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Postdischarge surveillance of surgical wound infection by telephone interview

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POSTDISCHARGE SURVEILLANCE OF SURGICAL WOUND INFECTION BY TELEPHONE INTERVIEW

By

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USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

Many postoperative wound infections are not being detected by traditional methods of surveillance of hospital acquired infections, due to decreasing length of hospital stay. Unless some form of postdischarge surveillance is undertaken, rates of hospital acquired infections will be underestimated. While Infection Control Practitioners are aware of this problem, implementation of postdischarge surveillance is hampered by lack of research into suitable cost-effective methods.

This study describes the implementation and feasibility of postdischarge surveillance by telephone interview and compares rates of infection in a private hospital before and after discharge. During a five month period a systematic sample of 300 clients was interviewed by telephone, 30 days after surgery. The data were analysed using descriptive statistics to summarise the incidence of self-reported signs of infection in clients after discharge. A comparison was made of infection rates based on pre- and postdischarge surveillance. The time and costs involved in performing this method of surveillance were calculated.

The results suggest that telephone interview as a method of contacting patients postdischarge is feasible with 87% of the sample being contacted and 90% of the interviews conducted lasting less than 5 minutes. However, the economic feasibility of using this method of postdischarge surveillance for all surgical

procedures needs to be taken into consideration when postdischarge surveillance is planned. The study identified an inpatient infection rate of 0.8% compared to a postdischarge rate of 3.6%.

The study also questioned the necessity of collecting information regarding non-specific signs of infection (redness, swelling, pain and elevated temperature) when carrying out postdischarge surveillance by telephone interview. Additionally issues relating to the importance of patient education were highlighted.

DECLARATION

"I certify that this thesis does not incorporate, without acknowledgment, any material previously submitted for a degree or diploma in any institution of higher education and that, to my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text".

Signed [redacted]

Dated 30/11/95

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CHAPTER ONE

Introduction

Background and Significance

Surveillance of hospital acquired infections (HAI) can be described as the gathering of information related to the incidence and characteristics of such infections, in order to identify problem areas of infection control. The knowledge of HAI rates allows trends to be evaluated, which may lead to strategies such as change of policies or the provision of education to assist in the reduction of infection rates. Thus, surveillance results in better quality care for hospital patients and reduced health care costs.

Reliable data needs to be collected regarding surgical wound infections, as they account for 20% of all HAI and take the greatest amount of resources to treat (Haley, 1985). No further studies as extensive as that of Haley (1985), have been carried out to describe the rates of hospital acquired infection. Many wound infections, however, are not being detected during hospitalisation due to decreasing length of stay. Therefore, to provide accurate data on rates of HAI some form of postdischarge surveillance is necessary. Without this the true number of HAI infections may be greatly underestimated, as studies have demonstrated that between 13-71% of infections occur after discharge (Cruse & Foord, 1980; Reimer, Gleed & Nicolle, 1987).

While many infection control practitioners are aware of the need for postdischarge surveillance, implementation is hampered by the lack of research into suitable methods. This study will describe the implementation of one method of postdischarge surveillance and determine rates of infection of surgical wounds pre- and postdischarge.

Research Purpose

The purpose of this study is twofold. Firstly, the study will describe the implementation and investigate the feasibility of using telephone interview for postdischarge surveillance of surgical wound infections in a private hospital. Secondly, the study will compare rates of surgical wound infection before discharge from the study hospital and from discharge up to 30 days following surgery.

Research Questions

1. What is the proportion of successful contacts of clients by telephone interview as a method of postdischarge surveillance?
2. How much time is spent obtaining each successful client contact and interviewing each client when carrying out postdischarge surveillance by telephone interview?
3. What are the costs incurred when carrying out postdischarge surveillance by telephone interview?
4. What is the incidence and nature of self-reported signs of wound infection in

clients interviewed after discharge?

5. What is in the incidence of hospital acquired wound infection when calculations are based on predischarge and self-reported postdischarge assessment?

6. What is the relationship between postdischarge infection and the demographic variables: age, gender and type of surgery?

Operational Definitions

Surgical Wound Infection

Australian Council for Health Care Standards (ACHS) Criterion of Infection.

An infection of the primary surgical incision site, that develops prior to discharge, will be defined by the presence of the following at the incision site:

Purulent drainage with or with-out positive laboratory culture of micro-organisms. (ACHS, 1993).

Non Australian Council for Healthcare Standards (NON ACHS) Criteria for Infection.

An infection of the primary surgical incision site, will be defined by the presence of one or more of the following, as stated by the by the client:

1. Purulent drainage from the primary operative incision site, associated with any

of the following:

- temperature of 37.6 ° C or above or
- redness surrounding the wound or
- swelling of the wound or
- pain associated with the wound or

2. Treatment of surgical wound with antimicrobial therapy.
3. Readmission to hospital for treatment of a complication of a wound infection involving any of the following:
   - antibiotic therapy or
   - surgical drainage or debridement or
   - dressing of infected surgical wound

Predischarge surgical wound infection

An infection of the primary incision site, that develops between discharge from hospital and up to 30 days after surgery. Rates were expressed using only ACHS criteria only.

Postdischarge surgical wound infection

An infection of the primary incision site, that develops after discharge from hospital and after 30 days following surgery. Rates were expressed using ACHS and non ACHS criteria.

Postdischarge surveillance

Telephone interview of a client, carried out at 30 days or more following surgery, to assess if a surgical wound infection has developed within 30 days after surgery.

Successful patient contact

The patient is contacted within three attempts by telephone, during a two week period, and is willing to participate in the study.

Unsuccessful patient contact

The patent cannot be successfully contacted within three attempts by telephone, during a two week period, or the client can be contacted by telephone but is unwilling to be interviewed for the study.

Non-specific indicator's of infection

Redness, swelling, pain or temperature of 37.6^{0} C or above related to the primary incision site.

Specific indicator's of infection

One or more of the following:

1. Purulent discharge from the primary incision site.

2. Treatment of the primary incision site with antimicrobial agents.

3. Readmission to hospital for treatment of a complication of a wound infection involving any of the following:

- antimicrobial therapy or
- surgical drainage or debridement or
- dressing of infected surgical wound

CHAPTER TWO

Literature Review

Introduction

The need to carry out some form of postdischarge wound surveillance is discussed by various researchers, but there appears to be no recommended method for obtaining accurate information regarding surgical wound infections that occur after discharge from hospital (Holtz & Wenzel, 1992; Olson & Lee, 1990; Rosendorf, Octavio & Estes, 1983; Surgical Wound Infection Task Force, 1992; Zoutman, Pearce, McKenzie & Taylor, 1990). The Surgical Wound Infection Task Force (1992) recommends all hospitals find strategies to monitor such infection within their resource systems. This literature review will firstly, describe various methods of postdischarge surveillance and the feasibility and reliability of each method in identifying wound infections. Secondly, the literature review will discuss the instruments and criteria utilised by researchers to identify postdischarge wound infections.

Methods of Postdischarge Surveillance

Information supplied by treating surgeon.

Methods of postdischarge surveillance that rely on doctors being questioned or

completing questionnaires, in relation to the number of wound infections following discharge from hospital, have been employed by a number of researchers. Cruse and Foord (1980) contacted surgeons' offices by telephone 28 days following each patient's surgery to obtain data on wound infections detected after discharge. In other studies surgeons were supplied with a questionnaire that provided names of patients who had undergone surgery in the preceding month and the procedure performed (Burns & Dippe, 1982; Hutton, Olmsted, Treston-Aurand & Craig, 1992; Manian & Meyer, 1990; Rosendorf et al. 1983; Roth & Verbridge, 1988). The surgeons were then asked to complete the appropriate section if the patient developed a wound infection following discharge.

Varying rates of compliance with the questionnaires were achieved in each of these studies, ranging from 73% (Manian & Meyer, 1990) to 93.8% (Burns & Dippe, 1982). The studies also showed varying rates of surgical wound infection postdischarge. Most studies found between 53% (Rosendorf et al.,1983) to 59% (Hutton et al.,1992) of infections occurred after discharge. Cruse & Foord (1980) detected infections in 13% of patients surveyed following discharge. This low rate may be attributed to the period in which the study was set, between 1967-1977, when hospital length of stay was relatively longer and day surgery cases were less prevalent compared with later years. Therefore, more infections were likely to be detected prior to discharge from hospital. Infection rates reported in the literature must be interpreted with caution as findings are calculated differently in various studies. In some studies postdischarge rates are expressed as a proportion of the combined inpatient and outpatient rates (Krukowski & Matheson, 1988). In others only a sample

of the total population was surveyed postdischarge (Rosendorf et al., 1983). Additionally the duration of hospitalisation of a sample of patients may also affect the number of infections detected postdischarge. Day or short stay patients are more likely to have infections detected by postdischarge surveillance, whereas patients who are hospitalised for longer periods of time are more likely to have infections detected by inpatient surveillance.

Postdischarge surveillance that relies on the treating surgeon supplying information has some shortcomings which are outlined by Craig (1983) and Manian and Meyer (1990). Firstly, patients may not attend their surgeon for treatment of wound infections, but instead may present at the emergency department or general practitioner for treatment. Secondly, in all studies cited, the questionnaire reached the surgeon one to two months following discharge making recall of patients who had wound infections difficult. Thirdly, the dependence on diagnosis by the surgeon may introduce some degree of bias and subjectively if surgeons are unwilling to admit they have had problems with wound infections. Finally, surgeons may be reluctant to complete further documentation when they cannot see any benefits.

Roth and Verbridge (1988) express further concerns regarding the reliability of postdischarge surveillance that depends upon information supplied by the treating surgeon. The authors initially established a quality assurance programme to quantify the number of patients who developed postoperative wound infections. This quality assurance programme was similar in design to postdischarge surveillance based on information supplied by treating surgeon. All surgeons involved in the study were

provided with questionnaires to complete if a patient had developed a wound infection following discharge. However, at the completion of the study the researchers were uncertain whether doctors had checked patients records prior to completing the questionnaire. These concerns made the accuracy of the results from their postdischarge surveillance doubtful. To assist in overcoming these concerns secondary checks were established. These checks consisted of maintaining lists of surgical patients having a positive micro-organism culture following surgery. Secondly, lists were compiled of all patients being readmitted to hospital following surgery. These records were then compared to information provided by surgeons to identify whether any cases of postdischarge infections had not been recorded. The researchers did not discuss the results of the secondary checks. However, such checks increase the amount of time required to undertake postdischarge surveillance. In today's economic climate with decreasing health care budgets, the time required to undertake these checks may not be available.

Outpatient review.

Another method of postdischarge surveillance is based on outpatient review discussed by Krukowski and Matheson (1988) and Byrne et al. (1994). In these studies the researchers determined whether patients developed a postdischarge surgical wound infection by using a combination of methods. Patients were, if possible, reviewed when they attended a postoperative clinic, where information was obtained regarding the development of postdischarge wound infections. This review occurred 4 - 6 weeks following surgery. If patients were not

reviewed at this time a postal questionnaire was sent to patients to complete or their general practitioner was contacted.

Krukowski and Matheson (1988) over a ten year period were able to collect data from 97.5 % of the study population which numbered 3100. The majority of data (94.8%) was obtained at postdischarge review in the outpatients' clinic. The remaining data (2.7%) was obtained by contacting the patients' general practitioner. A total of 57% of wound infections were detected following discharge compared with 43% detected by inpatient surveillance.

In the study conducted by Byrne et al. (1994) over a 32 month period 99.3% of the study population of 3466 patients were reviewed. Data were collected during outpatient evaluation for 69% of the study population, while one third (30%) of the population was contacted by postal questionnaire. If patients contacted by questionnaire stated they experienced problems with their wound, the patients' general practitioner was approached to obtain further information. This process helped to confirm whether a patient had developed a surgical wound infection postdischarge. From this study Byrne et al. (1994) detected 62% of wound infections postdischarge compared to 38% by inpatient surveillance.

The method of postdischarge surveillance described by Krukowski and Matheson (1977) and Byrne et al. (1994) may not be feasible in a private hospital. This is because private patients do not routinely attend one central clinic for postoperative review, making data collection difficult. Additionally patients may not

keep follow up appointments, requiring other methods of postdischarge surveillance to be undertaken. This problem was demonstrated in the study conducted by Byrne et al. (1994) were one third of patients had to be contacted by other means.

Review at time of suture removal.

In a study conducted by Ravichandrani, Karran, Toyn, Brough & Karran (1993) the researchers investigated the incidence of postdischarge wound infection, to evaluate the quality of surgical care. A total of 510 patients was assessed for the development of wound infection at the time of suture removal. This review was carried out by a research nurse in the patient's home. The researchers detected 64% of wound infections following discharge, that would not have been detected by inpatient surveillance only.

This type of postdischarge surveillance also has shortcomings. Firstly, patients were only reviewed at the time of suture removal, which is usually 10 - 14 days following surgery. The authors discussed how previous research found 15% of surgical wound infections occurred between 14 - 30 days following surgery. Therefore, 15% of wound infections may not have been detected by restricting the surveillance period to 14 days after surgery. Secondly, the cost of such postdischarge surveillance, where one nurse is employed to assess wounds at the time of suture removal, would be beyond the means of most health care facilities. Thirdly, hospitals with large catchment areas would find it difficult for one staff member to assess all wounds in the patients' homes at the time of suture removal due to the distances that

may need to be travelled.

Postcard.

A further method of postdischarge surveillance is discussed by Brown, Bradley, Opitz, Cipriani, Pieczarka and Sands (1987) and Whitby (1992). These researchers provided all patients with a postcard and asked patients to return the card if they developed a problem with their wounds after discharge. Patients were then followed up by an infection control nurse if cards were returned. Whitby (1992) states he achieved a 90% compliance rate, but does not provide the actual infection rate. This method of postdischarge surveillance requires minimal staff time to initiate, but relies entirely on the patient to report infections following discharge. Therefore, postdischarge surveillance by patient-completed postcards may be unreliable if patients are not aware of the importance of returning the cards.

Telephone interview.

Reliance on information provided by postcards was demonstrated to be an unreliable method of postdischarge surveillance by Reimer et al. (1987). The authors describe how they provided both patients and surgeons with postcards, which were to be completed if wound infections developed. The number of cards returned was so low they initiated a study to identify a more reliable method of data collection. In their study Reimer et al. (1987) followed up all patients 28 days after surgery by telephone and were able to contact 96.8% of the study population. Seventy one

percent of all the wound infections were detected by this method of postdischarge surveillance, thus only 29% of all wound infections were detected by inpatient surveillance. The researchers attribute the high incidence of infections detected postdischarge to the fact that contact was made with the patient, rather than the treating surgeon. They discussed how some patients may not return to their surgeon for treatment of a wound infection but, instead may visit a general practitioner. The researchers made no attempt to validate any information obtained by telephone interview. However they felt the information was accurate as in all but two cases of infection the patients reported a purulent discharge and the patients stated the diagnosis had been confirmed by their doctor.

Molyneux (1991) carried out a pilot study to assess whether telephone interviews provided a feasible method of postdischarge surveillance. She contacted 50 out of a sample of 51 clients in the study and detected 3 wound infections (6%). Zoutman et al. (1990) employed the same method of surveillance for 635 randomly selected patients. These researchers were able to contact 81.1% of the sample and identified wound infections in 5% of clients after discharge. Neither Molyneux (1991) nor Zoutman et al. (1990) carried out any procedures to determine if the information was reliable and valid. This is a limitation of most studies on postdischarge surveillance.

Manian and Meyer (1993) conducted a study to determine the efficiency of postdischarge surveillance of surgical wounds by telephone. Previously the researchers had carried out studies describing the use of monthly questionnaires

completed by surgeons to collect data on the development of surgical wound infections following discharge. The researchers were able to contact only 38% of the sample by telephone. The low rate of contact may be attributed to the fact that the researchers attempted to telephone patients in the sample during working hours. Many patients are unable to be contacted, or are unwilling to be interviewed, during their working day. Due to this low rate of contact Manian and Meyer (1993) found this method of postdischarge surveillance unsatisfactory.

Telephone contact, as with any method of postdischarge surveillance, has some limitations. Firstly, it may be considered subjective when the patient is the source of information. The use of experienced interviewers and specific definitions will assist in reducing this problem. Secondly, it may be considered labour intensive to have someone telephone patients, usually in the evening. Alternative methods of data collection, however may be considered labour intensive when the time taken to complete questionnaires by the surgeon, or recontacting patients who have completed postcards stating they have wound infections, is taken into account. Another factor to be taken into consideration is the time taken to educate both clients and surgeons about the documentation and the need for postdischarge surveillance.

Instrument

The following section of this literature review discusses the instruments and criteria used by researchers to determine whether a postdischarge wound infection

has occurred. Few researchers have described the content of the instrument they have used. Furthermore, the criteria used to define a postdischarge wound infection have not been described by many researchers.

One of the most detailed descriptions of the instrument and criteria has been provided by Zoutman et al. (1990). Their published questionnaire elicited information on whether the patients experienced any of the following signs, symptoms or interventions since discharge from hospital: 1) pain, redness or swelling near their wound since discharge, 2) an elevated temperature since discharge, or 3) further treatment for their wound. A wound was considered infected if: 1) a patient stated a doctor had diagnosed a wound infection, or 2) the patient stated they had experienced redness, swelling or pain near their wound associated with a purulent discharge.

A second group of researchers also provided descriptions of both the criteria and instrument used to determine a postdischarge wound infection. In the study conducted by Manian and Meyer (1993) patients were interviewed using a standard questionnaire. The researchers asked the patients whether they had experienced any of the following signs, symptoms or interventions since discharge from hospital: 1) purulent discharge from their wound, 2) redness, swelling or pain near their wound, 3) an elevated temperature, or 4) treatment for their wound since discharge. A wound was considered to be infected following discharge: if 1) the patient stated they had experienced two or more of the criteria used in the interview, 2) the patient stated they were treated with antibiotics for their wound, or 3) the patient stated they

had been told by a doctor they had a wound infection following discharge. Some criteria used by the researchers to determine a postdischarge wound infection were non-specific indicators of wound infection, for example, redness, pain and elevated temperature. The use of such indicators may lead to an over-estimation of rates of infection if patients stated they experienced redness, pain or swelling when this is part of a normal postoperative recovery, rather than a surgical wound infection.

The instrument and criteria used by both Manian and Meyer (1993) and Zoutman et al. (1990) are comprehensive and based upon Garner, Jarvis, Emori, Horan & Hughes (1988) Centre for Disease Control definition of surgical wound infection. In contrast Molyneux (1991) asked two general questions to obtain information from patients about problems experienced with their surgical wounds since discharge. The first question was whether the patient's wound had healed following surgery. The second question was whether the patient had experienced any problems related to their operation since discharge from hospital. This type of instrument was not based on any scientific definition of wound infections and the questions asked by the researchers were very broad. Therefore, data collection using this instrument may lead to an over-estimation of rates of infection if patients perceive they have had a wound infection when in reality they experienced a minor problem only. The criteria used to determine a wound infection postdischarge were not discussed by the researcher.

A further group of researchers (Rosendorf et al., 1993) published the instrument they used to obtain information on postdischarge wound infections.

The criterion used in this study to identify a postdischarge wound infection was that of surgeons' diagnosis. As previously discussed dependence on surgeons' diagnosis may lead to some degree of bias and subjectivity if surgeons are unwilling to admit they have problems with wound infections.

Krukowski and Matheson (1988) considered a wound was infected if a patient reported any type of discharge at their follow up review. This type of criteria may lead to an over-estimation of rates of infection as some forms of wound discharge are not a sign of infection. The researchers failed to mention how they obtained data on the number of postdischarge wound infections detected in their study.

Of the remaining studies, two stated that a standard data collection form was used to collect information regarding postdischarge wound infection. No description of the content of the instrument was provided, but the criteria used to determine a postdischarge wound infection were published (Burns & Dippe, 1982; Roth & Verbridge, 1988). Burns and Dippe (1982) considered a wound to be infected if the wound drained purulent fluid. A positive micro-organism culture was not required to confirm a wound infection. Roth and Verbridge (1988), used multiple criteria to identify postdischarge wound infections. These researchers considered a wound to be infected if a patient experienced an elevated temperature, along with a purulent discharge and redness at the incision site. A wound was also considered infected if it was treated with antibiotics postdischarge. A positive micro-organism culture was not required to identify a wound infection.

Other researchers (Cruse & Foord 1980; Brown et al., 1987; Hutton et al., 1992; Ravichandran et al., 1993) described neither the content of the standard data collection form nor the criteria used to identify a postdischarge wound infection.

Summary

The literature cited above demonstrates that postdischarge surveillance is a necessary part of any infection control programme in order to provide accurate data regarding the incidence of surgical wound infections. Many studies have been difficult to evaluate due to the lack of information on instruments used to collect data and the criteria utilised to identify a postdischarge wound infection.

Although some studies indicate that telephone interview provides a feasible method of postdischarge surveillance, further research needs to be undertaken to establish whether this is true in a given setting before more complex studies are conducted to test the reliability of this form of postdischarge surveillance.

While it is beyond the scope of this present study to fully measure reliability and validity of the telephone interview, this study has improved on existing research in two ways. Firstly inter-rater reliability of the interviewers was measured prior to the commencement of data collection. Secondly, detailed information on the characteristics of problems reported by patients regarding their wounds has been described in this study allowing the researcher, rather than the patient, to interpret whether a wound infection has occurred.

CHAPTER THREE

Conceptual Framework

For the Surveillance of Hospital Acquired Infections

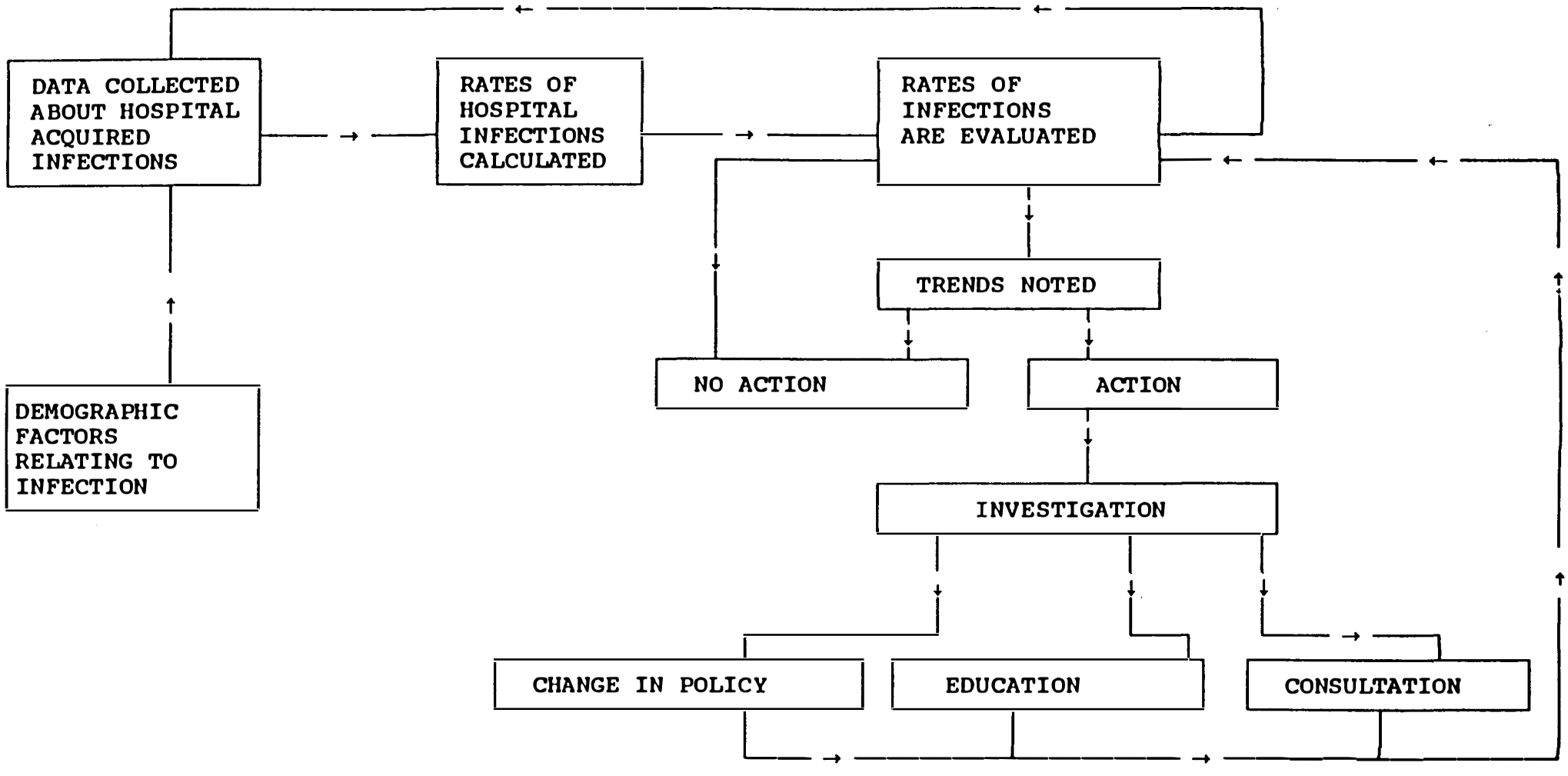
As shown in Figure one, surveillance is a continuous process based on the collection of accurate data related to HAI and demographic information of hospital clients. Following data collection, the incidence of HAI is calculated in order to establish whether any trends are occurring. If trends are noted, such as increases in the rate of HAI, the infection control practitioner will undertake an investigation to determine why this has occurred. Various strategies may be implemented, depending on the findings, to assist in the reduction of HAI. These may include firstly, education of nursing or medical staff in methods of reducing HAI. Secondly, the investigation may lead to a change of policies and procedures within the facility aimed at reducing the rate of HAI. Thirdly, consultation with other specialists in infection control may be required to assist in identifying reasons for increased rates of HAI. Following consultation, appropriate interventions may be introduced in an attempt to reduce the rates of HAI. Continual surveillance will indicate whether these strategies are effective. This conceptual framework has been developed through observation of professional practice.

Demographic information is obtained to assist in determining the risk factors of each patient acquiring a surgical wound infection. Previous research has

documented many risk factors relating to the development of surgical wound infections (Surgical Wound Task Force, 1992). This study has collected information relating to the surgical specialty, age and gender of the patients to describe the characteristics of the sample. The collection of other demographic information was not considered necessary for the purpose of this study.

FIGURE (1)

CONCEPTUAL FRAMEWORK FOR HOSPITAL ACQUIRED INFECTION SURVEILLANCE



CHAPTER FOUR

Methodology

Study Design

A descriptive design was used to describe the implementation of postdischarge surveillance by telephone interview and to compare the rates of infection predischarge and postdischarge.

Sample and Setting

The study was undertaken at a 150 bed private hospital in central Perth over a five month period between April and September 1994. A systematic sample of 300 patients admitted to the hospital for surgical procedures was enrolled in the study. Operating lists were reviewed on a daily basis and every third patient was selected to participate in the study, if the criteria for inclusion were met. If the selected patient did not meet the criteria the next patient on the theatre list, who met the selection criteria, was entered in the study.

The following groups of patients were excluded from the study.

1) Non English speaking patients.

2) Children under 16 years of age.

3) Patients who were expected to have no visible wound.

4) Patients undergoing cardiac catheterisation and dental surgery, as there have been no previously recorded cases of infection with these patients at the study hospital.

Demographic Information.

Information on age, gender and surgical specialty was collected on a demographic data sheet (Appendix A).

The mean age for the study was 47 years, with the range being 16 - 85 years. Of the patients contacted 165 (55%) were male and 135 (45%) were female.

The type of surgery undergone by the patients who were contacted is listed in Table 1. The largest group consisted of 142 (54.2%) patients who had undergone orthopaedic surgery, while 86 (33.2%) had undergone general surgical procedures, which included colon surgery, plastic surgery, cholecystectomy and hernia repairs.

Table 1

Surgical Specialty

Type of surgery	No	%
Orthopaedic	142	54.2
General	86	33.2
Gynaecology	12	4.6
Cardiothoracic	12	4.6
Urology	4	1.5
ENT	3	1.2

Instruments

Predischarge.

Data regarding wound infections that developed predischarge were collected on the study hospital's clinical review form (Appendix B). This form is routinely used to collect information on patients who have demonstrated problems with their surgical wounds during hospitalisation. Additionally, information on demographic characteristics, risk factors related to the development of surgical wound infections and antibiotic prophylaxis are collected on this form. This additional information was not required for the purpose of this study, but is necessary for the hospital to respond appropriately to any enquiries regarding surgical wound infections

and to provide data for the Australian Council on Health Standards clinical indicator programme.

Postdischarge.

A structured telephone interview was used to collect data on problems patients experienced with their surgical wounds postdischarge (Appendix C). The instrument was adapted with permission from one originally used by Zoutman et al. (1990) (Appendix D). The instrument was revised and further questions were included to elicit more specific information on indicators of wound infections and to make it more relevant to the Australian situation. Questions one to four were included to gain information on the time taken to contact and interview each patient. Question five was added to obtain information regarding the surgical specialty of the patients. Question six was included to identify whether patients considered they had problems with their wound. Additionally, patients who considered they had experienced problems with their wound were asked whether this conclusion was based on assessment by a health professional or by self diagnosis. The purpose of this question was to determine whether patients sought advice from health professionals if they considered they were experiencing problems with their wounds. Question seven was revised and further prompts were added to gain more detailed descriptions of the subjective signs of infection experienced by patients. These questions were added to allow the researcher to determine whether patient reported signs were truly a problem or related to normal postoperative recovery. Questions eight to twelve on objective indicators of wound infection were revised. Further prompts were added to gain more specific

information regarding these signs and to validate the patients' responses. For example, if patients stated they experienced an elevated temperature, they were asked whether they measured their temperature with a thermometer. Question thirteen remains unchanged from the original questionnaire. Some of the data collected, for example, redness, pain and swelling may not be reliable indicators of infection and information on these signs and symptoms was not collected predischarge. They were included in the postdischarge assessment for two reasons. Firstly, the data enabled comparisons to be made with other studies that used similar patient reported indicators. Secondly, the data were included to enable relevance of this information to be reviewed, the aim being to determine which signs and symptoms were useful indicators in determining postdischarge wound infections. The process would enable the existing postdischarge surveillance data collection form to be revised and questions that do not provide useful information to be deleted. The revision process may reduce the amount of time taken to interview patients in the future.

Reliability and Validity

Predischarge.

The reliability of the clinical review form was not tested in this study, but the content validity was established by the fact that the instrument was compiled by infection control experts and is based on the Australian Council of Health Care Standards accreditation guidelines.

Postdischarge.

Previous reliability and validity testing had not been conducted on the postdischarge instrument when developed by Zoutman et al. (1990) (personal communication, D. Zoutman, 29 June, 1993). For the present study the reliability of the instrument was tested by conducting a pilot study of 10 patients to determine inter-rater reliability between the researcher and two research assistants. This was carried out by one of the assistants conducting a second telephone interview with each patient within 48 hours of the first interview conducted by the researcher. The purpose of the follow up interview was explained to the patients at the conclusion of the first interview. The results showed a mean agreement of 91% with a range of 80 - 100% for all questions. There was 100% agreement between the interviewers on the what were to be considered specific signs of infection (questions 8, 10, 11).

Validity was addressed by having content validity of the questionnaire assessed by a panel of health professionals. The panel consisted of a clinical microbiologist, two infection control nurses and a nurse researcher. The review panel stated the instrument was appropriate for collecting information on postdischarge wound infections and no modifications were made.

Procedure

Predischarge.

Data were collected by hospital staff on wound infections that developed

predischarge according to routine surveillance procedures currently used in the study hospital. This type of surveillance involves all results of micro-organism cultures being sent daily from the hospital's laboratory to the infection control nurse. These reports are then followed up by the infection control nurse to identify surgical wound infections. The infection control nurse visits each ward area on a weekly basis to gain information regarding any surgical wound infections that may not have a positive micro-organism culture. Additionally, nursing staff are encouraged to report any surgical wound infection to the infection control nurse. Information obtained is then collated by the infection control nurse to provide rates of HAI. This type of surveillance has been shown to be cost effective, as well as sensitive in detecting surgical wound infections (Glenister, Taylor, Bartlett, Cooke, Sedgwick & Mackintosh, 1993).

Postdischarge.

As previously discussed, a pilot study of the patients was conducted to detect any problems with recruitment of participants prior to the main study and to assess inter-rater reliability of the interviewers.

Potential patients were approached on admission to hospital and provided with a letter describing the study (Appendix E). This process was carried out by nursing or clerical staff. If patients were willing to participate in the study, they were asked to complete the consent form (Appendix F) and demographic information (Appendix A). Having completed the forms they were asked to return these to the ward clerk, from

where the researcher would collect the forms daily. If any of the selected patients declined to participate in the study other patients were asked to participate until the required number was met. Having collected the completed consent and demographic forms the researcher entered patients into a central register and assigned them a code number. The anticipated date 30 days after surgery was calculated for each patient and added to the demographic information form. Completed forms were divided amongst the researcher and her two assistants.

At 30 days after each patient's surgery the researcher or an assistant contacted, the patients in the study, by telephone. The questionnaire (Appendix C) was completed by the interviewer to obtain information on problems patients had experienced with their wounds following discharge from hospital. Additionally, the time taken to contact each patient and the duration of each interview was recorded to the nearest second and minute respectively. When calculating the time to contact each patient, the time was noted at the commencement of dialling the patient's telephone number and was recorded either when the patient was contacted or after approximately one minute if there was no reply from the number called. The time taken to interview each patient was also noted by recording the time at the commencement and completion of each interview.

Ethical Considerations

Approval to carry out the research was granted by Edith Cowan University (Appendix G) and Mount Hospital Medical Advisory Committee (Appendix H). All

Patients' perceptions of problems with their wound.

Patients were asked whether they considered they had experienced a problem with their wound since discharge from hospital. From the sample 221 (85.3%) stated they did not consider they had experienced any problems with their wounds postdischarge. Patients who considered they had experienced problems were then asked whether this conclusion was based on assessment by a health professional or by self diagnosis. The majority were equally divided into two groups based on how this information was provided. In 18 (47.3%) cases the patients stated a doctor had assessed their wound and diagnosed a problem, while 17 (44.7%) patients stated they personally identified a problem with their wound. Of the remaining three patients, two stated a nurse identified a problem with their wound, while one stated an occupational therapist identified a problem.

Non specific signs of infection (swelling, pain and redness).

Table 4 describes the incidence of redness, swelling or pain reported by patients. The majority of patients experienced no redness, swelling or pain related to their surgical wound following discharge from hospital.

CHAPTER FIVE

Results

The study findings will be presented under the following three major headings related to the purpose of the project. Firstly, findings describing the feasibility of using telephone interview as a method of postdischarge surveillance of surgical wounds will be presented. Secondly, signs, symptoms and interventions reported by the sample will be described along with the rates of surgical wound infection pre- and postdischarge from the study hospital. Thirdly, information on the costs of carrying out the study will be presented.

Data obtained in the study were analysed using SPSS for windows computer statistical package release 5.

Feasibility of Telephone Interview as a Method of Postdischarge Surveillance

Contacting the sample.

Of the sample of 300 patients, 259 (87%) were able to be contacted. The number of attempts taken to contact each patient is shown in Table 2. The majority of patients (66%) were contacted on the first attempt.

Although operational definitions stated that only three attempts were to be

made to contact the sample, a further attempt was made in four cases. This occurred because on the third attempt patients stated the time was not suitable for the interview to be conducted, but they were still willing to participate in the study.

Table 2

Number of Attempts to Contact Sample

No of attempts	No of patients Contacted	%
1	171	66.0
2	61	23.6
3	23	8.9
4	4	1.5

Contact and interview time.

The mean time to successfully contact a patient was 36.37 seconds with a range of 10 - 140 seconds. The mean time to interview a successful contact was 3.14 minutes with a range of 1 - 15 minutes. The majority of interviews (90.7%) lasted five minutes or less. The mean time to contact and interview each patient was 3.84 minutes. This mean time was obtained by adding together the contact and interview time for each patient and then calculating the mean. In total it took 16.6 hours to contact and interview all 259 patients.

The reasons for unsuccessful contact are described in Table 3. The major reason for failure to contact patients was because there was no reply from the number called. This occurred in 18 (43.9%) cases. In another nine (22%) cases the patient was not available at the number called.

Table 3

Reasons for Unsuccessful Contact

Reason	Number	%
No reply	18	43.9
Not available	9	22.0
In hospital	6	14.6
On holiday	3	7.3
Wrong number	3	7.3
Phone not connected	2	4.9

Signs, Symptoms and Interventions Experienced by Sample

The following section describes the signs, symptoms and interventions experienced by the sample contacted.

Patients' perceptions of problems with their wound.

Patients were asked whether they considered they had experienced a problem with their wound since discharge from hospital. From the sample 221 (85.3%) stated they did not consider they had experienced any problems with their wounds postdischarge. Patients who considered they had experienced problems were then asked whether this conclusion was based on assessment by a health professional or by self diagnosis. The majority were equally divided into two groups based on how this information was provided. In 18 (47.3%) cases the patients stated a doctor had assessed their wound and diagnosed a problem, while 17 (44.7%) patients stated they personally identified a problem with their wound. Of the remaining three patients, two stated a nurse identified a problem with their wound, while one stated an occupational therapist identified a problem.

Non specific signs of infection (swelling, pain and redness).

Table 4 describes the incidence of redness, swelling or pain reported by patients. The majority of patients experienced no redness, swelling or pain related to their surgical wound following discharge from hospital.

Table 4

Redness, Swelling and Pain Reported by Patients.

Self reported	No	%	Yes	%	Only when touched	%
Redness	208	80.3	51	19.7	N/A	
Swelling	173	66.8	86	33.2	N/A	
Pain	195	75.3	17	6.5	47	18.2

Note: N/A = Not applicable

Relationship between type of surgery and non-specific signs of infection.

Table 5 summarises the findings when cross tabulation was carried out between type of surgery and the non-specific signs and symptoms of infection. Cardiothoracic and orthopaedic patients experienced the most problems with their wounds following discharge.

Table 5

Percentage of Patients Showing Non-specific Signs and Symptoms of Infection According to Surgical Specialty.

Surgery	Redness	Swelling	Pain when touched	Pain at all times
Orthopaedic	21	42	18	8
Gynaecology	0	0	17	25
Cardiothoracic	25	42	17	25
Urology	0	0	0	0
ENT	0	0	0	0

Discharge from wound.

Of the successful contacts 227 (87.6%) stated they had not experienced any type of discharge from their wound after leaving hospital. Of the 32 respondents who reported a discharge from their wound postdischarge, the greatest number, 13 (40.6%) had a blood stained discharge, while 10 (31.3%) experienced a watery discharge. Nine respondents stated they experienced a purulent discharge, which was the ACHS criterion and also one of the non ACHS criteria for surgical wound infection.

Elevated temperature.

Of the patients contacted 248 (95.8%) did not consider they had experienced an elevated temperature related to their wound since discharge from hospital. Patients who stated they experienced an elevated temperature were then asked to state its duration. Table 6 lists the replies of these 11 respondents. Respondents claiming to have experienced an elevated temperature were asked whether they measured their temperature with a thermometer. Of the five patients who used a thermometer three stated their temperature was 37.5°C or less, one patient could not recall the temperature, while only one person experienced an elevated temperature (>37.6°C) and this lasted for two to three days. A temperature greater than 37.6°C would indicate an infection, as defined by Non ACHS criteria used in the study.

Table 6

Duration of Elevated Temperature

Number of days	No Patients
1 day	3
1 - 2 days	1
2 - 3 days	2
4 days or more	5

Consultation with medical practitioner

Patients were asked whether they had consulted a medical practitioner regarding their surgical wound since discharge from hospital. The majority 215 (72%) stated they had not consulted a doctor. Of the 44 respondents who consulted a doctor, 24 (55%) visited their surgeon, 19 (43%) consulted a general practitioner, while one (2%) attended the emergency department of a hospital.

Patients were then asked whether any medications were prescribed for their wound post discharge. The majority 234, (90%) stated no medication had been prescribed for their wound, while 25 patients stated they were prescribed some type of medication. Of the latter group 22 stated that the medication had helped their wound, while three stated the medication prescribed had not been effective. Table 7 lists the type of medications prescribed for patients and shows that the largest number of prescriptions (17) were for antimicrobial agents.

Table 7

Type of Medication Prescribed.

Medication	Number	%
Antimicrobial agents	17	68
Anti-inflammatory agents	5	20
Analgesics	1	4
Antiseptics	1	4
Ointment for superficial thrombophlebitis	1	4

Readmission to hospital.

Patients were asked whether they had been readmitted to hospital for any treatment for their wound. The majority 254 (98.1%) stated they were not rehospitalised, while 5 (1.9%) were hospitalised for some form of treatment for their wound. Two patients were treated with antibiotics, one patient underwent surgery, while two patients returned for pain relief unrelated to their wound.

Infection Rates

During the period in which the research was conducted, the study hospital

had an infection rate of 0.81% calculated by inpatient surveillance. From the postdischarge study an infection rate of 7.2 % was calculated using the Non ACHS criteria. This was equivalent to another 18 infections being detected. A 3.6% infection rate was calculated using the ACHS criteria. It should be noted that there may be an overestimation of both the pre- and postdischarge rates of infection, as patients who were not likely to develop infections were excluded from both groups. Hence the denominator for both groups is reduced.

Two definitions of infection were used in the present study, the ACHS and Non ACHS. The use of ACHS definitions allowed comparisons of the pre- and postdischarge infection rates to be conducted, since only ACHS criteria could be obtained predischarge. The use of the Non ACHS criteria allowed comparisons between infection rates identified in the present study and previous research to be carried out. The ACHS definition of infection is used in the study hospital to identify predischarge surgical wound infections. This definition is a very narrow definition of infection and may not include all infection postdischarge. The Non ACHS definition is a broader definition similar to those used in other postdischarge studies.

Table 8 summarises the criteria fulfilled by patients who developed a postdischarge wound infection. Patients were excluded from calculations of postdischarge rates if they had already been included in the inpatient surveillance or readmitted to hospital for treatment unrelated to their wound. Thirteen patients were found to have fulfilled more than one criterion for infection.

Table 8

Number of Patients Fulfilling Criteria for Postdischarge Wound Infection

Criteria	Number
Treated with antimicrobial agents	19
Purulent discharge	9
Readmitted to hospital	2
Temperature 37.6^0 or greater	1

Characteristics of patients with a postdischarge infection.

Infections developed in 11 male patients and seven female patients. Nine patients under 50 years of age and nine patients over 50 years of age developed postdischarge infections.

Eight patients in each of the specialties of both general surgery and orthopaedics experienced postdischarge wound infection. One patient in each of the other specialties of gynaecology, cardiothoracics, urology and ENT developed a postdischarge wound infection.

Relationship Between Specific and Non-specific Signs of Infection.

Of the 259 respondents, 51 stated their wound was red postdischarge. Eleven of these patients developed an infection related to their surgical wound, while the remaining 40 experienced redness but did not develop an infection. Ten patients experienced swelling and developed a wound infection, while 76 patients experienced swelling but did not have an infection. Eleven patients experienced pain related to their wound and sustained a wound infection, while 53 patients also experienced pain but did not develop a wound infection. Chi square calculations were attempted but unable to be carried out because expected frequencies in some cells were less than five.

Costs.

The costs of carrying out the study are summarised in Table 9. The hourly rate of personnel to contact and interview the sample was based on $23.02, the rate of pay for a Level 2.1 Registered Nurse. This rate includes allowances for sick leave, annual leave and non-contributory superannuation. The cost of conducting the study, if personnel additional to current employees were paid to carry out the interviews, would have been $613.30.

Table 9

Costings for Study

Item	Cost
Personnel 16.6 hours @ $23.02	$382.13
Local telephone calls 236 @ $0.25	$ 59.00
STD telephone calls 22	$ 27.17
Photocopying 1806 sheets @ $0.08	$145.00
Total cost	$613.30

CHAPTER SIX

Discussion

This chapter will discuss the following major topics in relation to the study. Firstly, issues relating to the feasibility of using telephone interview as a method of postdischarge surveillance will be discussed. Secondly, aspects relating to the instrument used in this study to collect data on problems experienced by patients with their surgical wounds postdischarge will be presented. Thirdly, the infection rates identified in this study will be discussed and compared with other research. Fourthly, matters relating to consultation with medical practitioners and patient education identified by the study will be presented.

Feasibility

The primary purpose of this study was to investigate the feasibility of contacting patients by telephone as a method of postdischarge surveillance of surgical wounds. From the results obtained telephone interview appears feasible, with 87% of the study population contacted and 91% of the interviews lasting five minutes or less. This rate of contact compares favourably with previous postdischarge surveillance research that has also used telephone interview. The percentages of patients contacted in these studies have ranged from 38% (Manian & Meyer, 1993) to 96.8% (Reimer et al., 1987). Manian and Meyer (1993) attempted to contact patients during the day when many patients are unable or unwilling to be interviewed. This could account for

the low contact rate in the study. In the present study potential participants were asked to state the most convenient time for the interview to be conducted, with the aim of contacting the largest number of patients. In the study conducted by Reimer et al. (1987) the researchers did not state the criterion relating to the number of attempts taken to contact the sample. The present study attempted to contact the sample three times over a two week period. If no contact was made at this point the contact was classed as unsuccessful. In the study conducted by Reimer et al. (1987) researchers may have attempted to contact each patient more than three times. This point may account for the higher contact rate achieved by this group of researchers.

The percentage of patients able to be contacted was similar to studies that have employed other methods of postdischarge surveillance. These studies were able to contact from 73% (Manian & Meyer, 1990) to 99% (Byrne et al., 1994). The methods of postdischarge surveillance used by these researchers were information supplied by treating surgeon, or a combination of outpatient review and contacting patients by letter respectively. In the study conducted by Byrne et al. (1994) two-thirds of the sample was assessed at outpatient review to determine whether they had sustained a postdischarge wound infection. The remaining one-third of the sample, who did not attend the outpatient clinic, were contacted by mail and asked to complete a questionnaire to determine whether they had sustained a postdischarge wound infection. The use of two methods of postdischarge surveillance may account for the high rate of contact obtained by this group of researchers.

Economic Feasibility

One aspect of feasibility that was not investigated by the study was economic feasibility. In today's economic climate, with decreasing health care budgets, many health care facilities would not have the resources to carry out this form of surveillance on all patients undergoing surgical procedures in their hospitals. For example, in the study hospital where approximately 900 surgical procedures are carried out in one month, it would take 64 hours of staff time to carry out postdischarge surveillance by telephone interview. This is based on each interview lasting 3.84 minutes, the mean interview and contact time for the present study. Instead of carrying out postdischarge surveillance on all surgical patients the available resources may be better utilised by employing the principles of targeted surveillance described by Hayley, Gaynes, Aber and Bennett, (1992, p.100). The main purpose of this type of surveillance is to prevent the greatest number of infections with the least resources. The authors suggest targeting groups of patients with a high risk of acquiring some form of infection during their hospitalisation.

With postdischarge surveillance it may be appropriate to target groups of patients such as patients undergoing similar types of surgery, known from previous research to have high rates of infection. Alternatively, patients who have a short length of hospitalisation could also be targeted for postdischarge surveillance, as often very little information is known about infection rates in this group of patients. As described in the conceptual framework infection rates are calculated from this information. If increased rates of infection were noted an investigation could be

initiated to determine the cause. Various strategies may be implemented depending on the findings of the investigation to assist in the reduction of HAI. Due to the various types of procedures, and the varying length of stay of patients in the sample of the present study it was impossible to carry out any investigation to determine the cause of the infections.

The reduction of surgical wound infection rates provides measurable cost savings to the health care provider. It has been estimated in an English study that a surgical wound infection accounts for an extra 8.2 days hospitalisation for the patient, costing on average 1041 pounds (Coello et al., 1993). Additionally, the patient incurs other costs, some of which are measurable such as longer periods absent from work. Other costs may be unmeasurable such as the emotional strain of being unwell for extended periods. Preliminary research conducted in the United Kingdom by Elliston, Slack, Humphreys and Emmerson, (1994) highlighted the costs incurred by community agencies when wound infections developed postdischarge. The researchers found 11 out of 71 (16%) patients surveyed experienced surgical wound infections postoperatively. Seven of these infections occurred postdischarge. The extra nursing time to deal with a surgical wound infection that developed postdischarge ranged from 15 minutes to 16 hours, with a mean of 6 hours. Unfortunately the response to the survey from the general practitioners attending this group of patients was poor. Therefore, the time and costs incurred by general practitioners in treating postdischarge wound infections could not be accurately calculated. Additionally, no attempt was made to calculate the costs of further treatments, such as antimicrobial agents.

In summary, the cost of treating a postdischarge surgical wound infection in the community is difficult to calculate. This was evidenced by the difficulties experienced by Elliston et al. (1994). Previous research has provided information on the cost of inpatient treatment of surgical wound infections (Coello et al., 1993; Kandula & Wenzal, 1993; Hayley, 1985) and the benefits of using surveillance of surgical wound to reduce the rate of wound infection sustained by patients (Cruse & Foord, 1980). This present study highlights the need to conduct postdischarge surveillance in an attempt to reduce the number of surgical wound infections occurring after discharge. Because of the difficulty of costing wound infections that occur in the community, the cost benefits of conducting postdischarge surveillance have not been calculated by any researchers.

With increased competition in the health care industry, postdischarge surveillance could also be linked with patient or customer satisfaction surveys. Patients could be surveyed to obtain information about problems experienced with their surgical wounds following discharge from hospital, as well as how they rated the service provided by the facility. The use of an interview rather than a questionnaire to carry out postdischarge surveillance has the advantage of allowing the interviewer to elicit further information about problems patients experienced with their wounds. Telephone interview also enables the interviewer to explain the reasons for certain events and address any problems that may have caused the patient to be concerned or unhappy with the service provided. Thus, combining the two quality activities of postdischarge surveillance and patient satisfaction surveys would ensure the best use of available resources.

Instrument

The instrument used in this project was adapted from one originally devised by Zoutman et al. (1990). The instrument was chosen for use in the project as this group of researchers was one of the few to fully describe the instrument used to obtain information on postdischarge wound infections. Additionally, following a review of the instrument it was thought to be specific enough, with some adaptation, to obtain meaningful data on postdischarge wound infections. The instrument consisted of questions to obtain information on the time taken to contact and interview the sample, the type of surgical procedure undergone by the sample, information on non-specific and specific indicators of infection experienced by the sample, as well as any treatment patients received for their surgical wound postdischarge. The following section will discuss the usefulness of the information obtained by the instrument.

Patients' Perceptions of Problems with Their Wounds

Patients were asked whether they considered they had experienced any problems with their wound following discharge from hospital and who supplied this information to them. The purpose of this question was to determine whether patients sought advice from a health professional if they considered they were experiencing problems with their wound postdischarge. This question found that a number of patients 23 (8.8%) considered they experienced a problem with their

wound but did not display any signs of infection. This may occur because patients experience problems (such as uncontrolled pain) related to their surgical condition but not infection. The validity of this question, in its present form, to provide useful data is questionable because of its ambiguity.

Non-Specific Indicators of Infection

The collection of data on non-specific signs and symptoms of wound infection has been carried out by a number of researchers (Manian & Meyer, 1993; Zoutman et al., 1990; Roth & Verbridge, 1988). The non-specific indicators of infection examined in these study were redness, swelling, pain and elevated temperature. No previous research has analysed the ability of these factors to identify a wound infection postdischarge. In the present study it was found that non-specific indicators were of limited use in identifying postoperative wound infection. A large number of patients experienced non-specific problems with their wound but did not actually develop a wound infection according to both the ACHS and non ACHS criteria of infection. This may have occurred as these clinical features of redness, swelling and pain are often manifested as part of the normal physiological processes that take place following surgery (Luckmann & Sorensen, 1987, p.77). The study found 51 (20%) patients experienced redness related to their wound but only seven of this group had developed a wound infection. Increased redness is usually noted at the wound site at between 3 - 4 days following surgery or injury and may last for one or more years after surgery (Luckmann & Sorensen, 1987, p.77). In the case of swelling, many surgical procedures produce some degree of swelling, due to the

nature of the surgery (Luckmann & Sorensen, 1987, p.77). The study found 76 (33%) of patients stated they experienced swelling related to their wound following discharge from hospital, while only 10 of these patients experienced a wound infection. Pain is experienced by a great many surgical patients postdischarge depending on the type of surgery they have undergone (Vance & Corrigan, 1983, p16). The study found 51 (20%) patients stated they experienced pain related to their wound postdischarge. Eleven of these patients had experienced a wound infection. The results from this study highlight the difficulty experienced in identifying postdischarge wound infection by the use of criteria that are not specific indicators of infection, but may accompany wound infection.

Specific Indicators of Infection

Elevated temperature.

Elevated temperature is another indicator that has been used in postdischarge surveillance (Manian & Meyer,1993; Zoutman et al.,1990; Roth & Verbridge, 1988) and for this reason was included as a non ACHS indicator of infection in the present study. However, as with other questions used in postdischarge surveillance it has not been assessed regarding its specificity in identifying a wound infection. In the study 11 patients considered they had experienced an elevated temperature related to their wound postdischarge. Of those only five respondents used a thermometer to measure their temperature and only one stated they had experienced a temperature of greater than 37.6^{0}C , (unrelated to any other cause) which was one of the non ACHS criteria

used in this study to define a wound infection. A common response from patients when asked if they measured their temperature was they did not own a thermometer. These results show it is difficult to accurately interpret claims of elevated temperature when over half of respondents did not measure their temperature with a thermometer. Additionally, another difficulty in using elevated temperature as an indicator of wound infection is that patients may experience an elevated temperature unrelated to their surgical wound. The use of an interview, rather than a questionnaire, to carry out postdischarge surveillance, has the advantage of eliciting further information on whether the elevated temperature was related to their surgical wound or due to another illness.

Discharge from wound.

The collection of information relating to the type of discharge experienced by patients appears useful information to include in a questionnaire. The majority of definitions used to identify a surgical infection including the ACHS, include purulent discharge as one of their main criteria (Holmes & Readman,1994; Olson & Lee, 1990; Reimer et al.,1987; Brown et al.,1987). The use of an experienced interviewer allows further information to be obtained regarding the type of discharge experienced by the patient, which may be difficult to identify when a patient completed questionnaire is used. In the study nine (3.6%) of the patients experienced a purulent discharge following hospitalisation. Of these nine patients the majority (6) had received treatment with antimicrobial agents for their wound which would be consistent with the presence of a wound infection.

Medication prescribed and readmission to hospital

During the interview respondents were asked whether any type of medication had been prescribed for their wound postdischarge. This information on its own may not be a useful indicator of infection, as patients may state medications have been prescribed for their wound whereas in reality they may be for another postdischarge complication or an unrelated illness. This was evidenced by the varied replies of respondents regarding the type of medications prescribed for their wounds postdischarge. These replies included being supplied with analgesics and anti-inflammatory agents for their surgical wounds.

A similar pattern of information was evidenced when respondents were asked if they were readmitted to hospital for treatment relating to their wound postdischarge. Two out of five patients returned to hospital for pain relief unrelated to their surgical wound.

Therefore, responses to questions asking whether patients were readmitted to hospital for treatment of their wound, or whether they were prescribed any medications postdischarge, may not be useful indicators of infection. However, the addition of further prompts assists in determining the type of medication prescribed or the cause of the readmission to hospital. These prompts will assist in determining whether medications were prescribed or readmission was related to the patients' surgical wound. This in turn will assist in making the information obtained a more reliable indicator of infection. The prompts could be incorporated into a self

administered questionnaire. Alternatively, the use of an experienced interviewer will also allow for discrepancies in the information supplied by the patients to be clarified at the time of interview.

In summary, the following information is useful in identifying postdischarge wound infections:

1. The type of discharge patients experience from their surgical wound after leaving hospital.
2. The type of medications prescribed for the patients' surgical wound postdischarge, with some further prompts, such as asking respondents for what reason the medication was prescribed.
3. Any further readmission to hospital patients had experienced, with some further prompts,such as the reason for the readmission.

The following information is of little use in identifying a postdischarge wound infection.

1. Any redness, swelling or pain experienced by patients postdischarge.
2. Information regarding whether patients had experienced an elevated temperature postdischarge.

Infection Rates

The second purpose of this study was to compare rates of surgical wound infection before discharge from the study hospital and up to 30 days from surgery.

During the study period 4597 surgical procedures were performed at the study hospital and 1415 were excluded using the same criteria as for postdischarge exclusions. Of this sample of 3182 patients, 26 (0.82%) patients developed hospital acquired surgical wound infections prior to discharge. One limitation of the study was the inability to fully apply the exclusion criteria used in the postdischarge study to the predischarge patients. While inpatient infections are identified on a prospective basis, the denominator (the number of patients undergoing surgery at the hospital) used to calculate infection rates is obtained retrospectively and with the hospital's present data base it was not possible to apply the full set of exclusion criteria to the inpatients. All patients undergoing cardiac catheterisation, dental surgery and patients undergoing surgery that were not expected to have a visible wound were able to be excluded from the study. Patients under the age of 16 years and non-english speaking patients could not be accurately excluded from the predischarge denominator. This was thought to involve less than one percent of patients undergoing elective surgical procedures at the study hospital.

Postdischarge surveillance identified nine (3.6%) infections using a single criterion of purulent discharge (ACHS indicator of infection) and 18 (7.2%) when multiple criteria (non ACHS indicator of infection) as used in previous research (Manian & Meyer, 1990; Roth & Verbridge, 1988; Reimer et al. 1987; Zoutman et al. 1990) was applied. The implications of using single versus multiple criteria to identify infections will be discussed later in this section.

The rate of infection identified by the present study compares favourably

with those identified by other studies. Previous postdischarge surveillance of surgical wound infections has identified rates of infection as low as 0% (Manian & Meyer, 1993) to 6.8% (Hutton et al.,1992).

The comparison of infection rates between groups of patients within a hospital or between hospitals is a complex area for many reasons. Firstly, findings are calculated differently in various studies. In some studies postdischarge rates are expressed as a proportion of the combined inpatient and outpatient rates (Krukowski & Matheson, 1988). In others only samples of the total population were surveyed postdischarge (Rosendorf et al., 1983). In other studies samples of the total population undergoing similar procedures were surveyed (Holmes & Readman, 1994; Ravichandran et al., 1993). Secondly, the duration of hospitalisation of a sample of patients may affect the number of infections detected postdischarge. If carried out, postdischarge surveillance is more likely to detect infections in day or short stay patients, whereas patients that are hospitalised for longer periods are more likely to have infections identified by inpatient surveillance. Unless some form of postdischarge surveillance is undertaken rates of hospital acquired infections will be underestimated. Thirdly, the number of infections detected may vary according to the definition of infection chosen by the researchers. Researchers who have chosen to include non-specific criteria including redness, swelling and pain may report greater numbers of infections than those who use specific criteria. Fourthly, the severity of illness of patients surveyed is not described in any studies. Therefore, the comparison between different patient populations may not be valid.

The postdischarge study used multiple criteria of purulent discharge, or treatment of the surgical wound with antimicrobial agents, or an elevated temperature of 37.6°C or greater, or readmission to hospital for treatment of the surgical wound for infection. These criteria were chosen as previous research had used similar criteria (Manian & Meyer, 1993; Roth & Verbridge, 1988; Reimer et al. 1987; Zoutman et al.1990). These studies identified infection rates as low as 0% (Manian & Meyer, 1993) to 5% (Zoutman et al. 1990). Additionally the criteria were thought to be specific enough to distinguish between infection and other problems unrelated to infection. The criteria used in the inpatient surveillance was that of a purulent discharge, with or without microbiological confirmation. This definition of infection is the one used in the ACHS Clinical Indicator Programme in which the study hospital participates. It was beyond the scope of the present study to carry out predischarge surveillance using different from those normally used.

The postdischarge infection rate of 3.6% when the single criterion of purulent discharge was used, is within the range of other studies that have used a similar criterion to identify infection. These studies' infection rates ranged from 2.2% (Rosendorf et al. 1983) to 4% (Holmes & Readman, 1994).

The infection rate of 7.2% when multiple criteria are used was slightly higher than other studies that have also used multiple criteria. These studies' infection rates have ranged from no infections detected (Manian & Meyer, 1993) to 5% (Zoutman et al., 1990). Both studies used telephone interview to obtain information on postdischarge infection rates. The inability of Manian & Meyer,

(1993) to identify any infections postdischarge may be related to contacting only 39% of the sample. Such a low rate of contact questions the ability of the study to provide valid information. The 5% infection rate detected by the study conducted by Zoutman et al. (1990) may be attributed to day surgery patients being surveyed in the study, compared to a combination of day patients and inpatients in the present study. Although not measured in either study the severity of illness of patients undergoing day surgery would be expected to be less than for patients undergoing inpatient surgery. If this is the case inpatients would be more likely to acquire surgical wound infections than day patients. This area requires further research to confirm this hypothesis.

The 7.2% infection rate when multiple criteria are used is slightly higher than other studies that have employed other methods of postdischarge surveillance. These have ranged from 0.8% (Manian & Meyer, 1990) to 6.8% (Hutton et al., 1992). Although Manian and Meyer (1990) used multiple criteria to define infection in their study, the low infection rate identified may be attributed to the method of surveillance used to obtain information on postdischarge surgical wound infections. The researchers relied solely on information supplied by treating surgeon to calculate infection rates. This method of postdischarge surveillance may not detect all wound infections that occur after discharge from hospital, as some patients do not return to their treating surgeon if they experience problems with their wound postdischarge. This point is supported by the present study. Of the 44 respondents who consulted a medical practitioner the greatest number (24) visited their surgeon, while the remainder (20) consulted with a general practitioner or attended the emergency

department of a hospital (20). This information highlights potential inaccuracies with postdischarge surveillance that relies on information supplied by treating surgeons as discussed by other researchers (Burns & Dippe, 1982; Craig, 1983). General practitioners may treat a wound infection that develops postdischarge and may not provide this information to the surgeon leading to an underestimation of rates if this method of postdischarge surveillance is conducted.

The 6.8% infection rate identified in the study conducted by Hutton et al. (1992) may also be underestimated as again the researcher relied on information supplied by treating surgeon to calculate postdischarge infection rates.

Patient Education

The original purpose of this study did not involve any assessment of education provided to patients prior to discharge from hospital, but as the study progressed issues relating to the adequacy of patient education arose. During the data collection period many patients asked for advice regarding their surgical wound or their condition generally. These questions were dealt with by the interviewer or the patient was advised to seek appropriate assistance. Given the large proportion of patients reporting they experienced non-specific signs and symptoms of infection, it was considered possible that patients may be unaware these clinical features of redness, swelling and pain are often part of the normal physiological process that occurs following surgery. This was supported by the experience during the interview process when patients were asking advice regarding their condition. These issues

question the adequacy of education patients are receiving prior to discharge from hospital. Further research needs to be conducted to determine whether information provided to patients prior to discharge is comprehensive enough to allow them to care for themselves following discharge from hospital.

CHAPTER SEVEN

Conclusion

This chapter discusses the conclusions that have been drawn from the study, the implications for practice and makes recommendations for further research. Additionally the limitations of the study are presented.

Conclusions

The collection of data on the number of hospital acquired surgical wound infections is a key component of any hospital infection control programme. The infection control nurse plays an important role in the collection of this information. To ensure this data is accurate some form of postdischarge surveillance is necessary. Without postdischarge surveillance the true number of hospital acquired infection will be underestimated. As described in the conceptual framework rates of infection are calculated from the information obtained by surveillance. If trends such as an increase in the rates of infection are noted an investigation can be initiated to attempt to determine the cause. Various strategies may be implemented depending on the findings of the investigation to assist in the reduction of hospital acquired surgical wound infections. Thus, surveillance results in better quality care for hospital patients and reduced health care costs.

In this present study, telephone interview as a method of postdischarge surveillance of surgical wounds was feasible with 87% of the study population contacted and 91% of the interviews lasting five minutes or less. However, the economic feasibility of using this method of postdischarge surveillance for all patients undergoing surgical procedures needs to be taken into consideration when postdischarge surveillance is planned.

The present study also questions the necessity of collecting information on non-specific signs and symptoms that may accompany infection such as redness, swelling and pain. These signs and symptoms are also part of the normal physiological processes that occur following surgery and it is unrealistic to expect patients to evaluate whether this is abnormal or normal. The only way to interpret whether such signs and symptoms are abnormal is by direct observation by a health professional and even in some cases this may be incorrect as these signs and symptoms are very subjective. Therefore, the collection of such information when interviews are conducted by telephone appears of little use in determining a postdischarge wound infection.

Additionally, asking patients if they have experienced an elevated temperature following discharge from hospital appears to be of no value when identifying a postdischarge wound infection. Over half of the respondents who stated they had experienced an elevated temperature did not use a thermometer.

The study also confirmed the concerns expressed by other researchers

(Burns & Dippe, 1982; & Craig, 1983) that patients did not necessarily return to their surgeon for treatment when they considered they were experiencing problems with their wound. This information highlights the potential inaccuracies with postdischarge surveillance that relies on information supplied by treating surgeon. General practitioners may treat a wound infection that develops postdischarge and not provide this information to the surgeon, leading to an underestimation of rates of infection if this method of postdischarge surveillance is conducted.

Limitations

A limitation of the study was the inability to determine the length of hospitalisation of patients. Postdischarge surveillance is more likely to detect infections in short stay patients, rather than patients who are hospitalised for longer periods. This information could not be obtained from the study hospital current data base and obtaining this information from patients may not be reliable. In future research this point needs to be documented.

Another limitation of the study was that no validity checks on the information provided by patients were carried out. To provide a validity check on infections detected postdischarge, the patient's treating general practitioner or surgeon could be contacted by the researcher to confirm that the patient sustained a wound infection postdischarge. However, this would only confirm the identified infections and would not address the issue of sensitivity of the instrument supplied by other

respondents, that is the ability to confirm that all those patients' classified as not infected are truly so.

A further limitation of the study was the inability to fully apply the exclusion criteria used in the postdischarge study to the patients in the predischarge surveillance. It was necessary to apply the exclusion criteria used in the postdischarge study to the predischarge patients to allow comparison of infection rates between the two groups to be conducted. The exclusion criteria applied to the postdischarge sample could not be accurately applied to the predischarge patients. Thus, the two groups of patients are not exactly comparable. It was necessary to exclude patients from the postdischarge study for the following reasons. Firstly, children under 16 were excluded from the study for ethical reasons. Secondly, patients who were not expected to have a visible wound were excluded as the instrument was not designed to collect information from these patients. Thirdly, non English speaking patients were excluded, as the instrument could only be administered to this group of patients with the aid of interpreters and this was beyond the scope of the study. Fourthly, patients undergoing cardiac catheterisation were excluded as there had been no previous recorded cases of infection in this group of patients and in order to test the instrument it was essential to maximise the proportion of patients likely to develop infections. The exclusion of patients not expected to have a visible wound and patients undergoing cardiac catheterisation would not affect the calculation of infection rates as these patients were able to be accurately excluded from both the predischarge and postdischarge patients. However, children under the age of 16 years of age and non English speaking patients were not able to be accurately excluded

from the study, but the number of patients in both these categories was thought to be minimal (less than 1%).

A final limitation of the study was the inability to describe the severity of the illness of patients who developed a postdischarge wound infections. Therefore, the comparison between different patient populations may not be valid. The study hospital's present data base could not provide this information and it was beyond the scope of the study to obtain this information manually.

Implications for Nursing Practice

The findings of this present study highlight the need for infection control practitioners to conduct postdischarge surveillance of surgical wounds if accurate information on surgical wound infection rates is to be obtained. The study detected a further nine infections using ACHS criterion of infection, or 18 infections using the non ACHS criteria of infection, that would have gone undetected if only traditional surveillance was carried out.

The use of telephone interview as a method of contacting a sample of patients postdischarge is feasible as a method of contact but may not be economically feasible. In future studies using telephone interview it may be more appropriate to conduct targeted surveillance (Hayley, Gaynes, Aber & Bennett, 1992) rather than carry out surveillance on all patients undergoing surgical procedures. Postdischarge surveillance could be targeted at groups of patients undergoing similar types of

surgery known to have high infection rates from previous research. Alternatively, patients that also have a short length of hospitalisation could also be targeted for postdischarge surveillance, as often very little information is known about infection rates in this group of patients.

Recommendations for Future Research

Future research on postdischarge surveillance using the present instrument, with the suggested modifications should be conducted to validate the effectiveness of the instrument to identify postdischarge wound infections. The following are modifications, that could be made to the instrument:

1. The collection of information on redness, swelling and pain and temperature be deleted from the instrument.
2. The collection of information regarding whether patients perceived they had experienced a problem with their wound postdischarge be deleted.
3. Further prompts could be added to the questions on the type of medication prescribed postdischarge and the reason for readmission to hospital. This would ensure the information obtained related to the patients' surgical wound and not another condition.

Further research also needs to be conducted to compare the feasibility, as well as the validity and reliability of other methods of postdischarge surveillance to that of postdischarge surveillance by telephone interview. The validity testing could

be addressed by having a health professional visit patients to regularly following their discharge from hospital, and up to 30 days after surgery, to assess if a postdischarge wound infection has developed. This information could be compared with the information obtained by other methods such as telephone interview. Such studies will help to identify the most cost effective, sensitive and specific methods of detecting surgical wound infections that occur following discharge from hospital.

Additionally, an area of importance emerging from the study was that of patient education. This study identified issues that questioned the adequacy and quality of patient education prior to discharge. Further research should be conducted to determine whether present methods of postdischarge education are adequate. The issue of the quality of patient education is likely to become more important if the average length of a patient's hospitalisation continues to decrease and more surgical procedures are carried out on a day patient basis.

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APPENDIX A

DEMOGRAPHIC DATA

CODE NO:_____

NAME:_____

AGE AT LAST BIRTHDAY:_____

SEX: MALE:_____ FEMALE:_____

CONTACT TELEPHONE NUMBER:_____

TIME MOST CONVENIENT TO BE CONTACTED DURING MONTH AFTER DISCHARGE: AM/PM

PROPOSED DATE OF SURGERY:_____

MOUNT HOSPITAL

NOSOCOMIAL INFECTION CLINICAL REVIEW

WARD BED

Patient label

PLEASE COMPLETE AS MUCH INFORMATION AS POSSIBLE AND RETURN TO INFECTION CONTROL NURSE AS SOON AS POSSIBLE

SECTION A : SURGICAL WOUND INFECTION (S.W.I.)

Surgery performed _____ Surgeon_____ Anaesthetist _____

Cir. _____ Scrub _____ Asst. _____

Surgery date _____ Operating room _____ Discharge date _____

INFECTION RISK FACTORS :

ASA Score _____ Duration of surgery _____

	YES		YES
Age >60 yrs		Diabetes	
Pre-op stay > 24 hours		PVD	
Obese		Hair removal	
Steroids			

Other underlying medical conditions : _____

_____

Wound classification :

Dirty ☐ Operations in which a perforated viscus or pus is found.

Contaminated ☐ Operations which breach the GI, GU or respiratory tract, or in which there is a break in aseptic technique.

Clean ☐ All other operations in which the above criteria are not met.

Pacing wire : ☐ Pacing coil ☐

ANTIMICROBIAL PROPHYLAXIS _____

ANTIMICROBIAL THERAPY _____

PATHOLOGY : Specimen type _____ Date specimen collected _____

Invading organism _____

Additional information _____

_____

_____

Date infection reported _____ Signature _____

APPENDIX C

TELEPHONE INTERVIEW QUESTIONNAIRE

CODE NO

INFORMATION ON TELEPHONE CONTACT

1. NUMBER OF TELEPHONE ATTEMPTS TAKEN TO CONTACT CLIENT. (circle) 1

2

3

TIME TAKEN FOR EACH PHONE ATTEMPT

1st attempt Number of secs_____

2nd attempt Number of secs_____

3rd attempt Number of secs_____

3. TIME TAKEN TO INTERVIEW CLIENT (use 24 hour clock)

START TIME_____ STOP TIME_____ TOTAL _____

4. REASON FOR UNSUCCESSFUL CONTACT _____

INFORMATION ON SURGICAL WOUNDS

5. WHAT TYPE OF SURGERY DID YOU UNDERGO?

1. GENERAL
2. ORTHOPAEDICS
3. UROLOGY
4. GYNAECOLOGY
5. CARDIOTHORACIC'S
6. ENT

6. DO YOU CONSIDER YOU HAVE HAD ANY PROBLEMS WITH YOUR WOUND? YES 1

NO 2

IF YES, WHO TOLD YOU?

DOCTOR 1

NURSE 2

FRIEND OR RELATIVES 3

SUGGESTED BY YOURSELF 4

OTHER (SPECIFY) _____ 5

7. HAVE YOU NOTICED ANY OF THE FOLLOWING NEAR YOUR WOUND?

Redness YES 1

NO 2

If yes describe

Swelling YES 1

NO 2

If yes describe

Pain YES 1

NO 2

If yes was the pain:

Only when the wound was touched 1

Present at all times 2

8. HAVE YOU NOTICED ANY FLUID DRAINING FROM THE INCISION SITE?

YES 1

NO 2

If yes was it:

Watery 1

Bloodstained 2

Purulent 3

9. HAVE YOU HAD ANY FEVER SINCE DISCHARGE?

YES 1

NO 2

If yes

How long did it last? Less than 1 day 1

1-2 days 2

2-3 days 3

4 days or more 4

Did you measure the temperature with a thermometer?

YES 1

NO 2

If yes was it

Less than equal to 37.5 1

Greater than or equal to 37.6 2

10. HAVE YOU SEEN A DOCTOR ABOUT ANY OF THE SYMPTOMS?

YES 1

NO 2

If not go to section 12

If yes was it a

General Practitioner 1

Your Surgeon 2

A doctor at a hospital emergency department 3

Other (specify _____ 4

11. WERE YOU GIVEN ANY MEDICATION SPECIFICALLY FOR YOUR WOUND? YES 1

NO 2

If yes what was it? _____ 1

Client can't recall 2

Did it help? YES 1

NO 2

12. WERE YOU ADMITTED TO A HOSPITAL FOR PROBLEMS WITH YOUR WOUND? YES 1

NO 2

If yes what hospital was it? _____

What happened on your admission to hospital? Did you have?

Antibiotics 1

Dressings 2

Further Surgery 3

Other (specify) 4

13. If no and you have not seen a doctor, have you done anything about your wound?

APPENDIX E

COVERING LETTER OF INFORMATION FOR POTENTIAL PARTICIPANTS OF POST DISCHARGE WOUND SURVEY

[redacted]

1 April, 1994.

Dear Patient,

I would like to introduce myself. I am a Registered Nurse employed at Mount Hospital, and I am carrying out a study on surgical wounds following discharge as part of a Bachelor of Nursing with Honours Degree at Edith Cowan University.

The purpose of the study is to gain further information about any problems you may have experienced with your wound following discharge from hospital. Information obtained in this study may assist the hospital in providing an improved service in the future.

To carry out this study, I intend contacting a number of patients who have undergone surgery at the hospital by telephone - 30 days after surgery. The interview will last approximately 5-10 minutes.

I would like to gain permission from you to be contacted as part of this study. Participation in this study is entirely voluntary and you may withdraw from the study at any time without any effects on your care now, or in the future at Mount Hospital.

Information obtained will be used in a research report and may be published in scientific journals, but your identity will not be disclosed at any time during the study or in any publication.

I may be contacted on [redacted] (home) or [redacted] (work) to answer any questions in relation to the study.

If you would like to participate in the this study, would you please complete the attached consent form and return it to the Nurses Station on the Ward.

Yours sincerely,

ROBYN TAVERNER

APPENDIX F

POST DISCHARGE WOUND SURVEY

CONSENT FOR PARTICIPATION

This study is being carried out by ROBYN TAVERNER, a student at Edith Cowan University, undertaking a Bachelor of Nursing with Honours Degree. Robyn may be contacted by telephone on [redacted] (work) or [redacted] (home). The School of Nursing at Edith Cowan University may be contacted if any further information is required on 383 8333.

I,_____

FAMILY NAME_____ GIVEN NAME_____

of_____

have read and understood the letter of information for potential participants. I understand consenting to this study involves being contacted by the researcher, by telephone, 30 days following surgery. The interview will last 5-10 minutes.

I know that my participation in this study is strictly voluntary and I have the right to withdraw at any time during the study without any penalty.

I am aware that my identity will not be disclosed, but the information obtained from this study will be used in a research report and may be published.

_____ SIGNATURE OF PARTICIPANT

_____ SIGNATURE OF WITNESS TO PARTICIPANT

INFECTIOUS DISEASES AND MEDICAL MICROBIOLOGY
Queen's University

G.A. EVANS, MD FRCPC
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Kingston General Hospital
76 Stuart Street
Kingston, Ontario
K7L 2V7
Fax 613 548-2513

1993 June 29

Ms. Robyn Taverner
[redacted]

Dear Ms. Taverner:

I am enclosing a copy of the Surveillance Questionnaire which we used for the study on post discharge surveillance in outpatient surgery. It is not a particularly sophisticated questionnaire but was very useful to us. I have no problem with you adopting it or changing it as you see fit for your research needs. We did not perform strict validity or reliability testing of this instrument. In our study the control was the infection rate which would have been detected by inpatient surveillance only.

There is an increasing body of literature looking at post discharge surveillance, and no one has the exact answers as to the optimal methodology.

I offer you my best wishes for your research study. If I can be of any further assistance do not hesitate to contact me.

[redacted]

Dick Zoutman, MD, FRCPC
Chief of Medical Microbiology
and Infection Control

DZ/bg

Enclosure

CC File 2.1
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EDITH COWAN UNIVERSITY
PERTH WESTERN AUSTRALIA
JOONDALUP CAMPUS

FACULTY OF HEALTH AND HUMAN SCIENCES
Office of the Dean

Joondalup Drive, Joondalup
Western Australia 6027
Telephone (09) 405 5579
Facsimile (09) 405 5615

17 November 1993

Student No [redacted]

Ms R Taverner
[redacted]

Dear Robyn

I am pleased to advise that your Research proposal entitled "Post discharge surveillance of surgical wound infection by telephone interview" for the award of Bachelor of Nursing - Honours has been approved, subject to the conditions outlined by reviewers being addressed to the satisfaction of the coordinator.

This approval means that the Faculty Higher Degrees Committee believes that you have developed the proposal to a stage where worthwhile research can be conducted on your topic. It does not guarantee successful examination of your research thesis.

Copies of reviewers' comments on your research proposal have been forwarded to your supervisor. These comments are offered as a guide for further discussion between you and your supervisor. More detailed comments have been made in the margins of the actual proposal which can be picked up from your supervisor.

You may now proceed to conduct the research and prepare your thesis. In doing so, you should be guided by the information contained in the University booklet "Information for Honours, Masters and Doctoral candidates on Research Policies and Procedures".

Your supervisor will be asked to consult with you in recommending examiners for your thesis. It is important that this is done well before you submit the thesis, so that arrangements can be made to have your thesis examined without unnecessary delay. Therefore would you please ensure that this is finalised at least six working weeks before you submit your thesis. Your supervisor has the required proforma on which these details should be provided.

I wish you every success with your research.

Yours sincerely

[redacted]
ASSOC PROFESSOR MICHAEL LEE
Chairperson, Faculty Higher Degrees Committee

cc Supervisor
Student Services
ML:IR:HD13