



## Complete Summary

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### GUIDELINE TITLE

Antithrombotic therapy for venous thromboembolic disease. American College of Chest Physicians evidence-based clinical practice guidelines (8th edition).

### BIBLIOGRAPHIC SOURCE(S)

Kearon C, Kahn SR, Agnelli G, Goldhaber S, Raskob GE, Comerota AJ. Antithrombotic therapy for venous thromboembolic disease: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 2008 Jun;133(6 Suppl):454S-545S. [393 references] [PubMed](#)

### GUIDELINE STATUS

This is the current release of the guideline.

This guideline is updates a previous version: Buller HR, Agnelli G, Hull RD, Hyers TM, Prins MH, Raskob GE. Antithrombotic therapy for venous thromboembolic disease: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest 2004 Sep;126(3 Suppl):401S-28S.

### \*\* REGULATORY ALERT \*\*

### FDA WARNING/REGULATORY ALERT

**Note from the National Guideline Clearinghouse:** This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- [December 3, 2008, Innohep \(tinzaparin\)](#): The U.S. Food and Drug Administration (FDA) has requested that the labeling for Innohep be revised to better describe overall study results which suggest that, when compared to unfractionated heparin, Innohep increases the risk of death for elderly patients (i.e., 70 years of age and older) with renal insufficiency. Healthcare professionals should consider the use of alternative treatments to Innohep when treating elderly patients over 70 years of age with renal insufficiency and deep vein thrombosis (DVT), pulmonary embolism (PE), or both.
- [February 28, 2008, Heparin Sodium Injection](#): The U.S. Food and Drug Administration (FDA) informed the public that Baxter Healthcare Corporation has voluntarily recalled all of their multi-dose and single-use vials of heparin sodium for injection and their heparin lock flush solutions. Alternate heparin manufacturers are expected to be able to increase heparin production sufficiently to supply the U.S. market. There have been reports of serious adverse events including allergic or hypersensitivity-type reactions, with

symptoms of oral swelling, nausea, vomiting, sweating, shortness of breath, and cases of severe hypotension.

## COMPLETE SUMMARY CONTENT

\*\* REGULATORY ALERT \*\*

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## SCOPE

### DISEASE/CONDITION(S)

- Venous thromboembolism (VTE), including:
  - Deep venous thrombosis (DVT)
  - Pulmonary embolism (PE)
  - Acute upper-extremity DVT
- Complications of VTE, including:
  - Postthrombotic syndrome (PTS)
  - Chronic thromboembolic pulmonary hypertension (CTPH)

### GUIDELINE CATEGORY

Management  
Prevention  
Treatment

### CLINICAL SPECIALTY

Cardiology  
Critical Care  
Emergency Medicine  
Family Practice  
Internal Medicine  
Obstetrics and Gynecology  
Pulmonary Medicine  
Surgery

### INTENDED USERS

Advanced Practice Nurses  
Allied Health Personnel  
Health Care Providers  
Nurses  
Patients  
Physicians  
Psychologists/Non-physician Behavioral Health Clinicians  
Social Workers

## **GUIDELINE OBJECTIVE(S)**

- To provide evidence-based guidelines for antithrombotic therapy use in venous thromboembolic disease
- To update evidence-based recommendations for the use of antithrombotic and thrombolytic therapy for the management of thromboembolic conditions

## **TARGET POPULATION**

Patients with venous thromboembolism (VTE), including deep venous thrombosis (DVT), pulmonary embolism (PE), and acute upper-extremity deep venous thrombosis (UEDVT), or complications of venous thromboembolism, including postthrombotic syndrome (PTS) and chronic thromboembolic pulmonary hypertension (CTPH)

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Treatment/Management**

#### **Pharmacological Management**

1. Heparins
  - Subcutaneous (SC) low-molecular-weight heparin (LMWH)
  - Intravenous (IV) or SC unfractionated heparin (UFH)
  - Adjusted-dose heparin and heparinoids
2. Fondaparinux
3. Vitamin K antagonist (VKA)
4. Systemic thrombolytic therapy
5. Nonsteroidal anti-inflammatory agent

#### **Mechanical Management**

1. Ambulation
2. Elastic compression stockings, bandages, and sleeves
3. Intermittent pneumatic compression (IPC)
4. Catheter-directed thrombolysis (CDT), pharmacomechanical thrombolysis
5. Catheter extraction or fragmentation

#### **Surgical Management**

1. Balloon angioplasty and stents
2. Venous thrombectomy

3. Pulmonary embolectomy
4. Pulmonary thromboendarterectomy
5. Superior vena cava (SVC) filter

### **Monitoring**

1. Activated partial thromboplastin time (APTT)
2. Plasma heparin level
3. Anti-Xa activity (amidolytic assay)
4. International normalized ratio (INR)
5. Referral

### **MAJOR OUTCOMES CONSIDERED**

- Effectiveness of antithrombotic therapy in treating venous thromboembolism (VTE)
- Adverse effects of therapy, such as bleeding, heparin-induced thrombocytopenia (HIT)
- Thromboembolic recurrence rates, including recurrent deep vein thrombosis (DVT) and pulmonary embolism (PE)
- Mortality rates
- Incidence of DVT complications, including postthrombotic syndrome (PTS) and chronic thromboembolic pulmonary hypertension (CTPH)
- Quality of life

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

#### **Process of Searching for Evidence**

Defining the clinical question provided the framework for formulating eligibility criteria that guided the search for relevant evidence. In specifying eligibility criteria, authors identified not only patients, interventions, and outcomes, but also methodologic criteria. For many recommendations, authors restricted eligibility to randomized controlled trials (RCTs).

For many questions, randomized trials did not provide sufficient data, and chapter authors included observational studies when randomized trials were not the most appropriate design to address the research question. In particular, randomized trials are not necessarily the best design to understand risk groups, that is, the baseline or expected risk of a given event for certain subpopulations. Because no interventions are typically examined in questions about prognosis, one replaces interventions by the duration of exposure measured in time.

#### **Identifying the Evidence**

To identify the relevant evidence, a team of librarians and research associates at the McMaster University Evidence based practice center (EPC) conducted comprehensive literature searches. Methodologic experts (including the editors) and the EPC librarians reviewed each question to ensure the development of a comprehensive search strategy. For example, for questions about antiplatelet agents, the EPC consulted chapter authors to ensure that the search included all relevant antiplatelet agents. More specifically, authors then decided whether to include dipyridamole in a search that already included aspirin, clopidogrel, and ticlopidine.

For each question the authors provided, the librarians searched the Cochrane Database of Systematic Reviews, MEDLINE, and Embase for published English-language literature and human studies between 2002 and May 2006. To filter MEDLINE and Embase search results for RCT evidence, the librarians used the search strategy developed by the Cochrane Collaboration. These searches updated the more comprehensive and sensitive searches conducted for the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy: Evidence Based Guidelines.

The EPC team conducted separate searches for systematic reviews; RCTs; and, if applicable, observational studies. For observational studies, searches were not restricted in terms of methodology. Although increasing the probability of identifying all published studies, this sensitive approach resulted in large numbers of citations for many of the defined clinical questions. Therefore, trained research assistants screened the citation list developed from the search using criteria of increased specificity to reduce the number of irrelevant citations that the authors received. These irrelevant citations included press news, editorials, narrative reviews, single-case reports, studies that included fewer participants than specified by authors as an inclusion criterion, animal studies (any nonhuman studies), and letters to the editor. Authors did not include data from abstracts of meetings for the development of recommendations, and the guideline developers did not explicitly use Internet sources to search for research data. Authors were encouraged, however, to mention abstracts that reported on groundbreaking data that were particularly relevant to a specific question in the chapters in order to alert readers that new, fully published evidence might become available shortly.

#### *Standard Consideration of Study Quality*

High-quality clinical guidelines should pay careful attention to the methodologic quality of the studies that form the basis of their recommendations. Using the example of the prevention of venous thromboembolism during air travel, Table 1 in the methodology companion (see "Availability of Companion Documents" field) shows the criteria for assessment of study quality (randomization, concealment or treatment allocation, blinding, completeness of follow-up, and whether the analysis was performed according to the intention-to-treat principle), and Table 2 in the methodology companion (see "Availability of Companion Documents" field) shows the presentation of results that were circulated to the authors. Whereas all authors attended to these criteria, the guideline developers have summarized the results of the quality assessment for only a minority of the recommendations. Readers can find these summaries in an online appendix to the recommendations (see online supplemental data).

In assessing the quality of observational studies, the guideline developers did not make a distinction between prospective and retrospective because the key issues are unbiased sampling, high-quality measurement of patient characteristics and outcomes, and complete follow-up.

Although it is more likely that these quality criteria will be achieved in prospective studies, prospective studies may fail to achieve them, and retrospective studies may succeed. The guideline developers did make a key distinction about whether internal comparisons exist and their nature. Studies without internal comparisons received the label "case series" unless they met the following criteria: (1) a protocol existed before the date of commencement of data collection; (2) a definition of inclusion and exclusion criteria was available; (3) the study reported the number of excluded patients; (4) the study conducted a standardized follow-up, including description of schedule of follow-up, investigation of suspected outcomes, and criteria used to define outcomes; and (5) the study reported all losses to follow-up.

The guideline developers labeled studies that met these criteria "cohort studies without internal controls." Studies with internal comparisons received the label "cohort studies with concurrent controls" or "cohort studies with historical controls." These cohort studies may succeed or fail to ensure settings, similar time frames, adjustment for differences in patients' characteristics, and follow-up with patients. These features were captured in descriptive tables provided to authors when requested from the EPC.

## **NUMBER OF SOURCE DOCUMENTS**

Not stated

## **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

The rating scheme framework captures the trade-off between benefits and risks (1 or 2) and the methodological quality of the underlying evidence (A, B, or C). See "Grades of recommendations for antithrombotic agents" in the "Availability of Companion Documents" field and the "Rating Scheme for the Strength of the Recommendations." field.

## **METHODS USED TO ANALYZE THE EVIDENCE**

Review of Published Meta-Analyses  
Systematic Review with Evidence Tables

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

**Summarizing Evidence**

The electronic searches also included searches for systematic reviews. If authors were satisfied with a recent high-quality systematic review, evidence from that review provided a foundation for the relevant recommendation.

Pooled analyses from high-quality systematic reviews formed summary data on which panelists based their recommendations wherever possible. Pooling offers the advantage of obtaining more precise estimates of treatment effects and allows for greater generalizability of results. However, pooling also bears the risk of spurious generalization. In general, the summary estimates of interest were the different types of outcomes conveying benefits and downsides (risk, burden, and cost). When pooled estimates of effects were not available, the McMaster University Evidence based practice center (EPC) conducted meta-analysis to obtain pooled estimates for specific questions. These were questions that authors had specifically identified.

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus (Consensus Development Conference)

### **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

#### **Group-Specific Recommendations**

In general, the guideline developers have endeavored to make their recommendations as specific as possible for patient subgroups differing according to risk. Whenever valid prognostic data were available, the guideline developers used them to estimate absolute effects and made recommendations accordingly. Unfortunately, reliable prognostic indexes are not usually available, limiting the extent to which such group-specific recommendations are possible.

#### **Acknowledge Values and Preferences and Resource Use Underlying Recommendations**

Under ideal circumstances, knowledge of average patient values and preferences would be available for every recommendation, the panel members would summarize these values and preferences, and they would be integrated into the recommendations that guideline developers make. The guideline developers asked all chapter chairs before beginning the searches for the relevant literature to identify recommendations that they believed were particularly sensitive to patients' values and preferences. Moderate-quality evidence regarding values and preferences bearing directly on the recommendations proved available for only the chapter that addresses antithrombotic therapy in patients with atrial fibrillation. The panelists bore in mind what average patient values and preferences may be; the process, however, is speculative.

The guideline developer's main strategy for dealing with this unsatisfactory situation is to make the values and preferences underlying the recommendations explicit whenever the panelists believed that value and preference issues were crucial for a recommendation.

In addition, the guideline developers involved three consultants with expertise in the area of values and preferences to collaborate with the chairs of two chapters and try to ensure that the guidelines adequately represented the views of patients. This collaboration led to extensive discussions among the chapter authors and the consultants and the reflection of these discussions in the associated values and preference statements.

### **Finalizing and Harmonizing Recommendations**

After having completed the steps the guideline developers have described above, the guideline authors formulated draft recommendations before the conference, which laid the foundation for authors to work together and critique the recommendations. Figure 1 in the methodology companion (see "Availability of Companion Documents" field) shows the process of guideline development and review. Drafts of chapters that included draft recommendations were usually distributed for peer review to at least two panel members and were always reviewed by at least one panel editor before the conference. Written critiques were prepared and returned to the authors for revision of their work. At the plenary conference, a representative of each chapter presented potentially controversial issues in their recommendations. Chapter authors met to integrate feedback and consider related recommendations in other chapters and to revise their own guidelines accordingly. Authors continued this process after the conference until they reached agreement within their groups and with other author groups who provided critical feedback. The editors of this supplement harmonized the chapters and resolved remaining disagreements between chapters through facilitated discussion. All major correspondence and discussions at the meeting were recorded in written and audio protocols and are publicly available.

### **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

<b>Grading Recommendation</b>			
<b>Grade of Recommendation*</b>	<b>Benefit vs. Risk and Burdens</b>	<b>Methodologic Quality of Supporting Evidence</b>	<b>Implications</b>
Strong recommendation, high-quality evidence, Grade 1A	Desirable effects clearly outweigh undesirable effects, or <i>vice versa</i>	Consistent evidence from RCTs without important limitations or exceptionally strong evidence from observational studies	Recommendation can apply to most patients in most circumstances; further research is very unlikely to change our confidence in the estimate of effect
Strong recommendation, moderate-quality evidence, Grade 1B	Desirable effects clearly outweigh undesirable	Evidence from RCTs with important limitations (inconsistent results,	Recommendation can apply to most patients in most circumstances; higher quality research may well have an

<b>Grading Recommendation</b>			
<b>Grade of Recommendation*</b>	<b>Benefit vs. Risk and Burdens</b>	<b>Methodologic Quality of Supporting Evidence</b>	<b>Implications</b>
	effects, or <i>vice versa</i>	methodologic flaws, indirect or imprecise), or very strong evidence from observational studies	important impact on our confidence in the estimate of effect and may change the estimate
Strong recommendation, low or very low-quality evidence, Grade 1C	Desirable effects clearly outweigh undesirable effects, or <i>vice versa</i>	Evidence for at least one critical outcome from observational studies, case series, or from RCTs with serious flaws or indirect evidence	Recommendation can apply to most patients in many circumstances; higher-quality research is likely to have an important impact on our confidence in the estimate of effect and may well change the estimate
Weak recommendation, high-quality evidence, Grade 2A	Desirable effects closely balanced with undesirable effects	Consistent evidence from RCTs without important limitations or exceptionally strong evidence from observational studies	The best action may differ depending on circumstances or patient or society values; further research is very unlikely to change our confidence in the estimate of effect
Weak recommendation, moderate-quality evidence, Grade 2B	Desirable effects closely balanced with undesirable effects	Evidence from RCTs with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence from observational studies	Best action may differ depending on circumstances or patient or society values; higher-quality research may well have an important impact on our confidence in the estimate of effect and may change the estimate
Weak recommendation, low or very low-quality evidence, Grade 2C	Desirable effects closely balanced with undesirable effects	Evidence for at least one critical outcome from observational studies, case series, or from RCTs with serious flaws or indirect evidence	Other alternatives may be equally reasonable; higher-quality research is likely to have an important impact on our confidence in the estimate of effect and may well change the estimate

\*The guideline developers use the wording *recommend* for strong (Grade 1) recommendations and *suggest* for weak (Grade 2) recommendations.

## **COST ANALYSIS**

For these guidelines, the guideline developers implemented recommendations of a recent American College of Chest Physicians (ACCP) task force on integrating resource allocation in clinical practice guidelines by restricting resource expenditure consideration to a small number of recommendations for which they were particularly relevant. The guideline developers relied on two consultants with expertise in economic assessment to help with the process of considering costs in those small numbers of recommendations that the guideline developers considered very important to the decision.

Recommendations highly sensitive to resource allocation now include value and preference statements regarding how cost issues were integrated.

Refer to "Strategies for incorporating resource allocation and economic considerations" (see "Availability of Companion Documents" field) for details of the cost analyses.

## **METHOD OF GUIDELINE VALIDATION**

External Peer Review  
Internal Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

The American College of Chest Physicians (ACCP) Health Science Policy (HSP) established a process for the thorough review of all ACCP evidence-based clinical practice guidelines. After final review by the editors, the guidelines underwent review by appropriate NetWorks of the ACCP (for these guidelines, the Cardiovascular and Pulmonary Vascular NetWorks), the HSP, and the Board of Regents. The latter two have the right of approval or disapproval but usually work with the guideline authors and editors to make necessary revisions before final approval. Each group identified primary reviewers who read the full set of chapters as well as individual committee members who were responsible for reviewing one or more chapters. The reviewers considered both content and methodology as well as whether there was balanced, not biased, reporting and adherence to HSP processes. Finally, the *CHEST* editor-in-chief read and forwarded the manuscripts for nonbiased, independent, external peer review before acceptance for publication.

## **RECOMMENDATIONS**

### **MAJOR RECOMMENDATIONS**

The grades of recommendation (1A, 1B, 1C, 2A, 2B, 2C) are defined at the end of the "Major Recommendations" field.

### **Initial Anticoagulation of Acute Deep Vein Thrombosis (DVT) of the Leg**

1. For patients with objectively confirmed DVT, the guideline developers recommend short-term treatment with subcutaneous (SC) low-molecular-weight heparin (LMWH) **(Grade 1A)**, intravenous (IV) unfractionated heparin (UFH) **(Grade 1A)**, monitored SC UFH **(Grade 1A)**, fixed-dose SC UFH **(Grade 1A)**, or SC fondaparinux **(Grade 1A)** rather than no such short-term treatment.
2. For patients with a high clinical suspicion of DVT, the guideline developers recommend treatment with anticoagulants while awaiting the outcome of diagnostic tests **(Grade 1C)**.
3. In patients with acute DVT, the guideline developers recommend initial treatment with LMWH, UFH, or fondaparinux for at least 5 days and until the international normalized ratio (INR) is  $\geq 2.0$  for 24 hours **(Grade 1C)**.
4. In patients with acute DVT, the guideline developers recommend initiation of vitamin K antagonists (VKA) together with LMWH, UFH, or fondaparinux on the first treatment day rather than delayed initiation of VKA **(Grade 1A)**.

#### **IV UFH for the Initial Treatment of DVT**

In patients with acute DVT, if IV UFH is chosen, the guideline developers recommend that, after an initial IV bolus (80 U/kg or 5,000 U) it be administered by continuous infusion (initially at a dose of 18 U/kg/h or 1,300 U/h) with dose adjustment to achieve and maintain an activated partial thromboplastin time (APTT) prolongation that corresponds to plasma heparin levels of 0.3 to 0.7 IU/mL anti-Xa activity by the amidolytic assay rather than administration as IV boluses throughout treatment, or administration without coagulation monitoring **(Grade 1C)**.

#### **SC UFH Compared with IV Heparin for the Initial Treatment of DVT**

1. In patients with acute DVT, if monitored SC UFH is chosen, the guideline developers recommend an initial dose of 17,500 U, or a weight-adjusted dose of about 250 U/kg, twice a day (bid), with dose adjustment to achieve and maintain an APTT prolongation that corresponds to plasma heparin levels of 0.3 to 0.7 IU/mL anti-Xa activity when measured 6 hours after injection rather than starting with a smaller initial dose **(Grade 1C)** (See also Section 1.5 in the original guideline document).
2. In patients with acute DVT, if fixed-dose, unmonitored SC UFH is chosen, the guideline developers recommend an initial dose of 333 U/kg followed by 250 U/kg bid rather than non-weight-based dosing **(Grade 1C)** (See also Section 1.5 in the original guideline document).

#### **LMWH for the Initial Treatment of DVT**

1. In patients with acute DVT, the guideline developers recommend initial treatment with LMWH SC once or twice daily, as an outpatient if possible **(Grade 1C)** or as an inpatient if necessary **(Grade 1A)**, rather than treatment with IV UFH.
2. In patients with acute DVT treated with LMWH, the guideline developers recommend against routine monitoring with anti-factor Xa level measurements **(Grade 1A)**.
3. In patients with acute DVT and severe renal failure, the guideline developers suggest UFH over LMWH **(Grade 2C)**.

### **Catheter-Directed Thrombolysis for Acute DVT**

1. In selected patients with extensive acute proximal DVT (e.g., iliofemoral DVT, symptoms for < 14 days, good functional status, life expectancy of  $\geq 1$  year) who have a low risk of bleeding, the guideline developers suggest that catheter-directed thrombolysis (CDT) may be used to reduce acute symptoms and post-thrombotic morbidity if appropriate expertise and resources are available **(Grade 2B)**.
2. After successful CDT in patients with acute DVT, the guideline developers suggest correction of underlying venous lesions using balloon angioplasty and stents **(Grade 2C)**.
3. The guideline developers suggest pharmacomechanical thrombolysis (e.g., with inclusion of thrombus fragmentation and/or aspiration) in preference to CDT alone to shorten treatment time if appropriate expertise and resources are available **(Grade 2C)**.
4. After successful CDT in patients with acute DVT, the guideline developers recommend the same intensity and duration of anticoagulant therapy as for comparable patients who do not undergo CDT **(Grade 1C)**.

### **Systemic Thrombolytic Therapy for Acute DVT**

In selected patients with extensive proximal DVT (e.g., symptoms for < 14 days, good functional status, life expectancy of  $\geq 1$  year) who have a low risk of bleeding, the guideline developers suggest that systemic thrombolytic therapy may be used to reduce acute symptoms and postthrombotic morbidity if CDT is not available **(Grade 2C)**.

### **Percutaneous Venous Thrombectomy**

In patients with acute DVT, the guideline developers suggest that they should not be treated with percutaneous mechanical thrombectomy alone **(Grade 2C)**.

### **Operative Venous Thrombectomy for Acute DVT**

1. In selected patients with acute iliofemoral DVT (e.g., symptoms for < 7 days, good functional status, and life expectancy of  $\geq 1$  year), the guideline developers suggest that operative venous thrombectomy may be used to reduce acute symptoms and postthrombotic morbidity if appropriate expertise and resources are available **(Grade 2B)**. If such patients do not have a high risk of bleeding, the guideline developers suggest that catheter-directed thrombolysis is usually preferable to operative venous thrombectomy **(Grade 2C)**.
2. In patients who undergo operative venous thrombectomy, the guideline developers recommend the same intensity and duration of anticoagulant therapy afterwards as for comparable patients who do not undergo venous thrombectomy **(Grade 1C)**.

### **Vena Caval Filters for the Initial Treatment of DVT**

1. For patients with DVT, the guideline developers recommend against the routine use of a vena cava filter in addition to anticoagulants **(Grade 1A)**.

2. For patients with acute proximal DVT, if anticoagulant therapy is not possible because of the risk of bleeding, the guideline developers recommend placement of an inferior vena cava filter **(Grade 1C)**.
3. For patients with acute DVT who have an inferior vena cava (IVC) filter inserted as an alternative to anticoagulation, the guideline developers recommend that they should subsequently receive a conventional course of anticoagulant therapy if their risk of bleeding resolves **(Grade 1C)**.

### **Immobilization for the Treatment of Acute DVT**

In patients with acute DVT, the guideline developers recommend early ambulation in preference to initial bed rest when this is feasible **(Grade 1A)**.

### **Duration of Anticoagulant Therapy**

1. For patients with DVT secondary to a transient (reversible) risk factor, the guideline developer recommend treatment with a VKA for 3 months over treatment for shorter periods **(Grade 1A)**.
2. For patients with unprovoked DVT, the guideline developers recommend treatment with a VKA for at least 3 months **(Grade 1A)**. They recommend that after 3 months of anticoagulant therapy, all patients with unprovoked DVT should be evaluated for the risk-benefit ratio of long-term therapy **(Grade 1C)**. For patients with a first unprovoked VTE that is a proximal DVT, and in whom risk factors for bleeding are absent and for whom good anticoagulant monitoring is achievable, the guideline developers recommend long-term treatment **(Grade 1A)**.

*Underlying values and preferences:* This recommendation attaches a relatively high value to prevention of recurrent VTE and a lower value to the burden of long-term anticoagulant therapy.

For patients with a second episode of unprovoked VTE, the guideline developers recommend long-term treatment **(Grade 1A)**. For patients with a first isolated distal DVT that is unprovoked, the guideline developers suggest that 3 months of anticoagulant therapy is sufficient rather than indefinite therapy **(Grade 2B)**.

3. For patients with DVT and cancer, the guideline developers recommend LMWH for the first 3 to 6 months of long-term anticoagulant therapy **(Grade 1A)**. For these patients, the guideline developers recommend subsequent anticoagulant therapy with VKA or LMWH indefinitely or until the cancer is resolved (See Section 2.4 in the original guideline document). **(Grade 1C)**.
4. In patients who receive long-term anticoagulant treatment, the risk-benefit ratio of continuing such treatment should be reassessed in the individual patient at periodic intervals **(Grade 1C)**.

### **Intensity of Anticoagulant Effect**

1. In patients with DVT, the guideline developers recommend that the dose of VKA be adjusted to maintain a target INR of 2.5 (range, 2.0 to 3.0) for all treatment durations (Grade 1A). For patients with unprovoked DVT who have

a strong preference for less frequent INR testing to monitor their therapy, after the first 3 months of conventional-intensity anticoagulation (INR range, 2.0 to 3.0), the guideline developers recommend low-intensity therapy (range, 1.5 to 1.9) with less frequent INR monitoring over stopping treatment **(Grade 1A)**. The guideline developers recommend against high-intensity VKA therapy (INR range, 3.1 to 4.0) compared to an INR range of 2.0 to 3.0 **(Grade 1A)**.

### **Treatment of Asymptomatic DVT of the Leg**

1. In patients who are unexpectedly found to have asymptomatic DVT, the guideline developers recommend the same initial and long-term anticoagulation as for comparable patients with symptomatic DVT **(Grade 1C)**.

### **Elastic Stockings and Compression Bandages To Prevent Postthrombotic Syndrome (PTS)**

For a patient who has had a symptomatic proximal DVT, the guideline developers recommend the use of an elastic compression stocking with an ankle pressure gradient of 30 to 40 mm Hg if feasible **(Grade 1A)**. Compression therapy, which may include use of bandages acutely, should be started as soon as feasible after starting anticoagulant therapy and should be continued for a minimum of 2 years, and longer if patients have symptoms of the postthrombotic syndrome (PTS). (**Note:** feasibility, both short and long term, refers to ability of patients and their caregivers to apply and remove stockings.)

*Underlying values and preferences:* This recommendation attaches a relatively high value to long-term prevention of the postthrombotic syndrome (PTS) and a low value to the burden (e.g., inconvenience or discomfort) associated with wearing stockings.

### **Physical Treatment of PTS without Venous Leg Ulcers**

1. For patients with severe edema of the leg due to PTS, the guideline developers suggest a course of intermittent pneumatic compression (IPC) **(Grade 2B)**.
2. For patients with mild edema of the leg due to PTS, the guideline developers suggest the use of elastic compression stockings **(Grade 2C)**.

### **Physical Treatment of Venous Leg Ulcers**

In patients with venous ulcers resistant to healing with wound care and compression, the guideline developers suggest the addition of intermittent pneumatic compression (IPC) **(Grade 2B)**.

### **Hyperbaric Oxygen and the Management of Patients with Venous Ulcers**

For patients with venous ulcers, the guideline developers suggest that hyperbaric oxygen not be used **(Grade 2B)**.

## **Pentoxifylline**

In patients with venous leg ulcers, the guideline developers suggest pentoxifylline, 400 mg orally three times a day, in addition to local care and compression and/or IPC (**Grade 2B**).

## **Micronized Purified Flavonoid Fraction or Sulodexide for the Treatment of Venous Leg Ulcers**

In patients with persistent venous ulcers, the guideline developers suggest that rutosides, in the form of micronized purified flavonoid fraction administered orally, or sulodexide administered intramuscularly and then orally, be added to local care and compression (**Grade 2B**).

## **IV or SC UFH, SC LMWH, SC Fondaparinux, and VKA for the Initial Treatment of Pulmonary Embolism (PE)**

1. For patients with objectively confirmed pulmonary embolism (PE), the guideline developers recommend short-term treatment with SC LMWH (**Grade 1A**), IV UFH (**Grade 1A**), monitored SC UFH (**Grade 1A**), fixed-dose SC UFH (**Grade 1A**), or SC fondaparinux (**Grade 1A**) rather than no such acute treatment. Patients with acute PE should also be routinely assessed for treatment with thrombolytic therapy (see the "Systemically and Locally Administered Thrombolytic Therapy for PE" section below for related discussion and recommendations).
2. For patients in whom there is a high clinical suspicion of PE, the guideline developers recommend treatment with anticoagulants while awaiting the outcome of diagnostic tests (**Grade 1C**).
3. In patients with acute PE, the guideline developers recommend initial treatment with LMWH, UFH, or fondaparinux for at least 5 days and until the INR is  $\geq 2.0$  for at least 24 hours (**Grade 1C**).
4. In patients with acute PE, the guideline developers recommend initiation of VKA together with LMWH, UFH, or fondaparinux on the first treatment day rather than delayed initiation of VKA (**Grade 1A**).
5. In patients with acute PE, if IV UFH is chosen, the guideline developers recommend that after an initial IV bolus (80 U/kg or 5,000 U), it is administered by continuous infusion (initially at dose of 18 U/kg/h or 1,300 U/h) with dose adjustment to achieve and maintain an APTT prolongation that corresponds to plasma heparin levels of 0.3 to 0.7 IU/mL anti-Xa activity by the amidolytic assay rather than administration as IV boluses throughout treatment, or administration without coagulation monitoring (**Grade 1C**).
6. In patients with acute PE, if monitored SC UFH is chosen, the guideline developers recommend an initial dose of 17,500 U, or a weight-adjusted dose of about 250 U/kg, bid, with dose adjustment to achieve and maintain an APTT prolongation that corresponds to plasma heparin levels of 0.3 to 0.7 IU/mL anti-Xa activity when measured 6 hours after injection rather than starting with a smaller initial dose (**Grade 1C**).
7. In patients with acute PE, if fixed-dose, unmonitored SC UFH is chosen, the guideline developers recommend an initial dose of 333 U/Kg followed by a twice-daily dose of 250 U/kg rather than non-weight-based dosing (**Grade 1C**).

8. In patients with acute nonmassive PE, the guideline developers recommend initial treatment with LMWH over IV UFH **(Grade 1A)**. In patients with massive PE, in other situations where there is concern about SC absorption, or in patients for whom thrombolytic therapy is being considered or planned, the guideline developers suggest IV UFH over SC LMWH, SC fondaparinux, or SC UFH **(Grade 2C)**.
9. In patients with acute PE treated with LMWH, the guideline developers recommend against routine monitoring with anti-factor Xa level measurements **(Grade 1A)**.
10. In patients with acute PE and severe renal failure, the guideline developers suggest UFH over LMWH **(Grade 2C)**.

### **Systemically and Locally Administered Thrombolytic Therapy for PE**

1. All PE patients should undergo rapid risk stratification **(Grade 1C)**. For patients with evidence of hemodynamic compromise, the guideline developers recommend use of thrombolytic therapy unless there are major contraindications owing to bleeding risk **(Grade 1B)**. Thrombolysis in these patients should not be delayed, because irreversible cardiogenic shock may ensue. In selected high-risk patients without hypotension who are judged to have a low risk of bleeding, the guideline developers suggest administration of thrombolytic therapy **(Grade 2B)**. The decision to use thrombolytic therapy depends on the clinician's assessment of PE severity, prognosis, and risk of bleeding. For the majority of patients with PE, the guideline developers recommend against using thrombolytic therapy **(Grade 1B)**.
2. In patients with acute PE, when a thrombolytic agent is used, the guideline developers recommend that treatment be administered via a peripheral vein rather than placing a pulmonary artery catheter to administer treatment **(Grade 1B)**.
3. In patients with acute PE, with administration of thrombolytic therapy, the guideline developers recommend use of regimens with short infusion times (e.g., a 2-hour infusion) over those with prolonged infusion times (e.g., a 24-hour infusion) **(Grade 1B)**.

### **Catheter Extraction or Fragmentation for the Initial Treatment of PE**

For most patients with PE, the guideline developers recommend against use of interventional catheterization techniques **(Grade 1C)**. In selected highly compromised patients who are unable to receive thrombolytic therapy because of bleeding risk, or whose critical status does not allow sufficient time for systemic thrombolytic therapy to be effective, the guideline developers suggest use of interventional catheterization techniques if appropriate expertise is available **(Grade 2C)**.

### **Pulmonary Embolectomy for the Initial Treatment of PE**

In selected highly compromised patients who are unable to receive thrombolytic therapy because of bleeding risk, or whose critical status does not allow sufficient time for systemic thrombolytic therapy to be effective, the guideline developers suggest that pulmonary embolectomy may be used if appropriate expertise is available **(Grade 2C)**.

## **Vena Caval Filters for the Initial Treatment of PE**

1. For most patients with PE, the guideline developers recommend against the routine use of a vena caval filter in addition to anticoagulants **(Grade 1A)**.
2. In patients with acute PE, if anticoagulant therapy is not possible because of risk of bleeding, the guideline developers recommend placement of an IVC filter **(Grade 1C)**.
3. For patients with acute PE who have an IVC filter inserted as an alternative to anticoagulation, the guideline developers recommend that they should subsequently receive a conventional course of anticoagulant therapy if their risk of bleeding resolves **(Grade 1C)**.

## **Long-term Treatment of Acute PE**

1. For patients with PE secondary to a transient (reversible) risk factor, the guideline developers recommend treatment with a VKA for 3 months over treatment for shorter periods **(Grade 1A)**.
2. For patients with unprovoked PE, the guideline developers recommend treatment with a VKA for at least 3 months **(Grade 1A)**. The guideline developers recommend that after 3 months of anticoagulant therapy, all patients with unprovoked PE should be evaluated for the risk-benefit ratio of long-term therapy **(Grade 1C)**. For patients with a first unprovoked episode of VTE that is a PE, and in whom risk factors for bleeding are absent and for whom good anticoagulant monitoring is achievable, the guideline developers recommend long-term treatment **(Grade 1A)**.

*Underlying values and preferences:* This recommendation attaches a relatively high value to prevention of recurrent VTE and a lower value to the burden of long-term anticoagulant therapy.

For patients with a second episode of unprovoked VTE, the guideline developers recommend long-term treatment **(Grade 1A)**.

3. For patients with PE and cancer, the guideline developers recommend LMWH for the first 3 to 6 months of long-term anticoagulant therapy **(Grade 1A)**. For these patients, the guideline developers recommend subsequent anticoagulant therapy with VKA or LMWH indefinitely or until the cancer is resolved **(Grade 1C)**.
4. In patients who receive long-term anticoagulant treatment, the risk-benefit ratio of continuing such treatment should be reassessed in the individual patient at periodic intervals **(Grade 1C)**.
5. In patients with PE, the guideline developers recommend that the dose of VKA be adjusted to maintain a target INR of 2.5 (INR range, 2.0 to 3.0) for all treatment durations **(Grade 1A)**. For patients with unprovoked PE who have a strong preference for less frequent INR testing to monitor their therapy, after the first 3 months of conventional-intensity anticoagulation (INR range, 2.0 to 3.0), the guideline developers recommend low-intensity therapy (INR range, 1.5 to 1.9) with less frequent INR monitoring over stopping treatment **(Grade 1A)**. The guideline developers recommend against high-intensity VKA therapy (INR range, 3.1 to 4.0) compared with an INR range of 2.0 to 3.0 **(Grade 1A)**.

6. In patients who are unexpectedly found to have asymptomatic PE, the guideline developers recommend the same initial and long-term anticoagulation as for comparable patients with symptomatic PE (**Grade 1C**).

### **Pulmonary Thromboendarterectomy, VKA, and Vena Caval Filter for the Treatment of Chronic Thromboembolic Pulmonary Hypertension (CTPH)**

1. In selected patients with chronic CTPH, such as those with central disease under the care of an experienced surgical/medical team, the guideline developers recommend pulmonary thromboendarterectomy (**Grade 1C**).
2. For all patients with CTPH, the guideline developers recommend life-long treatment with a VKA targeted to an INR of 2.0 to 3.0 (**Grade 1C**).
3. For patients with CTPH undergoing pulmonary thromboendarterectomy, the guideline developers suggest the placement of a permanent vena caval filter before or at the time of the procedure (**Grade 2C**).
4. For patients with inoperable CTPH, the guideline developers suggest referral to a center with expertise in pulmonary hypertension so that patients can be evaluated for alternative treatments, such as vasodilator therapy or balloon pulmonary angioplasty (**Grade 2C**).

### **Treatment of Infusion Thrombophlebitis**

For patients with symptomatic infusion thrombophlebitis as a complication of IV infusion, the guideline developers suggest oral diclofenac or another nonsteroidal anti-inflammatory drug (**Grade 2B**), topical diclofenac gel (**Grade 2B**), or heparin gel (**Grade 2B**) until resolution of symptoms or for up to 2 weeks. The guideline developers recommend against the use of systemic anticoagulation (**Grade 1C**).

### **Treatment of Superficial Vein Thrombosis (SVT)**

For patients with spontaneous superficial vein thrombosis, the guideline developers suggest prophylactic or intermediate doses of LMWH (**Grade 2B**) or intermediate doses of UFH (**Grade 2B**) for at least 4 weeks. The guideline developers suggest that as an alternative to 4 weeks of LMWH or UFH, VKA (target INR, 2.5; range, 2.0 to 3.0) can be overlapped with 5 days of UFH and LMWH and continued for 4 weeks (**Grade 2C**). The guideline developers suggest that oral nonsteroidal anti-inflammatory drugs should not be used in addition to anticoagulation (**Grade 2B**). The guideline developers recommend medical treatment with anticoagulants over surgical treatment (**Grade 1B**).

*Remark:* It is likely that less extensive superficial vein thrombosis (i.e., where the affected venous segment is short in length or further from the saphenofemoral junction) does not require treatment with anticoagulants. It is reasonable to use oral or topical nonsteroidal anti-inflammatory drugs for symptom control in such cases.

### **IV UFH or LMWH for the Initial Treatment of Upper-Extremity DVT**

For patients with acute upper-extremity DVT (UEDVT), the guideline developers recommend initial treatment with therapeutic doses of LMWH, UFH, or

fondaparinux as described for leg DVT (see the "Initial Anticoagulation of Acute DVT of the Leg" section above) **(Grade 1C)**.

### **Thrombolytic Therapy for the Initial Treatment of UEDVT**

1. For most patients with acute UEDVT, the guideline developers recommend against the routine use of systemic or catheter-directed thrombolytic therapy **(Grade 1C)**.
2. In selected patients with acute UEDVT (e.g., in those with a low risk of bleeding and severe symptoms of recent onset) the guideline developers suggest that catheter-directed thrombolysis (CDT) may be used for initial treatment if appropriate expertise and resources are available **(Grade 2C)**.

### **Catheter Extraction, Surgical Thrombectomy, Transluminal Angioplasty, Stent Placement, Staged Approach of Lysis Followed by Interventional or Surgical Procedure, and Superior Vena Cava Filter Insertion, for the Initial Treatment of UEDVT**

1. For most patients with acute UEDVT, the guideline developers recommend against the routine use of catheter extraction, surgical thrombectomy, transluminal angioplasty, stent placement, staged approach of lysis followed by interventional or surgical procedure, or superior vena cava filter placement **(Grade 1C)**.
2. In selected patients with acute UEDVT (e.g., those with primary UEDVT and failure of anticoagulant or thrombolytic treatment who have severe persistent symptoms), the guideline developers suggest that catheter extraction, surgical thrombectomy, transluminal angioplasty, or a staged approach of lysis followed by a vascular interventional or surgical procedure may be used, if appropriate expertise and resources are available **(all Grade 2C)**.
3. In selected patients with acute UEDVT (e.g., those in whom anticoagulant treatment is contraindicated and there is clear evidence of DVT progression or clinically significant PE), the guideline developers suggest placement of a superior vena cava (SVC) filter **(Grade 2C)**.

### **Anticoagulants for the Long-term Treatment of UEDVT**

1. For patients with acute UEDVT, the guideline developers recommend treatment with a VKA for  $\geq 3$  months **(Grade 1C)**.

*Remark:* A similar process as for lower-extremity DVT (see the "Duration of Anticoagulant Therapy" section above) should be used to determine the optimal duration of anticoagulation.

2. For most patients with UEDVT in association with an indwelling central venous catheter, the guideline developers suggest that the catheter not be removed if it is functional and there is an ongoing need for the catheter **(Grade 2C)**.
3. For patients who have UEDVT in association with an indwelling central venous catheter that is removed, the guideline developers do not recommend that the duration of long-term anticoagulant treatment be shortened to  $< 3$  months **(Grade 2C)**.

## Prevention of Post-thrombotic Syndrome (PTS) of the Arm

For patients at risk for PTS after UEDVT, the guideline developers do not suggest routine use of elastic compression or venoactive medications (**Grade 2C**).

## Treatment of PTS of the Arm

In patients with UEDVT who have persistent edema and pain, the guideline developers suggest elastic bandages or elastic compression sleeves to reduce symptoms of PTS of the upper extremity (**Grade 2C**).

### Definitions:

Grading Recommendation			
Grade of Recommendation*	Benefit vs. Risk and Burdens	Methodologic Quality of Supporting Evidence	Implications
Strong recommendation, high-quality evidence, Grade 1A	Desirable effects clearly outweigh undesirable effects, or <i>vice versa</i>	Consistent evidence from RCTs without important limitations or exceptionally strong evidence from observational studies	Recommendation can apply to most patients in most circumstances; further research is very unlikely to change our confidence in the estimate of effect
Strong recommendation, moderate-quality evidence, Grade 1B	Desirable effects clearly outweigh undesirable effects, or <i>vice versa</i>	Evidence from RCTs with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence from observational studies	Recommendation can apply to most patients in most circumstances; higher quality research may well have an important impact on our confidence in the estimate of effect and may change the estimate
Strong recommendation, low or very low-quality evidence, Grade 1C	Desirable effects clearly outweigh undesirable effects, or <i>vice versa</i>	Evidence for at least one critical outcome from observational studies, case series, or from RCTs with serious flaws or indirect evidence	Recommendation can apply to most patients in many circumstances; higher-quality research is likely to have an important impact on our confidence in the estimate of effect and may well change the estimate
Weak recommendation,	Desirable effects	Consistent evidence from RCTs without	The best action may differ depending on

<b>Grading Recommendation</b>			
<b>Grade of Recommendation*</b>	<b>Benefit vs. Risk and Burdens</b>	<b>Methodologic Quality of Supporting Evidence</b>	<b>Implications</b>
high-quality evidence, Grade 2A	closely balanced with undesirable effects	important limitations or exceptionally strong evidence from observational studies	circumstances or patient or society values; further research is very unlikely to change our confidence in the estimate of effect
Weak recommendation, moderate-quality evidence, Grade 2B	Desirable effects closely balanced with undesirable effects	Evidence from RCTs with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence from observational studies	Best action may differ depending on circumstances or patient or society values; higher-quality research may well have an important impact on our confidence in the estimate of effect and may change the estimate
Weak recommendation, low or very low-quality evidence, Grade 2C	Desirable effects closely balanced with undesirable effects	Evidence for at least one critical outcome from observational studies, case series, or from RCTs with serious flaws or indirect evidence	Other alternatives may be equally reasonable; higher-quality research is likely to have an important impact on our confidence in the estimate of effect and may well change the estimate

\*The guideline developers use the wording *recommend* for strong (Grade 1) recommendations and *suggest* for weak (Grade 2) recommendations.

### **CLINICAL ALGORITHM(S)**

None provided

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

Appropriate antithrombotic therapy and management of patients with venous thromboembolic disease

### POTENTIAL HARMS

- Antithrombotic pharmacotherapy has the potential for adverse side effects, such as bleeding, heparin-induced thrombocytopenia, and hypersensitivity reactions.
- Catheter-directed thrombolysis has been reported to be associated with local and systemic bleeding.
- Percutaneous mechanical venous thrombectomy alone often fails to remove much of the thrombus and is associated with a high risk of pulmonary embolism (PE).
- Operative venous thrombectomy is an alternative approach for thrombus removal that is generally reserved for patients with iliofemoral deep vein thrombosis (DVT). Although operative pulmonary embolization is a concern with this procedure, it is an infrequent complication.

## CONTRAINDICATIONS

### CONTRAINDICATIONS

- Major contraindications to thrombolytic therapy include intracranial disease, uncontrolled hypertension at presentation, and recent major surgery or trauma.
- In patients experiencing active bleeding, anticoagulant therapy is temporarily contraindicated (e.g., active bleeding), there is the option of inserting a retrievable filter and removing the filter when it is safe to start anticoagulant therapy.

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

#### Limitations of These Guideline Development Methods

Limitations of these guidelines include the limited quantity and quality of available studies for some patient groups. Second, it is possible that some authors followed this methodology more closely than others, although the development process was centralized by an evidence-based practice center (EPC) and supervised by the editors. Third, it is possible that the guideline developers missed relevant studies in spite of the comprehensive searching process. Fourth, despite their efforts to begin centralizing the methodologic evaluation of all studies to facilitate uniformity in the validity assessments of the research incorporated into these guidelines, resources were insufficient to conduct this evaluation for all but a few of the recommendations in each chapter. Fifth, the guideline developers performed only

few statistical pooling exercises of primary study results. Finally, sparse data on patient preferences and values represent additional limitations inherent to most guideline development methods.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy includes local educational programs and tools offered through the American College of Chest Physicians (ACCP) Board of Governors and select other locations. The Veterans Administration (VA) will also participate in a pilot project.

### IMPLEMENTATION TOOLS

Resources

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness  
Staying Healthy

### IOM DOMAIN

Effectiveness  
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Kearon C, Kahn SR, Agnelli G, Goldhaber S, Raskob GE, Comerota AJ. Antithrombotic therapy for venous thromboembolic disease: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 2008 Jun;133(6 Suppl):454S-545S. [393 references] [PubMed](#)

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

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## **GUIDELINE DEVELOPER(S)**

American College of Chest Physicians - Medical Specialty Society

## **SOURCE(S) OF FUNDING**

American College of Chest Physicians

## **GUIDELINE COMMITTEE**

American College of Chest Physicians (ACCP) Expert Panel on Antithrombotic and Thrombolytic Therapy

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **ENDORSER(S)**

American College of Clinical Pharmacy - Medical Specialty Society  
American Society of Health-System Pharmacists - Professional Association

## **GUIDELINE STATUS**

This is the current release of the guideline.

This guideline updates a previous version: Buller HR, Agnelli G, Hull RD, Hyers TM, Prins MH, Raskob GE. Antithrombotic therapy for venous thromboembolic disease: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest 2004 Sep;126(3 Suppl):401S-28S.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available to subscribers of the [Chest - The Cardiopulmonary and Critical Care Journal](#).

Print copies: Available from the American College of Chest Physicians, Products and Registration Division, 3300 Dundee Road, Northbrook IL 60062-2348.

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

Executive Summary:

- Antithrombotic and thrombolytic therapy executive summary. Chest 2008 Jun; 133:71S-109S.

Background Articles:

- Antithrombotic and thrombolytic therapy. Chest 2008 Jun; 133:110S-112S.
- Methodology for antithrombotic and thrombolytic therapy guideline development. Chest 2008 Jun; 133:113S-122S.
- Grades of recommendation for antithrombotic agents. Chest 2008 Jun; 133:123S-131S.
- Strategies for incorporating resource allocation and economic considerations. Chest 2008 Jun; 133:132S-140S.

Electronic copies: Available to subscribers of the [Chest - The Cardiopulmonary and Critical Care Journal](#).

Print copies: Available from the American College of Chest Physicians, Products and Registration Division, 3300 Dundee Road, Northbrook IL 60062-2348.

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

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