Recommended Practices for Prevention of Deep Vein Thrombosis

The following Recommended Practices for Prevention of Deep Vein Thrombosis were developed by the AORN Recommended Practices Committee and have been approved by the AORN Board of Directors. They were presented as proposed recommendations for comments by members and others. They are effective March 1, 2011. These recommended practices are intended as achievable recommendations representing what is believed to be an optimal level of practice. Policies and procedures will reflect variations in practice settings and/or clinical situations that determine the degree to which the recommended practices can be implemented. AORN recognizes the various settings in which perioperative nurses practice. These recommended practices are intended as guidelines adaptable to various practice settings. These practice settings include traditional operating rooms (ORs), ambulatory surgery centers, physicians' offices, cardiac catheterization laboratories, endoscopy suites, radiology departments, and all other areas where surgery and other invasive procedures may be performed.

Purpose

The purpose of these recommended practices is to guide perioperative RNs by providing a framework for developing a protocol for deep vein thrombosis (DVT) prevention. These recommended practices provide guidance for administering pharmacologic and/or mechanical DVT prophylaxis and patient and health care personnel education. Although the prevention of DVT and pulmonary embolism (PE) should be a priority of the entire health care organization, the particular risks facing perioperative patients makes it imperative that perioperative RNs take an active role in DVT prevention. The patient in the perioperative environment may present with or encounter one or more of the three primary causative factors of DVT formation (ie, venous stasis, vessel wall injury, hypercoagulability).[1] The risk for DVT may be elevated for all perioperative patients, including children, because of immobility, tissue trauma, and surgical positioning requirements.[1-8] Deep vein thrombosis usually occurs in the lower extremities but also may occur in the upper extremities.[9] Prevention of DVT reduces the potential for associated complications such as post-thrombotic syndrome and PE.[10,11]

The perioperative nursing care interventions related to the treatment of complications of DVT (eg, venous stasis ulcers or their postoperative treatment, post-thrombotic syndrome, PE) are beyond the scope of this document. The choice of DVT prophylaxis is a medical decision and is beyond the scope of this document.

Recommendation I

A health care organization-wide protocol for the prevention of DVT that includes care of the perioperative patient should be developed and implemented.[12,13]

Using an organization-wide protocol developed from evidence-based, professional guidelines and providing alternative treatment considerations prompts health care providers to give consistent and appropriate DVT prophylactic care.[13] In a study of 150 hospitals, Maynard concluded that a protocol including a risk assessment and physician orders for venous thromboembolism (VTE) prevention accelerated improvements in VTE prophylaxis efforts.[14] Integration of the health care organization's protocol into all physician orders provides consistency between all care providers and increases use of the protocol.[12,13,15]

I.a. The health care organization-wide DVT protocol should be developed by a multidisciplinary team that includes key stakeholders including, but not limited to,

- RNs;
- physicians;
- anesthesia professionals;
- pharmacists; and
- personnel from
  - quality/risk management,
  - information technology (IT), and
  - administration.[13]

Key stakeholders' acceptance of the protocol is improved if they are involved in the decision-making process.[13] Each key stakeholder provides knowledge and expertise according to his or her area of practice and responsibility. The perioperative RN is a key stakeholder as a primary professional involved in implementing the protocol in the perioperative area and provides evidence-based references related to the safety, effectiveness, efficiency, and financial

considerations of DVT prophylactic measures.[16,17] Physicians representing each medical specialty can be resources for the evidence-based DVT prevention protocols developed by their medical specialty organizations.[8,14,18-20] Representatives from IT provide expertise in using technology to gather necessary data for use in the quality improvement program and by creating electronic programs that support protocol implementation. Administrative representatives approve the financial resources necessary to support the measures used in the protocol.

I.b. The DVT protocol should

- be supported by an evidence-based model (eg, risk-based, group-specific);
- be accessible to all health care providers;
- contain links to evidence-based treatment options;
- provide alternatives to suggested treatment;
- list contraindications;
- be simple to apply; and
- apply to all patients within the health care organization's scope of service.[12-14,17]

A standardized protocol can be easier to approve, put into action, and modify as necessary.[13] Use of an evidence-based model (eg, risk-based, group-specific) facilitates consistency in treatment and promotes adherence to the protocol.[12] An evidence-based model is based on validated research studies and links patient-related criteria (eg, patient-specific risk factors, the reason for admission) to the preferred prophylactic method.[13, 14,17] One example of a risk-based protocol defines a value for each prophylactic measure and a value for each patient-specific risk factor. The appropriate prophylactic measure is determined by summing the patient-specific risk factors values and connecting that number to the value assigned to the prophylactic measure.[21] Another risk-based protocol groups predetermined risk factors into categories such as a level one, two, or three. The appropriate prophylactic measure is determined by placing the patient into the appropriate group based on the patient's risk factors.[22] A group-specific protocol initially determines the type of prophylaxis based on the reason for hospitalization. This initial determination may be changed when other risk

factors identified during the assessment are included.[12]

I.b.1. The DVT protocol should include the use of a computer-generated alert identifying the patient at risk for developing a DVT. The alert is created by compiling the information from the patient assessment to produce a clinical decision support tool. When computerized documentation is not available, the patient assessment form should highlight those items, or groups of items, that indicate risk for developing a DVT and a consistent order set should be used. The computer-generated alert was shown in one study to improve the rate of prophylaxis from 1.5% to 10% for mechanical and from 13% to 23.6% for pharmacological prophylaxis. The population in this study consisted of 1, 255 patients in the intervention group and 1, 251 patients in the control group.[15] O'Connor et al compared the number of patients receiving DVT prophylaxis when hand-written orders were used compared to when order sets were used. A random review of charts during an eight-month period (N = 291) showed that DVT prophylaxis was ordered for 35.6% of patients when order sets were used compared to 10% of patients when hand-written orders were used.[23] Maynard et al demonstrated in a sample of 30, 850 admissions that adequate prophylaxis improved from 58% in 2005 to 93% in 2007 with the use of a standardized prevention protocol and order set.[22] A review of the literature by Maynard et al also supported the effectiveness of a computer-generated alert and a consistent order set.[14] The American College of Chest Physicians' evidence-based recommendations include the use of a computer decision support system.[12]

I.b.2. The DVT protocol should include a start time (eg, upon admission, preoperatively, postoperatively) for all types of prophy-laxis based on the clinical condition of the patient. Preoperative initiation of DVT prophylaxis is listed as criteria in clinical trials and listed as a requirement in evidence-based guidance statements.[12,24-27] The risk of DVT formation begins with preoperative immobility and continues throughout the intraoperative phase of care and is decreased by preoperative initiation of DVT prophylaxis. Some prophylactic measures, such as pharmacological methods, may be contraindicated because of the increased risk of bleeding and may need to be started postoperatively.[12]

I.c. The organization-wide protocol should include specific DVT prevention measures that address perioperative-associated DVT risk factors including, but not limited to,

- positioning;

- compression of tissue caused by retraction; and
- use of a pneumatic tourniquet, especially during prolonged periods of inflation.

Specific DVT prevention measures are needed during the perioperative patient care period, which may not be applicable to other areas of the organization. Patient positioning for the surgical procedure, such as the reverse Trendelenburg position (ie, the patient's head is positioned above heart level) and other positions that cause flexion and internal rotation of the hip and knee, can cause venous stasis. Venous stasis also can be caused by tissue compression resulting from retraction.[2,12,28] Tourniquet pressure can cause venous stasis or congestion by prohibiting venous return.[29]

Recommendation II

The perioperative RN should complete a preoperative patient assessment to determine DVT risk factors.

The preoperative nursing assessment provides information necessary to determine the individual patient risk factors for DVT and identify the appropriate DVT prophylaxis measures.

II.a. The preoperative patient DVT risk factor assessment should include, but not be limited to, the following:[12,17,30]

- Venous stasis:
  - age greater than 40 years;
  - cancer (eg, active or occult) and associated therapy;
  - history of cardiac disease;
  - obesity;
  - pregnancy and the postpartum period;
  - prolonged bed rest or immobilization;
  - prolonged travel (ie, between four to 10 hours within the previous eight weeks);

- surgery lasting longer than 30 minutes; and
- varicose veins.

- Vessel wall injury:
  - cancer (eg, active or occult) and associated therapy;
  - central venous catheters;
  - extensive burns;
  - previous history of DVT or stroke;
  - surgery; and
  - trauma (eg, major trauma, lower-extremity injury).

- Hypercoagulability:
  - cancer (eg, active or occult) and associated therapy;
  - inherited or acquired thrombophilia (ie, conditions in which the blood coagulates faster than normal);
  - oral contraceptive use or hormone replacement therapy;
  - pregnancy and the postpartum period; and
  - trauma (eg, major trauma, lower-extremity injury).

- Other:
  - acute medical illness,
  - acute infectious processes,
  - inflammatory conditions, and
  - smoking.

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The risk factor grouping of venous stasis, vessel wall injury, and hypercoagulability is frequently referred to in the literature as Virchow's Triad. Published reviews of the literature have indicated that patients with these risk factors exhibit a greater potential for DVT formation.[1,12,17,30,31]

II.b. The perioperative RN should consult and collaborate with surgical team members and members of other disciplines as appropriate regarding the need for and selection of prophylaxis based on the organizational protocol and the individual patient's DVT risk factor assessment. The perioperative RN has a professional responsibility to advocate for the patient during the entire perioperative period by consulting and collaborating with other professional colleagues regarding patient care.[16,17]

Recommendation III

The perioperative RN should implement specific interventions when the patient is receiving mechanical DVT prophylaxis.

Mechanical prophylaxis may be used throughout the perioperative period for various procedures, and specific interventions are necessary to decrease potential complications. Mechanical prophylaxis includes early ambulation, active and passive foot and ankle exercises, and the use of graduated compression stockings and intermittent pneumatic compression devices.[17] *The American College of Chest Physicians Evidence-Based Clinical Based Guidelines, 8th edition,* states that mechanical prophylaxis has been shown to reduce the risk of DVT, may improve the effectiveness of pharmacological prophylaxis, may be used in patients with a high risk of bleeding, and may reduce leg swelling.[12]

III.a. The perioperative RN should instruct the patient to perform foot and ankle exercises preoperatively. Foot and ankle exercises create natural muscle compression of the venous system of the legs, decreasing venous stasis.

III.b. The perioperative RN should implement specific activities when the patient is receiving mechanical DVT prophylaxis using intermittent pneumatic compression devices. Researchers suggest that intermittent pneumatic compression devices reduce venous stasis by improving venous return from the lower extremities.[24] Several intermittent pneumatic compression devices, with a wide variety of design features providing inflation on the foot, calf, or entire leg have been cleared by the US Food

and Drug Administration. The devices generally consist of wraps (eg, thigh- or knee-length, foot sleeves) that are placed on the legs or feet; tubing that connects the wrap to the pump; and a pump. The wrap may consist of single or multiple chambers. The chambers may be inflated as a single unit or sequentially and may be cycled using a preset timing device or manual timing device. The compression system also may feature technology allowing the inflation to be synchronized to the patient's respiration-related venous phasic flow, or customized inflation based on the patient's individual venous refill time.[32] The pump may be mobile or stationary.[24] Foot inflation devices simulate natural walking by providing compression to the plantar venous plexus. Calf and thigh devices work via a milking action that increases the velocity of venous return, enhances fibrinolysis, and increases the release of endothelial-derived relaxing factors and urokinase.[7,12,24] These relaxing factors and urokinase assist in preventing or inhibiting thrombosis development and enhance thrombolysis (ie, clot destruction) during thrombosis formation.[24] In a study of 502 total hip arthroplasties, Hooker et al concluded that intraoperative and postoperative thigh-high intermittent pneumatic compression is an effective prophylactic measure.[33] Woolson studied 322 patients and came to a similar conclusion.[34] In another study (N = 3016), Sugano et al concluded that mechanical DVT prophylaxis is safe and effective for elective hip surgeries.[35]

- III.b.1. The perioperative RN should assess the patient for and report to the physician any contraindications or possible complications related to use of the intermittent pneumatic compression device.

- Contraindications include, but are not limited to,

  - conditions affecting the lower extremity (eg, dermatitis, gangrene, extreme leg deformity, untreated infected wounds, injuries, or surgical sites);

  - conditions compromising lower extremity venous flow (eg, severe arteriosclerosis, other ischemic vascular disease, massive leg edema);

  - sensitivity to latex, unless wraps and tubing are latex free; and

  - severe congestive heart failure.[36]

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- Complications include, but are not limited to,
  - compartment syndrome;
  - latex sensitivity or allergy, unless the wraps and tubing are latex-free;
  - peroneal nerve palsy; and
  - skin injury.[24]
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- III.b.2. Intermittent pneumatic compression wraps should be applied according to the manufacturer's written instructions.
- III.b.3. When the manufacturer's written instructions for use require the use of stockinet, elastic hose, or other material under the device wraps, the material should be wrinkle-free when applied to the skin. Stockinet, elastic hose, or other materials may be recommended by some manufacturers for skin protection under the device wraps. Smooth, wrinkle-free under-wrap material may reduce the risk of skin injury.
- III.b.4. During application, the device or wrap tubing should be placed external to the wrap and away from locations that may create a pressure injury. Placement of the device or wrap tubing between the patient's skin and the device wrap may lead to a pressure injury.
- III.b.5. The perioperative RN should re-assess and verify that the intermittent pneumatic compression device and wraps are operating and are positioned properly after the patient is transferred to the OR bed.
- III.b.6. The perioperative RN should re-assess the wraps for proper placement if the patient's position is changed during the surgical procedure. Reassessment of proper placement of wraps after the patient's position is changed is needed to verify proper device placement and correct function.
- III.b.7. The intermittent pneumatic compression device should remain on during the intraoperative and immediate postoperative period except for very brief periods of time, when

removal is necessitated by patient care needs.[12]

- III.b.8. The DVT protocol should specify when the wraps should be disconnected from the pump and when a patient skin assessment should be performed (eg, ambulation, before discharge, transfer of care). If evidence of complications is present, the perioperative RN should document the information and report it to the physician.

III.c. The perioperative RN should implement specific activities when the patient is receiving mechanical DVT prophylaxis using graduated compression stockings. Graduated compression stockings, either thigh-high or knee-high in length, are frequently used intraoperatively and postoperatively. The stockings are thought to work by applying a constant graduated pressure to the leg, thereby reducing the venous diameter and venous stasis.[37,38] Conflicting evidence exists regarding which length of stocking, thigh- or knee-length, provides the greatest efficacy.[26,38-42]

- III.c.1. The perioperative RN should assess the patient for contraindications or possible complications related to the use of graduated compression stockings. Contraindications include, but are not limited to,

  ankle-brachial pressure index < 0.8 mm Hg;

  arteriosclerosis;

  cellulitis in lower extremities;

  dermatitis in lower extremities;

  latex allergy or sensitivity, unless stockings are latex-free;

  leg edema;

  leg ulcers;

  peripheral vascular disease;

  presence of infectious processes;

  recent surgical graft;

  severe peripheral neuropathy; and

thigh circumference exceeds the limit defined by the stocking manu-facturer directions for use.[38,42,43]

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- Complications include, but are not limited to,

  ischemia;

  latex allergy or sensitivity, unless stockings are latex-free;

  numbness and tingling; and

  skin injury.[42,43]

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- III.c.2. Graduated compression stockings should be properly fitted to the individual patient. The patient's legs should be measured separately and according to the manufacturer's instructions.[42,44] When stockings are too tight, venous return may be decreased and lead to venous pooling and clot formation. In addition, stockings that are too tight may cause the development of peroneal nerve palsy associated with increased direct pressure on the peroneal nerve.[45] When stockings are too loose, they may not provide the effective gradient compression required for DVT prevention. Measuring each of the patient's legs is necessary because there may be enough variability in circumference to require a different stocking size for each leg.[44]

- III.c.3. Graduated compression stockings should be applied according to the manufacturer's written instructions, which may include verifying that the

  stockings are not rolled up or down;

  stockings are smooth when fitted;

  toe holes lie underneath the toes;

  heel patches are in the correct position; and

  thigh gussets are positioned on the patient's inner thighs.[42,43,45]

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- Skin breakdown or a tourniquet effect can be created by graduated compression stockings, if not applied correctly.[42-45]

- III.c.4. The perioperative RN should verify that the graduated compression stockings have not rolled up the foot or down the leg during transfer to and from the OR bed or during procedural positioning. When the graduated compression stockings are allowed to roll up the foot or down the patient's leg, a tourniquet effect can be created and may lead to the formation of a DVT, arterial ischemia, gangrene, and necrosis by constricting blood flow.[42,45]

III.d. As soon as possible postoperatively, the perioperative RN should assist the patient with ambulation if appropriate and should assist with foot and ankle exercises for the patient who is unable to ambulate. Early ambulation and foot and ankle exercises create natural compression of the venous system and decrease venous stasis. These exercises alone are not adequate to prevent venous stasis in most hospitalized patients; therefore, supplemental mechanical or pharmacological prophylaxis may be required.[12]

Recommendation IV

The perioperative RN should implement specific interventions when the patient is receiving pharmacologic DVT prophylaxis.

Specific interventions are necessary to decrease the risk of potential complications from pharmacologic prophylaxis that may be used throughout the perioperative period. Pharmacologic prophylaxis consists of anticoagulant medications that inhibit blood clotting. The pharmacologic regimen may consist of medications such as warfarin; synthetic pentasacchride (ie, foundaparinux); low molecular weight heparin; and low-dose heparin.

IV.a. The perioperative RN should assess the patient for contraindications or the risk of possible complications related to pharmacologic DVT prophylaxis. Contraindications include, but are not limited to,

- complex trauma injuries;

- hemorrhage;

- infective endocarditis;

- neurosurgery;
- ocular surgery;
- pregnancy;
- recent intracranial, gastric, or genitourinary bleeding;
- recent surgery (ie, within two days); and
- recent lumbar puncture or neuraxial (ie, spinal, epidural) anesthesia or analgesia (ie, within 24 hours).[12,46-48]

Complications include, but are not limited to,

- bleeding;
- compartment syndrome;
- hematoma formation;
- heparin-induced thrombocytopenia;
- osteoporosis and osteopenia;
- skin necrosis;
- thrombocytopenia; and
- urticaria at injection sites.[4,12]

IV.b. Pharmacologic DVT prophylaxis should be administered in accordance with the "AORN guidance statement: Safe medication practices in perioperative settings across the life span."[49]

Recommendation V

The perioperative RN should provide the patient and his or her designated caregiver(s) instructions regarding prevention of DVT and the prescribed prophylactic measures.

Education related to DVT prevention and the prescribed prophylactic measures may improve patient compliance and acceptance.[17,30,42,50]

V.a. The patient receiving mechanical prophylaxis and his or her designated caregiver(s) should receive preoperative and postoperative instructions including, but not limited to, the following topics

- the mechanism of mechanical prophylaxis;
- the importance of compliance;
- the importance of wearing properly sized, graduated compression stockings;
- removal and proper reapplication of the intermittent compression device immediately after ambulation; and
- proper application, removal, and reapplication of graduated compression stockings.[17,42-44]

Education assists the patient in understanding the potential complications of mechanical prophylaxis, as well as the importance of compliance with its correct use.[42,45,50]

V.b. The patient receiving pharmacologic prophylaxis and his or her designated care-giver(s) should receive preoperative and postoperative instructions including, but not limited to, the importance of:

- follow-up appointments, including where and when they should occur;
- continuing medication post-discharge for the duration prescribed;
- following through with laboratory work at periodic intervals;
- avoiding certain activities (eg, contact sports);

- not using over-the-counter medications (eg, aspirin, ibuprofen);
- using a soft toothbrush;
- using an electric razor;
- reporting any unusual bruising;
- obtaining a medical alert bracelet;
- being aware of medication and food interactions, including herbal and other over-the-counter preparations (eg, ginger, ginkgo biloba, ginseng, feverfew, St. John's wort, green tea); and
- informing health care workers about pharmacologic prophylaxis before undergoing any procedures (eg, dental work, laboratory tests).[17,51]

V.c. Before a patient is discharged, the perioperative RN should provide the patient and his or her designated caregiver(s) with instructions on the prevention of DVT including, but not limited to,

current and future risk factors;

maintaining adequate hydration;

common signs and symptoms of DVT or PE (eg, leg pain, swelling, unexplained shortness of breath, wheezing, chest pain, palpitations, anxiety, sweating, coughing up blood);

avoiding clothing that constricts the lower extremities;

participating in physical exercise as indicated;

performing active and passive range of motion, especially of the lower extremities, as indicated;

avoiding sitting with knees bent or legs crossed for long periods of time;

elevating legs when sitting;

avoiding sitting or standing for long periods of time;

complying with all forms of DVT prophylaxis;

performing frequent coughing and deep breathing exercises and changing position when in bed;

avoiding raising the knee gatch of the bed during inpatient care;

alerting other patient care providers to the patient's history of DVT and current prophylactic measures; and

the physiology of blood flow and clot formation.[17,52]

Education provides the patient with an awareness of DVT prevention measures and the signs and symptoms of DVT that should be reported to the physician.[17,53] Deep vein thrombosis frequently develops or becomes evident after the patient is discharged. This is supported by a study of 5, 451 patients with DVT, nearly half of whom were diagnosed as outpatients, which indicates that more than half of those patients waited three or more days after the onset of symptoms to seek treatment.[52]

Recommendation VI

Personnel should receive initial education and competency validation, as applicable to their roles, on patient care measures to prevent DVT.

Initial and ongoing education of perioperative personnel on the prevention of DVT, the risk to the patient, and appropriate methods of prophylaxis facilitates the development of knowledge, skills, and attitudes that affect safe patient care.

VI.a. Perioperative RNs and all patient care personnel should receive initial education, competency validation, and current information on

- DVT prevention protocols and updates;
- DVT prevention policies and procedures and updates;
- DVT risk factors;
- perioperative-specific preventive measures; and
- the correct application and use of mechanical prophylactic measures (eg, contraindications, signs and symptoms of complications).

VI.b. Perioperative RNs should receive initial education and competency validation, as well as seek evidence-based knowledge, on

- the pathophysiology of DVT and PE;
- contraindications and complications for each category of prophylaxis;
- the selection of prophylactic measures; and
- the administration of pharmacologic prophylaxis.

Perioperative RNs have a professional responsibility to incorporate research findings into practice.[16] Methods of DVT prophylaxis are evolving and new information is being published periodically.

Recommendation VII

Documentation should include a patient assessment, plan of care, nursing diagnoses, and identification of desired outcomes and interventions, as well as an evaluation of the patient's response to the care provided.

Documentation serves as a method of communication among all care providers involved in planning, implementing, and evaluating patient care. Documenting nursing activities provides a description of the perioperative nursing care administered and the status of patient outcomes on transfer of care.

VII.a. Documentation should be recorded in a manner consistent with the health care organization's policies and procedures and should include, but not be limited to,

- results of the nursing assessment including risk factors and complications, if present;
- application and removal times for all mechanical prophylactic measures;
- the type and size of wrap or graduated compression stockings applied;
- the identifier and settings of the mechanical unit, if applicable;
- the time, route, and dosage of all pharmacologic prophylaxis;

- the reason for any variance from the protocol; and

responses to complications, if present.

Recommendation VIII

Policies and procedures for DVT prophylaxis should be developed, reviewed periodically, revised as necessary, and readily available in the practice setting.

Policies and procedures assist in the development of patient safety, quality assessment, and improvement activities. Policies and procedures establish authority, responsibility, and accountabil-ity within the facility. They also serve as operational guidelines that are used to minimize patient risk factors for complications, standardize practice, direct staff members, and establish continuous performance improvement programs.

VIII.a. The health care organization's policies and procedures regarding use of mechanical prophylaxis units must be in compliance with the Safe Medical Devices Act of 1990, as amended in March 2000.[54]

- VIII.a.1. When patient or personnel injuries or equipment failures occur, the mechanical prophylaxis unit and its components should be removed from service and all components retained, if possible. Retaining the unit and its components allows for a complete systems check to determine possible reasons for the failure.

VIII.b. Policies and procedures for preventing DVT should include the steps required for initiating and implementing the DVT protocol and reporting and responding to adverse events.[49]

Recommendation IX

A quality improvement program should be in place to evaluate the outcomes of DVT prophylaxis (eg, DVT rate) and protocol compliance.

The Agency for Healthcare Research and Quality states that quality and performance improvement programs assist in evaluating the quality of patient care and the formulation of plans for corrective actions. These programs provide data that may be used to determine whether an individual organization is within benchmark goals and, if not, identify areas that may require corrective actions.[13]

IX.a. The quality improvement program should include a study time frame (eg, six months before and six months after a change has been instituted) and should

- compare the health care organization's DVT prevention protocol to current research and established, research-based guidelines;
- determine the health care organization's DVT prevention protocol rate of use;
- determine and explore barriers to the use of the protocol; and
- determine the rate of readmissions for DVT or complications related to DVT.[13, 14]

Establishing a time frame assists in determining a baseline for comparison. Measuring the rate of readmissions helps to determine the effectiveness of the DVT prevention protocol. Determining the rate of use and the barriers to use assists with refinement of the protocol and ideally leads to an increase in protocol compliance and an improvement in patient outcomes.[13,14]

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