

**AN EVALUATION OF AN  
ACUTE PAIN SERVICE PROGRAM**

**by**

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## **Abstract**

The Acute Pain Service (APS), a multi-disciplinary team responsible for acute postoperative pain management, has been a recent development in hospitals. The purpose of this study was to increase our understanding regarding the effectiveness of APSs, to evaluate the impact of the implementation of an APS on pain management within an acute care hospital, and to make recommendations for the improvement of the APS under study.

A program evaluative method guided the study design that consisted of three phases. The objective of the first phase was to describe the implementation of the APS. Interviews and a document review provided data that was then analyzed to identify the forces and challenges that shaped three eras in the historical development of the service. The objective of the second phase was to assess the nursing and medical staff satisfaction with the APS through surveys and interviews. Analysis of the data revealed that while the staff was generally satisfied with the program, there were several areas identified for improvement. The objective of the third phase was to assess the impact of the APS on the control of acute pain. A retrospective chart review comparing two groups of abdominal surgery patients using patient-controlled analgesia failed to show any significant difference between acute pain outcomes before and after the implementation of the service.

The development of an APS, and its ultimate effectiveness, is dependent upon a number of resources: education, clinical support and adequate communication structures. Control issues surrounding pain management may arise as a result of the implementation

of an APS. Immediate recommendations for this program included increasing the visibility of the APS, decreasing the workload associated with the APS modalities, establishing an effective communication network and increasing clinical support to the program. Recommendations for future improvement included strengthening collaboration with the surgeons, promoting more efficient bed utilization by expanding the epidural local anesthesia program and repeating the program evaluation once changes are implemented. Several areas for further research surrounding acute pain outcomes and patient-controlled analgesia were identified.

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## Chapter One BACKGROUND

The past two decades have brought significant advances in the knowledge and treatment of acute postoperative pain, advances that have led to the establishment of comprehensive guidelines for the treatment of acute postoperative pain and core curricular materials for professional education (Acute Pain Management Guideline Panel, 1992; Fields, 1995). Sophisticated drug delivery techniques, such as epidural and patient-controlled analgesia, are now available, but many patients continue to experience needless suffering from unrelieved postoperative pain. Researchers estimate that 30 to 70% of patients will suffer severe postoperative pain (Cohen, 1980; Donovan, Dillon & McGuire, 1987; Reid, Evans, Topilko, & Ward, 1992). Although there are few recent studies, similar percentages are still being cited (Moote, 1994).

Unrelieved pain may contribute to the development of patient complications. The stress response triggered by pain may lead to cardiovascular compromise, tissue breakdown, increased metabolic rate, blood clotting, water retention and impaired immune function. In addition, pulmonary and thrombo-embolic complications may arise as a result of the immobility associated with pain (Acute Pain Management Guideline Panel, 1992). Unrelieved pain may cause severe psychological distress and may predispose patients to chronic pain (Fields, 1995). These complications ultimately lead to longer recovery periods in hospital and greater use of health care resources.

Three primary reasons cited for poor postoperative pain control are inadequate provision of analgesia, health care worker knowledge deficits and misbeliefs, and lack of organizational accountability. Intra-muscular opioids, delivered on an as needed (PRN) basis, provide unsteady levels of analgesia. Studies have shown that nurses are reluctant to provide any more than half the amount of analgesia available through physicians' orders (Cohen, 1980; Reid et al., 1992). Research has suggested that both physicians and

nurses have inadequate pain management knowledge and carry misbeliefs that hinder pain treatment (Gould, Upton, & Collins, 1993; Hamilton & Edgar, 1992; Lavies, Hart, Rounsefell, & Runciman, 1992; Mackintosh, 1994). The work of acute pain management is often poorly organized; few hospitals have appropriate tools for pain assessment, treatment and documentation. This lack of organization is indicative of a general lack of accountability within hospitals for pain control. A sociological study of pain treatment concluded that no team member was held accountable for pain, and that until pain work was organized with clear lines of accountability, pain control would not improve (Strauss, Fagerhaugh, & Glaser, 1974). Unfortunately, the relationship between accountability and pain control has not been explored significantly beyond this early study, although the issue of accountability is cited in editorials (Max, 1990; Von Gunten & Von Roenn, 1994).

The formation of Acute Pain Services (APS) has been one answer to addressing barriers to effective postoperative pain management. An APS is a multi-disciplinary team that takes accountability for acute pain management within the hospital. The purpose of this study was to increase our understanding regarding the effectiveness of APSs, to evaluate the impact of the implementation of an APS on pain management within an acute care hospital, and to make recommendations for the improvement of the APS under study.

The mandate of the APS is the reduction of acute pain through education, research, and the application of research-based treatment strategies. In Figure 1-1 the APS treatment model is contrasted with the traditional pain treatment model.

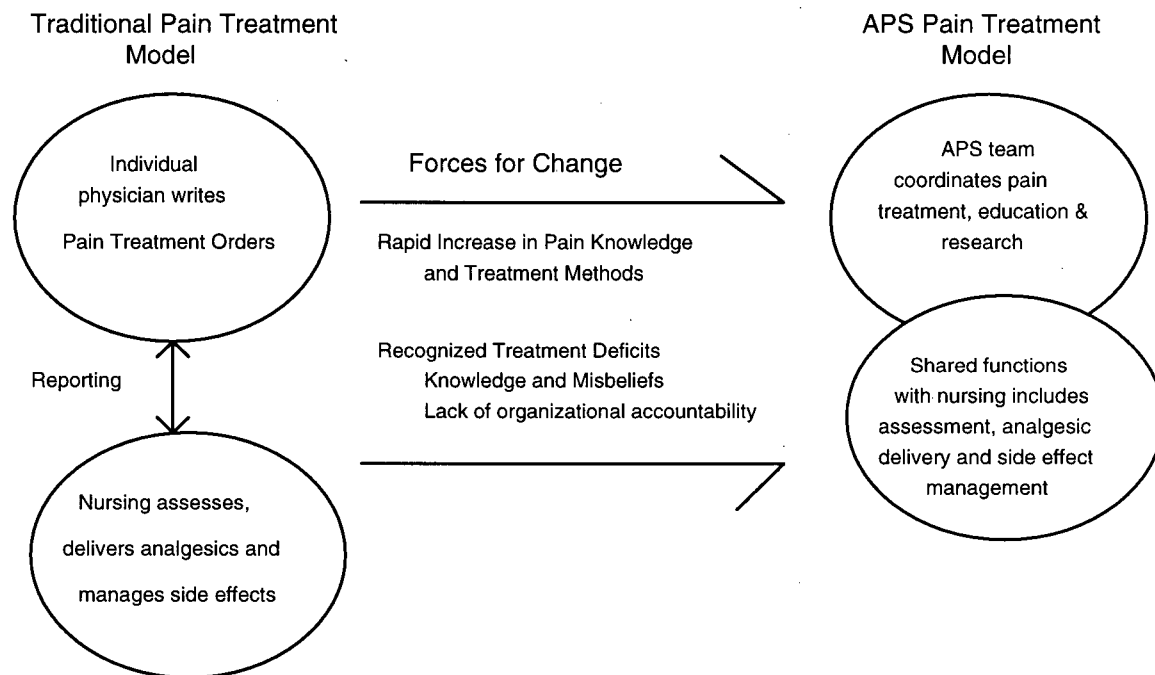


Figure 1-1 Traditional versus APS pain treatment models.

In the traditional model, the physician, usually a surgeon or an anesthetist involved in the surgery, writes pain treatment orders. Nurses, working within these orders, are responsible for ongoing pain assessment, analgesic delivery and attenuation of side effects. The physician re-enters the process if problems are encountered that cannot be solved by nurses. In the APS treatment model, orders are written by the APS physician, and the APS team remains involved in the ongoing process of pain management. The latter model may cause significant changes in the roles of nursing and medicine, because physicians not involved with the APS have limited control of postoperative pain management, and nurses are required to share their ongoing pain management role with the APS.

An APS was first described in the literature by Brian Ready and his colleagues from the University of Washington (1988). Since 1988, a number of articles have been published describing the development of Acute Pain Services in different countries and

contexts. There is, however, no description of the development of an APS within the Canadian health care context. Typically, authors describe outcomes of the APS in terms of number of patients seen, treatment modalities used, treatment side effects, health care worker satisfaction with the service, and patients' pain intensity and satisfaction. Only two studies have explored a potential improvement in patient outcomes as a result of the implementation of an APS. One group of researchers examined the outcome of lower respiratory tract infections hypothesizing that improved pain management should enhance mobilization postoperatively, thus preventing the development of respiratory infections (Wheatley, Madej, Jackson, & Hunter, 1992). Another group studied the outcome of pain intensity (Gould et al., 1992). There is a need to explore the impact of APSs on the management of acute postoperative pain, particularly in an age of health care cost restraint, where programs are required to demonstrate their contribution to cost effective, quality patient care.

In September 1994, an anesthetic-based APS was established at the hospital under study, a 500 bed tertiary level teaching hospital. With the implementation of the service, accountability for acute pain management was taken from individual surgeons and anesthesiologists and delegated to the APS anesthesiologist. A clinical resources nurse was hired to facilitate the administration of the service and to perform hospital-wide nursing education in pain management. All postoperative patients receiving patient-controlled, interpleural or epidural analgesia were followed by the APS. The APS has been operational for several years; however, there has been no formal evaluation of the program's functioning or its impact upon acute pain control. This study explored some of the processes and outcomes surrounding the implementation of the service.

### Objectives

1. To describe the implementation of the APS.
2. To assess the satisfaction of medical and nursing staff with the APS.
3. To assess the impact of the APS on the control of acute pain.

## Chapter Two

### THEORETICAL BACKGROUND AND LITERATURE REVIEW

To lay the foundation for this study, a number of concepts and bodies of literature will be discussed. The chapter is divided into two main sections. In the first section, the theoretical background includes an overview of postoperative pain and Acute Pain Services (APS), highlighting key studies that have significance for this study. In the second section, a comprehensive review of the empirical studies that have explored the outcomes of an APS is provided. For the reader unfamiliar with general pain theory, Appendix A provides background on the classification, theoretical concepts, and assessment and measurement of pain.

#### Theoretical Background

This section begins by presenting an overview of postoperative pain in terms of its characteristics, prevalence and treatment. Subsequently, a discussion of the historical development of APSs will be presented. Finally, a program model will be introduced as a framework for the discussion of how these services attain their mandate.

#### Postoperative Pain

Postoperative pain is acute pain caused by surgery. Pain experts suggest that 30-70% of postoperative patients suffer severe postoperative pain (Moote, 1994). Postoperative pain may cause significant patient complications. Pain triggers a stress response that may lead to cardiovascular complications, tissue breakdown, increased metabolic rate, blood clotting, water retention and impaired immune function. Patients who are in pain are often reluctant to move which may lead to pulmonary and thrombo-embolic complications. Ultimately, unrelieved postoperative pain may lead to

psychological distress, prolonged recovery periods and greater use of health care resources (Acute Pain Management Guideline Panel, 1992). This section will address characteristics and prevalence of postoperative pain, barriers to postoperative pain control and postoperative pain treatment techniques.

### Characteristics and Prevalence of Postoperative Pain

Postoperative pain is described in relation to the surgical intervention and the site of the incision. A number of factors may affect the intensity and duration of postoperative pain: the site and nature of the surgery, the age of the patient, the presence of complications and the perioperative analgesic delivery practices. Abdominal, thoracic and orthopedic surgeries tend to cause the highest intensity of pain for the longest period of time. Moderate or severe postoperative pain from upper abdominal or thoracic surgery usually lasts from two to seven days. Moderate or severe postoperative pain from lower abdominal surgery usually lasts from one to four days (Wasylak, 1992). Findings of one survey of surgical patients indicated that approximately one third of the patients had pain persisting for longer than four days after surgery. The patients in this study who experienced prolonged pain were generally older and had developed complications (Melzack, Abbott, Zachon, Mulder, & Davis, 1987). The anesthetic management during the surgery and the quality of the postoperative care also affects postoperative pain outcomes (Wasylak). Analgesics delivered in sufficient dosages both during and after the surgery are necessary to attenuate the pain response.

Various researchers have studied the prevalence of postoperative pain. The following is a review of some of those studies. In an early study, Cohen (1980) surveyed postoperative patients to determine the intensity of postoperative pain and found that 75% of patients experienced unrelieved pain of moderate to severe intensity. Her chart review revealed that despite severe pain patients received less medication than was ordered. Cohen proposed that nurses had inadequate knowledge of narcotic analgesic delivery and



carried exaggerated fears regarding narcotic addiction.

Donovan et al. (1987) surveyed a random sample of 353 medical and surgical patients experiencing pain to determine the incidence and characteristics of the pain, and the perceived effect of a number of variables thought to alter the pain experience. Of their sample, 58% experienced excruciating pain, and only 45% could remember a nurse discussing their pain. Their survey was corroborated by a chart review that revealed little was recorded about patients' pain. Similar to Cohen's (1980) study, the amount of analgesic given to the sample was less than 25% available through physicians' orders.

Several Canadian groups of researchers have also examined the prevalence of pain. Charles and Gauld (1993) administered a standardized questionnaire to discharged patients from 28 teaching and 29 non-teaching hospitals throughout Canada. Seventy-two percent of patients reportedly experienced some pain while in hospital. Of that group, 53% described their pain as severe, 35% as moderate and 12% as mild. A survey of elective surgical patients in another Canadian institution demonstrated that 69% of patients described their pain as discomforting or distressing and 13% as horrible or excruciating (Reid et al., 1992). Again, despite the prevalence of pain, patients did not receive more than 50% of the allowable analgesia.

### Barriers to Postoperative Pain Control

The studies cited above suggest that postoperative pain is more prevalent than it should be, primarily because it is under-treated. The under-treatment of postoperative pain has been attributed to two primary barriers: health care worker knowledge deficits and misbeliefs and lack of organizational accountability. Though a full discussion of the misbeliefs surrounding pain management is beyond the scope of this paper, two beliefs warrant special attention because of their impact on analgesic delivery. First, many health care workers are reluctant to believe patients' self reports of pain, particularly when the patient does not demonstrate the classic pain symptoms of grimacing, restlessness, crying,

muscle tension and vital sign changes. As many patients do not exhibit these behaviors, a large percentage of the population goes under-medicated (McCaffery, 1995; Watt-Watson, 1992). Second, many health care workers withhold analgesia out of unfounded fears that patients will become addicted to opioids (McCaffery; Watt-Watson).

Health care worker knowledge deficits and misbeliefs have been described in a number of studies. Mackintosh (1994) surveyed 100 surgical nurses to determine their knowledge and opinions of pain assessment and management. With a 61% return rate, her survey suggested that nurses in general have poor knowledge about pain assessment techniques and about basic analgesic pharmacology. Hamilton and Edgar (1992) surveyed 318 staff in an acute care teaching hospital and concluded that nurses lacked basic knowledge of pharmacology and carried exaggerated fears of opioid addiction. These studies have been supported by other studies of both physicians and nurses (Gould et al., 1993; Lavies et al., 1992). This apparent lack of knowledge is not surprising considering 48% of baccalaureate nursing programs in the United States spend four hours or less on pain (Graffon, 1990), and nursing program faculty may have inadequate knowledge about pain management (Ferrel, McGuire, & Donovan, 1993).

The second barrier to postoperative pain control is the lack of accountability within institutions for pain management. This barrier was studied by Strauss et al. (1974). Using a grounded theory approach, this group of researchers examined pain work in various settings to discover "(1) the general organizational setting in which the staffs' predominant work occurs; (2) the work itself, including that entailed in the staffs' management of pain; and (3) the consequent interaction between staff and patient and among staff members" (p. 560). They found that pain work entailed many tasks for the staff including handling patients' expressions; diagnosing, minimizing or preventing pain; helping patients to endure pain; and controlling and dealing with their own reactions to pain. Pain work was accomplished through a sophisticated process of negotiation between health care workers, and between health care workers and patients. A key part of

the study findings was identifying pain trajectories. They found that while expected pain trajectories were usually unproblematic, unexpected trajectories had the potential to cause patient labeling, staff and ward disruption, and poorly managed pain. Ultimately, their research revealed the invisibility of, and lack of accountability for, pain work.

Everyone has done more, observed more, knows more, than she reports or talks about to her colleagues - and certainly much more than she puts in the official records....We hazard, as once we did about dying, that until staff become genuinely accountable for their pain work, there will be little improvement in the care of the patients except that which is effected fortuitously or temporarily by virtue of an unusually skilled compassionate or sensible staff member....[U]ntil the staff become genuinely accountable for their pain work, there will be little improvement in the care of patients....[W]e predict that there will be little improvement in pain work until it becomes a matter of collective concern and organizational accountability. (p. 566)

Unfortunately, this seminal research has not been well developed through similar studies; although, increasingly the need for accountability for pain management is being explored in editorial literature. Max (1990), in an editorial on why we have been unable to improve analgesic outcomes, contends that the medical model of disease has rendered pain unimportant and invisible. Physicians specialize according to disease models, and consequently no one is accountable for symptoms such as pain. Von Gunten and Von Roenn (1994) claim that health care workers are not subject to administrative review for failing to treat pain in the same way that they would be for failing to treat other conditions.

### Postoperative Pain Treatment Techniques

Traditionally, postoperative pain has been managed primarily through intramuscular opioids delivered on a PRN basis. This technique, though easy to administer, has been criticized for a number of reasons: the injections are painful, there is frequently a lag between when the patient experiences pain and the delivery of the analgesic, and the

delivery of single, intermittent doses may cause swings in blood opioid levels (Ferrante, 1990). Increasingly, postoperative pain management is moving away from intra-muscular therapy to a multi-drug, multi-modal approach. Local anesthetics and non-steroidal anti-inflammatory drugs are being used in conjunction with opioids. Intra-muscular delivery is being replaced by the more sophisticated techniques of epidural and patient-controlled analgesia (PCA). Though epidural analgesia has been used postoperatively for many years, patients receiving this form of analgesia have been kept in intensive care units because of the risk believed to be associated with delivering drugs into the epidural space (Maier & Wolf, 1994). The high cost associated with an intensive care bed meant that this technique was limited to a few patients. Only recently has this technique been considered safe for general surgical wards, and hence, been available to a wider surgical population.

With PCA, patients have the control of a computerized pump that delivers doses of intravenous opioids at the push of a button. The patient is first given a loading dose by health care workers. The patient then self administers small doses of opioid when they feel pain. PCA offers significant advantages. The smaller, incremental doses mean that patients are less likely to develop side effects, and a steadier state of analgesia is provided (Ferrante, 1990). By avoiding the multiple tasks associated with intra-muscular delivery (gaining the attention of the nurse, having the nurse obtain the keys to the narcotic cabinet, having the nurse draw up and deliver the drug), the time that elapses between the onset of pain and the delivery of analgesia is reduced. Patients are given control over their pain management and can taper the delivery of opioid to their individual needs.

Despite the advantages of PCA and epidural analgesia, they are sophisticated delivery techniques requiring staff and patient education and support. Indeed, there is a suggestion within the literature that these techniques should not be implemented without an APS (Moote, 1995).

### Acute Pain Services

The concept of pain clinics or services started shortly after World War II when medical personnel began to treat psychiatric and substance abuse problems that arose as a result of chronic pain syndromes caused by war injuries. Two major types of chronic pain clinics developed: multi-disciplinary pain treatment centers and anesthesiologist-run nerve block clinics (Bonica, 1990). The growth of these clinics was relatively rapid. By 1976, there was a total of 17 pain clinics reported by the world medical news, by 1977, the American Association of Anesthesiologists listed over 300 clinics, and by 1987 there were 1,800 to 2,000 pain clinics located in 36 countries (Ghia, 1992). Having seen the effectiveness of these clinics, it followed logically that a similar model should be applied to the treatment of acute pain. This section will provide a brief historical overview of the development of APSs and will present a program model to describe how an APS performs its primary mandate of acute pain reduction.

### Historical Development

In 1988, Brian Ready and his colleagues from the University of Washington published the first article on the development of an APS. This article described the development and first 18 months of an APS including activities of the service, roles of APS personnel, patient complications and policies and procedures. According to Ready et al., the goals of an APS are to: (1) improve postoperative analgesia, (2) educate pain personnel, (3) conduct pain research and, (4) institute new analgesic methods. This seminal publication was followed by descriptions of similar services in Australia (Macintyre, Runciman, & Webb, 1990), Britain (Cartwright, Helfinger, Howell, & Siepmann, 1991), New Zealand (Schug & Haridas, 1993), Spain (Blanco, Blanco, Rodriguez, Castro, & Alvarez, 1994), Germany (Maier, Kibbel, Mercker, & Wulf, 1994) and Sweden (Rawal, 1994). There is no published description of an APS in Canada.

Nursing journals contain a number of articles emphasizing the role of nursing within an APS (e.g., Love, 1991; Weinrich, 1991; Wild, 1992). APSs have also been described in unique settings: pediatric (Llewellyn, 1993), multi-cultural (Dahlberg & Pendle, 1994) and oncology (Holritz & Lucas, 1993). Several articles have been published describing quality improvement indicators that should be used to monitor the safety and efficiency of an APS (Miaskowski, 1994; Pasero & Hubbard, 1991).

Since 1988, the growth of APSs within North America has been rapid. A 1991 survey of 47 university affiliated teaching hospitals in Canada found that 25 had an APS, and 17 were in the process of organizing one. The greatest barrier to implementation was lack of resources (Zimmerman & Stewart, 1993). A similar survey was done in the United States. Surveys were sent to a random sample of 500 hospitals having more than 100 beds. Of the 324 responses, 236 had an APS (Ready, 1995).

#### The Acute Pain Service Program Model

APSs vary in leadership and disciplinary composition. Most frequently the programs are run by anesthesiologists. Team members may include surgeons, anesthesiologists, nurses, physiotherapists, pharmacists and biomedical technicians. Criteria have been proposed for a pain management service to qualify as an APS: continuous in-service training for staff; systematic recording of pain, sedation and respiratory frequency; clear identification of the personnel responsible for pain relief; and continuous availability of suitably trained staff to deal with emergencies (Schug & Torrie, 1993).

The primary mandate of an APS is the reduction of acute pain. Figure 2-1 is this author's conceptualization, drawn from the literature, of how an APS accomplishes this mandate. On the left hand side of the diagram are the *focus variables*, called such because they describe the primary focus of the APS as described in the literature. In the middle of the diagram are the *bridging variables*. These are practical daily strategies that the APS uses to bridge from its focus to its *outcome* of pain reduction. Finally, there are

*program operational variables* that influence both the focus and the bridging variables, and ultimately the outcome of the program. A discussion of the nature and importance of each of these areas is foundational to understanding the evaluation of an APS.

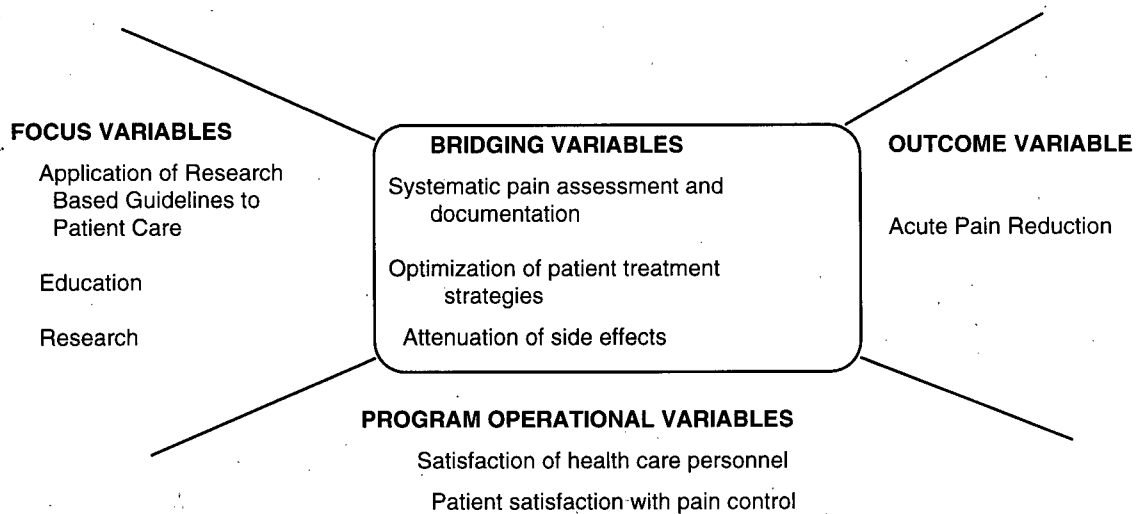


Figure 2-1. Acute Pain Service Program Model

### Focus Variables

A number of organizations have established research based guidelines for the management of acute pain: The United States Department of Health and Human Services (Acute Pain Management Guideline Panel, 1992), the International Association for the Study of Pain (1990), the American Pain Society (1992), and the Canadian Pain Society (Merskey & Prkachin, 1993). The International Association for the Study of Pain has also published core curriculum for professional education in pain (Fields, 1995). A major focus of the APS is to apply these guidelines in patient care.

Education is another focus variable of the APS. As discussed previously, health

care workers' lack of pain knowledge and misbeliefs surrounding pain are believed to contribute to the inadequate treatment of postoperative pain. In addition, the APS often introduces new analgesic techniques such as PCA, epidural and interpleural analgesia, techniques that require staff education and support. PCA requires a major philosophical shift on the part of staff and patients, and its initiation can generate significant anxiety (Clarke et al., 1994; Shade, 1992). Part of the role of the APS is to provide expert support and education.

Contributing to the advancement of pain knowledge through research can also be a focus of the APS; although, the ability to do this is dependent upon the resources available to the program. Research requires money, time and personnel skilled in the research process. As lack of resources is one of the major barriers to APS implementation in Canada (Zimmerman & Stewart, 1993), it may be that research will not be a major focus of many programs.

### Bridging Variables

The bridging variables are those daily functions of the APS that contribute to acute pain reduction. Systematic pain assessment helps to make pain visible, to facilitate communication surrounding pain and to support organizational accountability for pain through documentation (Au et. al., 1994; Bondestam, Hovgren, Johansson, Jern, Herlitz, & Holmberg, 1987; Scott, 1994). Optimization of treatment strategies is an important part of the program, as the use of pain assessment strategies and sophisticated treatment modalities does not guarantee success. For example, a study of the use of pain scales with patients in a cardiac care unit showed that when patients gave a pain score of 5-6 on a 10 point scale, analgesic was given on 50% of the occasions. When patients reported pain scores of 7-8, 20% of the patients remained unmedicated (Bondestam et al.). Pain scales may make pain visible, but it does not necessarily follow that the pain will be treated. Part of the role of the APS is to determine realistic and individualized pain goals,



and to treat patients in accordance with those. Likewise, when pain trajectories become difficult, medications and delivery methods must be manipulated before adequate pain control is realized.

The attenuation of side effects is another bridging variable. Opioids may cause a number of side effects: nausea and vomiting, respiratory depression, excessive sedation, pruritus and reduced gastric motility. The presence of these side effects can discourage patients from taking the pain medication, as many patients would rather have pain than side effects. There has also been some question as to whether the aggressiveness of the multi-drug, multi-modal approach advocated by the pain guidelines will contribute to overmedication and the development of life threatening side effects in some patients (Maier & Wolf, 1994; Schug & Torrie, 1993). The APS monitors for the development of side effects and alters treatment regimes as necessary.

#### Operational Variables

The final group of variables are the program operational variables. Miaskowski (1994) recommends using both staff and patient satisfaction when evaluating APSs from a quality improvement perspective. A number of factors can influence staff satisfaction with a program including availability, accessibility, organization, communication structures and policies and procedures (Timmreck, 1995). In the case of an APS, staff satisfaction may also be influenced by the change in their pain management role. Surgeons and anesthesiologists not involved with the APS have no ongoing involvement with patient pain management, and nurses must now share their pain management role with the APS.

Patient satisfaction with pain control is important to consider, for health care programs should operate with a consumer focus. This variable, however, should not be considered indicative of pain outcomes, as typically patients are satisfied even when they have poor pain control. The survey of discharged hospital patients cited previously

showed that while 48% of patients in pain felt that some or all of their pain could have been eliminated by prompt attention by hospital staff, 93% felt they got the right amount of pain medication (Charles & Gauld, 1993). A study of postoperative patients in Sweden indicated that while 30% of patients experienced pain much worse than they anticipated, most were not dissatisfied with their pain treatment (Rawal & Berggren, 1994). A similar survey of 52 postoperative patients found that while 27% of patients gained only little or some relief from their medication, and 31% said that their pain relief lasted 2 hours or less, 92% of patients were satisfied with their pain relief (Lavies et al., 1992). Clearly, patient satisfaction plays a role in APS program evaluation, but it cannot be assumed that satisfied patients are receiving effective pain control.

The variables discussed above are the major program variables that contribute to the outcome of acute pain reduction. Although pain reduction is the primary outcome variable chosen for this model, there are other indirect outcomes that have been suggested or evaluated in the literature: readmission rates due to inadequate pain management (Fields, 1995), length and cost of hospitalization (Fields, 1995), and adverse events from either pain therapy (Schug & Torrie, 1993) or uncontrolled pain (Wheatley et al., 1991). In the following section the empirical literature that documents the outcomes of APSs is critically reviewed.

## Literature Review

The purpose of this section is to review the studies that examine the outcomes of an APS. To be included in this review the study had to include a systematically measured outcome of the service. Excluded from the review were studies reported in a foreign language. One foreign language study was excluded; the abstract for this German article indicated that the study described the experience of an APS and reported complication rates as the primary outcome.

To retrieve all relevant literature for this review computerized and manual literature searches were conducted of Medline/Index Medicus and CINAHL. The Hospital Literature Index was searched manually. The literature was searched from 1985 to the present. Key terms were acute pain service(s); pain clinics/centers; pain, postoperative; pain, control; pain, management; and analgesia, techniques and methods. The search yielded a total of nine articles. These studies were then divided according to descriptive and experimental outcomes. Studies were labeled descriptive if they did not evaluate changes in outcomes as a result of the APS implementation. Studies were labeled experimental if they included outcomes prior to and after the implementation of the service. Seven articles were descriptive, one article was experimental and one article included both descriptive and experimental elements. An overview of these studies is presented in Table 2-1.

Table 2-1.

**Summary of Acute Pain Service Outcome Studies**

AUTHORS	STUDY TYPE	OUTCOME	SAMPLE
Cartwright et al., 1991	Descriptive	Pain, Side Effects	1308 post surgical patients
Macintyre et al., 1991	Descriptive	Patient Satisfaction, Side Effects	1503 post surgical patients
Ready et al., 1988	Descriptive	Side Effects	623 post surgical patients
Schug and Torrie, 1993	Descriptive	Side Effects	3016 post surgical patients
Blanco et al., 1994	Descriptive	Side Effects	1214 post surgical patients
Schug and Haridas, 1993	Descriptive	Nurses Knowledge	No description
Libreri, 1995	Descriptive	Nurse and Doctor Satisfaction	116 Nurses, 60 Doctors
Wheatley et al., 1991	Descriptive & Experimental	Pain, Patient Satisfaction, Side Effects, Chest Infections	660 post surgical patients. Major surgery only
Gould et al., 1992	Experimental	Pain	2035 post surgical patients

**Descriptive Studies**

Four outcomes are investigated in the studies retrieved: pain, side effects, patient satisfaction and health care worker knowledge and satisfaction. Two studies documented pain outcomes. Cartwright et al. (1991) surveyed 1308 postsurgical patients under the care of an APS on postoperative days 1, 2 and 3 using a verbal rating scale. They found that 10% of patients experienced severe pain postoperatively, a significant drop from the

30-70% quoted in the literature (Moote, 1994). Wheatley et al. (1991) surveyed 660 patients recovering from major surgery at one and two days using the visual analogue scale. They reported that of the patients using PCA, 63% experienced mild, 26% experienced moderate and 11% experienced severe pain. Of the patients using epidural analgesia 77% experienced mild, 21% experienced moderate and 7% experienced severe pain.

The incidence of side effects in patients under the care of an APS is examined in six studies. Of primary concern are the major side effects of respiratory depression and excessive sedation. Most researchers suggest that less than 1% of patients develop potentially serious side effects ( .33% - Blanco et al., 1994; .5% - Macintyre et al., 1990; .53% - Schug & Torrie, 1993; .6% - Ready et al., 1988). Two groups of researchers reported potentially serious side effect rates of 1-2% (1.4% - Cartwright et al., 1991; 1.2% - Wheatley et al., 1991). These results suggest that the incidence of serious side effects within an APS is low; however, as there was no comparison group included in these studies, this conclusion is tentative at best.

Patient satisfaction among patients receiving care from an APS is measured in two studies. Wheatley et al. (1991) found 96% of patients using PCA and 91% of patients using epidural analgesia stated they were satisfied with their pain control. Macintyre et al. (1990) measured patient satisfaction using a 0 to 10 scale. Their results indicated that patients receiving PCA had an average satisfaction scale of 8.7; whereas, patients receiving epidural analgesia had an average satisfaction scale of 8.5. These results seem to indicate a high level of patient satisfaction with their therapy, and suggest that PCA may contribute more to satisfaction than epidural analgesia; however, once again it is difficult to evaluate the significance of these results without a control group.

Health care worker knowledge and satisfaction is measured in two studies. Schug and Haridas (1993) state that 86% of nurses surveyed indicated that they were more knowledgeable of pain problems, pain assessment and pain treatment after the

implementation of an APS. Unfortunately, no details of the survey or sample are given. A quality improvement survey done by Libreri (1995) surveyed nurses' and doctors' opinions about, and satisfaction with, an APS, and their self reported knowledge of pain. A 17 question multiple choice survey was distributed to 140 nurses and 90 doctors. The return rate was 83% (n=116) for nurses and 75% (n=60) for doctors. Very few nurses (6%) or doctors (8%) believed the APS interfered with their patient management; however, 56% of nurses believed the communication between the APS and the nurses needed to be improved. Although one third of doctors believed that PCA should be managed by the surgical unit rather than the APS, 90% of doctors were satisfied with, or wanted more, APS involvement. In general, both doctors and nurses believed that the APS was efficient, prompt in their response to calls and either decreased or made no difference to their workload. Seventy-one percent of nurses and 27% of doctors rated their knowledge of PCA as good. Only 61% of doctors' responses are accounted for in this question, leaving one to wonder if there was a non-response rate of 39%. Other than communication problems, this survey demonstrated that generally staff was satisfied with the APS. This satisfaction, particularly on the part of the nurses, may be related to the nurses being responsible for identifying and referring patients to the APS. In many other situations, the anesthetist determines these referrals.

The studies reviewed so far have described various aspects of an APS: pain, side effects, patient satisfaction and health care worker satisfaction and knowledge. Unfortunately, these descriptive research studies do not provide any standard for comparison. We are unable to determine whether there has been any change as a result of the implementation of the APS or attribute any positive effects to the APS.

### Experimental Studies

Only two studies have documented a change in patient outcomes as a result of the initiation of an APS. Wheatley et al. (1991) retrospectively compared the incidence of

chest infection in surgical patients between the year prior to the initiation of the APS and the first year of the service. Diagnosis of chest infection was made by the infection control officer on the basis of fever, cough and purulent sputum. The analysis showed that there was a statistically significant reduction in chest infections during the first year of the service (1.3% compared to 0.4%). There is no discussion in the study of other variables that may have affected this reduction. For example, it would have been helpful to see the yearly variability in chest infections, apart from the initiation of an APS.

The second study examined the effect of a staged implementation of an APS on pain intensity (Gould et al., 1992). The first and last stages are general audits of all the surgical wards. The remaining stages entail the implementation of pain assessment charts, an algorithm to increase the use of intra-muscular analgesia, local anesthetic via nerve blocks and wound infiltration, a patient information sheet on pain control, and PCA. The main outcome measure was pain intensity as measured by a change in the visual analogue pain score 24 hours after surgery. Pain was categorized into minor, intermediate and major surgical pain, and measurements were made at rest, on movement and with deep inspiration. Data were collected from 2035 patients over nine months. Although the authors conclude that the implementation of an APS does lead to an improvement in postoperative pain as measured by the visual analogue score, the study results are unclear and uninterpretable.

### Conclusion

This review has shown that while pain management knowledge has evolved significantly over the past several decades, in many institutions the treatment of postoperative pain has not. In general, health care workers lack sufficient knowledge about pain to treat it effectively and carry a number of misbeliefs about pain management. Lack of accountability for pain management is a common occurrence in health care institutions. These factors together contribute to poorly managed postoperative pain, a

state that has implications for both patients and health care providers. Patient complications from unrelieved postoperative pain can cause needless suffering and greater use of health care resources.

Many institutions have endeavored to meet these challenges through the initiation of an APS; however, there has been little research to date that evaluates these services. A number of descriptive studies have explored different program variables, but these studies provide no standard for comparison, and so it is impossible to attribute the observed effects to the initiation of the service. Two studies that explored outcomes of an APS using a control group seem to indicate that the implementation of an APS may lead to better patient outcomes. In days of increasing health care restraint it is important to explore more fully how the implementation of an APS affects both the delivery of pain management and patient pain outcomes, particularly when the APS model may cost the health care system more than the traditional model of pain delivery.



## Chapter Three

### INTRODUCTION TO METHODS

As described in chapter one, the purpose of this study was to increase our understanding of the effectiveness of Acute Pain Services (APS), to evaluate the impact of the implementation of an APS on the delivery of pain treatment, and to make recommendations for the improvement of the APS under study. A program evaluation perspective guided the study design. Fink and Kosecoff (1984) divide program evaluative methods into two major types, improvement and effectiveness, based upon how the information will be used. Improvement program evaluation is used with programs that are still developing, and as the name suggests, the primary purpose of the evaluation is to refine and improve the program. Effectiveness evaluation is used with established programs to make definitive statements about the program's quality and outcomes. This program evaluation will have both effectiveness and improvement components.

Increasingly it is recognized within the program evaluative literature that evaluative research should go beyond program outcomes to examine the processes of the program. As programs are generally complex, this dual focus on processes and outcomes leads to a better understanding of how the parts affect the whole (Berk & Rossi, 1990). Also, to provide useful data for the implementation of other programs, an articulation of the processes that led to any demonstrated improvement in outcome is required. This study utilized multiple sources of data to examine both processes and outcomes. Qualitative and quantitative techniques were used to analyze the data.

The following were the objectives of this study:

1. To describe the implementation of the APS
2. To assess the satisfaction of medical and nursing staff with the APS

3. To assess the impact of the APS on the control of acute pain.

Each of these objectives focuses on a different aspect of the study and, as such, comprises a different phase of the program evaluation. The following diagram presents an overview of the various phases and methods of the study.

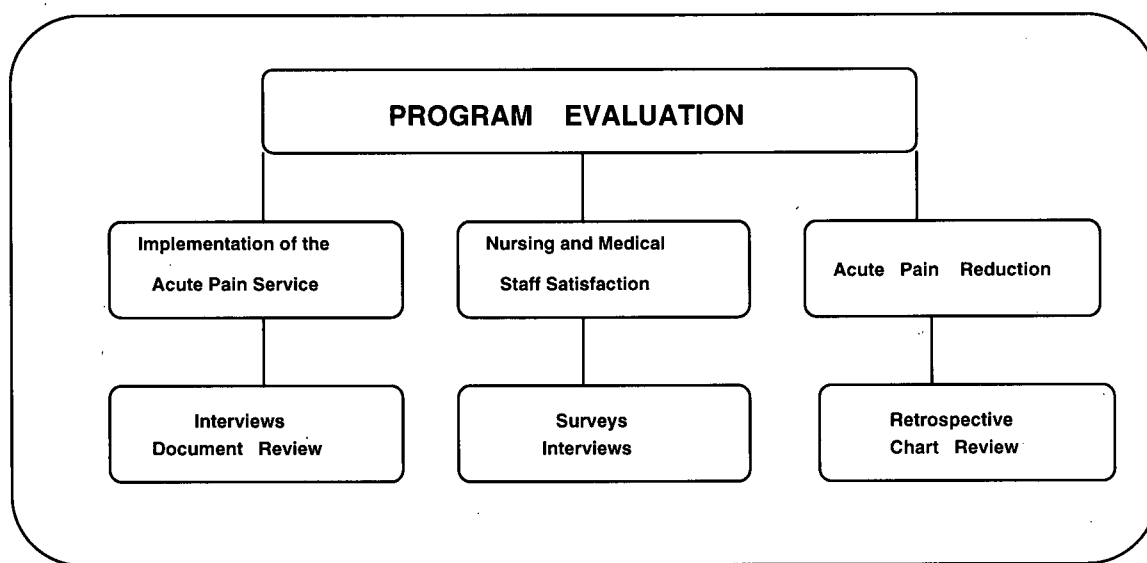


Figure 3-1. Research Design

The first phase was descriptive in nature and examined the implementation of the APS through interviews and document review. The second phase addressed nursing and medical staff satisfaction. These data were gathered through surveys and interviews. The third phase addressed the anticipated outcome of the APS, that of acute pain reduction. The data used to evaluate this outcome were gathered through a retrospective chart review. While this chapter provides an introduction to the program evaluative design, chapters four, five and six will provide a detailed description of the methods used for each phase. In chapter four the methods and findings related to the historical development of the APS will be described. Chapter five will focus on the methods and findings of the survey of medical and nursing staff satisfaction. Finally, chapter six will

include the methods and findings of the chart review designed to evaluate the outcome of acute pain reduction.

### Ethical Considerations

Permission for this study was obtained from the University of British Columbia Behavioural Sciences Screening Committee for Research and Other Studies Involving Human Subjects and from the medical and nursing vice presidents of the hospital under study. As this research did not involve patients, permission from the clinical investigations committee of the hospital was not be obtained. All interview participants signed a consent form (Appendix B). Participants for the historical interviews were recruited through a letter of initial contact (Appendix C). Survey participants were notified of implied consent through a cover letter (Appendix D).

## Chapter Four

### HISTORICAL DEVELOPMENT OF THE ACUTE PAIN SERVICE

The first phase of the research was directed toward an examination of the historical development of the Acute Pain Service (APS) from the introduction of epidural catheters to the nursing wards in 1988 to the formal establishment of the APS program in 1994. A description of the implementation of the APS provides an important context for understanding the other variables of medical and nursing staff satisfaction and pain reduction, and may help to lend direction for the development of similar services within a Canadian context. This chapter will first describe the methods used for the historical review and will then present the development of the APS according to three major eras.

#### Methods

Data for this phase were gathered through interviews and a document review. Five interviews, lasting from 30 to 70 minutes, were conducted with key people involved in the planning and implementation of the APS. This included one anesthetist and four nurses. One other anesthetist and nurse were identified as being key people in the formative years of the service; however, they had left the hospital and consequently were not interviewed. The following five questions guided the interviews:

1. What led to the initiation of the APS?
2. What resources were required to implement the APS?
3. What relevant events occurred during the implementation of the APS?
4. What factors influenced the development of the APS?
5. What, if any, problems were encountered during the implementation of the APS, and how were they dealt with?

All interviews were tape recorded, and transcribed in point form onto document summary sheets for analysis. Data from these sheets were then summarized onto two master tables:

significant chronological events and major influences.

A number of documents were also reviewed. Twenty-one sets of minutes of the Patient Controlled Analgesia (PCA) and APS committee meetings were reviewed from August 1992 to December 1994. Sixteen memos identified as being pertinent to these committees were reviewed for this same time period. Finally, two proposals from Dr. Simon Baker to the hospital administration and the response of hospital administration to these memos were reviewed. All of these documents were obtained from the personal files of Dr. Baker and Ms. Bonita Elliott. Pertinent information from these documents was organized chronologically using a summary sheet and integrated with the interview data onto two master tables (see Tables 4-1 and 4-2). Occasionally questions arose from the documents, and interviewees were contacted for clarification. The documents were used primarily to supplement interview data and to provide specific dates for events mentioned in the interviews.

## Findings

Analysis of the interviews and documents revealed that the development of the APS can be conceptualized as occurring in three distinct eras: the era of planning, the era of patient-controlled analgesia, and the era of the Acute Pain Service Program (see Table 4-1). The term era is being used to describe a period of time between two significant events that occurred during the development of the APS. Each of these eras will be discussed in terms of the critical events, the influencing forces and the challenges that characterized each era. Critical events are those events cited by the interviewees that stood out as being significant during the development of the service. The influencing forces are those forces, both positive and negative, that shaped the development of each era. Finally, the challenges are the major barriers that were faced during each era.

Table 4-1.

**Critical Acute Pain Service Events According to Era**

ERA	CRITICAL EVENTS
<b>Era 1: Planning 1980 to 1990</b>	<p>Local anesthetic block clinic established at the hospital (1980)</p> <p>Epidural catheters introduced to ICU (1988) and maternity (1989)</p> <p>First literature published describing an APS Program (1988)</p> <p>Interpleural catheters introduced to ICU, PACU and surgical vascular thoracic unit (1988)</p> <p>Anesthetic staff guest speakers at pain management conference (1988)</p> <p>Epidural bolus narcotics introduced to orthopedic ward (1988) and discontinued (1989)</p> <p>Staff from hospital speak on pain management at Critical Care nurses conference (1989)</p> <p>PCA symposium attended by several anesthetic and nursing staff (June 1990)</p> <p>Proposal for an APS submitted to hospital administration (January 1990). Budget denied (February 1990)</p> <p>Request for PCA pumps put on capital equipment budget and approved</p>
<b>Era 2: Patient-Controlled Analgesia December 1990 to April 1993</b>	<p>First PCA committee meeting (December 1990)</p> <p>First PCA trials. PCA introduced to post-anesthetic care unit and orthopedic ward (January 1991)</p> <p>Request for 3 more PCA pumps approved (May 1991)</p> <p>PCA introduced to vascular thoracic ward (July 1991)</p> <p>Seven PCA pumps purchased (September 1991)</p>

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Epidural bolus narcotics re-introduced to orthopedic ward (1992)

PCA expanded to pediatrics and general surgery (March 1993)

Approval to purchase 10 more pumps (September 1993)

PCA expanded to neurosurgery (November 1993)

Responsibility for administering local anesthetic agents into interpleural catheters transferred from medicine to nursing (February 1994)

Proposal for an APS re-submitted to hospital administration - Accepted March 1994

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**Era 3: Acute Pain Service Program  
March 1994 to December 1994**

Dr. S. Baker appointed official director of the APS (April 1994)

PCA committee changed to APS committee (May 1994)

APS clinical resource nurse hired (July 1994)

First meeting of APS anesthetist group (July 1994)

Initiation of APS quality improvement (August 1994)

Official implementation date of anesthetic patient rounds (September 1994)

APS patient census initiated through the computer system (September 1994)

Algorithm created for the control of pain and nausea and vomiting with PCA (December 1994)

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**Era 1: Planning**

The origin of the APS can be traced to the establishment of a local anesthetic block clinic within the hospital in 1980 by two anesthetists who were later to play key roles in the development of the APS. The success of this clinic was a strong motivator

for the anesthetists to provide this same service for patients in acute pain. The first formal program for the treatment of patients in acute pain began with the introduction of epidural anesthesia to the intensive care unit (ICU), and with the introduction of interpleural anesthesia to the ICU, post anesthetic care unit (PACU), and surgical vascular thoracic unit in 1988. Epidural opioid analgesia was also introduced to the maternity and orthopedic wards. Unfortunately, for reasons that will be discussed later, the epidural analgesia program was discontinued from the orthopedic ward in 1989.

Around the late 1980s information about APSs and alternative analgesic techniques such as PCA and epidural analgesia began to emerge, and interest increased among the staff at the hospital. The first article about an APS was published in *Anesthesiology* in 1988 (Ready et al.). Several staff members from the hospital presented their experience with epidural and interpleural analgesia at conferences in 1988 and 1989. A PCA symposium was offered in the lower mainland in June of 1990, and several staff from the hospital attended. Speakers from the symposium came to the hospital the next day to offer guidance about establishing a PCA program.

This increasing enthusiasm for PCA and epidural analgesia culminated in a proposal for an APS, written by Dr. Simon Baker, that was submitted to the hospital administration in January of 1990. The proposal for a 24 hour pain management service addressed such issues as the aims of the service, the anticipated modes of treatment, and the administrative and organizational aspects. Monies were requested from the hospital operating funds and included fees for a director, nurse clinicians, and a dedicated resident, fellow or intern (S. Baker, personal communication, January 30, 1990). The response to the proposal indicated that the cost of the service could not be assumed under the existing hospital budget, particularly given the number of staff required to operate the service. More information was requested about the number of patients that would be cared for and about the potential benefits to patients and the hospital. A recommendation was made for the establishment of a multi-disciplinary group (hospital administrator,



personal communication, February 20, 1990).

At this point, Dr. Baker concluded that the rejection of the proposal necessitated a change in strategy. He decided the best way to realize the establishment of an APS would be to start a PCA program, make it indispensable to the hospital, and then to build an APS around it. A request for PCA pumps was placed on the hospital's capital equipment budget, and this request was approved. This event marks the end of the planning era.

### Influencing Forces

Four primary forces shaped this particular era: changing paradigms of pain management, the presence of skilled and enthusiastic personnel, cost, and concerns over patient safety. Changing paradigms of pain management were a critical supportive factor during these early stages. The pain management literature was increasingly addressing the inadequacy of intra-muscular delivery and calling for systematic assessment and measurement of pain. Patients were being recognized as important partners in the pain management process. Effective pain management was being linked to improved patient outcomes and cost savings for hospitals. Without exception, the interviewees talked of the influence that this literature played in their desire to see new analgesic methods implemented.

The second positive force in the development of the service was the presence of skilled and enthusiastic personnel willing to donate their energies and time to this vision. As one interviewee put it, "I think you need a couple of champions, you know, a couple of champions for the cause and others will get on board." All of those interviewed expressed a consuming interest in pain management and cited other personnel in key positions who shared their passion. One particular anesthetist who had worked with PCA at another hospital lobbied persistently for the introduction of this modality to the hospital under study. Another anesthetist had worked in the block clinic, seen the success of local anesthetics for chronic pain management and was committed to applying these

techniques routinely for postoperative patients. The nurse who was in a key position as equipment manager had a commitment to PCA. This enthusiasm was essential to sustaining the vision throughout this early stage. Dr. Simon Baker (an anesthetist) and Ms. Bonita Elliott (the assistant head nurse, and then head nurse of the post anesthetic care unit) were primarily responsible for the early development of the epidural and interpleural programs. The following example shows the type of commitment that was required to establish these programs:

A lot of it was not done at work. A lot of it was done on our own time. We were spending all our time at home. We were spending our evenings. The only advantage was that we worked well together, we thought the same way about these things, we were both committed that we wanted this done. We only lived two miles apart so I would go on my evening run, and I'd deliver the next draft to his house. He'd bring it in the next morning.

This passion was facilitated through a network of external people who had experience with other services. Two large teaching hospitals in the city had APSs. Information from one program was included in the original proposal submitted to administration.

Despite the positive influence of the above factors, there were also two constraining factors that inhibited the development of the program: costs and concerns over patient safety. At this stage there was no item on the physician fee schedule for anesthetists to do follow-up pain management. This meant that all follow-up had to be done on a volunteer basis or covered under the hospital budget. As the hospital had denied any budget in their response to the initial proposal, all preliminary work put into this program by the anesthetists was on a volunteer basis.

Patient safety was also a concern during this era. In the early days of epidural analgesia monitoring in ICU was required because of the risk of respiratory depression. Elective beds in ICU for pain management purposes were both exceedingly difficult to get and costly. In an attempt to deal with this, in 1988, the hospital took the innovative step of placing patients receiving bolus epidural opioids on surgical wards; however,

following this decision several cases of respiratory depression associated with this technique were documented in the literature. Concerns for patient safety led to epidural analgesia being removed from the surgical ward until further research could ensure its safety.

### Challenges

The epidural and interpleural analgesia programs presented a number of significant challenges: workload, side effects, clinical support and insufficient education. Workload was an issue because, patients with these modalities required frequent monitoring. Several of the interviewees identified the presence of side effects associated with epidural analgesia as being a significant challenge, and one that increased their workload. Some speculated that in these early days how the anesthetists dealt with this modality varied widely, and perhaps, this contributed to these side effects.

Clinical support was also a challenge. The use of an epidural or interpleural catheter required ongoing support by anesthetic personnel. As there was no dedicated anesthetist to provide this follow up, frequently anesthetists were unable to provide this care in a timely manner due to their work in the operating room. Often, this left nursing staff without appropriate analgesia to administer, and patients in pain.

A final challenge was that of insufficient education for the nurses. The education was provided by assistant head nurses in addition to their existing workload. There was an initial "educational blitz," but little follow up meant that many of the nurses felt inadequate in their ability to handle this new technique. This was compounded by the lack of standard orders or protocols. As a result of these challenges, and the safety issues cited above, epidural analgesia remained a technique that was limited primarily to the ICU. Having discussed the forces and challenges surrounding the era of planning, we will now turn to the next era of PCA.

## Era 2: Patient-Controlled Analgesia

This era began with the first meeting of the PCA committee in December of 1990 and ended with the acceptance of a second proposal for an APS in March of 1994. A number of critical events occurred during this era. PCA was introduced to the hospital in 1991, and by 1993 the program had expanded to twenty pumps operating on six nursing units. Epidural bolus opioids were re-introduced to the orthopedic ward, and the responsibility for delivering anesthetic agents into interpleural catheters was transferred from medicine to nursing. This transfer of function was designed to solve the challenge of lack of clinical support by anesthesia. While the PCA program was directed by the PCA committee, the continuing development of the epidural and interpleural program was organized primarily by Dr. Simon Baker and Ms. Bonita Elliott.

In December of 1993 a second proposal for an APS was sent to the hospital administration. This proposal differed from the first in that it was more detailed and less funding was requested. Less nursing time was outlined, and no funding for a dedicated intern, resident or fellow was requested. In the summary of the proposal, it was emphasized that much of what was being requested had already been implemented.

By giving a name and structure to what is largely an existing program, the reality and the image of patient care in the [hospital] will be greatly enhanced with the formation of the Acute Pain Service. It will help to bring the standards and quality of patient care...into line with similar tertiary care teaching hospitals in British Columbia and across Canada (S. Baker, personal communication, December 1, 1993).

With one modification, this proposal was accepted for a six month trial in March of 1994. The modification was clinical nursing support through a half time clinical resource nurse from the post anesthetic care unit, rather than a full time APS nurse as requested (hospital administrator, personal communication, March 20, 1994). No formal evaluation was completed at the end of the six months; although, continuation of the program was approved.

### Influencing Forces

There were a number of positive forces that interviewees associated with this era: shifts in hospital operation, increasing acceptance of PCA, and difficulties with pain control on the ward. The early 1990s were days of increasing health care restraint. Hospitals were forced to reduce their length of stay and operating costs, while coping with an increasing emphasis on patients as consumers. PCA had been demonstrated in the literature to have some effect on length of stay and patient outcomes. By passing the control of analgesia from health care workers to patients, PCA also had a consumer orientation. Patients being admitted to the hospital were increasingly requesting PCA. These factors were sufficient to gain the support of hospital administrators for the PCA program.

PCA was also gaining momentum within the literature as a superior method of opioid delivery. Publications reporting the effectiveness of PCA were now prevalent, often with the implication that it was the gold standard for analgesic delivery.

This era was also influenced by pain management difficulties, particularly on the orthopedic and vascular thoracic surgical wards. Many of the vascular thoracic patients experienced the benefit of epidural analgesia in the ICU, but when beds were unavailable they had significant pain control problems. While these pain control problems were not new, the realization that more effective strategies existed created a general dissatisfaction with traditional methods of pain management.

As in the previous era, there were also a number of negative forces operating. The introduction of these techniques was costly. Both the PCA pumps and the associated equipment were expensive. A syringe of Morphine for PCA delivery cost roughly eight times what an ampoule for intra-muscular delivery cost. Nursing personnel had to be trained in the use of the pumps, and pharmacy personnel were required to mix the PCA syringes. The personnel time associated with this training also had cost implications.

In addition to the costs, PCA was being introduced during a time of rapid change. A new wing of the hospital had been completed, and a number of nursing units were being relocated. The organizational structure of the hospital was in transition with the formation of a new education department. One interviewee mentioned a number of other changes such as the closure of surgical beds, the instability of nursing jobs, and the increasing patient acuity. These factors contributed to a somewhat uncertain hospital climate that made the introduction of new analgesic techniques challenging. Interestingly, some interviewees cited the climate of change as being one that facilitated the introduction of new analgesic techniques, while others saw it as impeding the process.

### Challenges

Challenges similar to those faced in the planning era emerged from the data: workload, side effects, clinical support and insufficient education. Many nurses felt that PCA contributed unduly to their workload. Time saved in not having to deliver intra-muscular injections was taken up by responding to pump alarms and monitoring pain and side effects. The most common side effect was nausea and vomiting. A strange stand off emerged around anti-emetic usage. The staff nurses were not authorized to give direct IV anti-emetics, and they were unwilling to assume responsibility for this skill. One alternative was to deliver anti-emetics via IV mini-bag; however, the pharmacy staff maintained they were too busy to supply these bags, so the nurses were left to deliver intra-muscular or oral anti-emetics. For obvious reasons, both of these were unacceptable and clearly contributed to the excessive rate of nausea and vomiting. Eventually, three years after the initiation of the PCA program, the nurses assumed responsibility for administering direct IV anti-emetics.

Workload was also an issue for the staff of the PACU and pharmacy. During this era pain management was expanding rapidly, primarily under the direction of one anesthetist and the head nurse of the PACU. Without an APS program, the staff of this

unit became increasingly responsible for providing clinical support to the wards, and for tracking and cleaning and obtaining PCA pumps when they were needed. This created a burden for this staff. Similar workload difficulties occurred in the pharmacy department. The time consuming task of mixing epidural and PCA medications had to be assumed by the pharmacy personnel without the addition of further resources. This required a gradual increase in the number of medications that could be prepared. During the initial phases of epidural analgesia the pharmacy could only agree to supply one bag per day. Gradually, through persistent lobbying and negotiation this amount was increased to meet the needed supply.

Clinical support and insufficient education were also challenges. Nursing staff had difficulty adjusting to the amount of judgment that was required with PCA. Nurses had flexibility in adjusting the bolus dose, the lockout interval, and in providing clinician overrides. In these early years, little education was provided beyond how to operate the pump, and clinical support was not readily available to assist nurses in making complex decisions. The problem of patient education also arose consistently within meeting minute documents. Effective use of PCA requires a high degree of patient knowledge and cooperation. There was little formal teaching or a mechanism to ensure that patients understood what they had been taught.

New challenges also surfaced during this era. Issues of control were prevalent. Initially a decision had to be made about whether surgeons or anesthesiologists would control the PCA. The anesthesiologists were concerned that the surgeons would simply initiate the PCA and not provide ongoing support. The surgeons perceived the program as a potential "cash cow" for the anesthesiologists. As it turned out, the surgeons did not have the necessary time to implement the program, and one anesthesiologist in particular was willing to devote extensive time to its establishment, and so the responsibility fell to the anesthesiologists.

The decision about whether a nursing unit would accept an alternate form of

analgesia was made primarily by the staff of that unit. As one of the key initiators of the service stated, "I made contact in key places recognizing that it was nursing that was going to make this a success....I was not going to be able to force it down anyone's throat." This democratic process was problematic at times. Staff from several nursing units repeatedly refused the implementation of PCA on their ward. Many nurses on the vascular thoracic surgical unit refused to be certified to deliver local anesthetic agents into the interpleural catheter, because they felt this would increase their workload significantly. As a result, clinical support by the anesthetic department for the interpleural catheters remained an ongoing problem. Despite the care taken to ensure that nursing staff was involved in the decisions, interviewees varied in their perceptions of how collaborative the implementation of these programs were. Most felt that a fairly collaborative multi-disciplinary approach was used. Several felt that much more time and energy could have gone toward the promotion of these changes among all of the potential stake-holders.

Issues of control also surrounded the nurse-patient relationship. Many nurses had difficulty giving up their control over the provision of analgesia. Nurses on the surgical wards had been used to giving limited amounts of analgesic and so were concerned about the potentially large doses available through PCA. The PACU nurses, on the other hand, had been used to giving large amounts of opioids at their discretion. Their concern in giving control to the patient was that the patients would not receive sufficient amounts of analgesia. The PACU nurses resolved their concerns by not permitting patients to administer their own analgesia until their pain was well under control. The ward issues remained an ongoing concern and will be discussed further in relation to the next era.

Linked closely to the control issues were biases. Despite the paradigm shift within the pain management literature, many staff and patients were still operating under the old paradigm; "No pain, No gain" was a bias that many still adhered to. Staff and patients alike resisted the concept of liberal opioid use to minimize pain, and many



preferred the intra-muscular method of delivery. Several interviewees cited the age of the nurse and the years in practice as being inversely related to a willingness to adopt these new modalities.

The preparation of appropriate pain management tools presented a significant challenge during this era. Each modality had to be accompanied by protocols, pre-printed physicians' orders, educational packages and monitoring forms. The physicians' orders required many drafts as they had to ensure patient safety while providing enough flexibility for the nurses to manage the modality and its related side effects without 24 hour anesthetic support. Likewise, the monitoring protocols had to be stringent enough to ensure patient safety, while not causing undue workload for the ward staff. The development of these tools was further complicated by there being no clear mechanism for approval within the hospital. The PCA committee meeting minutes taken during this time reflect repeated concerns about poor documentation using these tools. Nurses were not documenting according to minimal acceptable standards, and there was some confusion about how the tools should be used. The acute pain flow sheet underwent numerous revisions, and still many nurses were dissatisfied with it.

All of these challenges surfaced as ongoing problems in the second phase of the study. As full understanding of these problems was only gained during the surveying of staff satisfaction, these issues will be discussed more fully in chapter five.

### Era 3: Acute Pain Service Program

During the first ten months of the program a number of critical events occurred. Dr. Simon Baker was appointed official director of the APS. A clinical resource nurse was hired. The PCA committee was officially changed to the APS committee, although much of the membership remained unchanged. During the summer of 1994 a small quality improvement program was initiated by the clinical resource nurse to monitor pain outcomes, side effects and staff adherence to monitoring standards. In September of

1994, a designated APS anesthetist began daily rounds on all patients receiving PCA, epidural and interpleural analgesia. This job rotated between a number of anesthetists who had agreed to work with the APS. A patient census was established through the hospital medi-tech computer system. In December of 1994, the APS committee created and implemented an algorithm for the control of pain and nausea and vomiting with PCA. The necessity for this algorithm will be discussed further under the challenges faced during this area. For the purposes of this study, the closure of this era is December 1994.

### Influencing Forces

Three primary forces shaped the development of this era: approval of a British Columbia Medical Association fee schedule for acute pain management, success of the PCA program and changes in hospital structure and function. Dr. Simon Baker, the first director of the APS, had initiated a proposal for an anesthetic acute pain service fee schedule several years prior to the approval of the APS program. This initiative was approved in 1994. This meant that anesthetists could bill the medical services plan for follow up visits to monitor patients on specialized pain management modalities. As the hospital was unwilling to provide a salary for the APS anesthetist, this billing initiative was critical to the formal implementation of the service. The problem of funding was not completely resolved; however, for not enough money could be generated through these billings to equal a day of pay in the operating room. Many anesthetists were reluctant to serve on the APS when the pay was so much less. This issue was further complicated, because the anesthetic department had to commit to taking on a new member. Should the APS fail in its six month trial, this meant that the department would be committed to finding work for this extra member, thus diluting their own individual incomes.

Changes in the hospital structure and function provided an opportune solution to this difficulty. In an effort to reduce patient length of stays, the hospital had developed a

program in which patients were admitted on the day of their surgery. As patients could no longer be seen by the anesthetist on the night before their surgery, there was a need for an anesthetist to do patient consults during the day in the pre-admission clinic. These consults provided the remaining income to make the APS a viable alternative to working in the operating room. This also provided a measure of security if the APS did not continue past its six month trial period.

One other hospital change greatly facilitated development of the APS. The nursing department was reorganized to include a comprehensive clinical resource nurse department. This structure enhanced the limited nursing support that had been allocated to the APS in the proposal. The APS clinical resource nurse coordinated the educational efforts, but the other clinical resource nurses were able to deliver much of the education. The hospital also developed a clear approval process for the implementation of policies and procedures, making the development of tools easier.

The third force that provided impetus for the APS was the success of the PCA program. This program grew rapidly over the years. From September to December of 1992, an average of 36 patients per month were placed on PCA. Over the same period of time in 1994 this number had climbed to 100. Several quality improvement audits done during this time showed that patients were highly satisfied with PCA, and that it cut down on the amount of nursing time required to administer analgesia. One interviewee also cited a decreased length of stay; although, given the move toward decreased length of stays within the institution, it would be hard to attribute this to the PCA program. One theme that emerged consistently from the interviews was the productivity of this multi-disciplinary committee and the rapport evident among its members. Several interviewees grieved the transition of the PCA to the APS committee. "All disciplines sat around the table working together to trouble shoot, and this made that group very strong. [It was] a very sad day when the name of the committee had to be changed. The PCA program was a lot of hard work for many dedicated people."

## Challenges

Once again the challenges of workload, side effects, clinical support and control characterized this era. The quality improvement audit indicated that the patient monitoring required by the analgesic techniques was often not being performed frequently enough. Workload also remained a challenge for departments such as biomedical engineering and pharmacy as they tried to keep up with the maintenance of PCA pumps and with supplying the necessary PCA and epidural infusions.

The quality improvement audit also showed that, with PCA in particular, many patients were experiencing side effects and unacceptably high pain levels without appropriate intervention by the nurses. Nausea and vomiting was often not being treated with anti-emetics. Similarly, many patients were being weaned from PCA prematurely and without adequate administration of oral analgesics. These findings resulted in the formation of algorithms to guide analgesic administration, weaning, and nausea and vomiting treatment with PCA. Nurses were educated about these algorithms, and the algorithms were laminated and attached to each of the PCA pumps.

The hospital had not approved funding for an anesthetist on 24 hour call to provide clinical support, and so the APS was only available from Monday to Friday 0800-1600. This difficulty was eventually resolved by the anesthetic department agreeing to allow nurses to phone the first call anesthetist in the operating room for problems during off hours; however, these anesthetists refused to carry the APS pager.

Issues of control between the various stake-holders remained a significant challenge. Although a staff member of the APS was now available by pager to deal with pain management difficulties; surgeons were still writing orders for intra-muscular analgesia. Clinical pharmacists on some of the nursing units had also been involved in pain management decisions. Nurses were left to decide who they would consult. This choice was often made based upon their own biases toward a particular type of analgesia.

If they did not like PCA, they would call the surgeon to have it discontinued so that the intra-muscular opioids could be implemented. This decision was often facilitated by the surgeons, as many of them remained skeptical about the value of PCA and the APS. Some surgeons reportedly stated they did not want the APS involved with their patients, because PCA caused too many side effects, and the APS was simply a way for the anesthesiologists to generate more income.

Nurses were often in the middle of this control issue, but as one interviewee suggested, most nurses' loyalties were with the patient, and once it was demonstrated that patient pain management improved, most nurses were convinced that the APS was a viable option. This process was facilitated by bedside support and education by the APS anesthesiologists. One interviewee shared an exemplar that she felt was a critical incident in helping nurses on her floor accept the presence of the APS.

I saw a staff nurse speaking with a general practitioner about an acute pain management issue. This patient was not on the APS service. This nurse was trying her darndest in a very collaborative way to make sure her patient got pain relief. This physician basically turned to her and said, "So, what school of medicine did you graduate from," and the APS physician actually interceded and said, "Well, you know, I'm sorry to interrupt, I heard this last little bit of conversation, My name is Dr. so and so from the APS committee and I must tell you that you have to get up very early in the morning to pull the wool over the eyes of any of the staff on this unit. She's absolutely correct. And may I make a professional recommendation with regards to the type of narcotic." That was an absolute turning point for the entire floor. Staff had their expertise acknowledged. Confidence level rose in a constructive way. People are motivated by respect for the knowledge they have.

The final challenge faced during this era was that of keeping track of patients on the APS. Though the APS census was controlled through the computer system, this method of tracking patients was dependent upon personnel entering patients into the census and removing them once the pain management modality had been discontinued. Frequently, patients were either not entered onto the service, or they were left in the data

base for days after the discontinuation of their analgesia. The anesthetists felt that this should not be part of their responsibilities, and it was difficult to educate and remind the hundreds of nurses on the various nursing units. To this day, the difficulty has still not been completely resolved.

### Conclusion

This chapter has presented the historical development of the APS through three eras: the era of planning, the era of patient-controlled analgesia and the era of the APS program. Table (4-2) presents a concise summary of the forces and challenges that shaped each of these eras. While unique challenges arose in each era, the increased workload, the need for more clinical support and the presence of side effects was pervasive in all eras. For the purposes of this historical review, the end of the era of the APS program was placed at December 1994. No significant opposing forces were identified during this time, but in the remaining two phases of the study ongoing challenges faced by this program will be described.

Table 4-2 Analysis of Forces and Challenges by Era

ERA	FORCES	CHALLENGES
<b>Planning</b>	+ Changing paradigms of pain management	Workload
		Side Effects
	+ Presence of skilled nursing and anesthetic personnel with a special interest in pain management	Clinical support
	- Cost	Insufficient education
	- Concerns over patient safety	
<b>Patient-controlled analgesia</b>	+ Shifts in hospital operation	Workload
	+ Increasing acceptance of PCA	Side Effects
	+ Difficulties with pain control	Clinical Support
		Insufficient education
	- Cost	Control
	- Multiple concurrent changes	Staff and patient pain paradigms
		Preparation of appropriate tools
<b>Acute Pain Service Program</b>	+ Fee schedule for acute pain management approved through the BCMA	Workload
		Side Effects
	+ Changes in hospital structure and function	Clinical support
		Control
	+ Success of PCA program	Tracking APS patients
		High pain levels with PCA

Forces Key:

- + Denotes a factor that contributed positively to the initiation of the APS
- Denotes an opposing factor to the initiation of the APS

## Chapter Five

### NURSING AND MEDICAL STAFF SATISFACTION

In the literature review presented in chapter two satisfaction was identified as an important factor in program evaluation. With the implementation of an Acute Pain Service (APS), the roles and accountability surrounding pain management can change significantly for physicians and nurses. This change has the potential to affect the satisfaction of medical and nursing staff with the service, key stake-holders in the pain management process. This in turn has the potential to affect the outcomes of the program. In this chapter the methods and findings related to the second objective of the study, to assess the satisfaction of medical and nursing staff with the APS, will be presented.

#### Methods

To assess health care worker satisfaction, 110 nurses and 42 physicians were surveyed using a satisfaction questionnaire (Appendix E). This survey included select items derived from the survey instrument developed by Libreri (1995) and items that were created for the purpose of this survey. The questionnaire was piloted, and minor revisions were made prior to administration.

Participants for the survey were chosen from a group of surgeons, anesthesiologists and nurses who had worked alongside the APS for at least one year. Excluded from survey participation were casual employees, surgeons whose surgical specialty limited their involvement with the APS and anesthesiologists who were part of the APS. Two hundred and sixty-one potential nursing participants were identified through the hospital employee database. Of these, 110 were randomly selected to receive the survey using a random numbers table. Just prior to distribution of the survey, this list of nurses was reviewed to



identify those that would be unavailable during the survey period (due to holidays, sick leave etc.). A number of ineligible participants were identified at this point. An equal number of nurses were then selected, once again using the random numbers table, to replace those identified as unavailable. All of the eligible physicians received surveys, as generally survey response rates from physicians are less than the desired 70-80% (Gould et al., 1994; Lavies et al., 1992). Survey participants were pre-contacted through the hospital electronic mailing system 1 week prior to distributing the survey, and were sent reminders to return the survey at 1 week and 3 weeks following its distribution (Crosby, Ventura & Feldman, 1989). The survey deadline was extended from 3 weeks to 5 weeks to facilitate return rates.

To obtain a more detailed account from the nursing staff regarding their satisfaction with the APS, 27 interviews with a convenience sample of nurses from 6 nursing units (4 from post anesthetic recovery, 4 from general surgery, 4 from pediatrics, 5 from orthopedic surgery, 7 from vascular surgery and 3 from neurological surgery) were completed. These nurses were selected based upon their willingness to discuss their satisfaction with the APS. Some of these nurses had already completed the survey and wished to expand on their comments. Others had not completed the survey. These interviews were conducted on the nursing units and lasted from 5 to 20 minutes. The following questions were used to guide the interview:

1. Tell me how satisfied you are with the APS?
2. Can you tell me of factors that contribute to your satisfaction or dissatisfaction?
3. Can you tell me about a time when you feel the APS helped you in the treatment of a patient's pain?
4. Can you tell me about a time when you felt the APS did not help you manage a patient's pain?
5. Has your role changed with the implementation of the APS, and if so, how?
6. Do you have any comments about the communication between the APS and patients,

or between the APS and staff?

7. Do you have any recommendations for improvement of the APS?

All interviews were tape recorded and transcribed. These transcriptions were then coded according to major themes addressed within the survey.

### Survey Results

Fifty-seven percent of nurses (n=63) and 19% of physicians (n=8) returned their surveys for a total response rate of 47%. A review of the data showed that, whereas physicians and nurses seemed to have similar opinions on general satisfaction and APS involvement with patients, they differed in the areas of desire for more education, perception of workload changes, and preference for more use of specialized analgesic techniques. The data where opinions seemed similar between physicians and nurses were amalgamated.

Over half of the physician and nursing respondents (58%) had worked at the hospital for greater than 10 years. The majority of the physicians who responded to the survey were surgeons, with only one response from an anesthetist. The survey was divided into six primary areas: analgesic techniques, availability of the APS, education, workload, communication and patient involvement, and general satisfaction. In addition to responding to questions on these primary areas, the staff was also asked for general feedback about the service.

From Table 5-1 it can be seen that respondents were generally satisfied with the APS. The mean satisfaction scores varied little, ranging from 3.49 on a 5 point scale for availability of the APS to 3.77 for the techniques used to provide postoperative analgesia. Satisfaction with the APS involvement with patients showed similar results. The staff indicated overall agreement with wanting the APS to be more involved with patient pain management (mean of 3.43), and only a small minority (8%) felt that the APS interfered with their management of pain management problems.

Table 5-1

**Survey Results of Satisfaction, Involvement with Patients and Knowledge on a Five Point Likert Scale**

Item	Mean	SD	Mode
<b><u>Satisfaction</u><sup>1</sup></b>			
The techniques used to provide postoperative analgesia.	3.77	.88	4
The quality of pain management provided by the APS.	3.70	.86	4
The availability of the APS to respond to pain management concerns.	3.49	.83	4
Your communication with the APS.	3.61	.87	4
Overall, how would you rate your satisfaction with the APS?	3.68	.99	4
<b><u>APS Involvement with Patients</u><sup>2</sup></b>			
I think APS team members communicate well with patients.	3.58	.74	4
I would like the APS to be more involved with patient pain management.	3.43	1.03	3
The APS interferes with my management of patient problems.	2.01	1.09	1
<b><u>Knowledge</u><sup>3</sup></b>			
How would you rate your knowledge about the analgesic techniques used by the APS?	3.54	.79	3

<sup>1</sup> 1 = Very Dissatisfied 5 = Very Satisfied<sup>2</sup> 1 = Strongly Disagree 5 = Strongly Agree<sup>3</sup> 1 = Poor 5 = Excellent

Although the highest satisfaction rating was given to the techniques used to provide postoperative analgesia, it can be seen in Table 5-2 that less than half of nursing respondents wanted to see more patients with epidurals (41%) and patient-controlled

analgesia (PCA) (43%). This may be because of the effect that these pain modalities have on workload. Forty-four percent of nursing respondents believed that the APS had increased their workload (see Table 5-2). Physicians were even less supportive of wanting to see more patients on epidurals (12.5%) or PCA (25%).

Educational issues are addressed in both Tables 5-1 and 5-2. Although the mean response for knowledge of analgesic techniques was 3.54 on a 5 point scale, the majority of nursing respondents (63.5%) indicated that they would like more education in pain management.

Table 5-2

**Survey Results of Analgesic Techniques, Education and Workload by Professional Role**

Item	Nurses		Physicians	
		(%)		(%)
I would like to see more patients with epidurals.	Yes = 26	(41.3)	Yes = 1	(12.5)
	No = 32	(50.8)	No = 6	(75.0)
	NR = 5	(7.9)	NR = 1	(12.5)
I would like to see more patients with patient-controlled analgesia.	Yes = 27	(42.9)	Yes = 2	(25.0)
	No = 33	(52.4)	No = 6	(75.0)
	NR = 3	(4.8)	NR = 0	
Would you like more education about pain management?	Yes = 40	(63.5)	Yes = 1	(12.5)
	No = 20	(31.7)	No = 7	(87.5)
	NR = 3	(4.8)	NR = 0	
What effect does the APS have on your workload?	No change = 17	(27.0)	No change = 6	(75.0)
	Increase = 28	(44.4)	Increase = 1	(12.5)
	Decrease = 13	(20.6)	Decrease = 1	(12.5)
	NR = 3	(4.8)	NR = 0	

The availability of the APS produced the lowest mean satisfaction score on the survey. This is not surprising because the majority of respondents (59%) indicated that they had been unable to reach the APS at least once in the previous year (see Table 5-3). Difficulty contacting the APS occurred overwhelmingly outside of the normal APS hours of operation, Monday to Friday 0800-1600 hours.

Table 5-3

**Survey Results on Availability**

<b>Question</b>	<b>Response</b>	<b>(%)</b>
How many times in the last year have you been unable to reach the APS?	Never = 25	(35.2)
	1-2 times = 20	(28.2)
	3-4 times = 17	(23.9)
	5 or more times = 5	( 7.0)
When have you had difficulty contacting the APS? (Total number of not applicable response = 36 or 50.7%)	Monday to Friday 08-16	
	Yes = 2	( 2.8)
	No = 28	(39.4)
	NR = 5	( 7.0)
	Monday to Friday 16-08	
	Yes = 22	(31.0)
	No = 8	(11.3)
	NR = 5	( 7.0)
	Weekends Anytime	
	Yes = 35	(35.2)
	No = 4	( 5.6)
	NR = 6	( 8.5)
	Statutory Holidays	
	Yes = 18	(25.4)
	No = 12	(16.9)
	NR = 5	( 7.0)

**Results from Interviews and Open Ended Survey Questions**

The qualitative data provided insight into many of the survey findings. The findings of the interviews and open-ended survey questions will now be discussed under six major domains: analgesic techniques, availability of the APS, education, workload, communication and patient involvement, and predictors of overall satisfaction.

**Analgesic Techniques**

The satisfaction with the analgesic techniques used by the APS indicated by respondents to the survey was also reflected in the interview data. Generally, interviewees liked the control that PCA provided for the patient, the minimal risk for

needle-stick injuries to health care workers, and the time that it saved in delivering analgesia. Several interviewees, however, were less than enthusiastic about PCA. These individuals cited the difficulty that patients have in taking control of their analgesia and the high incidence of side effects as sources of their dissatisfaction. Two interviewees believed that they had less contact with their patients who were on PCA and saw this as a barrier to developing an effective nurse-patient relationship.

What was most apparent from the interviews was the need to individualize the selection of both the analgesic administration technique and the drug. Many interviewees stated a preference for certain techniques (such as PCA or epidural) and drugs for particular populations of patients, and recommended that the APS make more of an attempt to ensure a proper fit of analgesic administration to the patient. A number of respondents to the survey (n=9) also indicated that patients needed to be screened better prior to placing them on PCA. In particular, it was believed that too many elderly patients and patients who had minimal pain were being placed on PCA. Some mentioned that individualization of analgesic administration would not be possible until all wards were trained in the various techniques. This was of particular concern to those in the critical care areas, these being the only areas where patients with epidural local anesthesia can be cared for. Several interviewees believed that keeping these patients in high intensity monitoring areas was a poor utilization of hospital resources.

#### Availability of the APS

The interview responses regarding the availability of the APS were mixed. Some interviewees mentioned this as a significant source of frustration. These interviewees stated that though they did not have difficulty contacting an anesthetist, the anesthetist was not necessarily available to see the patient because of other commitments in the operating room or pre-admission clinic. Availability seemed to also be linked to the visibility of the APS. Some staff were not aware of when the APS is available and the

role that the APS plays in pain management. For example, one interviewee spoke of how she tried to contact the APS for three hours one night, not realizing that the pager was unavailable after 1600 hours. Another interviewee spoke of the need to re-educate staff about the service. She felt that initially the staff had received some education about the role and availability of the service, but this information needed to be provided once again.

Other interviewees spoke of how much they appreciated the positive and rapid response of the APS to their calls. They liked the APS rounds, because they always knew someone would be coming at a specified time to help them with their pain management challenges. Many contrasted the APS to the old system when they would have to page the intern, resident or on-call doctor. They believed that the APS response was much quicker, and that a higher priority was given to their pain management concern.

Interviewees also appreciated the wide range of pain management options that they had within the pre-printed order sheets that enabled them to manage the patient without having to contact a physician.

The mixed response to the availability of the APS may be indicative of past difficulties. Almost without exception, staff on one ward spoke of the difficulty that they encountered in getting an anesthetist to administer medication into interpleural catheters. They believed this had put them in an untenable situation with patients, because patients were aware of the presence of the catheter and how often medication could be administered, while the nurse had to keep saying that the anesthetist could not come. The majority of staff on this ward have now been certified to administer medication into interpleural catheters and state that the availability of the APS has improved significantly, but the impressions left by those early difficulties remain.

## Education

The majority of nursing respondents to the survey indicated that they would like more education in pain management. Several interviewees also expressed a desire for more education. Two situations were described where nurses believed their lack of knowledge had potentially jeopardized patient safety. For example, one nurse spoke of giving a sedative to a patient receiving epidural analgesia and having the patient go into respiratory arrest. Her frustration was that it had not occurred to her to not use the sedative, and she felt that this could have been prevented through better education. While nurses who were interviewed spoke of how much autonomy they had acquired with the initiation of pre-printed physicians' orders, some believed they lacked the knowledge to effectively implement those orders. Interviewees had a number of recommendations for how this education could be facilitated: nursing grand rounds, attending rounds with the APS anesthetist and incorporating some APS education into hospital nursing orientation.

## Workload

When asked in an open-ended question on the survey to state how the APS had influenced their workload, respondents indicated that the better pain management provided by the APS made patient care easier, and less time was spent on delivering analgesics; however, managing side effects, monitoring patients and equipment malfunctions contributed to an increased workload. Comments made on the survey were also reflected in the interviews. Several interviewees spoke of the workload associated with nausea. Nurses indicated that this side effect seems to be worse with PCA than with intra-muscular delivery and felt that this problem could be improved through regular administration of anti-emetics. Nurses have pre-printed orders for anti-emetics similar to the orders provided for intra-muscular analgesia, and yet, it appears they are not in the habit of giving the anti-emetic regularly the way they may have with intra-muscular



delivery. With intra-muscular delivery the anti-emetic was easily delivered with the opioid; however with PCA, remembering to give an anti-emetic is more difficult. Indeed, if nurses are having to regularly draw up and deliver anti-emetics, some of the workload benefits gained through PCA delivery may be lost. Interviewees also mentioned workload issues similar to those written on the survey. PCA pumps frequently alarm and malfunction. The pumps are awkward, and so patients require more assistance in mobilization. One interviewee devoted significant time to writing about the effects that these modalities have on her day and workload. This description (found in Appendix F), while not typical of all the respondents, is supported by others who wrote comments on the survey and were interviewed.

Several interviewees stated that the APS saves them time, because they do not have to track down a physician to solve pain management problems. They also described several ways that the APS had reduced their workload by providing ward stock opioids and by standardizing the times for observing the vital signs of patients with interpleural catheters to match the routine ward times for vital signs. Others acknowledged that while the monitoring required is frequent, patients are being observed frequently anyway, the main difference is the paperwork required to document that observation.

### Communication and Patient Involvement

The interview data reflected three major themes: communication with nursing, communication with patients and the process of collaboration. Most interviewees expressed an appreciation for how the anesthetists communicated with them during patient rounds. The APS anesthetists were described as approachable, concerned, genuine and keen. Occasionally, nurses cited particular instances when the APS anesthetist was unapproachable, or when in their opinion they relied too heavily on the nurse's judgment without assessing the patient themselves, but they stressed that this was the exception. In several interviews, there was an implication that the APS was not aware

of the level of side effects and difficulties presented by some of the administration modalities. One interviewee expressed a desire to have a forum where nurses could bring forward pain management concerns without having to deal one-on-one with the anesthetists. What was interesting was that interviewees only talked about their contact with APS anesthetists, they did not mention other members of the APS committee.

Interviewees, in general, indicated that the APS personnel communicated well with patients, and no negative comments were made. Several interviewees indicated that patient teaching, particularly in the area of PCA, could be strengthened. Some patients are not being taught to use the pumps effectively, and may be given unrealistic expectations about how much pain can be alleviated.

The collaborative process of pain management was mentioned during the interviews. Many nurses had a sense of playing a more pertinent role in pain management with the implementation of the APS. They believed they had significant control and decision making power and were part of a team that worked collaboratively to ensure quality patient care. Two interviewees, however, expressed some resentment about the ability of the APS anesthetists to come in and make decisions based upon a rapid assessment of the patient.

One difficulty that surfaced in several interviews was the lack of collaboration between physicians. This tension was highlighted by a particularly strong comment written on the survey by a surgeon. "Often modalities like PCA [are] used inappropriately....The APS service seems to initiate consult on their own - often when not required. They would be better accepted if they discussed need (or role) for PCA with surgeon prior to ordering on what seems to be a financially motivated basis." Staff of the post anesthetic care unit also described times when the primary anesthetist and the APS anesthetist had planned for analgesia independently. The nurses saw this as a potential threat to patient safety, and voiced concerns about what may have happened had they not noticed the potential excessive administration of analgesia. On the surgical wards, the

communication conflicts generally surfaced around opposing views of appropriate analgesia between the surgeon and the APS anesthetist. In these situations, the nurses felt caught in the middle. Interviewees spoke of how they had to resolve those tensions by deciding who was ultimately responsible for the patient.

#### Predictors of Overall satisfaction

The data from the interviews supported a high degree of satisfaction with the APS, primarily due to the quality of pain management provided to patients. Only two out of 26 interviewees expressed dissatisfaction, and this was related to the difficulties presented by PCA. Many interviewees reflected back on what it was like prior to the implementation of the APS and how difficult patient pain management had been at times. They were particularly satisfied with the resource that the APS supplied for specific pain management challenges such as patients with opioid addiction or extensive surgery. Continuity and standardization of care were also cited as contributing significantly to satisfaction with the APS. The following is a quote that is representative of the type of feedback received in the interviews.

I think it is fabulous, things are much better....I think people are much more comfortable. We are not as willing to leave people in pain, not that we were trying to be mean, now we just say it's not good enough. There must be something else we can do, or another way to do it. If this isn't working we need to try something else....You know before if Demerol IM didn't work, you tried Morphine, and if that didn't work well you know you just kind of gave it to them. There was nothing else unless you went to oral stuff. People will really look to find an answer for somebody, and we're not as easy to jump to *they're using a whole lot*. There's no norm anymore. People recognize that people are different, you know like before it was they were a *button pusher* or a *clock watcher*. You don't see that as much anymore.

In the literature review, overall satisfaction of health care personnel with the program was identified as a significant variable that helps to influence the outcome

variable of acute pain reduction. A number of general variables were identified that have the potential to influence staff satisfaction with a program including availability, accessibility, organization, and adequacy of communication structures and policies and procedures (Timmreck, 1995). In this study, data from the survey were analyzed to explore the relationships between overall satisfaction with the APS and the variables of availability, communication, analgesic techniques, quality of analgesia, patient communication, knowledge levels, workload and length of time worked at the hospital. Non parametric Spearman rank order correlations demonstrate that overall satisfaction was associated with availability, communication, analgesic techniques, quality of analgesia and patient communication (see Table 5-4). The non parametric analysis was used as several of the variables were not normally distributed. All of these correlations were significant at the .01 level.

Table 5-4

**Spearman Rank Order Correlations between Reported Overall Satisfaction and Availability, Communication, Analgesic Techniques, Quality of Analgesia and Patient Communication.**

Overall Satisfaction (Q5) with	Correlation Coefficient	Significance
Availability of the APS (Q. 1)	.647	**
Communication with the APS (Q. 2)	.661	**
Analgesic Techniques (Q.3)	.763	**
Quality of Analgesia (Q.4)	.764	**
Patient Communication (Q.13)	.401	**

\*\* p .01

The non parametric Mann-Whitney U was used to test whether knowledge levels, workload, availability of the APS or length of time worked at the hospital made any difference in overall satisfaction with the APS (see Table 5-5). Those who indicated that their workload had increased as a result of the APS were less satisfied with the APS than those who indicated no change or a decrease in their workload. Likewise, those who had difficulty contacting the APS one or more times indicated less overall satisfaction with the APS than those who had never had difficulty contacting the APS. Those who rated

their knowledge of pain management as 4 or 5 showed no significant difference in overall satisfaction than those who rated their knowledge as 3 or less. Finally, those who had worked at the hospital for 10 years or longer showed no significant difference in satisfaction from those who had worked at the hospital for 10 years or less.

Table 5-5

**Mann-Whitney U Comparisons of Overall Satisfaction to Perceived Change in Workload, Availability, Knowledge Levels and Length of Time Worked**

Variable	N	Mean Rank	Mann-Whitney U	Significance
<u>Workload</u>				
No change/decrease	40	41.06	337.5	**
Increase	29	26.64		
<u>Availability of the APS</u>				
Never unable to contact	25	41.8	380	*
Unable to contact>1	44	31.14		
<u>Knowledge Levels of Analgesic Techniques</u>				
4-5 on a 5 point scale	33	33.85	556	Nil
1-3 on a 5 point scale	34	34.15		
<u>Length of Time Worked in Hospital</u>				
Less than 10 years	29	37.24	515	Nil
Greater than 10 years	40	33.38		

\* p .05

\*\* p .01

**Conclusion**

In summary, data from the surveys and interviews indicated that while staff were generally satisfied with the program, there were a number of areas of the program that were identified as problem areas. Overall satisfaction was shown to correlate with the other variables of availability, communication, analgesic techniques and quality of analgesia. Likewise, staff who had less difficulty contacting the APS, or who did not perceive an increase in their workload as a result of the APS, appeared to be more satisfied with the program.

## Chapter Six

### ACUTE PAIN REDUCTION

Acute Pain Services (APS) are ultimately concerned with effectively treating pain. This chapter will focus on the methods and findings of the final phase of the study. In this phase a retrospective chart audit was done to test the hypothesis that the implementation of the APS had reduced both the mean treatment pain scales, and the number of pain scales greater than 4, recorded for major abdominal surgery patients using patient controlled analgesia (PCA).

#### Methods

Charts were drawn from two time periods, January to August 1994 (Time 1) and January to August 1995 (Time 2). During Time 1, patients had the benefit of PCA, but the APS had not been implemented. During Time 2, the APS had been operational for four months. Patients were regularly being followed by the APS anesthetist, and a clinical resource nurse provided ongoing education for the staff. As was discussed in the historical review, a major focus of these first four months of the APS had been to reduce the unacceptably high pain scales demonstrated in the first quality improvement audit.

A power analysis was completed to determine the appropriate sample size. As the effect size could not be drawn from previous research, it was decided to base the calculation upon the smallest acceptable effect size, a difference in mean pain scales between the groups of 1. This represents a 10% difference on the 10 point numerical pain rating scale. Assuming that the variable is normally distributed, for a two tailed t-test, where power is .9 and level of significance is .05, a sample size of 64 per group should be used (J. Xu, UBC Statistical Consulting Services, November, 1995).

The total population of major abdominal surgery patients for these two time periods was identified through the medical records data base. Only patients receiving

PCA were included in the review to prevent confounding effects from other types of analgesic delivery methods that may differ in efficacy. A decision was made to delete the gastric bypass surgeries. A large number of gastric bypass surgeries are done at this hospital, and historically there has been some reluctance to place these patients on PCA because of their obesity. Charts were excluded from the review if the patient had concurrent additional surgery other than the identified abdominal surgery. This yielded 76 charts for the Time 1 group and 102 charts for the Time 2 group. As this number was so close to the number required by the power analysis, this total population was used.

All of these charts were audited using a data collection tool (Appendix G). The hospital under study uses a verbal numerical rating scale to measure a patient's pain intensity. This number is recorded every two hours for the first twenty-four hours, and then every four hours for the second twenty-four hours, on an acute pain flow sheet. The number of recorded pain scores, and the values of these scores, for the first forty-eight hours of treatment were gathered from this sheet. Pain scales recorded less than 30 minutes apart were excluded to prevent inflation of the pain scores by more intense monitoring during times of acute pain breakthrough. Data from the collection tool was coded, entered into the computer, cleaned and analyzed using Statistical Package for the Social Sciences. A significance level of .05 was set for all statistical tests.

### Findings

A description of demographic information for the two groups can be found in Table 6-1. There were no significant differences between the two groups with respect to gender, age, number of pain scale recordings or the time spent on PCA. The minimum number of pain scales for the 48 hour period was 4 and the maximum was 25. Only 3% of charts audited had less than eight pain scale recordings for the 48 hour period. These charts were typically patients who had PCA discontinued prior to the 48 hour cut off.

Table 6-1

**Demographic Comparisons between Time 1 and Time 2 Groups**

Variable	Time 1 (N=76)	Time 2 (N=102)	Statistic Value	Significance
Sex	Male = 35 Female = 41	Male = 59 Female = 43	Chi Square 2.43	.12
Mean Age	51.0	52.2	T-test -.506	.61
Mean Number of pain scale recordings	15.3	15.7	T-test -.66	.51
Time on PCA (Hours)	71.67	84.4	T-test -1.76	.08

**Pain Outcomes**

Pain outcomes for the two groups can be seen in Table 6-2. Mean pain scale scores for the groups were calculated for each 24 hour period and then compared using a t-test. No significant difference was found between the groups. The total number of pain scale recordings greater than 4 for each 24 hour period were then compared using the Mann Whitney-U. In previous research pain scales greater than 4 have been considered indicative of inadequate analgesia (Mantha et al., 1993; Pasero & Hubbard, 1991). The non parametric analysis was necessary, as this variable was not normally distributed. Again, no significant differences were found between the groups. The percentage of total recorded pain scales greater than 4 was also calculated for each 24 hour period. For the first twenty-four hour period 47% of recordings for the Time 1 group and 45% of recordings for the Time 2 group indicated unacceptable pain scales. As can be expected, this number dropped significantly to 22% for the Time 1 and 24% for the Time 2 group in the second twenty-four hour period. In light of this analysis, the hypothesis that the implementation of the APS has reduced both the mean treatment pain scales and the number of pain scales greater than 4 recorded for major abdominal surgery patients using PCA was not supported.



Table 6-2

**Comparison of Pain Outcomes between Time 1 and Time 2 Groups**

Pain Outcome	Time 1	Time 2
	N=76 0-24 hours N= 67 24-38 hours	N=102 0-24 hours N=98 24-48 hours
Mean Pain Scale		
0-24 hours	4.3	4.3
24-48 hours	3.0	3.15
Pain Scale Recordings > 4		
0-24 hours (% of total)	4.9 (47.1%)	4.7 (45.2%)
24-48 hours (% of total)	1.3 (21.8%)	1.5 (23.6%)
Low Pain Scale (Mean)		
0-24 hours	2.4	2.1
24-48 hours	2.0	1.9
High Pain Scale (Mean)		
0-24 hours	6.5	7.0
24-48 hours	4.1	4.5

**Conclusion**

In the previous four chapters the methods and findings of a three phase program evaluation of an APS were presented. The objective of the first phase was to describe the implementation of the APS. Interviews and document review were used to gather data about the historical development of the service from 1988 to 1994. The development of the service was presented in three eras, and critical events, influencing forces and challenges were presented for each era. The objective of the second phase was to assess the satisfaction of medical and nursing staff with the APS. Satisfaction surveys were distributed to nurses and physicians and were followed by interviews with 27 nursing staff from various nursing units. Satisfaction was discussed in terms of analgesic techniques, availability of the APS, educational needs, implications for workload,

communication, patient involvement, and overall satisfaction. Finally, the objective of the third phase was to assess the impact of the APS on the control of acute pain. A retrospective chart audit was used to test for significant differences between two groups on the pain outcomes of mean pain scales and pain scales greater than 4 per 24 hour period. No significant differences were found between the group of patients who had the benefit of the APS and the group of patients that did not.

## Chapter Seven

### CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study has been to increase our understanding regarding the effectiveness of Acute Pain Services (APS), to evaluate the impact of the implementation of an APS on pain management within an acute care hospital and to make recommendations for the improvement of the APS under study. The previous three chapters presented the findings of the phases that constituted this study: a historical review of the development of the APS, an evaluation of staff satisfaction with the APS and the impact of the APS on acute pain outcomes.

The findings indicate that the pain outcomes for the group of patients studied did not change significantly with the implementation of the APS. The incidence of postoperative pain found in this study was similar to other studies cited within the literature review (Cohen, 1980; Donovan et al., 1987; Reid et al., 1992). The low incidence of postoperative pain reflected in other APS studies (Cartwright et al., 1991; Wheatley et al., 1991) was not supported by this study; although, comparisons must be made cautiously as the two studies cited above were based on a single daily measurement as opposed to the ongoing measurements used in this study. The findings from the first two phases of this study uncovered significant variables that might influence the effectiveness of an APS.

This chapter begins with a discussion of the impact of the APS on the control of acute pain. Next, variables related to the effectiveness of an APS will be discussed. This discussion will culminate in recommendations for the improvement of the APS and for further research. First, however, some limitations of the research will be presented.

### Limitations

The survey method chosen for this study has several potential limitations. Although surveys are relatively easy ways to collect opinions from a large sample of people, they have been criticized for potential biases from non-response and self selection. Respondents who are motivated to return a survey may be those who hold particularly strong opinions about the APS leading to a somewhat distorted view of the general satisfaction with the program (Crosby et al., 1989).

Desirable survey response rates are 70-80 percent (Crosby et al., 1989). The response rate for this survey (57% for nurses and 19% for physicians) was significantly lower than the desired rate. This high non-response rate may mean that the sample is not representative of the population, and one must conclude that there is not enough physician response to represent their viewpoint. Supplemental interviews with nursing staff helped to augment the data from the surveys, but these interviews were done with a convenience sample. Again, those that agreed to be interviewed may be those who hold particularly strong views about the APS.

There are a number of possible reasons for the poor survey response rate. The hospital had undergone a time of intensive quality improvement surveying by various departments. This may have led to a general survey "burnout" on the part of staff. Two of the nursing units surveyed, the intensive care unit and the maternity unit, had limited experience with the APS. Yet, 43 of the potential 110 respondents randomly selected for the study were from these units. Several respondents sent their surveys back indicating that they did not have enough experience with the APS to respond. Should this survey be repeated, stratified random sampling should be used to ensure that these two units were not so heavily weighted in the selection.

The poor return rate from physicians is difficult to interpret. One physician mentioned that he could not answer these questions, because his experience with the service was so limited. In his response to the survey, another surgeon indicated his

displeasure with the unilateral way the APS was run. This has not been an uncommon comment from the surgeons in the past, and may be another reason for the lack of response.

The retrospective chart analysis also has a number of potential limitations. There may be reporting bias as the pain scales were recorded by health care workers. There has been some question within the pain literature as to whether health care workers document their own perception of pain or the patient's report (McCaffery, 1995); however, at the hospital under study the nurses have been instructed to record what the patient reports. Finally, the use of the numerical rating scale for pain assessment may not be as strong a research tool as the visual analogue scale. Given these potential threats to validity, the findings must be viewed with caution.

Finally, some limitations surround the program evaluative method chosen. There are multiple variables that can be examined when doing a program evaluation. This program evaluation focused on a limited set of variables and so provides one perspective of the program. This perspective may have differed had patient satisfaction or pain outcomes with a different surgery and pain modality been studied. This study provides insight into how an APS contributes to acute pain management; however, the findings are not necessarily generalizeable to other programs. Program evaluative methods are best suited to the improvement of the program under study. The remainder of this chapter will be devoted to a discussion of the findings.

#### Impact of the APS on the Control of Acute Pain

From the perspective of most nursing staff, the implementation of the APS has had a significant effect on the control of acute pain within the hospital. Not only did staff rate their satisfaction with the overall quality of pain management provided as high, the majority of interviewees stated that they had seen a remarkable improvement in the level of pain that patients experience, particularly in patient populations where pain control has

been a problem. The question arises as to why this staff perception was not born out in the retrospective chart audit. The groups from Time 1 and Time 2 showed similar pain outcomes, and indeed, almost half of the pain scale recordings for the first twenty-four hours showed unacceptably high levels.

There are several possible explanations. First, the staff perceptions were based upon the multiple changes that have occurred in pain management within the hospital over the past six years: routine monitoring, assessment tools, and patient-controlled (PCA) and epidural analgesia. In contrast, only one major change marked the difference between the groups from Time 1 and Time 2, the introduction of the formal APS program where patients were routinely seen by anesthesiologists, and where a clinical resource nurse provided supplementary education. Had one been able to capture the multiple changes over the years, the results may have been quite different. This hypothesis is supported in the literature. Other researchers found that the introduction of a pain assessment chart and an algorithm to guide intra-muscular usage showed a significant effect on acute pain outcomes; whereas, the introduction of local anesthesia and PCA did not (Gould et. al., 1992). The authors speculated that "it is less easy to detect a reduction in median scores with each subsequent stage, because of the improvements that have already taken place" (p. 1192).

The second reason for the lack of significant difference in pain outcomes may be that there was insufficient time allowed for the program to accomplish its purpose. The audit was completed only 4 months after the initiation of the program. This may not have been enough time to allow the anesthesiologists and the clinical resource nurse to become adjusted to their new role and to apply their influence toward more liberal analgesic use.

This limited time frame becomes significant when one realizes that the APS is just one of the partners in the process of PCA administration. Both nurses and patients play a critical role. Several studies have indicated that nurses and patients are satisfied with administering less analgesia than is required to deliver adequate pain relief (Charles &

Gauld, 1993; Donovan et al., 1987; Lavies et al., 1992; Reid et al., 1992). These difficulties have not disappeared with the introduction of PCA. The early quality improvement audit at the hospital under study showed that nurses changed pump settings infrequently, even in the presence of high pain levels. Smyth, Marin and Schad (1991) retrospectively screened 518 charts of patients on PCA to determine the presence of complications. They found that inadequate pain relief was a prevalent complication among the patients identified as experiencing problems. Interestingly, if patient under-utilization was a problem there was a clear lack of patient re-education, and the dose of the PCA was increased only a fraction of the time. Typically, patients were switched back to intra-muscular analgesia. Unfortunately, there is little research about the role of the patient with PCA, particularly research that examines the influence of education on improved patient outcomes (Shade, 1992). Given the amount of change that is required both on the part of nurses and patients, it may have been unrealistic to think that this could have been accomplished in such a short time period. Why the patients in this study are experiencing such pain intensity in the first twenty-four hours, despite the presence of sophisticated technology and an APS, requires further exploration.

#### Variables Related to the Effectiveness of an APS

After examining the historical development of the program and the satisfaction of the staff, what becomes apparent is the complexity of the variables influencing the effectiveness of an APS. Far from being the simple implementation of new pain modalities, for an APS to be successful it must implement change with full appreciation of the change in roles, communication and resources that are required. The following discussion will focus on three variables arising from the data that have influenced the development of this APS: planned strategic change as an active/passive process, adequacy of resources and communication processes.

### Planned strategic change as an active/passive process

Since its inception in 1988, the people who engineered the development of the APS followed a path of strategically planned, progressive change. Motivated by a passion for effective pain management, and willing to commit time and energy to the project, these people overcame numerous obstacles to see the successful implementation of the service in 1994. The change process has been a series of steps forward and back. The progression has been facilitated through astute lobbying on many fronts, both internal and external to the hospital. Sometimes the process was facilitated by taking advantage of opportune circumstances. For example, the opening of the pre-admission clinic provided a vehicle for extra anesthetic funding. Astutely, the PCA committee followed many of the recommended steps for introducing PCA to an institution. They clearly outlined the advantages, involved a multi-disciplinary team, ensured that the first experience was a success, implemented on one unit at a time, provided multiple sources of information and guidelines, and provided education and practice (Clarke et. al. 1994; MacDonald & Muir, 1996).

Nevertheless, equipment difficulties, workload issues, finances and other changes within the hospital often hindered the progress of the program. The key to goal achievement was being active in lobbying, planning and visioning, but also being willing to wait. Many times the APS postponed moving forward to garner needed support or to prevent extra stress during times of rapid change. Being sensitive to the opportune times for change was essential. For example, interpleural and epidural catheters were introduced at a time when there insufficient resources to use them optimally. This appears to have left a lasting impression on the staff involved, and to have negatively influenced their perception of the availability of the APS. Yet, one must also consider whether the APS would have made the progress it has, if it had always waited for ideal conditions, particularly in the area of resources.



### Adequacy of Resources

Unlike many APSs described in the literature, this APS has developed with a minimal resource base. While the budget for equipment has been fairly generous, the funding for support personnel has not. Many APSs have at least one full time pain clinician and a dedicated intern, resident or fellow. This APS has a part time clinical resource nurse who also has duties within the post anesthetic care unit and hospital educational structure, and anesthesiologists who have increasingly heavy responsibilities within the pre-admission clinic. The availability of APS personnel and the need for further education and clinical support arose as concerns both in the historical review and in the survey of staff satisfaction. While staff acknowledges that the availability of the service has improved over the years, most would like to see the APS more involved in patient care and available 24 hours. In a recent study regarding nursing perceptions of the introduction of PCA, nurses believed their greatest need was to have a competent, approachable person available 24 hours per day (MacDonald & Muir, 1996). A key factor here is the perceived approachability of the resource person. Even though an anesthesiologist can always be contacted after APS hours, staff in this study felt that other responsibilities made the anesthesiologist too busy for their concerns.

Education is another key resource. In this study, the mode for reported knowledge about the analgesic techniques used by the APS was 3 on a 5 point scale. In contrast, Libreri (1995) found that 71% of nurses rated their knowledge of PCA as good as opposed to fair or poor. Although it is difficult to compare results between studies, it would appear that the nurses in Libreri's study were more confident in their analgesic knowledge. Of real concern is that lack of knowledge may jeopardize patient safety. Nurses, it appears, have gained much decision making power through the use of standardized pre-printed orders; however, this power must be augmented by sufficient education to ensure these orders are used effectively. In speaking of the nursing role

within an APS, Wild (1992) emphasizes the need to not underestimate the role that educational programs play in supporting the patient care nurse.

Patient education, while not included as part of this program evaluation, was indicated by staff as being another area that requires development. Some staff felt that patients were not being prepared adequately to use the PCA. As mentioned previously, this may be one of the reasons why patients are still experiencing inadequate analgesia after major abdominal surgery.

The final resource that must be considered is the workload imposed by the APS on the nursing staff. This difficulty has prevailed throughout the history of the APS and has been attributed to the frequency of monitoring and the incidence of side effects. Monitoring guidelines for PCA and epidural analgesia are fairly standard throughout the literature, but the perception of workload is not. In Libreri's (1995) study only 17% of respondents felt that the APS increased their workload as opposed to 44% in this study. In the study done by Clarke et al. (1994), a recommendation was made to inform nurses that their workload with PCA would increase initially as they learned the procedure, but that in the long term their workload would be less. Nurses at this hospital have been working with PCA for many years, but 79% of survey respondents have yet to perceive a decreased workload. What may account for the perceived difference is the presence of side effects. Nurses in this study indicated side effects, particularly with PCA, greatly increased their workload. Other researchers, however, have not found any significant difference between side effects with PCA and intra-muscular methods of delivery (Ballantyne, Carr, Chalmer, Dear, Angelillo, & Mosteller, 1993; Gould et. al., 1992; Robinson & Fell, 1991). These perceived difficulties with side effects require further exploration.

Resolving the difficulties with the resources cited above may be dependent upon increasing the personnel available to the program. One cannot easily solve the educational and workload issues without more personnel time. While it may be difficult

to provide extra personnel during a time of health care restraint, one must also consider the costs of continuing on the present path. For example, several staff commented on the survey and in the interviews about the inefficiency and cost of keeping patients in high intensity monitoring areas for epidural local anesthesia. Yet, it may be difficult to make this modality more available on the nursing units without better APS support. Providing sophisticated pain management technology without adequate human resources to facilitate the necessary adaptation to that technology may be counter productive.

### Communication Processes

A critical variable in the introduction of an APS is the adequacy of its communication processes. While the APS has devoted significant energies to formalizing the policies and procedures for the various modalities, it appears that not as much energy has gone into establishing an effective network of communication. This was apparent in numerous problems revealed in the second phase of the study. Staff expressed a desire for information about the APS and for a mechanism by which to provide feedback to the APS. Nurses expressed concerns about the difficulties they were experiencing with analgesic techniques, and many expressed opinions about how the modalities could be used more effectively for various patient populations. Limited communication between the APS anesthetist and the anesthetist performing the surgery has led to difficulties with potential over-medication in the post anesthetic care unit.

One of the most significant difficulties has been the lack of communication of clear lines of accountability for pain management. In the past, this has placed nurses in a difficult position of having to determine whom they will contact. There appears to be an ongoing tension between some of the surgeons and the APS as to who should control the pain management process. While an insufficient number of surgeons responded to the survey to determine the extent of this feeling, this tension was repeated enough in interviews to substantiate some degree of problem. This difficulty has been identified in

other experiences with APS (e.g., Schug & Haridas, 1996).

The potential difficulties of a poorly organized communication network can be understood if one realizes the integral role that nurses play in the implementation of an APS (Moote, 1994). While the APS decides on the treatment regime and monitors the patient twice daily, it is the bedside nurse who is ultimately responsible for administering the plan of care. To perform their role effectively, nurses must have some control over the process. In a study of nurses' experiences with PCA, Clark et al. (1994) concluded that nurses' ability to maintain control and accountability was essential to successful adoption of the PCA approach. They explained that "if nurses themselves had control of their worklife situation, they were much more successful in giving the patient control" (p. 47). A key element of control is a network of communication that allows for information to flow downward, upwards and laterally. The control of information is directly linked to power, and the more information can be exchanged, the more nurses can share control of the pain management process (Robbins & Stuart-Kotze, 1990).

Enhancing the communication network can also be a powerful tool for overcoming resistance to change. Examples provided during the interviews with nurses demonstrated how effective the interpersonal exchange between the APS team members and the nurses has been in establishing the viability of the program. The nurses saw the APS as a collaborative process when the APS team members were approachable and consulted with them on a daily basis. This type of process consultation is particularly important for changing attitudes, expectations and behaviors (Robbins & Stuart-Kotze, 1990). Changing attitudes and behaviors toward pain management is an essential component in effectively managing postoperative pain. This consultative communication network needs to be carefully developed with a broader scope.

## Recommendations for Program Improvement and Further Research

The following recommendations, though specific to the improvement of the APS under study, can also serve to inform other similar services in their development.

### Recommendations for Immediate Improvement

#### **1) Increase the visibility of the APS:**

- Present information about the APS in nursing and medical staff orientation.
- Hold weekly pain management rounds open to staff on the nursing units.
- Institute innovative programs such as "The Hospital: Creating a Pain-Free Environment" campaign, modeled after the anti-smoking campaigns, instituted in one hospital in Montreal (Besner, 1993).

#### **2) Decrease the workload associated with the APS pain management modalities:**

- Switch documentation to care maps with charting by exception.
- Review the literature and similar APS services to see if the frequency of monitoring could be reduced.
- Explore why side effects such as nausea and vomiting with PCA seem to be more prevalent than what is cited in the literature.
- Work with the nurses to ensure appropriate screening of patients for PCA.

#### **3) Establish effective communication between all the key participants in the pain management process:**

- Establish a network of nurses whereby feedback can be exchanged on a regular basis. This could be done through informal interviews, special forums or educational offerings.
- Ensure there is a mechanism of reporting between the operating room anesthetists and the APS anesthetists.

#### **4) Increase clinical support to the APS:**

- Establish 24 hour pager support to the staff by a dedicated APS nurse or anesthetist.

- Provide ongoing educational offerings for staff, particularly in the areas of clinical decision making.

- Increase the APS nurse position to a full time position.

#### Additional Recommendations

These three additional recommendations are suggested for future improvement of the APS. First, collaboration with the surgeons should be strengthened by obtaining more information about the effects of the APS on their practice. Second, more efficient bed utilization should be promoted through the expansion of epidural local anesthesia to the surgical wards. A case could be made for immediate expansion of this program as a measure to improve the incidence of unacceptable pain demonstrated in phase three of the study; however, some attempt should first be made to address the clinical support, workload and availability issues. This should enhance the potential for successful expansion of the epidural program. Finally, this program should be evaluated again once the above changes have been implemented.

#### Recommendations for Further Research

Results from this study indicate several areas for further research. Pain outcomes should be examined for a third time period, 1996. During this time, epidural opioid analgesia was introduced by the APS to the patient population examined in this study. These 1996 outcomes could be compared to the data from this study to determine if further maturing of the program, or if the introduction of epidural analgesia, has had a significant effect on pain outcomes. A comparison of the effectiveness of several anti-emetic agents in reducing the rates of nausea and vomiting with PCA is another important area for further research. Finally, aspects of the patient experience with PCA require exploration. Variables such as patient teaching need to be researched in terms of their relationship to PCA outcomes.

## Conclusion

Adequate treatment of patients in acute pain remains a challenge for health care. The formation of APSs to take accountability for acute pain management in hospitals has been a recent attempt to meet this challenge. Little, however, has been written about the effectiveness of these services. There is a need to understand the impact of the APS on the treatment of acute pain. The findings of this study suggest a number of variables that influence the development and effectiveness of an APS. The establishment of an APS within an institution requires dedicated people willing to following a path of planned strategic change. This requires both taking advantage of opportunities for growth and being willing to wait during times when the rapidly changing health care climate makes further change difficult. The development of an APS, and its ultimate effectiveness, will be dependent upon a recognition of the resources required to implement such a service: education, clinical support and communication. An adequate communication structure is particularly important for recognizing the unintended effects of the implementation of the service. The development of each APS may present unique challenges, as was found in the workload and analgesic side effect issues that surfaced in this study. Findings from this study also suggest that with the implementation of an APS a number of control issues surrounding pain management will surface and should be addressed proactively.

While this study failed to show any significant difference in pain outcomes with the implementation of an APS, other factors, such as the patient role in analgesia, were revealed for further exploration. This lack of significant findings may also suggest that a significant amount of time is required for socialization of all the key partners in pain management before a change in outcomes will occur.

## References

- Acute Pain Management Guideline Panel. (1992). Clinical Practice Guidelines. Acute Pain Management: Operative or medical procedures and trauma. Rockville, MD: Agency for Health Care Policy and Research.
- American Pain Society. (1992). Principles of analgesic use in the treatment of acute pain and cancer pain. Skokie, IL: American Pain Society.
- Au, E., Loprinzi, C., Dhodapkar, M., Nelson, T., Novatny, P., Hammack, J., & O'Fallon, J. (1994). Regular use of a verbal pain scale improves the understanding of oncology inpatient pain intensity. Journal of Clinical Oncology, 12, 2751-2755.
- Ballantyne, J.C., Carr, D., Chalmers T., Dear, K., Angelillo, I., & Mosteller, F., (1993). Postoperative patient-controlled analgesia: Meta-analyses on initial randomized controlled trials. Journal of Clinical Anesthesia, 5, 182-193.
- Berk, R., & Rossi, P. (1990). Thinking about program evaluation. London: Sage.
- Besner, G. (1993). The hospital - Creating a pain-free environment: A program to improve pain control in hospitalized patients. Journal of Palliative Care, 9 (1), 51-52.
- Blanco, J., Blanco, E., Rodriguez, G., Castro A., & Alvarez, J. (1994). One year's experience with an acute pain service in a Spanish University Clinic Hospital. [CD-ROM] European Journal of Anesthesiology, 11, 417-421. Abstract from: Medline: Identifier: 95080278.
- Bondestam, E., Hovgred K., Johansson, F., Jern, S., Herlitz, J., & Holmberg, S. (1987). Pain assessment by patients and nurses in the early phase of acute myocardial infarction. Journal of Advanced Nursing, 12, 677-682.
- Bonica, J. (1990). Multidisciplinary interdisciplinary pain programs. In J. Bonica, J. Loeser, C. Chapman, & W. Fordyce (Eds.), The management of pain (2nd ed., pp. 197-208). Philadelphia: Lea & Febiger.
- Burns, N., & Grove, S. (1993). The practice of nursing research. Toronto: WB Saunders.
- Cartwright, P., Helfinger, R., Howell, J., & Siepmann, K. (1991). Anaesthesia, 46, 188-191.
- Chapman, C., Casey, K., Dubner, R., Foley, K., Gracely, R., & Reading, A. (1985). Pain measurement: An overview. Pain, 22, 1-31.



Charles, C., & Gault, M. (1993). Canadian patient-centred hospital case study. Hamilton, ON: McMaster University, Department of Clinical Epidemiology & Biostatistics.

Clarke, H., Derrick, L., Eivemark, J., Fulton, T., Iker, C., Jardine, K., Leroux, S., Macdonald, V., Marshall, M., McCall, M., McLeod, B., Nixon, L., Muir, J., & Turner, L. (1994). Nurses' experiences with the implementation of a PCA approach: An interagency collaborative study. Vancouver, BC: Registered Nurses Association of British Columbia.

Cleeland, C. (1989). Measurement of pain by subjective report. In C. Chapman, & J. Loeser (Eds.), Advances in pain research and therapy. Vol 12. Issues in pain measurement (pp. 391-404). New York: Raven.

Cohen, F. (1980). Post-surgical pain relief: Patients' status and nurses' medication choices. Pain, 18, 265-274.

Crosby, F., Ventura, M., & Feldman, M. (1989). Examination of a survey methodology: Dillman's total design method. Nursing Research, 38, 56-58.

Dahlberg, N., & Pendle, S. (1994). Developing an acute pain service in a multicultural setting. Journal of Post Anesthesia Nursing, 9, 96-100.

Donovan, M., Dillon, P., & McGuire, L. (1987). Incidence and characteristics of pain in a sample of medical-surgical inpatients. Pain, 30, 69-78.

Donovan, M. (1992). A practical approach to pain assessment. In J. Watt-Watson, & M. Donovan (Eds.), Pain management: Nursing perspective (pp. 59-78). St. Louis: CV Mosby.

Duncan, G., Bushnell, C., & Lavigne, G. (1989). Comparison of verbal and visual analogue scales for measuring the intensity and unpleasantness of experimental pain. Pain, 37, 295-303.

Eklom, A., & Hansson, P. (1988). Pain intensity measurements in patients with acute pain receiving afferent stimulation. Journal of Neurology, Neurosurgery, and Psychiatry, 51, 481-486.

Ferrante, F. (1990). Patient characteristics influencing patient-controlled analgesia. In F. Ferrante, G. Ostheimer, & B. Covino (Eds.), Patient-controlled analgesia (pp. 51-60). Boston: Blackwell Scientific Publications.

Ferrell, B., McGuire, D., & Donovan, M. (1993). Knowledge and beliefs regarding pain in a sample of nursing faculty. Journal of Professional Nursing, 9, 79-88.

Fields, H. (Ed.). (1995). Core curriculum for professional education in pain. Seattle: IASP press.

Fink, A., & Kosecoff, J. (1984). An evaluation primer. Beverly Hills: Sage.

Ghia, J. (1992). Development and organization of pain centres. In P. Raj (Ed.), Practical Management of Pain (2nd ed., pp. 16-30). St. Louis, MO: CV Mosby.

Gracely, R. (1989). Pain psychophysics. In C. Chapman, & J. Loeser (Eds.), Advances in pain research and therapy. Vol 12. Issues in pain measurement (pp. 211-230). New York: Raven.

Graffon, S. (1990). Pain content in the curriculum - A survey. Nurse Educator, 15, 20-23.

Gould, T., Crosby, D., Harmer, M., Lloyd, S., Lunn, J., Rees, G., Roberts, D., & Webster, J. (1992). Policy for controlling pain after surgery: Effect of sequential changes in managment. British Medical Journal, 305, 1187-93.

Gould, T., Upton, P., & Collins, P. (1994). A survey of the intended management of acute postoperative pain by newly qualified doctors in the South West region of England. Anaesthesia, 49, 807-810.

Hamilton, J., & Edgar, L. (1992). A survey examining nurses' knowledge of pain control. Journal of Pain and Symptom Management, 7 (2), 18-26.

Harrison, A. (1991). Assessing patients' pain: Identifying reasons for error. Journal of Advanced Nursing, 16, 1018-1025.

Holritz, K., & Lucas, A. (1993). Implementation of anesthesia pain management service program. [CD-ROM] Cancer Practice, 1, 129-136. Abstract from: Medline: Identifier: 93313592

International Association for the Study of Pain. (1979). Pain terms: A list with definitions and notes on usage. Pain, 6, 249.

International Association for the Study of Pain. (1990) Report of the working party on pain after surgery. London: The Royal College of Surgeons of England and the College of Anesthetists.

Jeans, M., & Melzack, R. (1992). Conceptual basis of nursing practice: Theoretical foundations of pain. In J. Watt-Watson & M. Donovan (Eds.), Pain management: Nursing perspective (pp. 11-35). St. Louis, MO: Mosby.

Jensen, M., Karoly, P., & Braver, S. (1986). The measurement of clinical pain intensity: A comparison of six methods. Pain, 27, 117-126.

Lavies, N., Hart, L., Rounsefell, B., & Runciman, W. (1992). Identification of patient, medical and nursing staff attitudes to postoperative opioid analgesia: Stage 1 of a longitudinal study of postoperative analgesia. Pain, 48, 313-319.

Libreri, F. (1995). An acute pain service: A quality assurance survey of nurses and doctors. Australian Journal of Advanced Nursing, 12 (4), 33-8.

Llewellyn, N. (1993). APS: A multidisciplinary team..a paediatric acute pain service. [CD-ROM] Nursing Standard, 7, 7. Abstract from: Medline: Identifier: 1994176940.

Love, G. (1991). Acute pain services: A new career direction for postanesthesia nurses. Journal of Post Anesthesia Nursing, 6, 321-23.

MacDonald, V., & Muir, J. (1996). Implementing innovations in health care settings. Canadian Nurse, 92 (9), 31-33.

Macintyre, P., Runciman, W., & Webb, R. (1990). An acute pain service in an Australian teaching hospital: The first year. The Medical Journal of Australia, 153, 417-421.

Mackintosh, L. (1994). Do nurse provide adequate postoperative pain relief? British Journal of Nursing, 3, 342-7.

Maier, C., Kibbel, K., Mercker, S., & Wulf, H. (1994). Postoperative pain therapy at general nursing stations: An analysis of eight year's experience at an anesthesiological acute pain service. [CD-ROM] Anaesthesist, 43, 385-397. Abstract from: Medline: Identifier: 94324771.

Maier, C., & Wulf, H. (1994). Postoperative pain managment and acute pain service in Canada. Canadian Journal of Anaesthesia, 41, 653-654.

Mantha, S., Thisted, R., Foss, J., Ellis, J., & Roizen, M. (1993). A proposal to use confidence intervals for visual analog scale data for pain measurement to determine clinical significance. Anesthesia & Analgesia, 77, 1041-1047.

Max, M. (1990). Improving outcomes of analgesic treatment: Is education enough? Annals of Internal Medicine, 113, 885-889.

McCaffery, M. (1995, May). Pain Assessment and intervention in clinical practice: Syllabus of workshop delivered at the Royal Columbian Hospital, New Westminster, B.C.

McGuire, D. (1992). Comprehensive and multidimensional assessment and measurement of pain. Journal of Pain and Symptom Management, 7, 312-319.

Melzack, R., Abbott, F., Zachon, W., Mulder, D., & Davis, M. (1987). Pain on a surgical ward: A survey of the duration and intensity of pain and the effectiveness of medication. Pain, 29, 67-72.

Melzack, R., & Wall, P. (1965). Pain mechanisms: A new theory. Science, 150, 971-79.

Merskey, H., & Prkachin, K. (Eds.). (1993). The prevention of postoperative pain. London: The Canadian Pain Society.

Miaskowski, C. (1994). Pain management: Quality assurance and changing practice. In G.F. Gebhart, K.L. Hammond, & T.S. Jensen (Eds.), Proceedings of the 7th World Congress on Pain, Progress in pain research and management, Vol 2, Seattle: IASP Press.

Moote, C. (1994). The prevention of postoperative pain. Canadian Journal of Anaesthesia, 41, 527-533.

Moote, C. (1995). Postoperative pain management - back to basics. Canadian Journal of Anaesthesia, 42, 453-7.

Ohnhaus, E., & Adler, R. (1975). Methodological problems in the measurement of pain: A comparison between the verbal rating and the visual analogue scale. Pain, 1, 379-384.

Pasero, C., & Hubbard, L. (1991). Development of an acute pain service monitoring and evaluation system. Quality Review Bulletin, 17, 396-401.

Price, D., Bush, F., Long, S., & Harkins, S. (1994). A comparison of pain measurement characteristics of mechanical visual analogue and simple numerical rating scales. Pain, 56, 217-226.

Price, D., McGrath, P., Rafii, A., & Buckingham, B. (1983). The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain, 17, 45-56.

Rawal, N. (1994). Postoperative pain and its management. [CD-ROM]. Annals of the Academy of Medicine, Singapore, 23, 56-64. Abstract from: Medline: Identifier: 95225610.

Rawal, N., & Berggren, L. (1994). Organization of acute pain services: A low-cost model. Pain, 57, 117-123.

Ready, B., Oden, R., Chadwick, H., Benedetti, C., Rooke, A., Caplan, R., & Wild, L. (1988). Development of an anesthesiology-based postoperative pain management service. Anesthesiology, 68, 100-106.

Ready, B. (1995). How many acute pain services are there in the United States, and who is managing patient-controlled analgesia? Anesthesiology, 82, 322.

Reid, D., Evans, M., Topilko, J., & Ward, H. (1992). Postoperative pain. Canadian Nurse, 88 (7), 55.

Robbins, S., & Stuart-Kotze, R. (1990). Management: Concepts and applications. Scarborough, ON: Prentice Hall.

Robinson, B., & Fell, D. (1991). Nausea and vomiting with use of a patient-controlled analgesia system. Anaesthesia, 46, 580-582.

Schug, S., & Haridas, R. (1993). Development and organizational structure of an acute pain service in a major teaching hospital. Australian and New Zealand Journal of Surgery, 63, 8-13.

Schug, S., & Torrie, J. (1993). Safety assessment of postoperative pain management by an acute pain service. Pain, 55, 387-391.

Shade, P. (1992). Patient-controlled analgesia: Can client education improve outcomes? Journal of Advanced Nursing, 17, 408-413.

Strauss, A., Fagerhaugh, S., & Glaser, B. (1975). Pain: An organizational-work-interactive perspective. Nursing Outlook, 22, 560-566.

Timmreck, T. (1995). Program planning, development and evaluation: A handbook for health promotion, aging and health services. Boston: Jones and Bartlett.

Von Gunten, C., & Von Roenn, J. (1994). Barriers to pain control: Ethics and knowledge. Journal of Palliative Care, 10, 52-54.

Wasylyak, T. (1992). Surgical pain management. In J. Watt-Watson, & M. Donovan (Eds.), Pain management: Nursing perspective (pp. 401-425). St. Louis, MO: CV Mosby.

Watt-Watson, J. (1992). Misbeliefs about pain. In J. Watt-Watson, & M. Donovan (Eds.), Pain management: Nursing perspective (pp. 36-58). St. Louis, MO: CV Mosby.

Weir, R., & Crook, J. (1992). Chronic pain and the management of conflict. In J. Watt-Watson, & M. Donovan (Eds.), Pain management: Nursing perspective (pp. 426-453). St. Louis: CV Mosby.

Wenrich, J. (1991). Acute pain service in a community hospital. Journal of Post Anesthesia Nursing, 6, 324-30.

Wheatley, R., Madej, T., Jackson, J., & Hunter, D. (1991). The first year's experience of an acute pain service. British Journal of Anaesthesia, 67, 353-359.

Wild, L. (1992). Nursing aspects of acute pain management. Anesthesiology Clinics of North America, 2, 435-442.

Zimmerman, D., & Stewart, J. (1993). Postoperative pain management and acute pain service activity in Canada. Canadian Journal of Anaesthesia, 40, 568-75.

## Appendix A

### Pain

The International Association for the Study of Pain (IASP) has defined pain as "an unpleasant sensory and emotional experience arising from actual or potential tissue damage or described in terms of such damage" (p. 249). Pain is commonly thought of in terms of three major types: acute, chronic malignant, and chronic nonmalignant (sometimes referred to as chronic benign). Acute pain is triggered by acute injury, disease or surgery and is expected to resolve with the precipitating insult. Chronic malignant pain arises from progressive disorders such as cancer. Chronic nonmalignant pain is pain that cannot be explained by an active organic lesion (Weir & Crook, 1992). As the line between acute and chronic pain is sometimes blurred, some authors also include a time criteria when defining chronic pain. McCaffery (1995) suggests that acute pain lasting beyond three months should be re-defined as chronic pain. This appendix will first address some general theoretical concepts of pain and then focus specifically on the assessment and measurement of acute pain.

#### Theoretical Concepts

Traditional theories of pain have been relatively simplistic. A painful stimulus was thought to be picked up by sensory nerve endings, transported via nerve fibres to the spinal column and transmitted to the brain where it was recognized as pain. The amount of pain experienced, therefore, was thought to be proportional to the extent of tissue damage. Today, conceptualizations are more complex. Recognition that pain is an internal, subjective state has led to an integration of the psychological variables that modify the perception of pain, variables such as anxiety, attention, culture, past experience, feelings of control and meaning of the pain producing situation (Jeans & Melzack, 1992).

One of the most popular theories of pain is the gate control theory (Melzack & Wall, 1965). This theory proposes that a gating mechanism, located in the dorsal horn of the spinal column is responsible for regulating the perception of pain. Large and small fibres transmit somatic input from the periphery through the gating mechanism to specialized spinal cord transmission cells. The relative activity of these small and large fibres determine the extent to which the gate is opened or closed; large fibres inhibit pain transmission (close the gate), and small fibres facilitate pain transmission (open the gate). When the output from the spinal cord transmission cells reaches a critical level, the neural centers responsible for pain are activated, and the individual perceives pain (Jeans & Melzack, 1992).

The gating mechanism is also affected by excitatory and inhibitory nerve impulses from the brain. Within the gate control theory are three major psychological dimensions,

regulated by various physiological mechanisms, that influence the perception of pain: sensory-discriminative, motivational-affective and cognitive evaluative (Fields, 1995; Jeans & Melzack, 1992). The sensory discriminative dimension includes the spatial, temporal and magnitudinal properties of the pain experience. The motivational-affective dimension includes negative perceptions of the pain and the drive to seek pain relief. The cognitive-evaluative domain includes the individual experiences and meanings attached to the pain. This final domain is considered the central control, as it has the capacity to affect both the sensory-discriminative and motivational-affective domains. The interplay of the three domains is illustrated in Figure A-1.

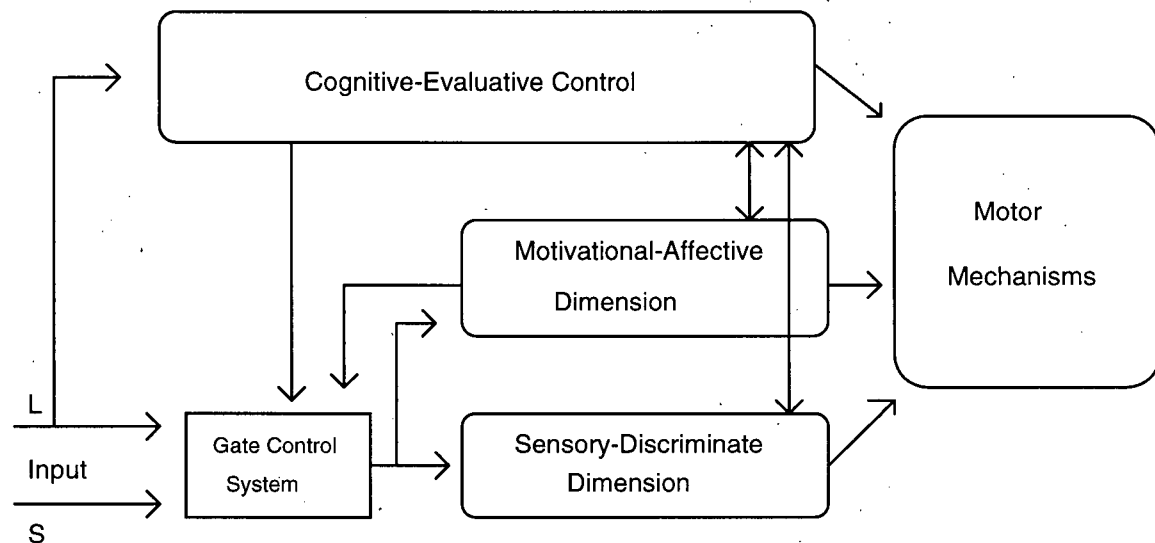


Figure A-1. Dimensions of Pain Perception. Adapted from Jeans & Melzak, 1992

As can be seen in the figure, input is received to the gate control system via small and large fibres. The nerve fibres extending from the gate project to the sensory-discriminate and motivational-affective domains. These systems interact with the central control domain to determine a motor response. Both the motivational-affective and cognitive-evaluative domains feed back to the gating mechanism to regulate the flow of pain impulses. The path leading from the large fibres to the central control represents a specialized system of fibres, called the central control trigger, that activate higher cognitive processes which then descend to influence the gating mechanism.

This conceptual model of pain demonstrates how complex the experience of pain can be. An identical pain stimulus can produce widely varying pain experiences because of the multitude of variables that interact to modify the stimulus.



## Assessment and Measurement

Pain assessment and measurement, though frequently undifferentiated, have different goals and methods. Pain assessment is used in clinical practice to explore the nature of the pain and to aid in the selection and evaluation of pain treatment regimes. Pain measurement involves assigning numbers to variables that represent quantities of particular aspects of pain. Measurement can be used for either assessment or research purposes (Donovan, 1992). The purpose of this section is to outline approaches to pain assessment and measurement and to describe the most common measurement tools used for postoperative pain.

Pain assessment and measurement can be performed through physiological correlates, behavioral indices and self report. Self report has been criticized in the literature for a number of reasons including variability in subject's memory and verbal abilities, demands of the reporting situation, inability to differentiate pain from related constructs and the need for some individuals to maximize or minimize their suffering (Cleeland, 1989; Gracely, 1989). Observers can be inclined to deny self report, dismissing it as attention getting, a desire for narcotics, or distress over non pain related issues (Harrison, 1991; McCaffery, 1995). Physiological correlates and behavioral indices also have a number of limitations in that they can be affected by the stimulus rate, by environmental manipulations, and by diminishing response rates over time. Behavioral and physiological correlates may be particularly unsuitable for chronic pain as the objective measures may not be sensitive enough to measure pain once the patient has gone through a period of physiological adaptation (Cleeland, 1989; Donovan, 1992). Ideally, subjective reports should be used in conjunction with behavioral and physiological correlates, but some would argue that if there is discrepancy between the two, the subjective report should provide the standard from which treatment is based (McCaffery, 1995).

Pain assessment has an important role in the clinical treatment of pain. A thorough and methodical assessment makes pain visible so that it can be communicated, evaluated and treated. A comprehensive pain assessment should include both physical (temporal characteristics, location, intensity, quality, origin, functional ability, characteristic pain behaviors, exacerbating or relieving factors, and effects of therapy) and psychosocial (meaning, economic effects, coping behaviors) parameters (Donovan, 1992). Ideally, this assessment should be documented on a pain flow chart so that it can be communicated to all members of the health care team (McCaffery, 1995).

Pain measurement tools fall into one of two categories: uni-dimensional or multi-dimensional. Uni-dimensional tools, as the name suggests, are used to measure only one dimension of pain, primarily intensity. The multi-dimensional tools measure some or all of the following six dimensions of pain: physiologic, sensory, affective, cognitive, behavioral and socio-cultural.

Pain measurement tools are selected according to a number of factors: patient

population, clinical situation, and practicality (McGuire, 1992). Patient population factors such as age, cognitive ability, education and culture are important to consider in the selection of a tool, as some tools require a high level of cognitive ability and language skills. The type of pain and the illness phase are key clinical factors to consider. Chronic and malignant pain are assessed using multi-dimensional tools, as this type of pain will have multiple repercussions for the patient. Likewise, patients who are in the terminal phase of their illness may require a less complex tool than one used in earlier stages. Finally, there are a number of practical issues when selecting a tool such as the time and energy required for the completion of the tool, the comfort and preference of the patient and the relevance of the parameters to both the clinician and the patient.

The measurement and assessment of postoperative pain is usually done through pain intensity rating scales. These subjective tools require little time and cognitive ability and are easier to administer than the multi-dimensional tools. The two most common tools are the visual analogue scale (VAS) and the numerical rating scale (NRS). The visual analogue scale is administered by presenting the patient with a straight line (usually 10 cm long) that is anchored at either end with the words no pain and worst pain. The patient places a mark on the line that indicates their current pain intensity. The person administering the scale measures from the left hand side of the line to the mark indicated by the patient. This number, measured in millimeters, becomes the pain scale measurement. The VAS is the tool most frequently used for postoperative pain research; however, it has disadvantages in that it requires two steps to complete, the measuring of the line needs to be precise, and it is time consuming.

The more common tool for clinical practice is the numerical rating scale. This scale can be administered verbally. The patient is asked to produce a number between 0 and 10 indicating their pain intensity if 0 represents no pain and 10 represents the worst pain imaginable. An intensity scale of 0-3 has generally been considered adequate analgesia, although this may vary between institutions (Mantha, Thisted, Foss, Ellis, & Roizen, 1993).

The VAS and NRS correlate highly in their measurement of pain intensity (Ekblom & Hansson, 1988; Jensen, Karoly and Braver, 1986; Price, Bush, Long, & Harkins, 1994). The reliability and validity of these scales is generally accepted, although as cited previously, there is still some controversy surrounding the subjective nature of these scales (Chapman et al., 1985; Donovan, 1992; Price et al.). Apart from the subjectivity of these scales, there are two primary concerns with their use in pain measurement. First, because the whole psychological spectrum of pain perception is condensed into one scale, the responses tend to be spread over the entire scale, regardless of the magnitude of the stimulus (Chapman et al.). Second, there is a concern about the use of these scales as ratio scales in statistical analysis. The VAS has been demonstrated in several studies to have ratio scale properties, but the NRS has not (Mantha et al., 1993; Price, McGrath, Rafii, & Buckingham, 1983; Price et al.).

Verbal rating scales that use descriptive categories are used less frequently in the assessment of postoperative pain. A typical categorical scale may use the descriptors of no pain, mild pain, moderate pain and severe pain. The verbal rating scale has been shown to correlate highly with the VAS (Duncan, Bushnell, & Lavigne, 1989; Ohnhaus & Adler, 1975); however, it has been criticized for having intervals that do not represent identical steps in pain intensity (Chapman, Casey, Dubner, Foley, Gracely, & Reading, 1985).

This appendix has presented a discussion of the theoretical concepts of pain and has reviewed major concepts in pain assessment and measurement, with special emphasis on postoperative pain.

## Appendix B

### CONSENT FORM

Project Title: Evaluation of an Acute Pain Service Program.  
(Thesis Research for Masters degree in Nursing)

Principal Investigator: Dr Joy Johnson Telephone: XXX-XXXX

Co-Investigator: Barbara Pesut: XXX-XXXX

The objective of this research is to conduct a program evaluation of the Acute Pain Service to increase understanding about the effectiveness of Acute Pain Services, to evaluate the impact of the implementation of an Acute Pain Service on the delivery of pain treatment, and to make recommendations for the improvement of the Acute Pain Service.

I will be participating in one interview, lasting 30-60 minutes, in which I will be asked to give my opinions of some aspect of the Acute Pain Service. The interview will be tape recorded, and some sections may be transcribed by a typist.

I will not benefit by participating in this study. It is hoped that the knowledge gained will improve the efficiency and effectiveness of the Acute Pain Service.

I give permission to be interviewed, for the interviews to be tape recorded, and then later typed out. I understand the tapes and the typed pages of interviews will have all information that can identify me removed, and that my name will not be used in the research reports. I also give permission for research that involves a secondary analysis of my interviews.

I understand that I am free to refuse to participate in this study, to refuse to answer any questions, and to withdraw from the study at any time without having my employment affected.

I have had the opportunity to ask questions, and these questions have been answered to my satisfaction. I have received a copy of this form to keep.

This is to certify that I \_\_\_\_\_,  
agree to participate as a volunteer in this project.

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Participant

---

Interviewer

---

Date

## Appendix C

### Evaluation of an Acute Pain Service Program.

Primary Investigator: Barbara Pesut

Telephone: XXX-XXXX

To:

I am a registered nurse working on my Masters in Nursing at the University of British Columbia. As part of the program, I am doing an evaluation of the Acute Pain Service of this hospital. Part of this evaluation entails analyzing how the service was planned and implemented through the years of 1989 to 1995. As you have contributed to this implementation process, I would like to interview you. This interview will take approximately 30-60 minutes, and you will be asked some or all of the following questions depending upon your level of involvement with the implementation:

1. What led to the initiation of the APS?
2. What resources were required to implement the APS?
3. What relevant events occurred during the implementation of the APS
4. What factors influenced the development of the APS?
5. What, if any, problems were encountered during the implementation of the APS, and how were they dealt with?

You will also have an opportunity to express your opinions about the impact of the Acute Pain Service, if you so desire. Your participation in this study is completely voluntary. You have a right to refuse to participate in this study, to refuse to answer any questions, and to withdraw from the study at any time without having your employment affected.

Thank you for your consideration of this matter. Please don't hesitate to contact me at the number given above if you have any questions or concerns. I will be contacting you by telephone for your response.

Sincerely,

Barbara Pesut BSN, RN (MSN Cand.)

## Appendix D

### **Evaluation of an Acute Pain Service Program**

Principal Investigator: Dr Joy Johnson      Telephone: XXX-XXXX

Co-Investigator: Barbara Pesut:      Telephone: XXX-XXXX

I am a registered nurse completing a Masters degree in Nursing at the University of British Columbia. For my thesis I am doing a program evaluation of the Acute Pain Service of this hospital. To enhance the effectiveness of the care provided by this service I would like to get your opinions of the service.

I would appreciate it if you would take the five minutes necessary to complete this survey. Completion of this survey is voluntary; however, your participation is vital to the improvement of this service. To ensure the confidentiality of your responses, please do not indicate your name on the survey. Your response to this survey will imply that you consent to participate in this research project. Please return completed surveys in the envelope provided via the internal hospital mail by \_\_\_\_\_.

I am also interested in doing short interviews to expand on the issues raised in this questionnaire. If you are willing to be interviewed, please write your name and phone number on the response card enclosed with the survey, and return it via the internal mail. The return address is located on the back of the card.

Thank you for your participation in this research project. Your input into the improvement of the Acute Pain Service is appreciated.

Sincerely,

Barbara Pesut BSN, RN

## Appendix E

The following questions are designed to assess your satisfaction with the Acute Pain Service. *Please read the questions carefully and circle the appropriate responses.*

<i>e.g.</i>	1	2	3	4	5
	Very				Very
	Dissatisfied				satisfied

## Satisfaction

*Indicate your satisfaction with the following elements of the Acute Pain Service.*

1. The availability of the APS to respond to pain management concerns?

1	2	3	4	5
Very				Very
Dissatisfied				Satisfied

- ## 2. Your communication with the APS?

1	2	3	4	5
Very				Very
Dissatisfied				Satisfied

3. The techniques used to provide postoperative analgesia (e.g. PCA, Epidural, Interspersal)?

1	2	3	4	5
Very				Very
Dissatisfied				Satisfied

4. The quality of pain management provided by the APS?

1	2	3	4	5
Very				Very
Dissatisfied				Satisfied

5. Overall, how would you rate your satisfaction with the APS?

1	2	3	4	5
Very				Very
Dissatisfied				Satisfied

Now, for some specific topics...

**Analgesic Techniques**

*Indicate whether you agree or disagree with the following statements.*

6. I would like to see more patients with epidurals.

1. Yes
2. No

7. I would like to see more patients with patient-controlled analgesia.

1. Yes
2. No

**Availability of the APS**

8. How many times in the last year have you been unable to reach APS personnel for help with patient pain management? (*Circle one*)

1. Never [*go to question 10*]
2. 1 - 2 times [*go to question 10*]
3. 3 - 4 times [*go to question 9*]
4. 5 or more times [*go to question 9*]

9. When have you had difficulty contacting the APS? (*select as many as are appropriate*)

1. Monday to Friday 0800 to 1600
2. Monday to Friday 1600 to 0800
3. Weekends anytime
4. Statutory holidays



### **Education**

10. How would you rate your knowledge about the analgesic techniques used by the APS?

1      2      3      4      5  
Poor                      Excellent

11. Would you like more education about pain management?

1. Yes
2. No

### **Workload**

12. What effect does the APS have on your workload?

1. No change in workload
2. Increase in workload
3. Decrease in workload

If you indicated that the APS has increased or decreased your workload, please specify how.

---

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### **APS Involvement with Patients**

*Indicate your level of agreement with the following statements.*

13. I think APS team members communicate well with patients.

1      2      3      4      5  
Strongly                      Strongly  
Disagree                      Agree

14. I would like the APS to be more involved with patient pain management.

1      2      3      4      5

Strongly  
Disagree

Strongly  
Agree

15. The APS interferes with my management of patient problems.

1      2      3      4      5

Strongly  
Disagree

Strongly  
Agree

**Personal Information**

Which of the following best indicates your professional role?

1. Registered Nurse
2. Surgeon
3. Anesthetist

How long have you worked at this hospital?

1. Less than 1 year
2. 1 to 5 years
3. 6 to 10 years
4. Greater than 10 years

**General Comments**

*Please feel free to comment on any of the questions 1 to 15. Do you have any comments about the APS or suggestions for improvement?*

**Thank you for your responses.**

**Please return this survey in the envelope provided through the internal hospital mail.**

Appendix F  
Description of APS Workload Impact  
(Transcribed from document submitted)

RESPONSE TO THE ACUTE PAIN SERVICE SURVEY

The following information is feedback about the positive and negative aspects of the APS program at [hospital]. Up to this time we have not been given the opportunity to voice our legitimate concerns in a constructive manner. The primary focus of the caregiver is to maintain adequate comfort in a safe environment to assure that the patients' needs are adequately met in their journey back to health. Managing pain, whether caused by surgery, trauma, or the disease process, is an enormous responsibility for the nurses. It is their assessment skills and experience which enable them to make the appropriate decisions to meet the patients needs without interfering with all the other aspects of care and progress. The tools that are used to secure maximum comfort by the APS (epidural fentanyl and morphine, PCA, IPC, IV infusion of narcotics) has served some positive aspects to alleviating suffering. Certain types of pain have been minimized making life easier for the patients in their acute phase of distress. Tools that make things "easier" does not necessarily mean it is best or safest for all involved. There are problems that have never been addressed or brought out in the open. The cost to support the APS may be utilized in more positive and humane forms of caring. There is no machine that can deliver the quality of comfort and caring given by a conscientious nurse...if she has the time and resources to do so. The machines and medication, with the consequences of their use, take the primary focus away from the human touch which is so important in the caring and healing process.

To best explain this, here is a typical scenario in the day of a nurse on [ward]. Hopefully, it will bring to your attention the problems we face daily.

IT IS A WEEKDAY...

NURSE X comes to work at 0730. She gets report for 19 patients, 5 of which are hers and another 5 when NURSE Y is on her breaks. Here is the list of the 10 patients.

NURSE X'S PATIENTS:

Patient A:

First day post op after a thoracotomy, R.U.L. he has an IPC, PCA morphine pump, 2 chest tubes to pleuravac and suction, IV, central line, foley, oxygen by mask.

Patient B:

Forth [sic] day post aortic abdominal aneurysm repair. She is being weaned off her fent drip which is still at 2 cc an hour. She has had her nasogastric tube removed the day before and her foley at 0500 that morning. She is still on IV fluids and is being started on clear fluids for breakfast. She was given 2 Tylenol #3s at HS, 0200 and at 0600.

Patient C:

A brittle diabetic lady who is agitated and confused due to the pain and the disease process of her necrotic foot. She is waiting for an amputation in the future and up to now is refusing to sign her consent. She is on a morphine drip, and a heparin drip. She is also

incontinent, and has diarrhea. We have tested her for CD toxin...no result yet.

Patient D:

This lady is on a heparin drip and has a PCA morphine pump. She is going for angios later in the day. She is fasting. She is also nauseated from the morphine. She is anxious and afraid. She is unable to get up without help.

Patient E:

A young male with fractured ribs from an MVA. Has a history of drug and alcohol abuse. He is on a continuous PCA morphine mode and can also have 1.5 mg. with a 4 min. lockout. He is an uncooperative person who won't do his DB&C exercises. His speech can be very abusive in manner.

#### NURSE Y'S PATIENTS:

Patient F:

A man post op many days after an esophagectomy, has a J-tube feeding, a cut off chest tube that needs irrigations, is still on PCA demerol. He is very agitated at times with a need for ativan often and also gravol and maxeran as he is always nauseated. He has a history of alcohol and drug abuse.

Patient G:

Second day post op pneumonectomy with clamped chest tube. He has a [sic] epidural fentanyl drip. He is on star wars oxygen and is very anxious. He appears to be in need of a diuretic.

Patient H:

First day post op AAA Repair. He has an NG, foley, oxygen, epimorph drip at 12 cc an hour, a central line, IV, and a wife who stayed overnight. She interferes with all aspects of his care.

Patient I:

A lady who returned from the PACU at 0600. She had an emergency embolectomy during the night. She was given a bolus of epimorph in the OR and needs monitoring q1h for 18 hours. She has a heparin drip, a PCA morphine, IV, foley and is still on oxygen.

Patient J:

A confused man many days post op after a ruptured AAA. He still has post op psychosis and requires haldol. He has a trach, central line, foley, moistened oxygen over his trach. He is restrained and his hands are tied so he does not pull out his trach and tubes.

#### SO HERE WE GO....

Nurse X leaves report about 0800 to the sound of several beeps and a call bell. Pt. A has a PCA beeping almost empty. Pt. D's heparin infusion baxter is alerting their [sic] is air in the line. Some minutes after taking the champagne sized bubble out of the line the machine finally shuts up. Then the PCA pump of Pt. A is alerting empty. The nurse runs to get another syringe. She then goes to the bell to find out that Pt. B has vomited all over the bed. She had called earlier but the machines took priority. It is then realized she had a number of Tylenol #3's as she was being weaned off epi fent. She had bowel sounds the day before and had passed flatus so her NG had been removed. Now her bowel sounds were barely audible and she's feeling miserable. After cleaning her up she runs to get her some maxeran. Then she learns that Pt. C's blood sugar has come back at only 2.4.

The poor nurse darts to meet the glucose needs and the antiemetic for her patients. She hears Pt. E yelling from his room. He wants an override. So now she must find the narc keys to operate the pump. After she has obliged this person while encouraging him to deep breath [sic] the breakfast trays arrive. She still has not been able to pour her 0800 meds. Also the APS doctor has arrived and wants a run down on the patients. This takes more time. She tries to accommodate where she can. Pt. C is a feed. When setting her up it is smelled that she has done a big job in her diaper which needs changing first. The bell goes off again and this time it is Pt. B again. She needs the bed pan. On running for the bedpan she hears Pt. C's heparin pump beeping again. This time it is occluded. The sight [sic] is checked to find it has gone interstitial. It is removed and the unit clerk is asked to call the IV nurse. The bed pan is given. She goes to feed the other lady and shortly after the bell rings again. Pt. B wants off the bed pan. However, she cannot pee. Her bladder is found to be distended. It is realized that the inability to urinate is another side effect of the epidural drip. She needs her foley reinserted!

It is time for first coffee to go. Luckily Nurse X is on second. But now must attend to pressing concerns of the other patients on Nurse Y's team. Shortly after, the wife of Pt. H rushes at her in the hall. She is worried how her husband looks. She is desperate that he is seen immediately. He is found to be very drowsy, pale, diaphoretic, with shallow resps at 6 per min. The epidural is turned off, he is placed in high fowlers with more oxygen. It is very difficult to arouse him. The unit clerk is asked to call APS stat as she runs to get a [sic] the antidote. Also help was asked for. There was none but first coffee should be back soon. Again a loud beeping is heard. It is the PCA pump of Pt. E that is empty. The poor nurse is frantic. She must run faster. Another mad dash to the narcotic cupboard and the call bell goes off again. It is Pt. D who has to go to the bathroom. She refuses a bedpan and demands to get up. She is very tearful because she is afraid. She is also nauseated from the morphine. After untangling all her tubes she finally hobbles to the bathroom with much support from the nurse.

On leaving her the cleaning lady comes urgently towards her. She is concerned about Pt. J. While cleaning his room she noticed he was in much need of suctioning. He was very restless and his hand restraints were coming loose. So the nurse darts to the room to meet those needs also!!!! Now a doctor appears. He would like to go on rounds. She is unable to accommodate this request. The T.L. should be back momentarily.

The first coffee goers are returning...thank heavens...there comes Mrs. H. with another pressing concern.

Nurse X gives nurse Y an update. She returns to Pt. D to help her get back to bed. Before [sic] going on her break she peeps in on Pt. C only to find she has pulled out both her IVs and smells again like her diaper is full. Frustrated and exasperated she attends to this mess. No point going to coffee. She has not even had a chance to do any of her signs yet and the 1000 meds are yet to be poured.

The poor nurse wishes by this time that she had chosen another profession. Hopefully in the next life if she should be called to be a VT nurse she will be bionic. But presently her head is full of four letter words ready to spit off her tongue the minute someone has a demand of her.

From these 2 hours of hectic frustrating work you can hopefully understand some of the

problems the nurses on [ward] face.

1. Beeping machines take priority.
2. Certain meds have side effects that are worse then [sic] the pain.
3. It can be difficult to assess when too little or too much is given as there is often no continuity of care.
4. Some patients are not in a position to mentally comprehend how to use their PCA wisely.
5. There is often no time to give patients uninterrupted TLC as a machine will certainly interfere at the moment the nurse is connecting therapeutically with her patient.
6. It is difficult to take all the signs when required due to the disruptions and inability to remember all the different times for the different patients.
7. The nurse is placed in an unsafe setting when she is responsible for 10 patients....Burnout if inevitable!

For thoracotomy patients, I find the IPC the best, but only when the nurse is in the position to give it. Presently we are all learning how to do this. The need can be met at the time it is required...Not when it is convenient for APS!!!!

Though this survey is confidential, we should not be afraid to come forward with our concerns. This must be done in an open unthreatening way so that we can come together to find positive solutions for the problems this service has created for us.

Sincerely,

[Name]

## Appendix G

# Data Collection Sheet

Identification Number: \_\_\_\_\_ Group: Treatment \_\_\_\_ Control \_\_\_\_

### **Inclusion/Exclusion Criteria**

## Inclusion

\_\_\_ Abdominal Surgery

## Exclusion

## \_\_\_ Epidural/Interpleural Analgesia

## Using PCA

\_\_\_ Surgery to other body part (e.g. ortho)

### Demographic Data

**Surgical Intervention:** \_\_\_\_\_

**Sex:** (circle) 1. Male 2. Female      **Age:** (Indicate actual age)\_\_\_\_\_

**Pain Scale Entries** ( $T$ =time of recorded entry)

**First 24 hours:** From: Date \_\_\_\_\_ Time \_\_\_\_\_  
To: Date \_\_\_\_\_ Time \_\_\_\_\_

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_ 7. \_\_\_\_\_ 8. \_\_\_\_\_

T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_

9. \_\_\_\_\_ 10. \_\_\_\_\_ 11. \_\_\_\_\_ 12. \_\_\_\_\_ 13. \_\_\_\_\_ 14. \_\_\_\_\_ 15. \_\_\_\_\_ 16. \_\_\_\_\_

T.\_\_\_\_\_T.\_\_\_\_\_ T.\_\_\_\_\_ T.\_\_\_\_\_ T.\_\_\_\_\_ T.\_\_\_\_\_ T.\_\_\_\_\_T.\_\_\_\_\_

**First 24 hours:** From: Date \_\_\_\_\_ Time \_\_\_\_\_  
To: Date \_\_\_\_\_ Time \_\_\_\_\_

17. \_\_\_\_\_ 18. \_\_\_\_\_ 19. \_\_\_\_\_ 20. \_\_\_\_\_ 21. \_\_\_\_\_ 22. \_\_\_\_\_ 23. \_\_\_\_\_ 24. \_\_\_\_\_

T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_

25. \_\_\_\_\_ 26. \_\_\_\_\_ 27. \_\_\_\_\_ 28. \_\_\_\_\_ 29. \_\_\_\_\_ 30. \_\_\_\_\_ 31. \_\_\_\_\_ 32. \_\_\_\_\_

T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_ T. \_\_\_\_\_, T. \_\_\_\_\_

PCA End: Date \_\_\_\_\_ Time \_\_\_\_\_ # Visits by APS \_\_\_\_\_