



Nursing Best Practice Research Unit

Unité de recherche sur les pratiques exemplaires
en soins infirmiers



Chart Audit Tool on Nursing Assessment and Device Selection for Vascular Access and Patient Outcomes

NURSING BEST PRACTICE GUIDELINES

EVALUATION USER GUIDE

November 2006

Disclaimer

The opinions expressed in this publication are those of the authors. Publication does not imply any endorsement of these views by either of the participating partners of the Nursing Best Practice Research Unit, which include members of the University of Ottawa faculty and members of the Registered Nurses' Association of Ontario (RNAO).




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Nursing Best Practice Guidelines Evaluation User Guide

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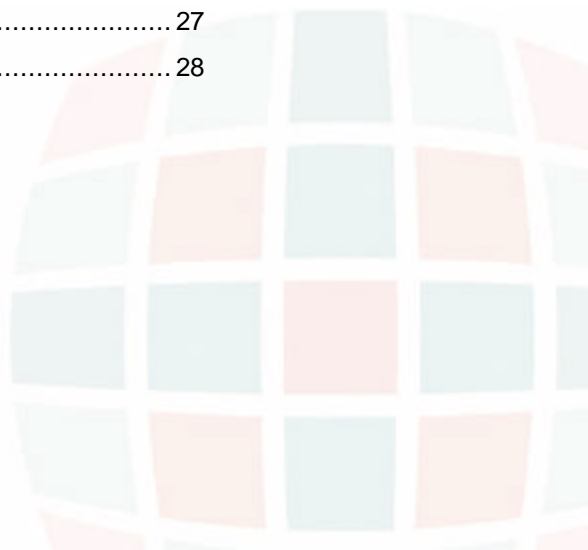
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1 Development of the Chart Audit Tool



Chapter highlights

- › Why evaluation tools for Best Practice Guidelines are necessary
- › Process used for developing the Chart Audit Tool

The Nursing Best Practice Research Unit (NBPRU) was formed in January 2005 as a partnership between the University of Ottawa, School of Nursing and the Registered Nurses' Association of Ontario (RNAO). One of the research unit's objectives is to develop and pilot test tools useful in the evaluation of the implementation of clinical nursing BPGs.

BACKGROUND

Clinical or best practice guidelines (BPGs) summarize the most up-to-date research on various clinical topics. They contain recommendations that are useful in helping healthcare providers practice evidence-informed care and improve patients' health outcomes. The Registered Nurses' Association of Ontario (RNAO), with funding from the Ontario

Ministry of Health and Long-Term Care has developed 30 BPGs to date. Each BPG includes evidence-based practice, education, and organization/policy recommendations. Details about the RNAO Best Practice Guideline Program may be obtained on the RNAO website: www.rnao.org/bestpractices

When BPG recommendations are implemented in a healthcare organization, the evaluation of its impact needs to be linked with changes in nursing practice and improvements in patient outcomes. The measures used to evaluate the BPG implementation need to be valid and reliable so that conclusions about the relationships between the implementation and the outcomes can be established. The evaluation measures also need to be feasible, acceptable, and meaningful to healthcare providers and patients/ clients. Sound measures are crucial for effective decision-making on the implementation and evaluation of evidence-informed care.

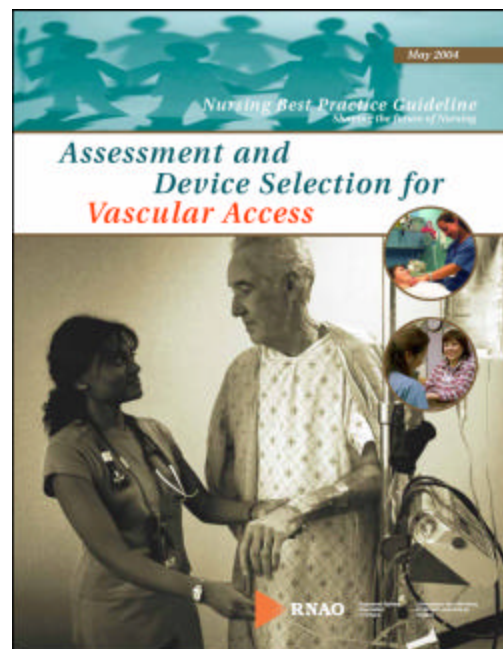
The Nursing Best Practice Research Unit (NBPRU) was formed in January 2005 as a partnership between the University of Ottawa, School of Nursing and the Registered Nurses' Association of Ontario (RNAO). One of the research unit's objectives is to develop and pilot test tools useful in the evaluation of the implementation of clinical nursing BPGs. At a symposium held in the spring of 2005, a team of leading researchers, administrators, government funders, and policy researchers identified a gap in the availability of tools for measuring the outcomes of guideline implementation. Hence, the NBPRU has developed evaluation tools to accompany various BPGs. The psychometric properties of these evaluation tools were examined in several studies.

This user guide describes the development and psychometric properties of a chart audit tool that was developed by the NBPRU for the evaluation of nursing practice in relation to the assessment of a patient's need for vascular access devices, and the selection of appropriate devices as outlined in the RNAO Best Practice Guideline (BPG) *Assessment and Device*

Selection for Vascular Access (McConnell, Nelson, Virani, 2003; RNAO, 2004). It is intended for users who have experience and/or graduate training in basic research and evaluation.

THE RNAO BPG ON ASSESSMENT AND DEVICE SELECTION FOR VASCULAR ACCESS

The RNAO (2004) BPG *Assessment and Device Selection for Vascular Access* incorporates best practices related to client assessment and appropriate device selection associated with infusion therapy (Canadian Intravenous Nurses Association, 1999; ICN, 2000; Center for Disease Control and Prevention, 2002; EPIC, 2001; Health Canada Population and Public Health Branch, 1997; Joanna Briggs Institute, 1999; National Kidney Foundation, 2001). Specifically, the BPG emphasizes the need for a comprehensive client assessment prior to the initiation of infusion therapy. The BPG recommendations show that nurses have a role in advocating for appropriate vascular access devices.



Many factors need to be considered when making decisions related to the selection and insertion of various vascular access devices, including: the client's health history (including vascular integrity), prescribed therapy and expected duration of therapy, device availability, and client preferences (Barton, Danek, Johns & Coons, 1998; Bowen, 2001; Maki & Ringer, 1991).

Key patient outcomes associated with the implementation of this guideline include decreases in readmission rates and infection rates due to vascular access device complications such as phlebitis and infiltration.

RESEARCH DESIGN

The development of the evaluation measure for the BPG on vascular access device selection followed a collaborative process involving representatives from the guideline development panel, implementation sites, and the guideline evaluation team. This collaborative team identified priority recommendations of the BPG, selected an area for developing an evaluation measure, and reviewed relevant tools identified

during a literature review. We called this team the VAD "DREAM" Team (**D**eveloping, **R**eviewing, **E**valuating and **A**nalyzing **M**easures).

We found two tools that were the most relevant to the patient outcomes related to our prioritized recommendations of the BPG: a tool developed by Palefski and Stoddart (2001) and a draft data collection sheet from one of the participating sites. Through discussions and reviews with content experts, we developed a chart audit tool for pilot-testing.

The chart audit tool was pilot-tested in two healthcare organizations located in Ontario from July to December 2004. The sites included a 300-bed community hospital, providing primary and specialized care, and a home healthcare agency, providing home healthcare nursing, corporate health, and personal/home support services. A more detailed description of the sample and procedures is presented in Higuchi et al. (in press).

2

Administration, Scoring and Interpretation



Chapter highlights

This chapter provides information on:

- › The 3 sections of the Chart Audit Tool
- › How to administer, score and interpret the Chart Audit Tool

The Appendix provides more detailed resources for administering, scoring and interpreting.

DESCRIPTION OF THE CHART AUDIT TOOL

The current user guide presents the Chart Audit Tool on Nursing Assessment and Device Selection for Vascular Access and Patient Outcomes. A retrospective chart audit tool was perceived as the most efficacious manner in which to assess nursing care and patient/client outcomes on the assessment and selection of appropriate vascular access devices as well as potential complications related to intravenous therapy.

Chart audits extract important information on nursing care documented in patient health records. For infusion therapy this information could include: type of device inserted, duration of therapy, and patient venous status (Redfern &

Christian 2003). As well, chart audits are convenient methods to determine current practice prior to the introduction of substantial changes from new practice guidelines.

The current chart audit tool can be used by nurses who are providing care related to infusion therapy and wish to use the tool as a reference or guide for what they should be documenting. This chart audit tool can be adapted for use by managers within various healthcare organizations interested in using the tool in quality improvement programs, where the benefits of educational programs on infusion therapy in general, and intravenous devices specifically, need to be measured. The tool can also be used to see if there are changes after the

implementation of recommendations in the BPG. Graduate students and others may also wish to adapt the chart audit tool for their own infusion therapy and/or vascular access device research.

The chart audit tool (see **Appendix A**) assesses nursing care and patient/client outcomes on complications related to intravenous therapy. The tool is divided into three parts corresponding primarily to the order of occurrence of events, and includes: 1) Patient Profile; 2) evidence of IV Therapy Guidelines utilization, and 3) Patient Outcomes. The factors listed in the first and second sections were based on iterative discussions of the extant literature and specific factors mentioned in the BPG. In the third section, VAD insertion characteristics and the list of complications were adapted from a draft data collection sheet from one of the implementation sites and the patient complications sheet developed by Palefski and Stoddart (2001).

Patient Profile: In this first section, information on the patient's age, gender, diagnosis, nature of therapy, and the type of agent (infusate) are included. In addition, factors predisposing patients to complications are also noted.

Evidence of IV Therapy Guidelines

Utilization: The second section includes documentation of intravenous therapy nursing care related to: 1) assessment, 2) judgement, 3) action plan, 4) communication of plan, and 5) ongoing monitoring. These areas parallel the nursing care subsections outlined in the BPG. In each of these areas, the chart auditor indicates, on a three-point rating scale, if there is Strong, Partial, or No Evidence, that the nurse had documented the specific requirements for each area.

For the assessment category, documentation requirements include assessing patient health problems; previous IV problems; the purpose, nature and duration of the infusion therapy; and patient needs or preferences. The evaluation team, as well as the expert panel, believed that since the implementation of BPGs can take considerable time, there may not be comprehensive documentation including all criteria in the early stages of BPG implementation. To provide support to nurses and organizations for continued BPG implementation, it was felt that acknowledging even partial aspects of documentation of an assessment would be encouraging.

Patient Outcomes: The third section lists characteristics of the VAD insertion (e.g., type of catheter, catheter size, number of lumens, number of attempts; date and reason for removal) and characteristics of VAD associated complications (e.g., phlebitis, infiltration, cellulitis). This section also contains items addressing the actions taken to respond to identified complications (i.e., hot compress, thrombolytic agent, line required, line replaced, no action taken, no action required/will monitor, other) and outcomes related to these actions.

ADMINISTRATION

The retrospective chart audit tool is usually completed after the patient has completed therapy or has been discharged. A patient chart is obtained from medical records and the information is then extracted and documented on the chart audit tool in the appropriate locations. For example, in the first section, the data abstractor would document through chart extraction, the patient's gender, age, primary diagnosis etc.

The chart audit tool can be used before and after the BPG recommendations on the assessment and selection of vascular access devices are implemented. Currently, there is no data in the literature indicating how much time should elapse between completion of therapy or patient discharge and completion of a medical chart review. Some chart audits are completed immediately following a procedure (Dalton et al., 2001), while others are completed at six months (Cassidy, 1999) or even, several years after the patient has been seen.

In the recent validation study by Higuchi et al. (2006), the first two sections were completed during or immediately after the initiation of infusion therapy (so that the observation tool could be completed to test for concurrent validity), while the third section on patient complications was completed, approximately two weeks after the initiation of infusion therapy. All chart audits were done prior to any implementation of the BPG.

Given our results on the lack of information on patient outcomes two weeks after the infusion therapy, it may be prudent to conduct the chart audits at least one month after the patient is discharged. It is also recommended to monitor improvements over time, to see at what point documentation and/or nursing practice significantly improve. Policy and procedures adopted by medical records departments, however, may limit chart access availability post patient discharge.

SCORING AND INTERPRETATION

Frequencies for all items in the chart audit tool are calculated. Appendix D shows some sample scoring to obtain data on the items in the chart audit tool. The items in the second section which are most pertinent to the evaluation of the BPG implementation are scored as 0 (No evidence), 1 (Partial evidence) or 2 (Strong evidence). The higher ratings indicate increased documentation that the BPG recommendations on the assessment and selection of vascular access devices are being applied.

Each of the five items in the second section yields a score between 0 and 2. At the time of tool development, we did not analyze total scores. If there are few cases with partial or strong evidence, these categories can be collapsed into one category (any evidence), similar to what was done in Higuchi et al. (in press).

The relationship of the scores obtained in the second section with items in the first and third sections (Patient Profile, and Patient Outcomes) can be calculated if there are a sufficient number of cases. In general, the scores in the second section will be the dependent variable, and the other items are the independent variables. A statistician or a statistics reference book can provide further guidance on issues of power and sampling, and appropriate statistics to use.

3

Overview of Psychometric Properties of the Chart Audit Tool

Chapter highlights

Psychometric properties of the Chart Audit Tool:

- > Content validity
- > Concurrent validity
- > Feasibility
- > Acceptability
- > Inter-rater Reliability

In this section, we provide a summary of the psychometric properties of the chart audit tool. More detailed technical information is provided in Higuchi, Edwards, Danseco, Davis & McConnell (in press) on the chart audit tool’s feasibility, acceptability and the concordance between the chart audit and observation tools. Higuchi et al. also report on the descriptive statistics for each section per site and overall.

Table 1 summarizes the psychometric properties of the chart audit tool that were assessed, as reported in Higuchi et al. (2006) and the procedures used to evaluate them.

Table 1. Statistical Procedures Used to Evaluate Psychometric Properties of the Chart Audit Tool.

Psychometric Property	Statistical Procedure Used
Feasibility	<ul style="list-style-type: none"> • Documented the time to retrieve the charts and time to collect information from the chart audits. • T-tests utilized to determine if the time to retrieve the charts and collect the data were different across the two sites.
Acceptability	<ul style="list-style-type: none"> • Examined refusal rates and the percentage of missing data for each item.
Inter-rater Reliability	<ul style="list-style-type: none"> • Calculated the percentage of agreement, due to the small number of charts available
Concurrent Validity	<ul style="list-style-type: none"> • Examined the concordance or agreement between the chart audit and the observation using the phi coefficient

Content Validity (*whether a measure's scales or dimensions captures constructs in a comprehensive manner*) was evaluated through expert clinician reviews, as the chart audit tool was developed. The review focused on the comprehensiveness of the items, as well as the inclusion of items that were part of the guideline recommendations and consistent with current evidence. The chart audit tool was deemed by expert review to have acceptable content validity.

Concurrent validity (*whether a measure produces similar responses when compared to responses obtained by applying alternative, equivalent measurements at the same time*) of the chart audit tool was evaluated by assessing the relations between responses in the chart audit tool and the responses obtained through an observation specifically designed for this purpose.

An observation tool was developed, which is an exact duplicate of the Nursing Assessment section of the chart audit tool. Observers obtained evidence of nursing behavior (e.g., assessment and selection of appropriate device; discussion of nursing judgment; discussion of patient action plan; and communication of action plan to multidisciplinary team) during their observation of nurse's discussions and interactions with patients at the initiation of IV therapy.

Higuchi et al. (2006) reported a low association between the ratings in the chart audit and the observation data. For example, most nurses were observed to assess patient needs and infusion therapy needs. The chart audit of the same episode, however, did not provide this evidence. In other words, a review of the patient health record did not have documentation in the chart

that the nurse had provided an assessment of patient health and IV therapy needs. Results for other items such as on the action plan and communication of plan to a multidisciplinary team are similar.

Feasibility (*whether a measure can actually be used in a particular setting given the resources, demands of testing and complexity of administration*) was evaluated by looking at the reasons for exclusion from the study, documenting the time to collect the information from the chart audit, and the resources required to collect the data.

The data collection period took place between July and December 2004. Overall, 93 patients/clients consented to the medical chart review; generating a 95% response rate. Higuchi et al. (2006) noted that charts were generally obtained about two days after requests from the health records office. Charts were obtained faster from the community hospital compared with the home care agency where charts were often in patients' homes and/or various area offices.

With regards to data abstraction using the chart audit tool, charts were reviewed faster in the community hospital than the home care agency. This may be due to the shorter duration of intravenous therapy for participants from the hospital. That is, chart reviews for 8 hours or more of infusion therapy may require less time for data extraction compared to chart reviews conducted for a minimum of 72 hours of infusion therapy.

Acceptability (*whether a measure and its items are acceptable to end-users*) was evaluated by examining missing data for individual items. Missing data points were reviewed for all items in the chart audit tool on a total of 71 charts (46

charts from the hospital and 25 charts from the home care agency). Higuchi et al. (2006) found that only two items in the first section of the chart audit tool (i.e., Patient Profile) had missing data, the Judgment item in the second section (Evidence of IV Therapy Guidelines), and almost all items in the third section (Patient Outcomes).

Chart auditors commented in the data abstraction sheets that there was a lack of documentation in the health record. Only the following items in the third section had acceptable data (less than 10% missing data): the insertion date; who inserted the VAD; whether the VAD device was a central IV or a peripheral IV; and the reason for VAD removal.

Inter-Rater Reliability (*whether a measure will produce similar responses when two or more assessors use the tool at the same time*) was assessed by examining the agreement between two raters in site A. Each rater separately assessed the same five charts.

In general, agreement between the two raters on items in the first (i.e., patient profile) and second sections (i.e., nursing assessment) was high (80% to 100%). Agreement on the third section (i.e., VAD complications), however, was not calculated as the raters themselves were unable to complete this section due to a lack of documentation in the medical records reviewed. Results on the reliability of the chart audit tool are inconclusive at this time due to the small sample.

4

Summary

The BPG on the assessment and device selection for vascular access (RNAO, 2004) focuses on the need for nurses to assess the appropriateness of the devices and to develop a vascular access plan. The current user guide presented a chart audit tool on nursing assessment and patient outcomes related to the assessment and selection of vascular access devices. The psychometric properties of this tool, including the feasibility, acceptability, validity, and reliability were briefly described. More detailed technical information on the tool and the study are reported in Higuchi et al. (in press).

The chart audit tool appears to be a relatively acceptable and feasible tool to use in order to extract information regarding patient demographics, including primary diagnosis, and the nature of IV therapy prescribed. The tool's acceptability and feasibility is limited when information regarding patient outcomes and complications are sought. The tool's inter-rater reliability and concurrent validity are also inconclusive at this time.

The current chart audit tool can be used to obtain data on patient demographics and some aspects of a patient's course of IV therapy. It may tend to underestimate actual nursing practice related to infusion therapy due to low practices in documenting nursing care. The chart audit tool can also be integrated within quality improvement measures as a tracking tool for measuring changes in documentation as BPG implementation continues. Auditing charts is a data collection tool useful in extracting information with minimal risk to patients, and therefore it is one of the most commonly used methods for data collection within the health sciences.

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Appendix

LIST OF APPENDICES

APPENDIX A	Chart Audit Tool on Nursing Assessment and Device Selection for Vascular Access and Patient Outcomes
APPENDIX B	How to Collect Data in Healthcare Settings
APPENDIX C	SPSS Data Entry Guidelines
APPENDIX D	Sample Variable Lists and Programs for the Chart Audit Tool
APPENDIX E	Resource
APPENDIX F	Quick Reference Guide

APPENDIX A: CHART AUDIT TOOL ON NURSING ASSESSMENT AND DEVICE SELECTION FOR VASCULAR ACCESS AND PATIENT OUTCOMES

Agency/ Site #:	
Date Data Collected:	(dd/mm/yy):
Chart Abstractor's Initials:	

Part I. Patient Profile

1. Patient ID # _____
2. Age _____
3. Gender Male Female
4. Primary Diagnosis _____
5. Factors Predisposing Patient to Complications (Check all that apply):
 - a. Immunosuppressed
 - b. Circulatory Impairment
 - c. Diabetes
 - d. Obesity
 - e. Previous history of VAD complication. Describe: _____
 - f. Other documented. Describe: _____
6. Nature of Therapy:
 - a. Antibiotics
 - b. Chemotherapy
 - c. TPN
 - d. Other
7. Name of agent _____
8. Check if agent is one of the following:
 - a. vesicant
 - b. irritant
 - c. pH < 5 or > 9
 - d. Osmolarity > 500 mOsm/L
9. Expected duration of therapy (in days) _____

Part II. Evidence of IV Therapy Guidelines

Please indicate by a “check” in the the level of evidence documented in the chart and the types of items documented

	<i>Strong Evidence</i>	<i>Partial/Limited Evidence</i>	<i>No evidence</i>
A. Assessment	<input type="checkbox"/> 1. Thorough, systematic assessment that includes consideration of: <input type="checkbox"/> 1a. Patient health problems <input type="checkbox"/> 1b. Previous IV problems <input type="checkbox"/> 1c. Purpose, nature & duration of IV therapy <input type="checkbox"/> 1d. Patient needs/preferences	<input type="checkbox"/> 2. Evidence of assessment but addresses only these aspects: <input type="checkbox"/> 2a. Patient health problems <input type="checkbox"/> 2b. Previous IV problems <input type="checkbox"/> 2c. Purpose, nature & duration of IV therapy <input type="checkbox"/> 2d. Patient needs/preferences	<input type="checkbox"/> 3. No documentation of assessment of these items.
B. Judgment	<input type="checkbox"/> 1. Nursing judgment or recommendation discussed.	<input type="checkbox"/> 2. No specific nursing judgment or recommendation discussed.	<input type="checkbox"/> 3. No evidence of nursing judgment or recommendation.
C. Action Plan	<input type="checkbox"/> 1. Thorough information of planned action including: <input type="checkbox"/> 1a. Discussion of recommendation and planned action with patient & family <input type="checkbox"/> 1b. Discussion of multi-disciplinary plan.	<input type="checkbox"/> 2. Incomplete information or partial evidence of planned action: <input type="checkbox"/> 2a. Limited discussion of plan with patient & family. <input type="checkbox"/> 2b. Limited discussion of multi-disciplinary plan.	<input type="checkbox"/> 3. No action plan or evidence of discussion with patient and/or family.
D. Communication of Plan	<input type="checkbox"/> 1. Clear evidence of communication of decision to healthcare team	<input type="checkbox"/> 2. Evidence of communication of decision ambiguous.	<input type="checkbox"/> 3. No evidence of communication of decision.
E. Ongoing Monitoring	<input type="checkbox"/> 1. Evidence of consistent monitoring during each drug administration or nursing intervention.	<input type="checkbox"/> 2. Inconsistent evidence of monitoring during each drug administration or nursing intervention.	<input type="checkbox"/> 3. No evidence of monitoring.

Part III. Patient Outcomes

A. VAD Insertion ¹ :	No documentation
1. Insertion Date:	<input type="checkbox"/>
2. Inserted by: <input type="checkbox"/> RN <input type="checkbox"/> MD	<input type="checkbox"/>
3. Number of attempts:	<input type="checkbox"/>
4. Type: <input type="checkbox"/> Peripheral <input type="checkbox"/> Central (specify): <input type="checkbox"/> Implanted Port <input type="checkbox"/> PICC <input type="checkbox"/> Percutaneous <input type="checkbox"/> Tunneled Catheter	<input type="checkbox"/>
5. Catheter Size:	<input type="checkbox"/>
6. Number of Lumens:	<input type="checkbox"/>
7. Difficulties Encountered (describe):	<input type="checkbox"/>
8. <input type="checkbox"/> X-ray verification of catheter tip location	<input type="checkbox"/>
9. <input type="checkbox"/> Verification for brisk blood flow when withdrawing	<input type="checkbox"/>
B. Nature of Therapy (continued): Actual duration of therapy (in days):	<input type="checkbox"/>

C. VAD Complications²

1. Complication	✓	2. Date discovered	3. Action Taken to Address Complication*	4. Outcome
a. Infiltration	<input type="checkbox"/>			
b. Phlebitis	<input type="checkbox"/>			
c. Infection at entry site/ Local Infection	<input type="checkbox"/>			
d. Cellulitis	<input type="checkbox"/>			
e. Sepsis (confirmed via blood cultures)	<input type="checkbox"/>			
f. Thrombosis	<input type="checkbox"/>			
g. Occlusion of Line	<input type="checkbox"/>			
h. Line damage	<input type="checkbox"/>			
i. Pain (in access extremity or during infusion)	<input type="checkbox"/>			
j. Other (describe)	<input type="checkbox"/>			
k. None documented	<input type="checkbox"/>			

*Examples of action taken: 1=hot compresses, 2=tPA (clot buster), 3=line repaired, 4=line replaced, 5=no action taken, 6=no action required/will monitor, 7=other (describe)

D. Conclusion of VAD Therapy:

1. Date of Removal _____ None documented

2. Reason for removal:

- a. Therapy completed
- b. Patient request
- c. Due to above noted complication(s)
- d. Unintended/unplanned removal
- e. Other (describe) _____
- f. None documented

1 ADAPTED FROM THE VON DATA COLLECTION SHEET, AND THE FIGURE 1 DATA COLLECTION FORM OF PALEFSKI, S. & STODDARD, G. (MARCH-APRIL 2001). THE INFUSION NURSE AND PATIENT COMPLICATION RATES OF PERIPHERAL-SHORT CATHETERS. A PROSPECTIVE EVALUATION. JOURNAL OF INTRAVENOUS NURSING, PP. 113-12.

APPENDIX B: HOW TO COLLECT DATA IN HEALTHCARE SETTINGS

This document is intended to generally outline for the novice researcher (nurses, allied health care workers, managers of quality improvement programs, and others) the specific steps on how to obtain research information or data within a healthcare setting. A sample flow chart of the research process is provided. This document focuses on conducting research in the context of a hospital setting. The clinical context of a particular research setting needs to be considered when determining whether these procedures need to be adapted.

Before conducting any research, you will need to seek approval for your study from the appropriate research ethics board(s) (REB), such as at the healthcare facilities where you plan to conduct the research and/or your educational institution (if you are a student or instructor). Data collected for quality improvement purposes within a facility may not need ethical approval; however, this should be checked with your facility's research ethics board. The following steps address the most common ethical issues. Your research ethics board may have additional ethical concerns.

Step 1: Communication of the Study Approach to the Research Assistant

When conducting research at a healthcare centre, you will likely have to rely on a Research Assistant (RA) who can be based at the site, hired part-time, or a student with placement at the site. The RA can help with the particular facility REB application and process requirements, recruitment of participants and data collection. The RA must be properly informed and trained on the study protocol to ensure he/she follows approved ethics procedures that protect participants' rights, privacy and confidentiality. The RA will be your key contact at the healthcare setting and will alert staff about the research study to assist with the recruitment of participants and collection of data.

The healthcare organization that has agreed to participate in your research usually selects the RA who will be working with you based on direction from you on the skills and credentials required to conduct the research. Participating research personnel should be regular employees of the healthcare centre with access to potential participants on a daily basis, but not providing direct patient care.

It is recommended that the research personnel do not have direct supervision or influence over potential participants (either patients or staff). This provision is a requirement for conducting ethical research. The ethical concern is that if patients are approached by their attending care personnel or if staff are approached by a direct supervisor, they may feel that they have to participate in the research out of fear that not participating might affect their care or employment. This is referred to as coercion. The potential for coercion is minimized and/or eliminated if research staff are not directly involved in the patient's care and/or are not in a direct supervisory role or position of influence over potential staff participants.

The following should be provided to the RA to ensure that the study's purpose, procedures, and his/her role are understood:

- Research study information (e.g., what is being studied; how participants are to be recruited; the RA role during the recruitment and data collection phases; how participant informed consent will be obtained; how and what data will be collected; the estimated time it will take for recruitment, data collection and study completion).
- Patient eligibility criteria (see Step 2).
- How the RA is to communicate study information to all nursing staff on participating units and/or to appropriate staff throughout the organization.
- Study materials to be distributed to patients and/or staff (flyers, information and consent form). Ensure the RA leaves extra copies at the nursing station.

Step 2: Recruitment and Assessing for Participant Eligibility

Eligibility criteria will depend on the research questions you are undertaking. For example, if you are doing a study on adults requiring infusion therapy, then the following may be your patient eligibility criteria:

- Adult (18 years or older)
- Scheduled to receive IV therapy for a duration of > 72 hours
- Competent and able to give consent

Unit staff should be informed of the study and eligibility criteria so they can provide study information to potential participants and notify the RA of eligible, interested participants. You will need to check with your research ethics board or quality improvement officer about proper procedures in recruiting participants for your study, considering current privacy legislation.

One alternative that has been used by the evaluation team of the University of Ottawa is to approach potential participants to explain the study in more detail after unit staff has obtained “permission to call/contact” from an interested participant (see Step 3 below). Depending on study procedures, the RA may collaborate with the Unit/Ward Clerk to secure a list of potential patient participants.

Unit/Ward clerks typically have access to patient information on the unit because they are responsible for the logistics of the unit (patient admission to the unit, room placement, movement of patients from unit to appointment and vice versa, etc.). A recruitment approach involving the Unit/Ward Clerk may be more appropriate and/or useful when trying to do a “sweep” across a unit or organization involving the recruitment of all (or large numbers of) patients over a short period of time.

If a participant is eligible and if you need to use a permission to call/ contact, go to Step 3. Otherwise, proceed to Step 4.

Step 3: Providing Eligible Potential Participants with Study Information (Flyer, Information Sheet & Consent Form) and Obtaining Permission to Call/Contact– Unit Staff and RA

Prior to the RA discussing the study in more detail with an eligible participant, potential participants are approached by unit staff first, who will briefly describe the study and/or hand out flyers and ascertain whether an eligible participant is interested in learning more about the study. If eligible potential participants indicate an interest, then the unit staff will obtain “permission to call/contact” for the RA to further explain the study. The participant signs the ***Request for Permission to Call/Contact*** form.

When permission to call is obtained, unit staff will notify the RA and leave the completed **Permission to Call/Contact** form at the nursing station or in the appropriate, designated place. In a home care setting, this may involve faxing the completed “permission to call/contact” form to the RA.

Step 4: RA Meeting with Potential Participant to Provide Detailed Explanation of Study and Seek Informed Consent

When you have identified a potential participant for your study, you will need to meet with him or her to discuss and ascertain the following:

- Verify that the potential participant meets eligibility criteria.
- If the potential participant is identified as not eligible, explain this to him/her, thank him/her for his/her time and interest, and end the meeting. Ensure reasons why the potential participant was ineligible get recorded on the Master Sheet (Step 5). This is important information for the study investigators and should be tracked.
- If the potential participant is eligible, explain the study and review materials. Ensure the potential participant has had time to read through the materials.
- Ask potential participant if he/she has any questions and answer them.
- Request signed consent for all parts of the study. Ideally, you would like consent for all study tasks. However, ethically the potential participant does not have to consent to all tasks within a research protocol.
- Have both the participant and the RA sign both copies of the Information Sheet & Consent Form. Leave one copy with the participant.

If the potential participant is not eligible or refuses consent, no further contact should be made with the potential participant. Refusal to participate is also important information to track for study investigators. Ensure this gets recorded on a Master Sheet (see Step 5).

Step 5: Recording Participant Information on the Master Sheet

A Master Sheet allows the RA to track recruitment and data collection. Add pertinent participant information to the Master Sheet for all participants approached (whether identified as eligible or not, and whether consented or not). The following should also be recorded on the Master Sheet:

- Assigned ID Code to participant. ***This assigned ID code will be recorded on all data collection forms.*** None of the data collected should have the participant’s name on it. For tracking purposes, only the Master Sheet should link the assigned ID code to the participant. The Master Sheet may

include the patient’s hospital chart number or patient ID number (assigned by the hospital at intake), depending on whether the data collection will involve a chart audit/review and retrieval of the patient’s health record at a later date from medical records. All data collection forms should be tracked using the assigned ID code.

- An example of a unique assigned ID code (that you have created for the study and assigned to the participant) can be made up in the following manner:

XXX	X-XX	X to XXX
Organization	Unit	Patient recruitment number

- The assigned ID code can consist of letters or numbers, and fewer than three digits can be used. For example,
 - The Organization code could be 100
 - The Unit code could be A
 - The participant recruitment number can start at one and increase incrementally by one in consecutive order e.g. (1 would be assigned to the first participant recruited, and 129 to the 129th participant recruited). The unique assigned ID code would look like this: **100A129**
 - Some research projects need to have several sessions with the same participant. Despite the fact that they may participate in more than one session, only ONE unique ID code is assigned to the participant.
- Store the signed participant consent in a locked cabinet in designated area.
- Always store the Master Sheet in a separate locked cabinet. The Master Sheet should never be stored with the data collection forms.
- Once all data collection is completed, the RA will forward the completed data collection forms to the researcher. The Master Sheet should be stored for one year after study completion, after which point it should be destroyed by the RA following established procedures at the healthcare organization.
- The researcher will require the RA to summarize recruitment and data collection information from the Master Sheet (e.g. number of interested participants approached by the RA who were eligible versus not eligible; number who consented versus did not consent; number for whom data collection was not completed and possible reasons why; etc).

Step 6: Collecting Chart Audit/Review Data on Consenting Participants

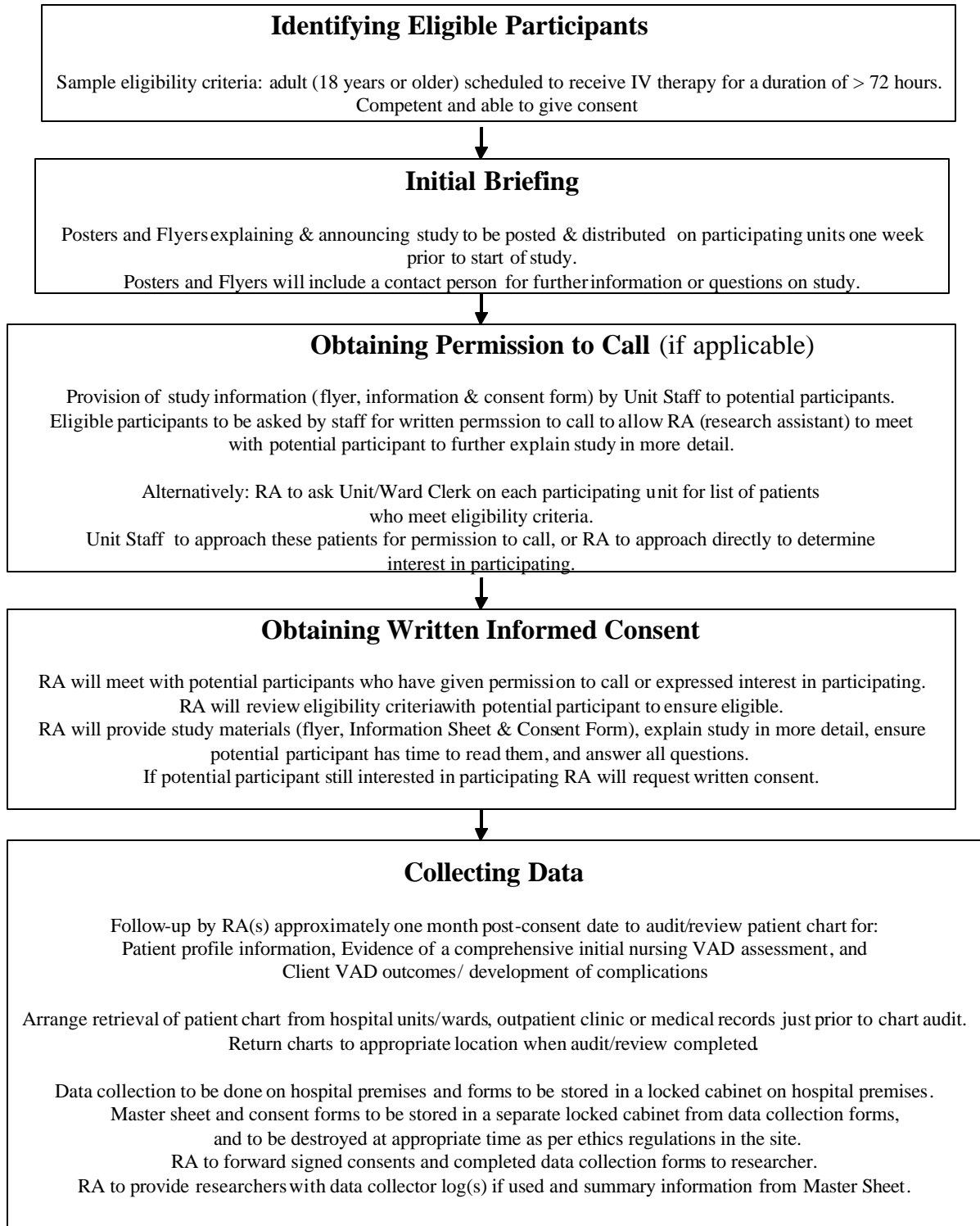
To ensure that information required on a patient’s condition has been recorded in the patient’s health record, it is recommended that charts be audited/ reviewed approximately one month after recruitment to the study. This time frame may, of course, vary depending on the nature of your study and the type of information sought.

- Determine who and how many research assistants will be conducting the chart audit/review. If there will be more than one research assistant, training on auditing/reviewing the chart will be required to

make sure there is agreement between the different raters (i.e. training will help ensure that the research assistants audit/review patient health records in a consistent manner). This is referred to as inter-rater reliability.

- Have the research assistant(s) practice doing the chart audit/review on five charts. This pilot-test will help identify any problems in the procedures or information that may be unique to your setting, and can help clarify questions they might have on what to look for and where to look for it.
- Retrieve patient health records from the appropriate location within the organization. Be prepared to show written patient consent for the audit/review.
- Review each patient health record, being sure to complete all sections of the ***Chart Audit/Review data collection tool***. Ensure the Assigned Patient ID Code is recorded on all pages of the data collection tool. This will ensure that if the pages should get separated, you will still have the data needed for data entry and analysis.
- When the chart audit/review is completed, promptly return the patient health records to the appropriate location within the organization.
- Update the Master Sheet to reflect that chart audit/review is completed.
- Ensure that you record on the ***Chart Audit/Review data collection tool*** the start and finish times for the audit/review. It will also be important to track for the researchers on the Master Sheet the time to obtain each health record once it was requested and the amount of time that elapsed between obtaining patient consent and actually conducting the chart audit/review.
- Other important comments for the research assistants to record, either on the Master Sheet or in a separate data collector log are problems, questions, or difficulties encountered, such as why they may not have been able to complete a chart audit/review, or if information was missing from the health record.
- It is important that the research assistants record in the ***Chart Audit/Review data collection tool*** when data is missing from the health record. Missing data can be problematic for researchers, and it is important for them to understand the reasons why data is missing. For example, it is important to distinguish between data that is not recorded in the data collection tool because it was missing from the patient health record versus the research assistant not completing the audit/review or forgetting to record information for an item.
- Store the completed ***Chart Audit/Review data collection tool***, and data collection log if used, in a locked cabinet in a designated area.

Flow Chart of Research Process: Chart Audit/Review



APPENDIX C: SPSS DATA ENTRY GUIDELINES

This document provides a general guideline for data entry. The recommendations are made assuming SPSS as data entry spreadsheet/software. The methodology explained below considers various types of variables;

1. Defining variables:

- a. Keep the question number as variable name (e.g., 1 as q1, 1.1 as q1.1, 1.1a as q1.1a etc.
- b. Clarify details of the name under "label" for ex. q1 labeled as "marital status".

2. Universal/Generic Code: missing=999 for all the variables.

3. Scale/Continuous data:

- a. SPSS by default keep 2 decimal places for the values of numeric variable viz. 1 as 1.00. Keep the default while entering data. Thus, 1="very dissatisfied" will appear as 1.00, 2="dissatisfied" as 2.00, 3="satisfied" as 3.00, and 4="very satisfied" as 4.00, etc.
- b. Missing=999.

4. Categorical/Nominal data:

- a. The example might be gender, education, yes/no etc.
- b. Follow the same code sequence as given in the questionnaire.
- c. Guideline for open ended question:
 - i) Gender: male=1, female=2, missing=999
 - ii) Yes/No: yes=1, no=2, missing=999
 - iii) Education: grade 1=1, grade 2=2, grade 3=3, missing=999.

5. String and other (date/time etc.) variables:

- a. Specify the length as 250 not the SPSS default as 8.
- b. Date: keep the very first date type provided by the system which is dd-mmm-yyyy for ex. May 31 2004 as 31-MAY-2004. You don't need to key exactly the same letters to get this format for ex. if "31 5 4" is keyed it will be displayed by the system as "31-MAY-2004".
- c. Time: keep the type as hh:mm:ss for ex. 5 hrs 10 minute 1 sec as 05:10:01. Again it's enough to key "5 10 1" to get the format of "05:10:01".

6. Multiple response questions:

Key only Yes (= 1) or No (= 2) for the following type of questions unless specified otherwise.

Example:

Were any of the following noted as predisposing factors to VAD complications: (*please check all that apply*);

- Immuno-suppression
- Circulatory impairment
- Diabetes
- Obesity
- Previous history of complications
- Other, please specify _____

**APPENDIX D: SAMPLE VARIABLE LISTS AND PROGRAMS FOR THE
CHART AUDIT TOOL**

1. Sample Variable Names and Values for Part 1 (Patient Profile)

Variable	Variable Label	Value Labels	
patient_id	Patient ID		
unit_code	Unit Code		
age	Patient age		
gender	Gender	1	Male
		2	Female
diagnosis	Primary diagnosis		
imm_supp	Immunosuppressed	0	Not checked
		1	Checked
circul_imp	Circulatory impairment	0	Not checked
		1	Checked
diabetes	Diabetes	0	Not checked
		1	Checked
obesity	Obesity	0	Not checked
		1	Checked
history	Previous history VAD complication	0	Not checked
		1	Checked
history_des	Description of previous VAD complication		
other_fac1	Other factors	0	Not checked
		1	Checked
other_fact	Other documented factors		
antibiotics	Antibiotics checkbox	0	Not checked
		1	Checked
chemo	Chemotherapy checkbox	0	Not checked
		1	Checked
TPN	TPN checkbox	0	Not checked
		1	Checked
other	Other therapy checkbox	0	Not checked
		1	Checked
name	Name of agent		
Vesicant	If agent is vesicant.	0	Not checked
		1	Checked
irritant	If agent is irritant	0	Not checked
		1	Checked
pH	pH < 5 or > 9	0	Not checked
		1	Checked
osmolarity	Osmolarity > 500 mOsm/L	0	Not checked
		1	Checked
duration_1	Expected duration of therapy		

2. Sample SPSS Program for Part 1 (Patient Profile)

```
*****
* Objective: To obtain patient characteristics from Part 1 Patient Profile.

FREQUENCIES
VARIABLES=age gender diagnosis imm_supp circul_imp diabetes obesity history history_des
other_fact antibiotics chemo TPN other name vesicant irritant pH osmolarity duration_1.

MULT RESPONSE
GROUPS=$predis 'Predisposing Factors to Complications' (imm_supp circul_imp diabetes obesity
history other_fac1 (1))
$nature 'Nature of Therapy' (antibiotics chemo TPN other (1))
/FREQUENCIES=$predis $nature.
```

3. Sample Variable Names and Values for Part 2 (Evidence of IV Therapy Guidelines)

Variable	Variable Label	Value Labels	
Q1	Assessment	0	No evidence
		1	Partial evidence
		2	Strong evidence
Q2	Judgment	0	No evidence
		1	Partial evidence
		2	Strong evidence
Q3	Action Plan	0	No evidence
		1	Partial evidence
		2	Strong evidence
Q4	Communication of Plan	0	No evidence
		1	Partial evidence
		2	Strong evidence
Q5	Ongoing Monitoring	0	No evidence
		1	Partial evidence
		2	Strong evidence

4. Sample SPSS Program for Part 2 (Evidence of IV Therapy Guidelines)

```
*****
* Objective: To obtain frequencies for Part 1 Evidence of IV Therapy Guidelines.

FREQUENCIES
VARIABLES=Q1 Q2 Q3 Q4 Q5.

*****
```

5. Sample Variable Names and Values for Part 3 (Patient Outcomes)

Variable	Variable Label	Value Labels	
insert_date	VAD insertion date		
insert_ps	VAD inserted by	1	RN
		2	MD
attempt_#	# of attempts		
Type	Peripheral or Central VAD	1	Peripheral
		2	Central
Central_type	Type of Central VAD	1	Implant Port
		2	PICC
		3	Percutaneous
		4	Tunneled
		5	Not applicable/ peripheral
type_cmt	comment on type of VAD		
size	Catheter size		
lumens	# of Lumens		
difficulties	Difficulties encountered		
X_ray	X-ray verification of catheter tip location	0	Not checked
		1	Checked
vbbf	Verification for brisk blood flow	0	Not checked
		1	Checked
duration_2	Actual duration of therapy		
A_infil1	Infiltration	0	Not checked
		1	Checked
A_infil2	Date discovered		
A_infil3	Action taken to address complication	1	hot compresses
		2	tPA (clot buster)
		3	line repaired
		4	line replaced
		5	no action taken
		6	no action required/ will monitor
		7	other
A_infil4	Description of other action		
A_infil5	Outcome of infiltration		
* For the variables B to J, the variables as the ones in infiltration are repeated (i.e., date discovered, action taken, description of other action, and outcome)			
B_phleb	Phlebitis		
C_local	Infection at entry site/ local infection		
D_cell	Cellulitis		
E_sepsis	Sepsis		
F_throm	Thrombosis		
G_occlu	Occlusion of line		
H_line	Line damage		
I_pain	Pain		
J_other	Other complication		

Variable	Variable Label	Value Labels	
no_docum	None documented	0	Not checked
		1	Checked
date_rem	Date of removal		
reason_rem	Reason for removal	1	Therapy completed
		2	Patient request
		3	Due to complications
		4	Unplanned removal
		5	Other
other_rs	Other reason for removal		
date	Date of audit		

6. Sample SPSS program for Part 3 (Patient Outcomes)

```

* Objective: To obtain data on patient outcomes.
* Information on VAD insertion characteristics and duration of therapy.
FREQUENCIES
VARIABLES= insert_date insert_ps attempt_# Type Central_type type_cmt size lumens
difficulties X_ray vbbf duration_2.

* Information on VAD complications.
FREQUENCIES
VARIABLES= A_infil1 A_infil2 A_infil3 A_infil4 A_infil5 B_phleb1 B_phleb2 B_phleb3
B_phleb4 B_phleb5 C_local1 C_local2 C_local3 C_local4 C_local5 D_cell1 D_cell2 D_cell3
D_cell4 D_cell5 E_sepsis1 E_sepsis2 E_sepsis3 E_sepsis4 E_sepsis5 F_throm1 F_throm2
F_throm3 F_throm4 F_throm5 G_occlu1 G_occlu2 G_occlu3 G_occlu4 G_occlu5 H_line1
H_line2 H_line3 H_line4 H_line5 I_pain1 I_pain2 I_pain3 I_pain4 I_pain5 J_other1 J_other
J_other2 J_other3 J_other4 J_other5 no_docum.

* Information on Conclusion of VAD therapy.
FREQUENCIES
VARIABLES=date_rem reason_rem other_rs date.

*To obtain the presence of any complication.
Compute comp=0.
If (infiltration=1 or phlebitis=1 or local_infec=1 or cellulitis=1 or sepsis=1 or thromb=1 or
occlusion=1 or line_dam=1 or pain=1 or other_com=1) comp=1.
Var labels comp 'Any patient complications'.
Value labels comp 0 'None' 1 'Yes'.
Formats comp (F8.0).
Execute.

FREQUENCIES
VARIABLES=comp.

* To obtain all complications using multiple response.
MULT RESPONSE
GROUPS=$allcomp 'Complications' (imm_supp circul_imp diabetes obesity history
other_fac1 (1))
/FREQUENCIES=$allcomp.

```

APPENDIX E: RESOURCES

For information on the Registered Nurses Association of Ontario (RNAO) Best Practice Guidelines Project, consult the website of the RNAO. The nursing BPGs can be downloaded for free. Hard copies are available for purchase.
<http://www.rnao.org/bestpractices>

For further information on developing, implementing and evaluating nursing practice guidelines, consult the RNAO **“Toolkit: Implementation of clinical practice guidelines.”** The RNAO Toolkit can also be downloaded for free and hard copies are available for purchase through the RNAO website.

For further information on evaluation of nursing best practice guidelines and other evaluation tools, contact the Nursing Best Practice Research Unit. Other monographs include measures on organizational innovation characteristics, organizational stability, organizational culture for change, organizational support for BPG implementation, education and supportive processes, and perceived worth of the BPG, and interviewing nurses and administrators.

<http://www.nbpru.ca>

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APPENDIX F: QUICK REFERENCE GUIDE

Name	Chart Audit Tool on Nursing Assessment and Device Selection for Vascular Access and Patient Outcomes
Purpose	To evaluate the implementation of recommendations in the RNAO Best Practice Guideline on Assessment and Device Selection for Vascular Access
Description	<p>The chart audit tool consists of three parts: 1) Patient Profile, 2) Evidence of IV therapy Guidelines, and 3) Patient Outcomes.</p> <p>The second part directly relates to the evaluation of documentation in the chart on five areas relating to vascular access device assessment and selection: 1) assessment, 2) judgment, 3) action plan, 4) communication of plan and 5) ongoing monitoring.</p>
Type of data	Retrospective chart review
Estimated time to collect data	3 to 30 minutes per chart, depending on volume of records to review
Training requirements	Familiarity with intravascular therapy terminology and familiarity with documentation in the particular healthcare organization. Since this evaluation measure is to be used in conjunction with the RNAO BPG on Assessment and Device Selection for Vascular Access, some training on the BPG is recommended.
Cost	Free electronic copies. Hard copies of the user guide can be purchased.
Summary of Procedures	<ol style="list-style-type: none">1. Train all chart reviewers on the types of information that need to be collected from the charts.2. If several persons are conducting the chart review, assess level of agreement and continue training until 95 to 100% agreement is reached.3. Determine inclusion and exclusion criteria.4. Gather all charts that meet the inclusion criteria.5. Review the charts for the information listed in the Chart Audit Tool.
Scoring & Interpretation	Evidence relating to documentation are rated as 0 (no evidence), 1 (partial evidence) or 2 (strong evidence) for each of the five areas in Part 2 (Evidence of IV Therapy Guidelines). Higher numbers mean more use of evidence relating to the BPG recommendations.
Citation	Davies B, Danseco E, Higuchi KS, Edwards N, McConnell H, Lybanon V, Fleming K & Perrier A. (2006). Nursing Best Practice Guidelines: Chart Audit Tool on Nursing Assessment and Device Selection for Vascular Access and Patient Outcomes. Nursing Best Practice Research Unit, University of Ottawa, Canada. pp. 1-29.
Contact Information	If you plan to use this tool, please contact: Dr. Barbara Davies, Co-Director Nursing Best Practice Research Unit University of Ottawa School of Nursing 451 Smyth Road, Ottawa, ON K1H 8M5 Barbara.Davies@uottawa.ca or Tel. 613-562-5800 ext. 8436

Nursing Best Practice Guidelines Evaluation User Guide

Chart Audit Tool on Nursing Assessment and Device Selection for Vascular Access and Patient Outcomes



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