

**CASE STUDY**  
for healthcare ecosystem

# How two systems became VTE Centers of Excellence

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Using realistic stories to transform patient care

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# Overview

## The challenge

VTE (venous thromboembolism) patients are typically underdiagnosed and experience care delays. VTE encompasses both deep vein thrombosis (DVT) and pulmonary embolism (PE). There is limited guidance related to patient selection and limited standardization of care, as manifested through VTE-specific care pathways that are universally accepted by the array of clinical stakeholders who treat VTE with variable experience in treating the disease. The problem is most pronounced in CV services, where interventional cardiology, interventional radiology, and vascular often all see VTE patients, leading to lower volumes for individual providers, and ultimately adversely impacting the quality of care.

## The organizations

Ascension Providence Hospital and Palmetto Hospital are destinations for specialty care, including advanced heart and neuroscience care, comprehensive cancer services, orthopedics, women's health and pediatric care. Ascension Michigan operates 15 hospitals and hundreds of related healthcare facilities. Palmetto General is an integrated care system consisting of 360 beds, 570-plus medical staff, and more than 1,700 employees.

## The approach

Center of Excellence (COE) models have developed cross-continuum protocols, coordinated responsibilities across service lines, and referral pathways to improve patient outcomes, lower readmissions, reduce loss-to-follow-up, and reduce healthcare costs.

## The result

As a result of COE models in the VTE and DVT space, programs are able to see more patients and as a result, care can become standardized over time, with programs that have evolved to ensure patients will be appropriately identified, triaged, and treated in short order and with minimal variance. Early evidence also suggests clinics have positive impacts on patient outcomes overall.

# Approach

## How two systems became VTE centers of excellence

In 2019, Providence Hospital in Michigan began their Advanced Venous Disease Clinic to serve as a one-stop-clinic where VTE patients could come in and instantly be seen by vascular specialists, hematologists, and an extended provider to receive extra care and guidance through the system's care pathway.

In the same year, Palmetto General started a centralized PE and DVT program consisting of two interventional radiologists and one interventional cardiologist who work in conjunction to surface best practices and treat cases. In both systems, conversion from conservative therapy to interventional therapy was the primary driver of improved outcomes.

Through our research, we've identified four main imperatives that systems should strive towards to become centers of excellence:

### Four imperatives

**01** Prioritize early disease identification

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**02** Define care pathways and cross continuum care

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**03** Strengthen staff coordination

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**04** Leverage data to prove quality

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PROFILE HIGHLIGHT KICKER

**Advanced Venous Disease Clinic of Ascension Providence Hospital in Michigan***Integrated healthcare system consisting of 15 hospitals.***Prioritize early disease identification**

In September 2019, interventionalists at Ascension Michigan realized that many of their patients were having second and third DVT and PE events due to incomplete work ups and inadequate medication. CV service line leadership realized this cohort needed more attention around this disease, and wanted to reduce fragmented care across different specialties. Data on poor VTE outcomes prompted the physician leadership to adopt a new approach designed to identify patients earlier and reduce the fragmentation of VTE across different specialties within the system..

To ensure that VTE patients received prompt diagnosis and treatment, Ascension did rounds at different hospitals to speak with and educate a wide array of specialists so that patients would be triaged and referred appropriately. They also leveraged community partnerships to ensure that patient education was done as well.

**Define care pathways and cross continuum care**

Prior to the start of Ascension's efforts, the full work-up for a VTE patient could take up to six months to ensure all appropriate care steps were completed, where this process should typically take either 1 or 2 visits. Under the new framework, after the VTE patient is identified, they receive an appointment for an initial visit focused on ensuring the patient receives care from all appropriate specialties. Imaging is generally performed prior to this visit to ensure that all care needs can be appropriately evaluated.

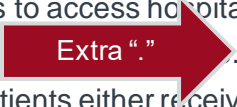
The nurse practitioner staffed acts as the VTE coordinator and serves as a resource for identifying best treatment practices for each patient. Additionally, together all the staff at the advanced VTE clinic hold quarterly and monthly meetings evaluate each patient seen in the clinic and identify potential challenges each patient confronts.

CONTINUED



### Strengthen staff coordination

Ascension decided to create a multidisciplinary clinic staffed with a vascular specialist, hematologist, and an extended provider (NP) who would serve as a VTE coordinator and a liaison between patients and providers. There is a rotation between providers, all of whom have the same algorithms for how to treat patients. The goal of this clinic is to provide a comprehensive work-up of each VTE patient's needs, so that the patient can receive imaging and all necessary care in one room over the course of one or two visits.

Ascension has found that keeping PCP informed about their patients' individualized treatment is most important to ensure care continuity, and this in turn leads to further downstream referrals. Poor communication between PCPs and specialists, as well as the inability of PCPs to access hospital records for patients with VTE needs led to consistent fragmented care.  . . . With limited guidance and structure for care continuity, many patients either received delayed care, insufficient care, or were lost to follow-up.

With the advent of the advanced VTE clinic, follow-up with PCPs is now continuous, with pre- and post-appointment communication hardwired into the care pathway.

### Leverage data to prove quality

As the clinic gains traction across the health system, collecting and analyzing data is an on-going process. Currently, patients are given a 20-question survey so that the nurse practitioner can track their progress from visit to visit. These metrics include quality of life/pain scale, circumference of legs, success for procedures, staging of disease, ulcer state, and more.

Data collection is in its early stages, but they are using anecdotal trends to prove value to leadership. The limitations in the data currently are that the pain scale is subjective and may be harder to compare across patients.

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## Palmetto General Hospital

*Integrated healthcare system consisting of 360 beds, 570-plus medical staff*

### Prioritize early disease identification

The venous thromboembolic disease (VTE) program at Palmetto General Hospital was created to identify patients rapidly, triage them appropriately, and immediately risk-stratify them based on imaging, laboratory values, and hemodynamic status. To assist the community, a spoke-and-hub model has been created with Palmetto as a receiving hospital. To support and facilitate this process, a 1-page placard was created for display in the ER of participating hospitals outlining the algorithm of diagnosis and care transfer. Once triggered, the appropriate receiving specialists are notified and are on standby to assume care.

# 700%

Growth in the number of cases seen at their advanced VTE program. They are seeing approximately 15 cases per month, up from 2 cases before the centralized program was initiated.

### Define care pathways and cross continuum care

#### *Palmetto's algorithm of care and transfers*

CODE PERT powerplan and overhead page initiates (all orders STAT):

- CTA chest PE protocol medically necessary
  - No labs needed
- CT room cleared and immediately available for patient
- Radiologist aware to dictate presence or absence of RIGHT heart strain
- Labs drawn (CBC, CMP, PT-INR, troponins, pro-BNP, lactate, d-dimer, ABG)
- Echo tech (2D-echocardiogram)
- Consultations (Cardiology, Pulmonology, ICU)
- Pharmacy for possible TPA
- PERT-on-call physician notified
- Ultrasound for lower extremity duplex study

- If transfer is indicated from outside facility, the following occurs for Palmetto:
  - Physician to Physician communication
  - EMS notified for ambulance transfer
  - Nursing supervisor notified in both facilities
  - No need for insurance approval

*\*\*NOTE: Symptomatic Iliofemoral DVT triggers automatic transfer to receiving hospital*



### Strengthen staff coordination

In 2019, Palmetto General Hospital started their VTE program with 3 staff interventionalists: two interventional radiologists and one interventional cardiologist.

Among the goals of the program was to be a center of referral for all four sister hospitals in the system and foster a system wide strategy for consistent care. The VTE program members gave weekly talks to ER, ICU, primary care, and specialist physicians; attended community events providing education, and ensured that referring physicians had standardized algorithms of care in place to accurately triage DVT and PE patients. They also appointed multiple staff champions across the system to ensure continued adherence to protocols.

The system now has monthly meetings attended by members of the C-suite, nurse managers, interventionalists, and related physicians to discuss previous month issues and address any concerns. In addition, the interventionalists conduct post-hoc evaluations of each case, paying special attention to cases with suboptimal outcomes. Thereby, the process is continuously in a state of improvement.

### Leverage data to prove quality

#### *Palmetto's outcomes of interest*

- **Length of overall stay and ICU stay**
  - *Early findings:* Mechanical thrombectomy patients leave 40% earlier and have 45% decreased ICU length-of-stay compared with patients treated with anticoagulation
- **Clinical metrics**
  - Readmission rate, 90 day walking test, pulmonary artery pressure improvements, decreased RV:LV ratio, pre-and post echo, pre and post O<sub>2</sub> demand, pre and post hemodynamics
- **Financial burden**
  - Decreased cost to patient and institution





# Results

## How we know it's working

Center of excellence models for VTE have allowed programs to ensure that patients are appropriately identified, triaged, and treated with minimal variance, in keeping with the guidance of standardized care pathways. As a result, systems employing VTE COEs have been able to increase their overall VTE volumes and improve the outcomes for patients seen within the COE.

Keys to success in this space include coordination across all providers seeing VTE patients, pre-existing relationships with individual program physicians and in subspecialties, provider and patient education, and standardized protocols for patient identification and triaging.

## On-going challenges

### *Loss to follow-up*

Many patients may become loss-to-follow up after care and if symptoms are absent. Without aggressive follow-up efforts, patients may become loss to follow up as early as after 3 months.

### *Limited guidance*

While we have seen early evidence of improved patient outcomes through the VTE COE model, there is no "one-size-fits-all" approach to creating a center of excellence. Each program will have to adopt its own approach based on existing resources and patient populations.




There are limited protocols, guidance and standards in the field to support providers in decision making. Literature is also limited in informing risk stratification and appropriate treatment options.

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