

# Vein Reaction

*Effectively managing your patients with VTE*

■ **By Cori Cohen Grant, Ph.D., M.B.A., and John Cuddeback, M.D., Ph.D.**

In addition to substantial pathology in the lungs, COVID-19 puts patients at risk for thrombosis and thromboembolism in the peripheral circulation, particularly patients who have preexisting thrombotic disease or are at risk of thrombotic events.<sup>1</sup>

This is a good time to review how your organization is caring for people with venous thromboembolism (VTE), a broad term that includes deep vein thrombosis (DVT) and pulmonary embolism (PE). Treatment of VTE and prevention of recurrence ideally involve multispecialty, multidisciplinary teams and evidence-based protocols, so they benefit from the model of care that characterizes AMGA member organizations.

Even before the pandemic, 60,000–100,000 Americans died of VTE each year.<sup>2</sup> VTE is among the most common causes of preventable hospital death,<sup>3</sup> and most clots that occur in the outpatient setting are directly linked to a recent hospitalization or surgery.<sup>4</sup> Readmissions for VTE are longer and more costly than initial hospitalizations.<sup>5</sup>

Treatment for VTE is changing, with several new and updated clinical guidelines for treating VTE in inpatient and outpatient settings. As therapeutic options expand, the role of the anticoagulation clinic is growing well beyond warfarin management. And increasingly, patients with DVT and even low-risk PE are treated as outpatients in the ER, rather than admitted to the hospital.<sup>6</sup>

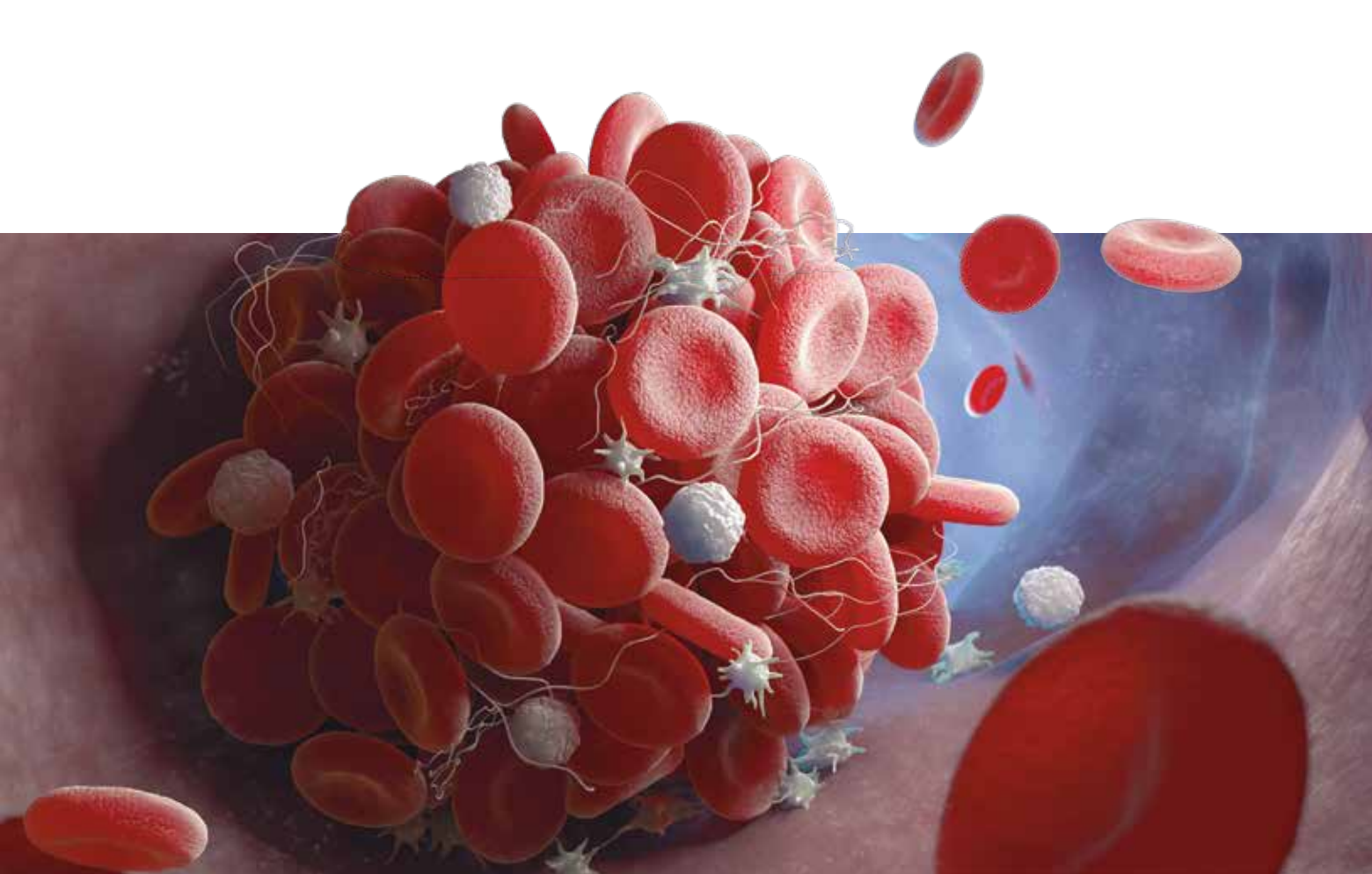
Anticoagulation therapy strikes a balance, suppressing the coagulation cascade while minimizing the risk of a major

bleed. COVID makes this even more challenging, with direct effects on platelets and coagulation factors plus secondary effects of inflammation and the potential for drug interactions with COVID therapies.<sup>7</sup> Here we focus on the fundamentals of VTE care, but the same processes are needed to address COVID-related thrombotic disease.

AMGA recently conducted roundtables with experts from 12 member organizations: Advocate Aurora Health, Billings Clinic, Cleveland Clinic, Geisinger, HealthPartners Park Nicollet, Henry Ford Health System, Intermountain Healthcare, Lehigh Valley Health Network, Mercy (St. Louis), Ochsner Health System, Permanente Medical Group, and University of Wisconsin Health.

Selected for their expertise in VTE, all these organizations have developed protocols and care team structures to manage DVT and PE. These protocols typically include a variety of risk assessment tools to inform key decision points in the care process. They are typically created by a system-wide anti-coagulation committee that keeps abreast of the literature and published guidelines and updates the internal protocols at least annually.

First, we'll give a brief review of VTE treatment—not to get into specific therapeutic choices, but to illustrate the process issues involved, with a focus on transitions of care. Then, we'll share what we learned about how groups manage patient discharge after hospital treatment for VTE, ensuring continuity of treatment in the outpatient setting.



## VTE Treatment Timeline and Guidelines

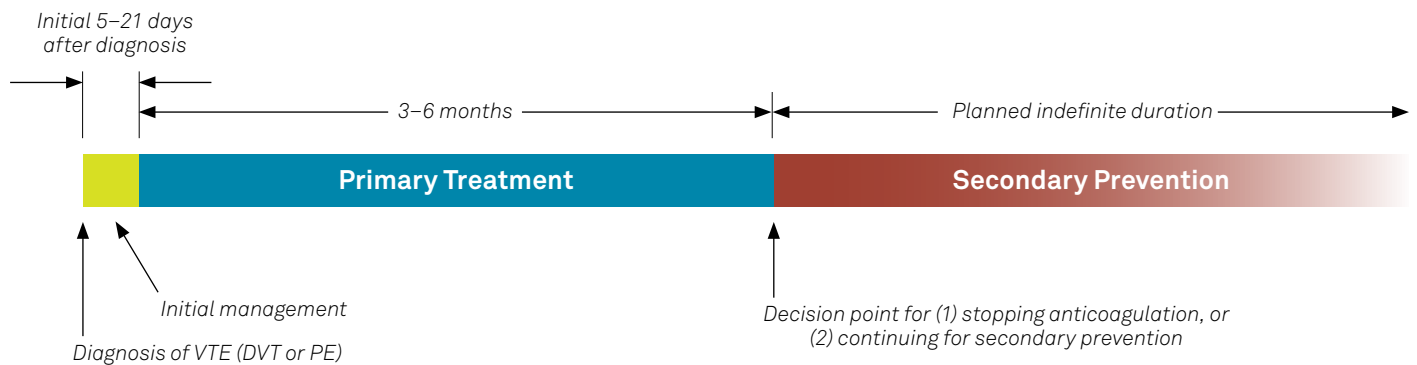
Most cases of PE and severe DVTs are treated with anticoagulation, but severe PEs may also require emergency thrombolysis, catheter retrieval, or an inferior vena cava filter. At the other end of the risk scale, superficial vein thromboses, some DVTs, and isolated subsegmental PEs may not require any specific treatment.<sup>8</sup>

Figure 1 is modeled after the American Society of Hematology 2020 Guidelines for Management of VTE. The first five

to 21 days after diagnosis of a new VTE is the initial management period, beginning with deciding whether the patient can be treated at home or requires admission to the hospital. In either case, there is a handoff when the patient leaves the ER or the hospital, ideally with patient education and follow-up by a dedicated anticoagulation clinic, in coordination with the patient's primary care provider.

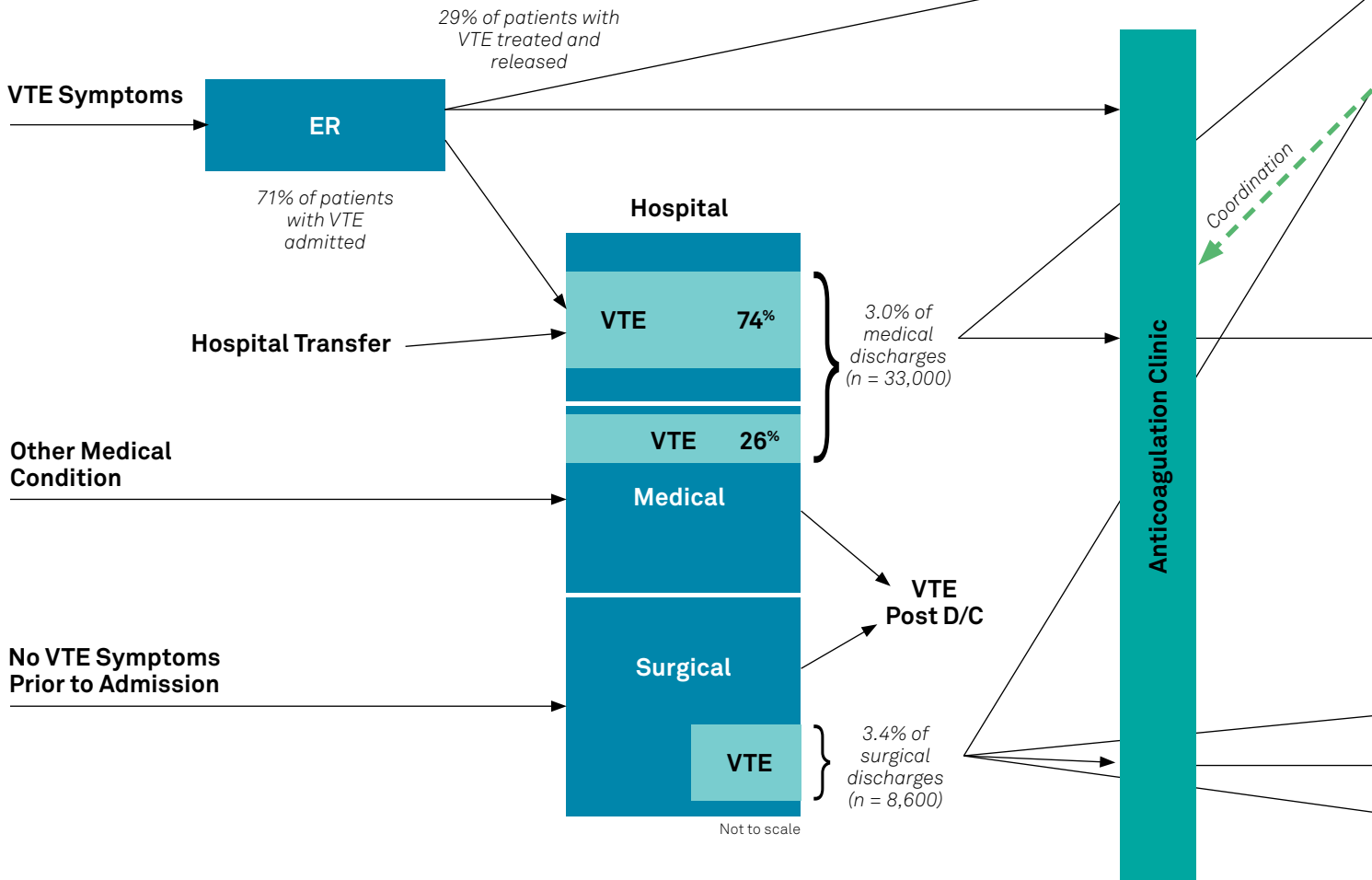
Anticoagulant therapy is continued for three to six months, the minimum duration of treatment. After primary treatment,

**Figure 1**  
**Timeline Guidelines for VTE Management**



Source: American Society of Hematology 2020 Guidelines for Management of Venous Thromboembolism

**Figure 2**  
**Flow of Patients with VTE**



Rough percentages based on AMGA's analysis of adjudicated claims data from 14 AMGA member organizations participating in the Collaborative for Performance Excellence, a partnership between AMGA and Optum. Data obtained by provider organizations from payers with whom they have risk contracts, including Medicare Shared Savings Program and commercial payers, then processed and aggregated by Optum.

it is important to make a deliberate decision for each patient whether to discontinue anticoagulant therapy or to continue it for secondary prevention of recurrent VTE. Secondary prevention may be continued indefinitely, although patients should be reevaluated periodically to review the benefits and risks of continued anticoagulant therapy.

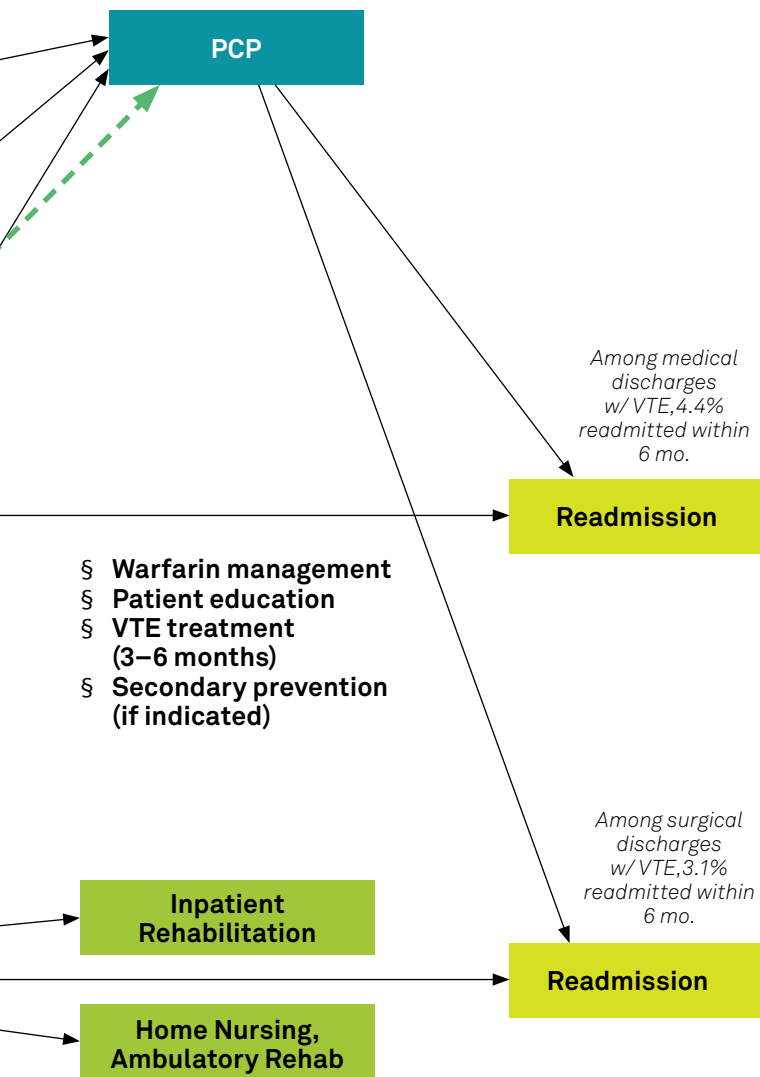
See “Selected VTE Clinical Guidelines” for links to guidelines published by six specialty societies and the National Institute for Health and Care Excellence (NICE) in the U.K. In addition, Intermountain Healthcare has developed an exemplary internal Care Process Model, which includes the risk assessment tools used in their decision algorithms and

links to their patient education materials ([intermountainhealthcare.org/ckr-ext/Dcmnt?ncid=529597630](https://www.intermountainhealthcare.org/ckr-ext/Dcmnt?ncid=529597630)).

**Flow of Patients with VTE**

To understand the flow of patients with VTE, we analyzed adjudicated claims data for 42,000 adult patients with VTE during 2018 or 2019 (excluding mental health and obstetric patients) from 14 AMGA members participating in the Collaborative for Performance Excellence™ (CPX). What we found is shown in Figure 2.

Patients may present to the ER with symptoms of VTE. About 71% are admitted to the hospital, and 29% are treated



in the ER and released, with follow-up care usually provided through an anticoagulation clinic, in coordination with the patient's primary care provider (PCP).

Some 3.0% of hospitalized "medical" patients (i.e., not surgical, mental health, or obstetric) have VTE. Of those, 74% were admitted for the VTE; 26% were admitted for another condition, but the VTE developed during their hospital stay. Among these patients, 4.4% are readmitted for VTE within six months.

Of patients admitted for a surgical procedure, 3.4% will experience a VTE before discharge, despite DVT prophylaxis during their hospital stay. Among surgical patients, 3.1% are readmitted for VTE.

Some medical and surgical patients who are discharged without VTE are at increased risk for VTE after discharge.

Transitions of care are key to completing VTE therapy and preventing recurrence, ensuring that safe and effective anticoagulation is maintained across the hand-offs. With the increased risk of VTE due to COVID, optimizing care for patients with VTE can be a key strategy for improving both population health and financial performance under value-based payment.

## Pulmonary Embolism Response Team

Most of the larger hospitals in the roundtables have a multidisciplinary Pulmonary Embolism Response Team (PERT) that's activated to respond to life-threatening PEs in the ICU setting. They also coordinate care for patients at intermediate or high risk for a PE, resulting in fewer unnecessary procedures.

In addition to managing inpatient care, most of these PERTs also direct the course of care for high-risk patients after discharge. Some organizations also maintain a PE registry and ensure post-discharge follow-up by a pulmonary hypertension team to monitor patients for this infrequent but serious complication of thromboembolic disease.

The PERT Consortium ([pertconsortium.org](http://pertconsortium.org)) provides resources for developing a PERT. They are developing a national PE registry, and they offer frequent webinars on leading-edge research in VTE, which is evolving rapidly during the pandemic.

The planning that goes into creating a PERT enables rapid mobilization of a multidisciplinary response when needed, and development of protocols provides a common understanding of key decision criteria.

## Anticoagulation Clinics

Inpatient VTE treatment often begins with heparin (unfractionated or low molecular weight), with a switch to an oral anticoagulant upon discharge.

The first oral anticoagulant was warfarin, a vitamin K antagonist, which is inexpensive and effective. However, common genetic mutations can affect its metabolism, and dosing can be affected by the patient's diet, including excessive alcohol consumption, and other medications, so periodic laboratory monitoring is required to maintain adequate anticoagulation while minimizing the risk of bleeding.

Coordinating all these steps and ensuring consistent testing and proper dose adjustment has led many organizations to create anticoagulation clinics staffed by clinical pharmacists or nurses. The clinics also became an important source of patient education, subsidized in part by insurers' payments for the lab tests. Some patients needed to continue low molecular weight heparin after discharge, so the clinics also helped them learn to do the subcutaneous injections.

# Select VTE Clinical Guidelines

## American College of Chest Physicians (ACCP)

- ▶ **Methodology for the development of antithrombotic therapy and prevention of thrombosis guidelines: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (2012).** doi: 10.1378/chest.112288.
- ▶ **Antithrombotic therapy for VTE disease: CHEST guideline and expert panel report (2016).** doi: 10.1016/j.chest.2015.11.026.
- ▶ **Correction to grade in: Antithrombotic therapy for VTE Disease: CHEST guideline and expert panel report (2016).** doi: 10.1016/j.chest.2016.08.1442.

## American College of Physicians (ACP)

- ▶ **Evaluation of patients with suspected acute pulmonary embolism: Best practice advice from the Clinical Guidelines Committee of the American College of Physicians (2015).** doi: 10.7326/M141772.

## American Society of Hematology (ASH)

- ▶ **American Society of Hematology 2018 guidelines for management of venous thromboembolism: prophylaxis for hospitalized and non-hospitalized medical patients.** doi: 10.1183/13993003.01647-2019.
- ▶ **American Society of Hematology 2018 guidelines for management of venous thromboembolism: optimal management of anticoagulation therapy.** doi: 10.1182/bloodadvances.2018022954.
- ▶ **American Society of Hematology 2020 guidelines for management of venous thromboembolism: treatment of deep vein thrombosis and pulmonary embolism.** doi: 10.1182/bloodadvances.2020001830.

## European Society of Cardiology (ESC)

- ▶ **2019 ESC guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS).** doi: 10.1183/13993003.016472019.

## North American Thrombosis Forum (NATF)

- ▶ **Extended venous thromboembolism prophylaxis in medically ill patients: An NATF anticoagulation action initiative (2019).** doi: 10.1016/j.amjmed.2019.12.001.

## International Society on Thrombosis and Haemostasis (ISTH)

- ▶ **Categorization of patients as having provoked or unprovoked venous thromboembolism: guidance from the SSC of ISTH (2016).** doi: 10.1111/jth.13336.

## UK National Institute for Health and Care Excellence (NICE)

- ▶ **Quality Standard. Venous thromboembolism in adults: diagnosis and management (updated 2021).** nice.org.uk/Guidance/QS29 (accessed February 11, 2021).

In 2012, the first direct oral anticoagulant (DOAC) was approved by the FDA for VTE. Since DOACs do not require regular laboratory monitoring, the function and the economic model of the anticoagulation clinic changed. But there is still a need for coordination with the patient's primary care provider and patient education about the importance of medication adherence. Abrupt discontinuation of a DOAC can put the patient at risk of another VTE. According to roundtable participants, one-fourth of patients are still treated with warfarin after discharge, for medical or cost reasons, so the ability to monitor clotting times and adjust doses must be maintained.

Increasingly, some DOACs are being used as monotherapy, starting the patient on the drug in the hospital, rather than heparin, and continuing, with an adjustment in dose, upon discharge. The DOACs that are approved for initial treatment of VTE also enable low-risk patients who need anticoagulation to be treated in the ER and released, rather than admitted.

## Keys to Success

Every roundtable participant emphasized the key role that clinical pharmacists play in managing patients with VTE. In addition to guidance on drug treatment and dosage, they provide most of the patient education, starting at the bedside in the hospital or the ER. These relationships are important for effective transitions of care.

"Meds-to-beds" programs promote adherence to therapy by delivering an initial supply of medication to the patient before they leave the hospital, along with education and clarification of plans to coordinate follow-up care with the patient's PCP. This also allows insurance coverage to be confirmed or patient assistance programs to be identified to address financial constraints.

Even before the pandemic, one roundtable participant had an entirely virtual anticoagulation clinic staffed by nurses and pharmacists. Services are activated when an order is made by the hospitalist or PCP, and the clinic order automatically renews annually, if notes in the EHR show that the patient remains actively engaged.

## Addressing the Gaps

Most groups have an effective process for transition of care for patients whose PCP is part of the same health system, including monitoring adherence and making decisions about length of treatment and long-term prevention. Unfortunately, none of the roundtable participants had an ideal process for transitions when the patient did not have a PCP or their PCP was outside their system. Within most systems, PCPs rely on accessing information in the shared EHR, since the discharge summary is seldom sufficiently detailed with respect to anticoagulation treatment. All the roundtable participants are still working on this important problem.

More comprehensive registries for patients with VTE are needed to track medication adherence and adverse events. While they require significant resources to maintain, they are valuable to ensure patients don't stop taking anticoagulants early or continue them beyond the planned duration of treatment or prevention.

The pandemic poses additional challenges to long-term management of patients with VTE, and research is still in progress to understand how to effectively prevent and manage VTE among patients with COVID.

Although the roundtables focused on transitions of care for non-surgical patients, participants noted that VTE still occurs among surgical patients, despite elaborate VTE prophylaxis efforts and emphasis on the issue in hospital accreditation



**More comprehensive registries for patients with VTE are needed to track medication adherence and adverse events.**

requirements. The CPX data reflects this observation, with VTE documented in 3.4% of surgical discharges, indicating that this remains an unsolved problem. Efforts must continue to improve prophylaxis for surgical patients.

We learned in the roundtables how the model of care at AMGA member organizations has enabled the design of effective care processes for patients with VTE. Institution-wide initiatives to promote awareness around post-discharge VTE risk can help to drive appropriate treatment and secondary prevention. These efforts can dovetail with a timely focus on health equity, addressing concerns exposed or magnified by the pandemic.

Finally, the roundtable participants emphasized that, as important as the care process is, a trusting patient/provider relationship is also essential. [GRJ](#)

## Acknowledgements

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*groups and health systems improve population health. Thanks also to the 16 clinical leaders from AMGA member organizations who shared their experience in these roundtables. AMGA's goal with this research is to help other members improve VTE care in their organizations. To learn more, please email [research@amga.org](mailto:research@amga.org).*

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## References

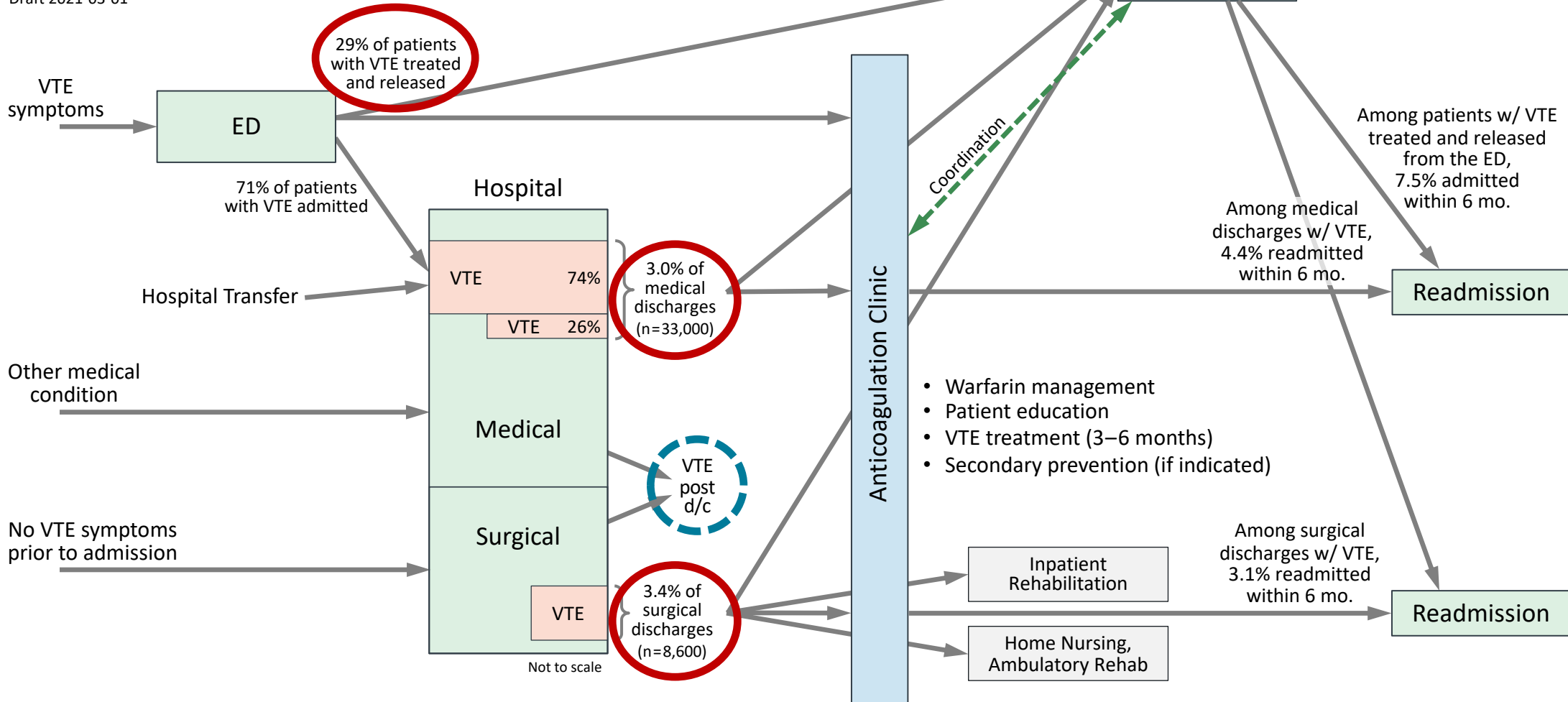
1. D. Jiménez, A. García-Sánchez, P. Rali, et al. 2020. Incidence of VTE and Bleeding among Hospitalized Patients with Coronavirus Disease 2019: A Systematic Review and Meta-analysis. *Chest*, November 17, 2020: S0012-3692(20)35146-1. doi: 10.1016/j.chest.2020.11.005. Epub ahead of print. PMID: 33217420; PMCID: PMC7670889.
2. Centers for Disease Control and Prevention (CDC). 2020. Data and Statistics on Venous Thromboembolism. Accessed February 11, 2021 at [cdc.gov/ncbddd/dvt/data.html](https://cdc.gov/ncbddd/dvt/data.html).
3. G. Maynard. 2016. *Preventing Hospital-Associated Venous Thromboembolism: A Guide for Effective Quality Improvement, 2nd Edition*. Rockville, MD: Agency for Healthcare Research and Quality, August 2016. AHRQ Publication No. 16-0001-EF.
4. F.A. Spencer, D. Lessard, C. Emery, et al. 2017. Venous Thromboembolism in the Outpatient Setting. *Archives of Internal Medicine*, 167(14): 1471–1475. doi:10.1001/archinte.167.14.1471.
5. J.P. Casciano, Z. Dotiwala, R. Kemp, et al. 2015. Economic Burden of Recurrent Venous Thromboembolism: Analysis from a US Hospital Perspective. *American Journal of Health-System Pharmacy*, 72(4): 291–300. doi: 10.2146/ajhp140204.
6. J. Kline, D. Adler, N. Alanis, et al. 2020. Study Protocol for a Multicenter Implementation Trial of Monotherapy Anticoagulation to Expedite Home Treatment of Patients Diagnosed with Venous Thromboembolism in the Emergency Department. *BMJ Open*, 10(10): e038078. doi: 10.1136/bmjopen-2020-038078. PMID: 33004396; PMCID: PMC7534683.
7. B. Bikdeli, M.V. Madhavan, D. Jiménez, et al. Global COVID-19 Thrombosis Collaborative Group. 2020. COVID-19 and Thrombotic or Thromboembolic Disease: Implications for Prevention, Antithrombotic Therapy, and Follow-Up: JACC State-of-the-Art Review. *Journal of the American College of Cardiology*, 75(23): 2950-2973. doi: 10.1016/j.jacc.2020.04.031. Epub 2020 Apr 17. PMID: 32311448; PMCID: PMC7164881.
8. Intermountain Healthcare. 2020. Diagnosis and Treatment of Venous Thromboembolism (VTE), 2020 Update. Accessed at [intermountainhealthcare.org/ckr-ext/Dcmnt?ncid=529597630](https://intermountainhealthcare.org/ckr-ext/Dcmnt?ncid=529597630).

# AMGA VTE Implementation Study – Focus Populations

Sponsored by Janssen Pharmaceuticals

█ Included in study  
█ Not included in study

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