratings of the relative advantage of home therapy

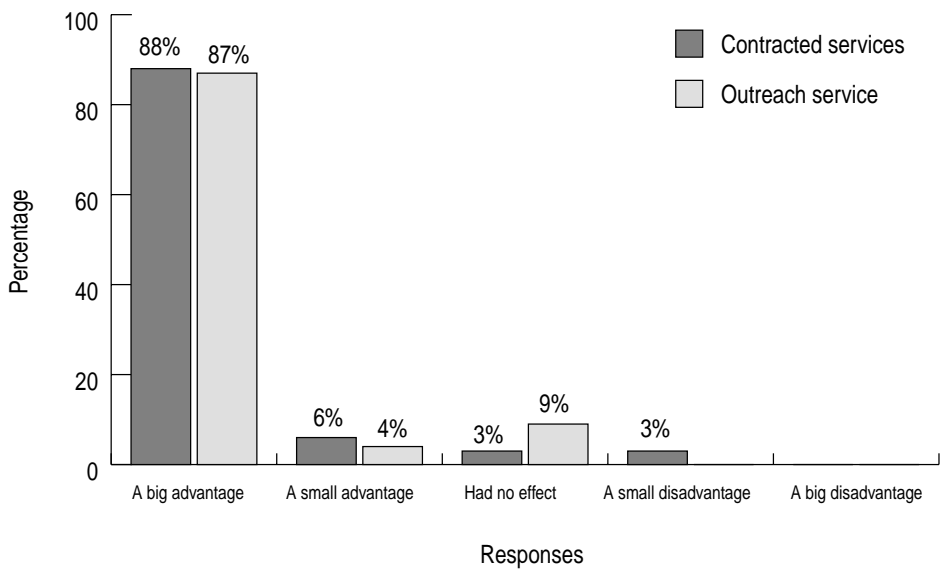


Figure 5: Carer ratings of the relative advantage of home therapy

Respondents felt safe about their partner receiving parenteral therapy at home and found the home care record beneficial. All but one respondent would participate in a similar project again. The respondent not wishing to participate again ‘did not regard herself to be capable, physically or mentally, to participate as a carer’ for the person receiving parenteral therapy at home.

Medical officers

The response rate for medical officer satisfaction surveys was 55 per cent (n = 34). Twenty-eight of these stated that the project was beneficial for delivering prescribed patient treatment in the home. These responses were based on 21 patients having been reviewed in outpatient clinics at the Gold Coast Hospital (Figure 6). The presence of project staff at reviews was identified as an advantage by 18 medical officers.

Most respondents (n = 27) were satisfied with notification of patient progress, pathology results and/or alterations in patient conditions. Forty-seven per cent of respondents did not remember receiving a letter identifying the patient’s treatment. In their opinion, these letters may have been filed without medical review or lost within the mailing system. Medical officers indicated that they were not aware of the home care record detailing treatment given to their patients.

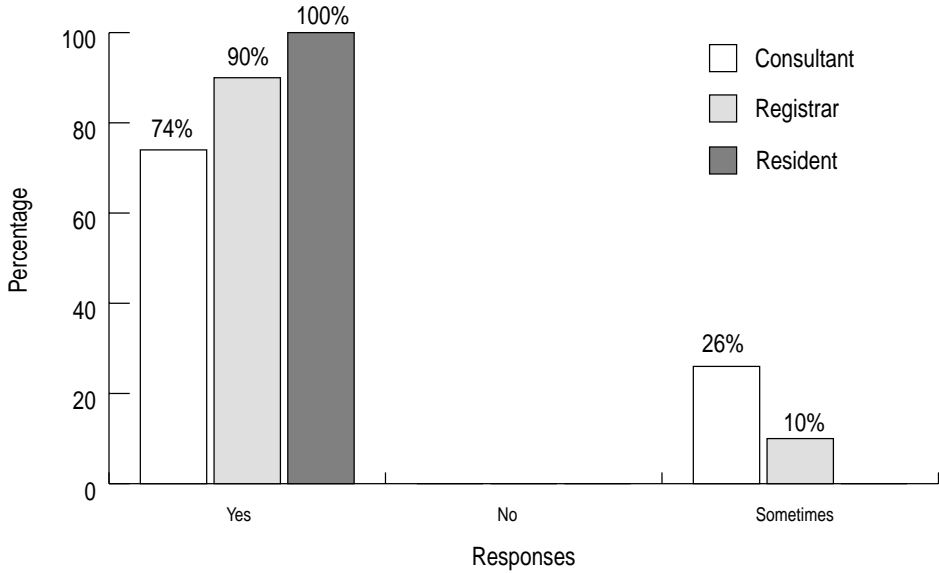


Figure 6: Medical officer ratings of the benefits of administering home therapy

Respondents indicated that they preferred patients to remain under their care rather than to be followed up by the patient's general practitioner. All but one respondent had no objection to the patient's general practitioner receiving information about the parenteral therapy administered at home and 94 per cent of respondents (n = 32) would continue to refer patients to the project.

General practitioners

The response rate for general practitioner satisfaction surveys was 65 per cent (n = 43). Thirty-three per cent of respondents were unaware that their patients had received parenteral therapy at home. This was attributed to the documents being filed without medical review or lost in the mailing system.

Patients were asked to take their home care record with them to the general practitioner review and on the 20 general practitioner occasions of service, each respondent reported being aware of the record. This group of general practitioners agreed that patient groups with uncomplicated cellulitis, pneumonia and pyelonephritis were generally suitable for administration of short-term intravenous antibiotics.

The majority of respondents indicated that they would be happy to prescribe and coordinate their patients' parenteral therapy. Results also indicate a preference for administering therapy in their rooms. If therapy was to be administered in the home, 35 per cent (n = 15) of general practitioners preferred to have a clinical nurse perform the procedure as a time-saving measure.

Respondents ranked their interest in further education (in order of preference) as:

- central venous access devices
- new intravenous technologies
- microbiology/pharmacy/infection control
- intravenous cannulation.

Service providers

Service providers (n = 18) were surveyed in April and December to monitor any improvements in project service provision. The response rate was 100 per cent on both occasions, which indicated greater interest than from other groups (70 per cent from patients, 58 per cent from carers, 55 per cent from medical officers, 65 per cent from general practitioners).

All respondents rated the service provided by the project staff in assisting/overseeing the administration of prescribed therapy in the patient's home as

excellent. Length and frequency of visits by project staff were also seen to be adequate.

A similar result regarding requesting extra information was identified in April and December. There was one episode of having difficulty with a request and this was associated with an after-hours problem when project staff were unavailable.

In April 1996, 33 per cent of respondents were 'hesitant' when administering and maintaining parenteral therapy. In December 1996 all staff surveyed felt 'confident' managing parenteral therapy.

All respondents found that the home care record detailing the patient's treatment and procedures was a helpful resource. They also confirmed that networking and communication between community service providers and hospital-based services have continued to improve since the commencement of the project.

Cost analysis

The total cost (inpatient and community care) of providing services to 113 project patients was approximately \$448 000. If project patients had remained in hospital for their total length of stay, the cost incurred by the hospital would have been approximately \$892 000. The potential cost savings were thus approximately \$444 000 (Table 5).

The total cost (inpatient and community care) of providing services to 35 target group (DRG 490) patients was \$47 000. If patients had remained in hospital for their total length of stay, the cost incurred would have been approximately \$111 000. It was thus concluded that the project potentially saved the hospital approximately \$64 000 for this group of patients alone.

Table 5: Total cost of service delivery for each model of care

Cost	
Inpatient length of stay (days)	729
Project length of stay (days)	1 376
Total length of stay (days)	2 105
Inpatient stay	\$311 775
Projected inpatient stay	\$891 994
Model 1 Outreach service	\$131 001
Model 2 Contracted service	\$140 573

Summary of findings

The major outcomes of the project were:

- 1376 inpatient days saved
- potential total savings to the hospital of \$444 000
- no significant cost difference in service delivery models
- decreased inpatient average length of stay for target patient group (DRG 490) from 4.3 days to 3.1 days (Queensland average length of stay = 3.9 days)
- patient and carers indicated a preference for community care
- medical officers advocated the benefits of administering parenteral therapies in the community
- general practitioners were interested in managing future community parenteral therapies
- (nurse) service providers endorsed the development of a parenteral therapy resource centre.

Discussion

State and Commonwealth health care initiatives have appropriately responded to consumer desire for seamless access to health care by funding ambulatory care projects. Pilot projects such as the one reported in this paper have contributed towards establishing a national framework for classifying ambulatory care services. This, in turn, has contributed to national standardised definitions and information systems. There is also potential for outcomes from these projects to have an impact on future DRG weighting and appropriate reimbursement.

Ambulatory care models of service delivery benefit patients, acute care facilities and the community. Benefits to patients are evident by improved access for people requiring parenteral administration of treatments through provision of a community-focused assessment of eligible inpatients, acceptance of direct referrals from outpatient clinics and by increasing options of service delivery models. Due to the accessibility of this service, some patients returned to work or school much earlier and some families have been empowered by learning how to contribute to their own health care.

High levels of patient and carer satisfaction were also apparent in the findings and this concurs with previous studies (Moody 1994; Montalto 1995). Interestingly, it was the patients' perception that delivered care was equal when given by either the outreach team or contracted service. As a quality

improvement activity distinct from the study, all peripherally inserted central catheter tips ($n = 35$) were collected on removal and sent to the hospital's bacteriology department to evaluate colonisation rate. There was a zero colonisation rate, which provided a positive infection control outcome.

The hospital has benefited by an increased throughput of patient admissions by increasing available bed-days. Through targeting a specific patient group, the project has been able to monitor impact on length of stay. The project has effectively had an impact on the average length of stay for the total number of DRG 490 patients admitted to the Gold Coast Hospital during the study period. Establishment of community parenteral services has facilitated discharge planning and a flow of information between key players involved in parenteral therapy within the organisation. The Community Parenteral Therapy Project has been used as a benchmark for delivering similar services throughout the State.

Whilst potential cost savings to the hospital were identified in this study, these were not true savings as hospital beds were not closed when patients were admitted to the project. Interestingly, no significant (service delivery) cost difference was found when comparing outreach and contracted services (approximately \$8000), however, it was found that consumables can be purchased more cost-effectively from the hospital than from contracted agencies. However, the cost of unpaid carers and the opportunity cost of loss of productivity for these people were not calculated because of logistical difficulties. Further research should evaluate the contribution of such informal carers.

The results of service provider surveys indicate that education strategies promoted by the project have assisted in building confidence in administering parenteral therapy and in maintaining intravascular devices. This has positive implications for the future when more complex patients will be managed in the community. It is also reassuring that service providers endorsed the establishment of a community parenteral therapy resource centre. Data were collected throughout the study on geographic distribution of the patient population and this will enable such a resource to be located at a convenient site. Even though there was limited involvement from general practitioners, survey results indicated the interest of local practitioners in the future management of parenteral therapy patients. This may be expedited from the community resource centre.

This study illustrates the need for evidence-based decision-making in health care. It has indicated that ambulatory models of health care can be successfully utilised to facilitate the concept of shared care, especially in the direction of chronic illness. The framework of this project allows both acute and chronic care service delivery to people requiring parenteral therapy. It will continue to smooth

transitions from hospital and divert potential hospital admissions to home. The re-engineering of parenteral therapy services is currently under way to further enhance continuity of care.

Acknowledgements

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Note

Unfortunately the Gold Coast District Health Service did not continue to finance this project when Commonwealth funding ended. However, limited funds were allocated for a further 12 months to provide community parenteral therapy outreach services only.

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